

# CHINA HUANQIU CONTRACTING & ENGINEERING CORP., CHINA

## Key Facts

**Company:** China Huanqiu Contracting & Engineering Corp.

**Website:** [hqcec.cnpc.com.cn](http://hqcec.cnpc.com.cn)

**Industry:** Oil & Gas

**Country:** China

**Products Used:**  
CAESAR II®

### Key Benefits:

- Optimized equipment, structure, and piping layout, saving \$500,000
- Minimized stress analysis time by 20 percent
- Reduced costs by \$750,000 with the expansion joint module

## WORLD'S LARGEST INDIRECT COAL LIQUEFACTION FACILITY DESIGNED WITH CAESAR II®

### HQC relies on efficient analysis for \$10 billion project

China Huanqiu Contracting & Engineering Corporation (HQC), affiliated with China National Petroleum Corporation, provides engineering, procurement, and construction (EPC); research and development; equipment manufacturing; and commissioning. Founded 50 years ago, HQC operates in 30 provinces in China and 20 countries and has completed more than 1,000 projects.

### IDENTIFYING GOALS

Shenhua Ningxia Coal Industry Group chose HQC to design a coal indirect liquefaction processing facility located in the Ningdong Energy Chemical Base in Yinchuan, China.

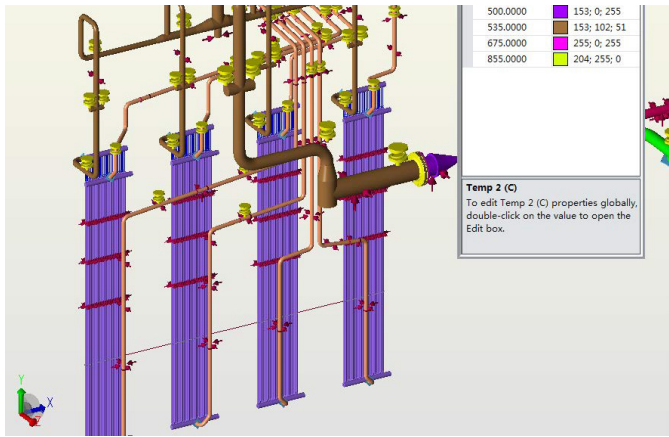
The largest indirect coal liquefaction construction project in the world, it covers about 728.75 hectares (2.8 square miles) and required an investment of US\$10 billion.

"This national demonstration project is a landmark event for China's coal oil and chemical industry and required a huge investment," said Zhongyang Li, chief engineer with HQC.

The project includes the coal gasification plant, synthetic oil plant, catalyst plant, and installations for all other processes. Annually, the facility uses 24.5 million tons of coal (raw coal and fuel coal) to produce:

- 4 million tons of oil
- 1 million tons of methanol
- 2.7 million tons of 405 reconcile diesel
- 1 million tons of naphtha
- 300,000 tons of liquefied gas





## OVERCOMING CHALLENGES

CAESAR II® was used to design 13,450 process pipelines and 2,400 pieces of equipment. In operation, the ethylene cracking furnace tube reaches 1100° at 0.5MPa internal pressure, so calculating creep stress is critical. In addition, other pipes and equipment experience severe cyclic conditions:

- Pipe diameter ranges up to 88 inches
- Pipeline design temperature varies from -196° to 1100°
- Pipeline design pressure ranges from 0 to 33MPa

HQC had previously used another pipe analysis software that had a complex user interface and was often out of date, resulting in a lot of wasted time performing the analyses and producing an optimized design for the client.

For almost three decades since, the company has had success using CAESAR II, and HQC knew this large-scale project would require the capabilities the software provides.

## REALIZING RESULTS

With CAESAR II, the team produced isometric drawings, performed static and dynamic analyses, analyzed stresses on all pipe and related components, and produced the required deliverables with efficiency, quality, and accuracy.

If the project had not finished on time, the delay would have negatively impacted the facility owner while causing economic losses.

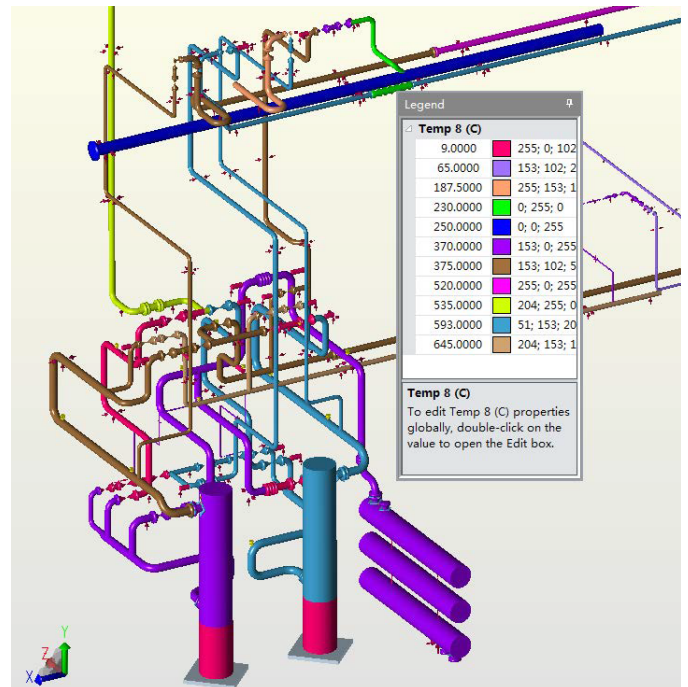
CAESAR II helped reduce labor hours by 20 percent while avoiding security risks. It also helped avoid overdesign, saving US\$1.3 million in materials.

“In China we have an old proverb: A handy tool makes a handy man. CAESAR II gives us accurate stress analysis and optimized design,” Li said.

“By keeping costs within budget, we achieved 100 percent satisfaction feedback from the client. Using CAESAR II has significantly enhanced the reputation of HQC at home and abroad.”

## AWARD-WINNING PROJECT

HQC received the 2016 CAESAR II Drivers of Success Award for its use of the software. The annual Drivers of Success competition recognizes innovative applications of Hexagon PPM products, impressive project results, and significant benefits from collaboration among disciplines and the integration of the products.



## ABOUT HEXAGON PPM

Hexagon PPM is the world’s leading provider of asset life cycle solutions for design, construction, and operation of industrial facilities. By transforming unstructured information into a smart digital asset, our clients are empowered to visualize, build, and manage structures and facilities of all complexities, ensuring safe and efficient operation throughout the entire life cycle.

PPM is part of Hexagon (Nasdaq Stockholm: HEXA B; hexagon.com), a leading global provider of information technology solutions that drive productivity and quality across geospatial and industrial landscapes.