

Q&A Report

#	Question	Answer	Answer Name
1	One of the problems is quality of data particularly on evaporation. Even the best model will be of limited value without good quality data. Particularly relevant for hypersaline situations	Agreed. Evaporation is often one of many uncertainties in a water balance, particularly for hypersaline systems where standard datasets may not be representative. The key is to calibrate and validate the model against multiple lines of evidence, including measured water levels, pond inventories, return water volumes and overall site performance.	Shaun Kelly
		There is always a risk of GIGO (Garbage In = Garbage Out)! GoldSim's probabilistic elements can be used to assign upper and lower bounds (and a range of results in between using Monte Carlo simulations). Also sensitivity tools to determine the most important parameters in a simulation.	Attendee
		will you also cover how GoldSim's water balance links with seepage, infiltration, and coupling workflows with FEFLOW (time varying parameter, material & boundaries conditions)?	Attendee
2	I'm really interested in dry beach evaporation and drying of tails, as more drying can lead to reduced seepage rate or reduced post-closure seepage duration. But the theory behind dry beach evaporation seems very complex.	yes and particularly so for saline/hypersaline situations	Attendee
		live answered	Anushree Mistry AWS
3	How do you fix the elevation-area-capacity curves for the planning of tailings dams, considering the continuous changes in the storage capacity?	One way is to have lookup tables for defined periods e.g. year 1, 2, 3. More advanced models are dynamically linked to e.g. Muk3d.	Attendee
		Hi Thane. Appreciate your reply. How do you fix the useful life of the dam? Is it linked to lookup tables for defined periods e.g. year 1, 2, 3?	Attendee
		Establishing relationships that link with the deposition schedule is necessary to capture the dynamic nature.	Shaun Kelly
		It's generally considered too expensive to construct a TSF (Tailings Storage Facility) to contain all the tailings produced over the Life Of Mine (LOM). Typically, the initial TSF is designed for (say) 3 years operation, then the capacity is increased incrementally using upstream/downstream/central embankment raises. In GoldSim you can create a set of volume/area lookup tables for each stage of the TSF.	Thane Richardt
4	Recommendations on how to build a water balance when the project is in a PFS stage, i.e. no staging, deposition design, throughput, etc. Only the ultimate footprints are known. Drive the water balance through the most critical risk factors? I work in Canada where water balances are typically net positive. Therefore, balancing the storage, pumping, and leaving room for the EDF and passage of the IDF is most critical, especially during freshet with large ultimate footprints. Having the water balance drive the design of normal operating water levels and maximum operating water levels is very critical here. How do you handle the iterative changes between using pumping rates as an input vs having the water balance output those pumping rates and iterating, so on and so forth.	Great question Theo. In a scenario like what you've described, I'd set up and calibrate the water balance based on current state, pumping capacities etc. Use that to define a position compared against whatever your design criteria, or acceptable risk position is. If there is a gap, then you'd be modifying that model to test upgrade scenarios that will close the gap or get you closer, to feed into some sort of feasibility/selection process.	Gavin Rootsey
		Thanks Gavin. I agree with your approach, and appreciate the client side perspective. I believe the balance between pumping and storage design, especially in net positive balance regions should be better addressed in CDA, ICOLD, and ANCOLD guidelines and built in with the current LOWL, NOWL, MOWL and freeboard guidance. It's a complex process and it definitely includes the clients operators at the mine site as well, not just the designers. Thanks for the response!	Attendee
5	What is the Piping risk mentioned in the slide?	Although not directly mentioned in the slides. The pond level vs probability product produced from the third TSF water balance example can be a useful input for setting pond levels in piping risk analysis.	Mike Liu
6	How do you couple the TSF water balance models with groundwater models for integrated assessment (e.g. seepage migration pathways)? Ultimately, the mass balance must close from surface water and groundwater perspectives.	There are multiple ways to address this. You might start by running your groundwater model (under multiple scenarios/boundary conditions) and develop a response surface (i.e., multi-dimensional lookup table) that can then be coupled to your water balance model. Rarely (for very complex systems) you could actually couple the groundwater model dynamically (e.g., GoldSim can call a groundwater model every timestep).	Rick Kossik
		This would be a great topic for a future session, focused more on advanced modelling practices for integrating groundwater model data by coupling directly with groundwater model software	Attendee
7	What factors have to be considered in the reservoir operation studies for tailings dams? Can these factors change during the useful life of tailings dams?	live answered	Anushree Mistry AWS
8	GoldSim has a comment field on each variable. Is this the best location to track data provenance and confidence?	live answered	Rick Kossik
		I would add a note to the element. Perhaps that is what you are referring to? You could also put it into the element description, but I think a note is better	Rick Kossik
		Yes, I've been using this note field. I don't think there's a table view that lists them out though, so to find the information later you need to click into each element? For complex operational mine site models where clients are hot on data provenance to allow effective maintenance over years, we've had to create a side-car spreadsheet. But that then introduces risk of becoming out of sync with the model if not religiously updated.	Attendee
		That's a good point! I will add that to the list of GoldSim new features!	Rick Kossik
9	How do you (regularly ?) assess and plot the phreatic line for seepage control of tailings dams during the operation and maintenance phase of the project development?	live answered	Anushree Mistry AWS
10	!@Gavin thanks for your input here. In your view, roughly how much of project time splits between the setup/calibrate/forecast/track parts of the loop?	live answered	Joel Voortman AWS
		Thanks Gavin. That tracks with what I've experienced building GoldSim models. Great feedback, appreciate it	Attendee

11	What are the main variables that determine the cases used for analysis in water balances?	Can be site specific, but typically, climate (rainfall/evap), production rate, water demand, groundwater inflows, recovery efficiencies, storage capacities and operating rules.	Shaun Kelly
		its a normal practice considerer the tailings management as the main variable?	Attendee
		Not always! Depends on the purpose of the model. it is an important aspect.	Shaun Kelly
12	Hi there :) What were those four failure modes for loss of containment if someone caught them all? I have seepage, internal erosion, overflow and ?	... catastrophic dam failure ...	Attendee
		A few failure/ loss of containment modes include - seepage, overtopping, internal erosion/piping, slope instability, foundation failure	Shaun Kelly
13	... catastrophic dam failure ...		
14	What would be the most pressing knowledge gap to minimise catastrophic failure?	live answered	Joel Voortman AWS
		Goldsim Vs other apps (html,python) . Kindly provide the pros and cons . What is the best application for the site .	Attendee
15	How will climate change alter water balance assumptions over the life of a TSF?	Climate change may alter rainfall, evaporation, runoff and the frequency of extreme events over the life of a TSF. This can affect water availability, spill risk, freeboard requirements and closure performance.	Shaun Kelly
		I would be interested in whether you are considering changes to the rainfall events intensity / duration associated with climate change and possible impacts of short, intense extreme rainfall on water balance for TSFs and risk of failure?	Attendee