

Solution Mining Research Institute Fall 2016 Technical Conference  
Salzburg, Austria, 25 - 28 September 2016

## **Hexahedral Finite Element Mesh Capturing Realistic Geometries of Bayou Choctaw Strategic Petroleum Reserve**

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### **Abstract**

The three-dimensional finite element mesh capturing realistic geometries of Bayou Choctaw site has been constructed using the sonar and seismic survey data obtained from the field. The mesh consists of hexahedral elements because the salt constitutive model is coded using hexahedral elements. Various ideas and techniques to construct finite element mesh capturing artificially and naturally formed geometries are provided. The techniques to reduce the number of elements as much as possible to save on computer run time with maintaining the computational accuracy is also introduced. The steps and methodologies could be applied to construct the meshes of Big Hill, Bryan Mound, and West Hackberry strategic petroleum reserve sites. The methodology could be applied to the complicated shape masses for not only various civil and geological structures but also biological applications such as artificial limbs.

**Key words:** Caverns for Liquid Storage, Computer Modeling, Hexahedral Finite Element, Rock Mechanics

This work is being filed for U.S. patent by Sandia/DOE in February 2016 (EFS ID: 24939243).

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