Computing Highlights at ESH&Q

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Computing in ESH&Q

- General ESH&Q databases
  - Compliance, Lessons Learned, etc.
- Document Review and Approval Process / Docushare
- Medical databases
- Industrial Hygiene databases
- RadCon databases
  - Dosimetry, Tours, RAM, RWP, Radiation Shielding
- RadCon Web page
- RadCon data monitoring and analysis
  - Data from area and environmental radiation detectors
- Radiation calculations
  - Varying methods, often computationally expensive
Highlights

• Continuous improvement of the database structure and logic, with the help of the IT department
• New RadCon webpage development
• Update of the RadCon data monitoring and analysis system for 12 GeV operations
  – Example of long term environmental monitoring at CEBAF boundary
Environmental Dose Rates around CEBAF

RBM08: Photon Dose Rate (μrem/h)

JLab Weather: Rain Accumulation (inch)
Radiation Calculations

• Small-scale, but often CPU-intensive calculations:
  – Shielding and facility design
  – Radiation backgrounds (safety, damage, activation)
• Simulation codes: GEANT3, Geant4, FLUKA
• Members of FLUKA collaboration
• Benchmarks and code development specific for JLab: photo-, electro-nuclear reactions, isotope production
• Simulations of the radiation detectors’ response
• Recent developments: work on the interface between the CAD engineering models and FLUKA, setting up the DAGMC/FluDAG system
Import Complicated Geometries in FLUKA

DAGMC by Computational Nuclear Energy Research Group

Example uses of DAGMC

- CMS Detector - LHC
- ATR
- NASA Hab Module
- Fusion Neutron Science Facility
- Advanced Thin Ion Calorimeter
- ISS
- Spallation Neutron Source