P2SAC Research Projects
Kenexis Sponsored and Facilitated
Sponsored Research Studies

• 2017 – CFD Validation of LPG Release

• 2018 – Open PHA Data Structure Definition
  – Data Mining for similar hazards – consistent Consequence/Safeguards
  – Basis for Unified Hazard Assessment

• 2019 – Minimum Sufficient CFD Scenarios (MS Program)
  – Estimate Minimum Scenarios for Repeatable Detector Placement

• 2019 – PHA Gamification (MS Program)
  – Convert PHA information into Quiz Questions
  – Improve Employee Knowledge of Process Hazards

• 2019 – Smart Mobile Operator Assistance Tools (Kenexis Internal)
“Open PHA” Data Schema Definition

- Define the expected data and types of a JSON object
Hazard Indexing Leads to Unified Hazard Structure

- Identify Similar Hazard Scenario in Other Studies
  - Cause Indexed
  - Consequence Indexed
    - **Hazard Indexed**

- Hazard Indexing Allows Single Structure
  - HAZOP
  - LOPA
  - Bowtie
  - Hazard Register
Minimum Sufficient CFD Scenarios

• CFD Modeling More Accurate but more costly
• Accuracy of Detector Placement Increased with Number of Scenarios
• How many are required?
Estimate Minimum Sufficient Scenarios

1. Perform a subset of scenarios
   - Weather Conditions
   - Release Orientations
   - Equipment Items
2. Optimize Detector Placement
3. Increase Scenario Count
4. Optimize Detector Placement
5. Calculate Detector Variation
6. Repeat Until Change in Detector Variation is small
PHA Gamification

• Understanding Process Hazards is Critical
• Teaching this Information is Dry and Boring
• Employ Gamification Techniques to Enhance Learning
• Automatic Development of Questions Based on Open PHA Data Structure
• Prizes and recognition for winning scores
Mobile Operator Support Tools

• Member Discussion Key Point “We need tools to help our people work more safely”
• Increased use of mobile phone technology in field
• Software to assist operations / maintenance to not make mistakes
Procedure Assistance and Tracking - OpScope™

• Mobile Procedures
  – Task Information
  – Picture/Video Explanation
  – Location (GPS/Map)
  – Equipment Confirmation with QE Code
  – Centralized Status Tracking of all procedures
What’s Next?

• Sound power characterization from leaks
• Radiation poisoning of optical fire detectors
• Massive parallel computing for CFD
• You tell me!
Contact

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