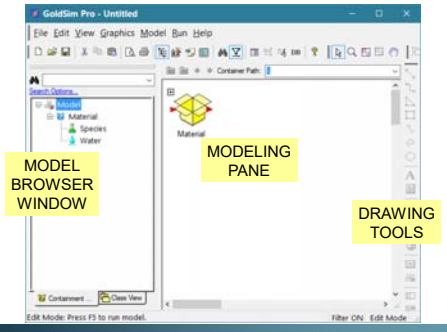
Performance Assessment Modeling with GoldSim

NEPTUNE AND COMPANY

Presentation Outline

- Introduction to GoldSim
- Handling Uncertainty
- A GoldSim PA Example

The GoldSim Interface



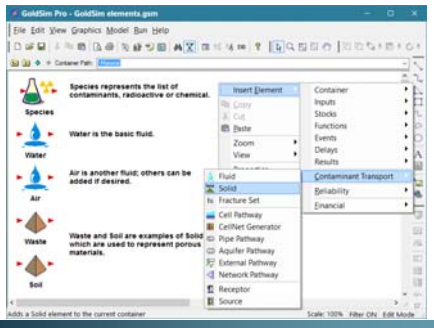
GoldSim Basic Model Elements

- **Data**: input of a fixed value
- **Stochastic**: input of a distribution for a value
- **Expression**: a mathematical expression
- **Selector**: for building complex conditionals
- **Event**: timed or triggered event and consequences
- **Extremum**: for tracking maximum values
- **Lookup Table**: input of a table of values

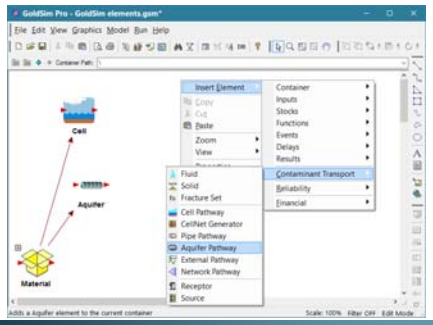
GoldSim PA Model Elements

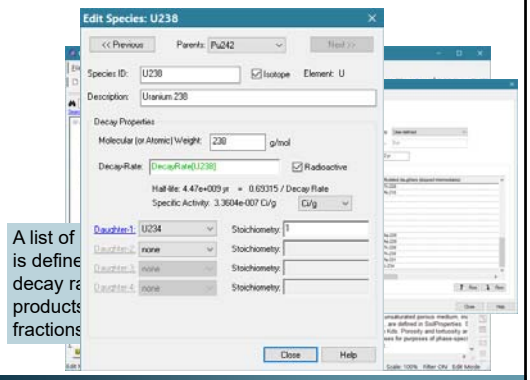
- **Species**: input of chemical and rad species
- **Fluid**: definition of a fluid (in this case, water)
- **Solid**: definition of a porous solid
- **Source**: contaminant source
- **Cell**: compartment containing materials
- **Aquifer**: definition for simple groundwater transport
- **Receptor**: definition of an exposed receptor

Model Elements: Materials



Model Elements: Pathways





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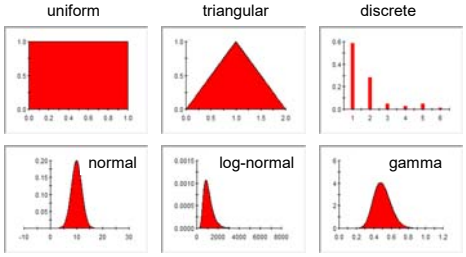
Many Types of Distributions are Available to Represent Uncertainty



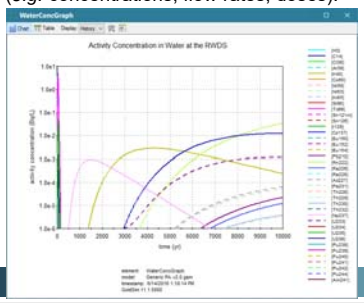
What is chosen must have some basis in reality.

Typical Results

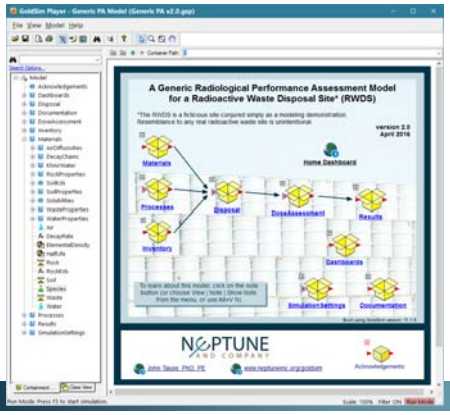
Result

Any state or condition of the model can be tracked and graphed through time (*e.g.* concentrations, flow rates, doses).

This could be concentration or dose.



A Screenshot Tour of Neptune's Generic PA Model



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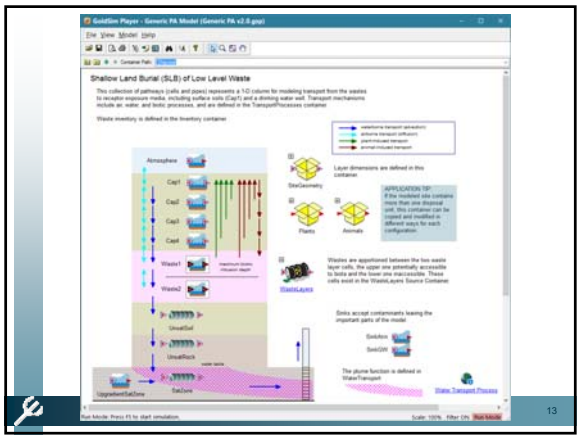
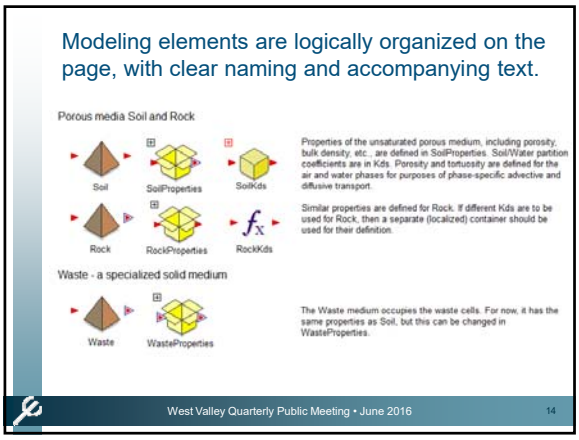
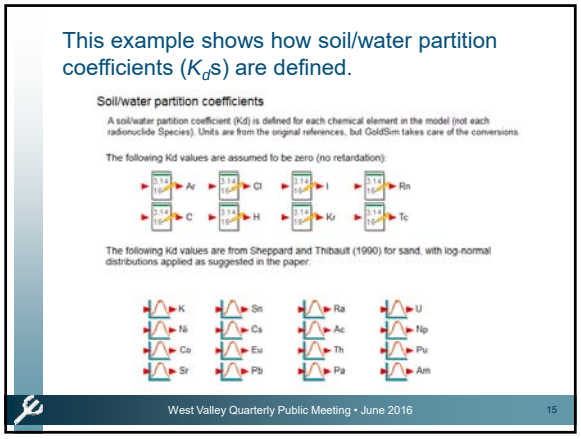


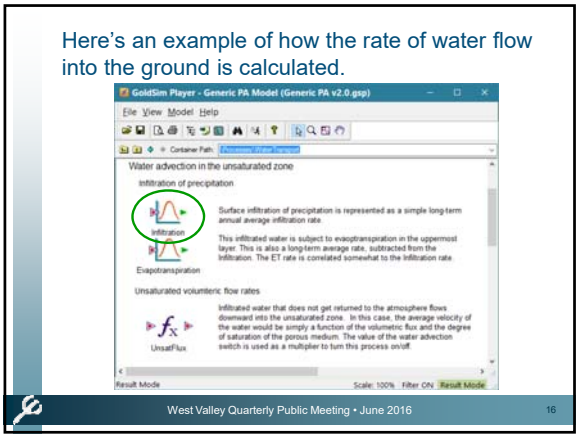
Modeling elements are logically organized on the page, with clear naming and accompanying text.



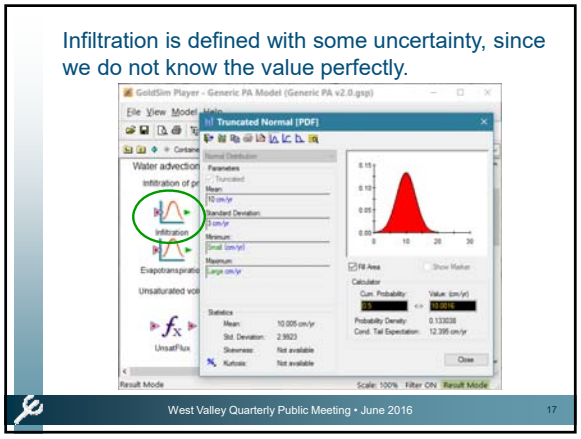
This example shows how soil/water partition coefficients (K_ds) are defined.



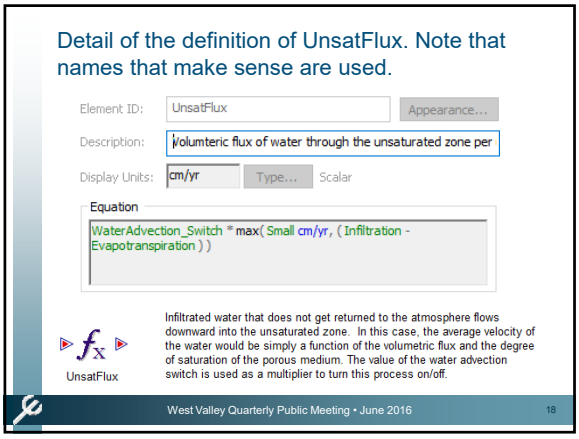
Here's an example of how the rate of water flow into the ground is calculated.



Infiltration is defined with some uncertainty, since we do not know the value perfectly.



Detail of the definition of UnsatFlux. Note that names that make sense are used.



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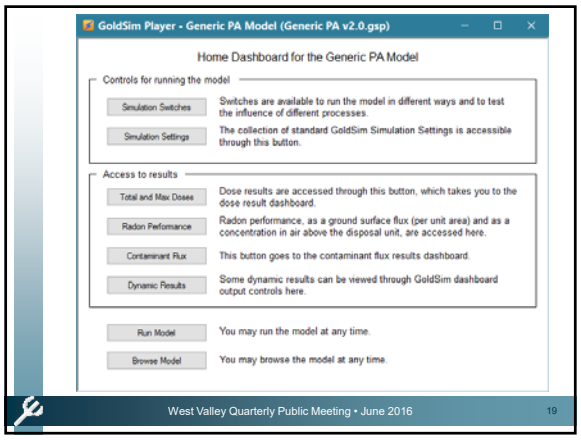
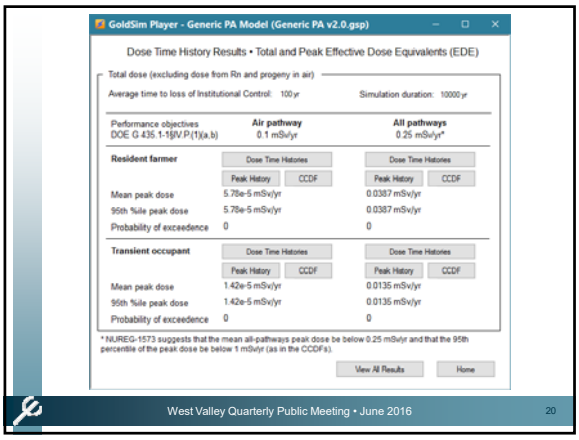
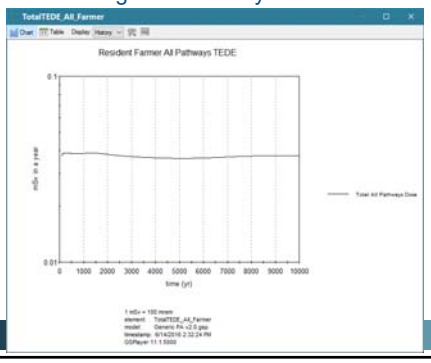
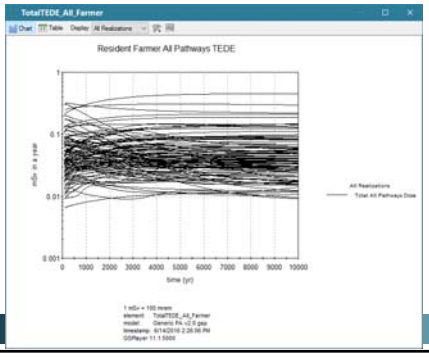




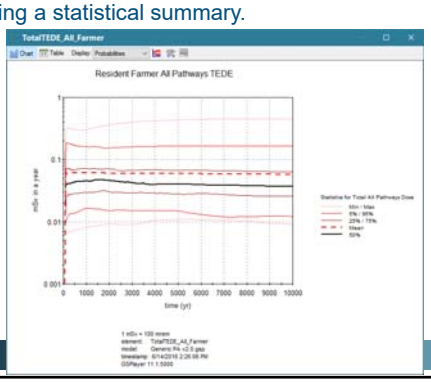
A single run (deterministic) simulation will generate a single time history of dose.



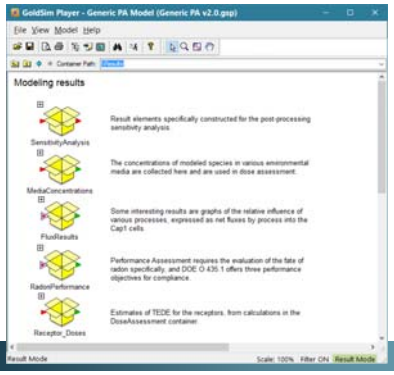
A probabilistic simulation will generate several time histories of dose, showing uncertainty.



A probabilistic simulation can also be shown using a statistical summary.



Many types of results can be examined.



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The Generic PA Model is available here:

www.neptuneinc.org/genericpa

The GoldSim Player is available here:

www.goldsim.com/web/downloads