Introduction to Nuclear Fuel Cycle Chemistry

Welcome and Course Introduction

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Thank You!!

ORGANIZING COMMITTEE

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U.S. DOE – Office of Environmental Management (EM-20)
Through CRESP

U.S. Nuclear Regulatory Commission
(Curriculum Development grant)

Thank You!!

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Lisa Bliss, Assistant Director of CRESP
Randi Hall, Administrative Assistant

“Behind the Scenes”

Mark Gilbertson (DOE-EM 20)
Charles W. Powers – CRESP Co-PI

"There is never time to do it right –
There is always time to do it over"

"Let's do it right the first time using effective knowledge transfer"

Key Concerns For Process Development and Implementation

- Process performance criteria and interfaces
- Process knowledge
- Process safety
- Scale-up basis
- Reliability and maintenance
- Management structure
- Personnel
- Options

Process Performance Criteria and Interfaces

- Performance criteria
  - Expected Processing Rate
  - “Product” characteristics – downstream requirements
  - Availability and net throughput
- Range of feed characteristics – **Chemistry!** (and physics)
  - Composition, physical properties, T, P
  - Hazards
- Facility requirements
  - Shielding
  - Ventilation
  - Utilities

What is the level of process knowledge?

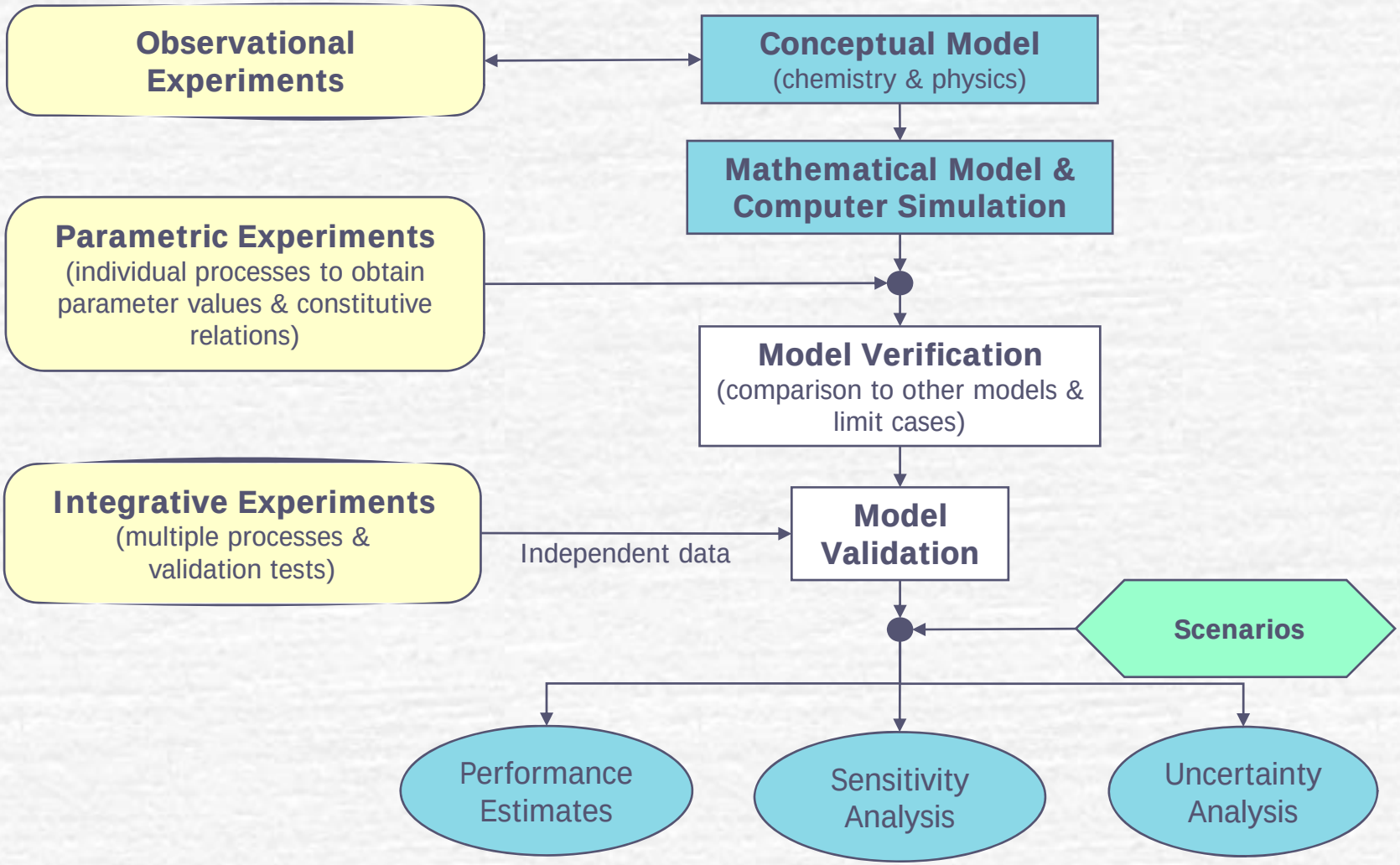
- **Process chemistry and physics**
  - Reaction chemistry, thermodynamics, heat and mass transfer
- Mass and energy balances (design and transient conditions)
- Process safety
- Operating Envelope
- External constraints
- Materials of construction
- Personnel

Is the basis of design consistent with program objectives?

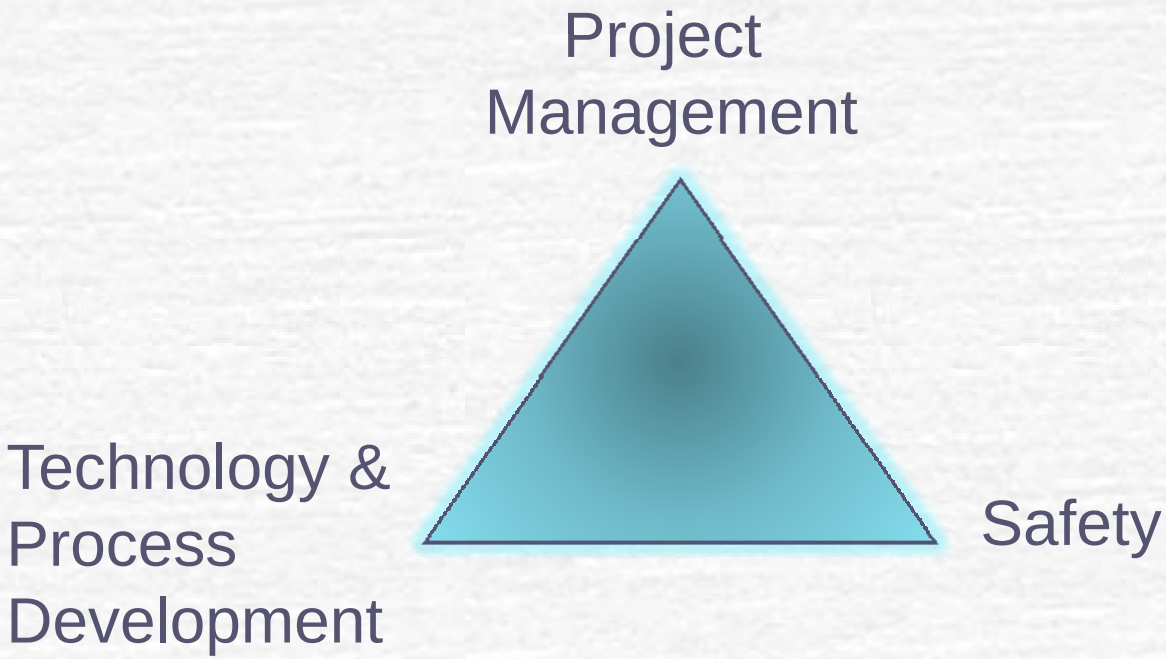
Which process components are first of a kind?

Does the process design account for technical and programmatic uncertainties?

Process- and Mechanism-Based Experimentation & Modeling



Management Challenge



What level of information is needed when?
How do these systems interact?