

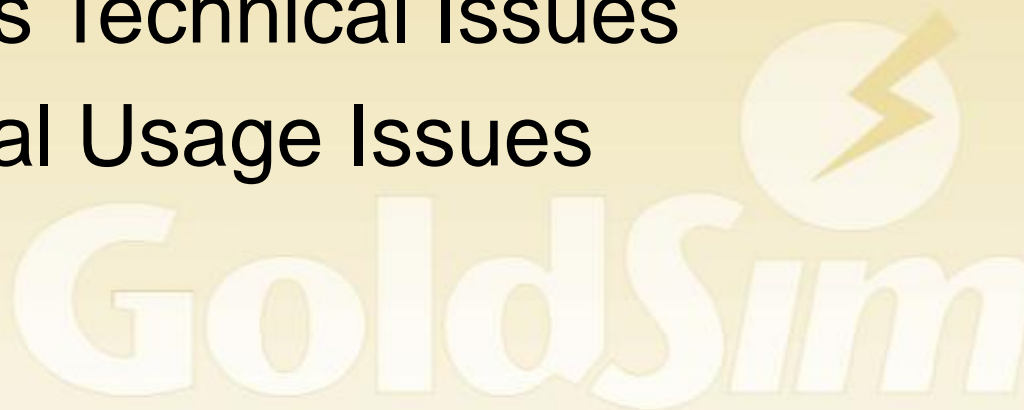
GOLDSIM COMMENTS



Ian Miller
imiller@goldsim.com
GoldSim Technology Group

Presentation Outline

- GoldSim Description and Usage
- Various Technical Issues
- General Usage Issues



GoldSim Description and Usage

- GoldSim design goals: *Versatility, Transparency, Extensibility, Reliability.*
 - User creates a graphical representation of the modeled system.
 - Like a visual programming language (C+++)...
 - *Requires the user to deeply understand their facility and the software.*
- Widely used in non-radwaste modeling:
 - Environmental, mining, processing, water resources, aerospace, business...

GoldSim RadWaste PA Usage

- **Countries**
 - Australia
 - Brazil
 - Canada
 - China
 - Czech Republic
 - Egypt
 - Finland
 - France
 - Germany
 - Japan
 - Korea
 - Lithuania
 - Macedonia
 - Netherlands
 - Pakistan
 - Romania
 - Slovakia
 - South Africa
 - Spain
 - Switzerland
 - Taiwan
 - United Kingdom
 - United States
- **Low-Level Facilities**
 - **United States:**
 - Oak Ridge EMWMF Mixed Waste Facility
 - West Valley Demonstration Project
 - Savannah River Site E-Area
 - Nevada National Security Site Areas 3 and 5 Radioactive Waste Management Sites
 - WCS Texas Compact Disposal Facility
 - Energy Solutions Clive, Utah facility
 - Waste Control Specialists' (WCS) Andrews County Facility, for the Compact Waste Facility and the Federal Facilities Waste Disposal Facility
 - Los Alamos National Laboratory (LANL) Technical Area 54 Remediation Feasibility Investigation
 - LANL Material Disposal Area (MDA) G LLW PA
 - LANL MDA H
 - **International:**
 - Drigg, Dounreay, UK
 - Wolseong, Korea
 - Rokkasho, Japan
 - Sites in Germany, Hungary, Slovakia, Ukraine, Brazil, elsewhere...
- Also used for HLW, ILW, D&D, environmental restoration.

GoldSim Status Update

- Major new release around 2012 year-end:
 - Enhanced support for scenarios.
 - Built-in decay chains, dose factors (ICRP).
 - Enhanced ability to model dynamic flow systems.
 - Enhanced probabilistic analysis support.
 - “Result categories”...
 - Enhanced spreadsheet interface.

Technical Issue: Code Capabilities

- Model QA/QC
- Model transparency
- Adaptability/flexibility
- Deterministic or probabilistic capability
- Sensitivity analysis capability
- Extensibility
- Ease of use and availability.

These are all important!

Technical Issue: Model Purpose

- You don't need a sledgehammer to swat a fly.
 - But be careful: a simple model that isn't conceptually correct is a liability.
 - Generally, the price of simplicity is additional conservatism.

Technical Issue: Uncertainty Analysis

- Avidly avoided in the LLRW arena.
- Lack of an in-depth uncertainty analysis makes a safety case fragile.
- Many types of uncertainty: parameters, processes, “the future”, model uncertainty...
 - Model uncertainty has two flavors:
 1. Approximation effects (e.g., use of Kd's, grid discretization...).
 2. Alternative conceptual models: porous medium vs fractured medium.

Model Design Process (compare to FEPs)

1. What are the components of the system?
2. What are the attributes of each component? (“*state variables*”)
3. What are the behaviors of each component?
4. What are the interactions?
5. What are the external influences?

Technical Issue:

Scenarios or Probabilistic Approach?

- Software should support both.



General Software Usage Issue

- Most non-PA specialists are unaware of the range of FEPs and modeling issues required to do a good PA model.
 - This applies to both developers/consultants and regulators.
- PA software can't overcome this.