



Colorado School of Mines
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Web site: <http://www.mines.edu/Research/>

Center for Research on Hydrates and Other Solids (CHS)

The Center for Research on Hydrates and Other Solids (CHS) is sponsored by a consortium of ten industrial and government entities. CHS focuses on research and education involving solids in hydrocarbon and aqueous fluids which affect exploration, production and processing of gas and oil.

Involving over ten students and faculty from three departments, CHS provides a unique combination of expertise that has enabled CSM to achieve international prominence in the area of solids. CSM participants interact on an on-going basis with sponsors, including frequent visits to their facilities. For students, this interaction often continues beyond graduation, with opportunities for employment at sponsoring industries.

Background:

- University-sponsored
- Initial research begun at CSM in 1976
- Research Consortium established in 1987
- Unique monograph/software on hydrates published in 1990
- Currently self-supporting with an annual budget in excess of \$500,000
- 10 graduate students, undergraduate students, and faculty currently involved

Areas of Expertise:

- Equilibria and transport properties of aqueous crystals
- Kinetic rates of formation of crystals
- Inhibition of crystal formation
- Detection, production, and processing techniques
- Hydrates in reservoir production
- Spectroscopy and diffraction of crystal structures
- Analytical and molecular dynamic modeling
- Disciplines of chemistry, chemical engineering, petroleum engineering, physics, and geology
- Hydrates in food industry
- CO₂ sequestration in oceans

Sponsoring Organizations:

- BP Amoco
- Chevron
- Oil and Natural Gas Corporation of India
- Japanese Maritime Research Institute
- Petrobras
- Phillips
- Idaho National Engineering & Environmental Laboratory (INEEL)
- Texaco
- UNOCAL
- DeepStar Consortium of 21 energy companies
- *Governmental sponsorship by:* the National Science Foundation and the U. S. Department of Energy

Method of Technology Transfer:

- Semiannual technical program review
- Annual progress reports
- CSM faculty visits to sponsor facilities
- M.S. and Ph.D. graduates employed by sponsors
- >5 avg. peer-refereed publications annually
- **Web site:** <http://www.mines.edu/research/chs/>

Spin-offs / Contributions:

- Better production in the oil and gas industry
- Alliance between fundamental and applied research
- Patents

**Contact CHS Director, Dr. Dendy Sloan, Chemical Engineering and Petroleum Refining Department,
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