Modularization

Shipping and Logistics Challenges
Modules Defined
Project benefits
Benefits Overview

• The costs of modular units are generally 10-15% higher than field erected units since modules are designed to withstand the rigors of shipping and require more structural steel.

• It reduces the overall project cost due to lower field construction costs and shorter construction schedule.

• Strategy reduces the construction schedule particularly due to the certain site’s narrow construction windows.
Modularization can reduce costs, however, site specific issues should be addressed:

- Environmental regulation
- Permitting process
- Labor availability
- Site access
- Weather
- Gateway requirements
Benefits of large vs small modules

- Fewer process systems are split between modules
- Fewer inter-module connections
- Man hours are less for fabrication and installation
- Less engineering
- Less plot area is used
- Hydrotesting and quality check work is easier and more complete
- Fewer foundations
- More hours spent at fab site; therefore better quality
- Larger or taller equipment is more easily accommodated
- Reduction in schedule at installation site (faster start-up
Benefits of Super Modules: (2000-5600 tons)

• Substantial reduction in site labor hours
• Safer- less site exposure
• Wider contractor pool for remaining work scope
• Up to 50% reduction in plot space
• Significant over all cost savings
• Site directs substantially reduced
• Reduced camp requirements
SHIPPING LIMITATIONS FOR MODULES

- Modules can be as large as 200-feet long and 150-feet wide or larger and can weigh over a million pounds.
- Road & rail limitations are the primary restrictors on size while maritime capabilities are almost always more than adequate with advance planning.
- Shipping studies and detailed route surveys are critical to the success of the project and should be conducted in the design phase of the project.
Summary on the benefits of modularization

- Limited plot space
- Difficult labor conditions and high labor cost at the plant site
- Restricted quality of skilled labor at plant site
- Remote site location
- Bad weather conditions at plant-site such as extreme heat or cold, frozen ground, snow, etc.