Safety Procedures

Advanced PSE+

- **New ecosystem** for Process System development design and optimization
- **Accelerates development and implementation**

- Product of **over 12 years** of DOE/NETL supported **capability development**
- Expert skills from **multiple National Labs and Universities**
- **Strong stakeholder involvement**/collaboration throughout

Key Aspects of PSE+ System

- Accelerates all aspects of technology development and deployment

- **Maximizes information gain** and use at all TRL stages to accelerate development and guarantee and optimize performance
- Fully **integrates test programs, modeling and optimization** using most advanced data acquisition, statistical analysis, modeling and optimization tools.
  - Identifies key gaps in existing knowledge
  - Directs development to address key gaps
  - Shortens pathway between lower and upper TRL levels
  - Provides ability to best understand and assure performance
  - Maximizes value generation from large pilot and demonstration test programs

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Key Aspects of PSE+ System

- Allows examination of how new technologies interact with existing infrastructure and markets.
  - best application pathways and optimum approaches to achieve high-level goals (e.g. minimizing greenhouse gases, assuring grid reliability, minimizing cost…).
  - Addresses questions like which tech should be deployed, where and when
  - Directs development of new technologies toward best integration to existing system

- Best of everything applied…
  - Advanced process synthesis capabilities
  - Tested process component libraries
  - Most advanced math and algorithms
  - Most advanced statistical approaches
  - Host of simplifying tools eg well-trained surrogates (employing best means to reduce highly complex systems to solvable forms)

Key Aspects of PSE+ System

- OPEN SOURCE
  - Users can build upon it, benefit from others experience

- If you can learn to use it…you will
  - develop technology faster,
  - be most able to optimize it and
  - assure its performance

- An army of trained people capable of supporting applications

"ADEPT" Development

- "Accelerated Development and Engineering of Process Technology"

- ADEPT steps…
  - **Assess existing data and models**. Identify weaknesses in information.
  - **Create test plans that improve certainty** in key process performance areas.
  - **Operate development program to acquire most valuable information** to accelerate development, optimize further design, assure performance
  - **Utilize the best information to create fully validated models**
  - **Utilize** performance-quantified **models to inform and accelerate TEA, FEED and FID processes, optimize scale-up designs**, minimize over-design and **enable performance guarantees**

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"ADEPT" Development

- Key tools
  - FOQUS toolkit (Complex model construction, uncertainty quantification, Sequential Design of Experiments, Surrogate tools…)
  - IDAES Advanced Process Modeling and Optimization system
    - Most advanced model construction and optimization capability
    - Integrated across scales from micro- (process fundamentals) to macro- (grid, market)

- Multitude of validated models for many technologies and components

- Applied to multiple key process technology areas…
  - Carbon capture
  - Advanced energy systems
  - Water treatment
  - Minerals processing

Outline

- Today – Plenary and Posters
  - Latest update on key capabilities, status and directions
  - Hot Topics Panels
  - Key Applications
  - Posters
  - Opportunities to interact, build partnerships

- Tomorrow – Parallel sessions
  - Individual program focus areas (CCSI2, IDAES, WaterTap, PrOMMiS)
  - Hot Topics interactive discussions
  - Partner dialogues

WELCOME

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