

**WHAT WE DO**  
**PROCESS**

Widely considered C&I's niche, there's little our Process Team has not experienced. Our approach is quite simple: DESIGN IT AS IF WE HAVE TO RUN IT. We appreciate your technical AND operational concerns given our vast hands-on refinery and plant experience.

**MECHANICAL**

C&I's Mechanical Department is responsible for the development of equipment and material specifications, request for quotations and bid evaluations. From years of experience using cutting edge software, the Mechanical Group models pipe, performs stress analysis, hydraulic analysis, and designs pressure vessels and tanks.

**POWER & CONTROLS**

Our team of Electrical Engineers and Designers has a wide variety of experience. Power Systems: System design, equipment specification, protective device coordination, short circuit, arc flash & load analysis. Instrumentation & Control Systems: SIS systems, CEMS and process analyzer systems. Physical Design: Power distribution, lighting, grounding, heat tracing, motor controls, raceway systems, communication infrastructure. System Integration: DCS, PLC & HMI systems design, specification, programming and start-up.

**PLANT DESIGN**

The Plant Design team is responsible for developing the overall layout and space allocation from conceptual through detailed design phases on projects. Final construction drawings are developed using the latest CAD and 3D modeling software based on project data, vendor data and specifications supplied by our Process and Mechanical Departments.

**CIVIL / STRUCTURAL**

C&I's Civil / Structural Engineers, registered in over 20 states including Illinois and California, are responsible for all support structures, containment and seismic design.

**PROJECT CONTROLS**

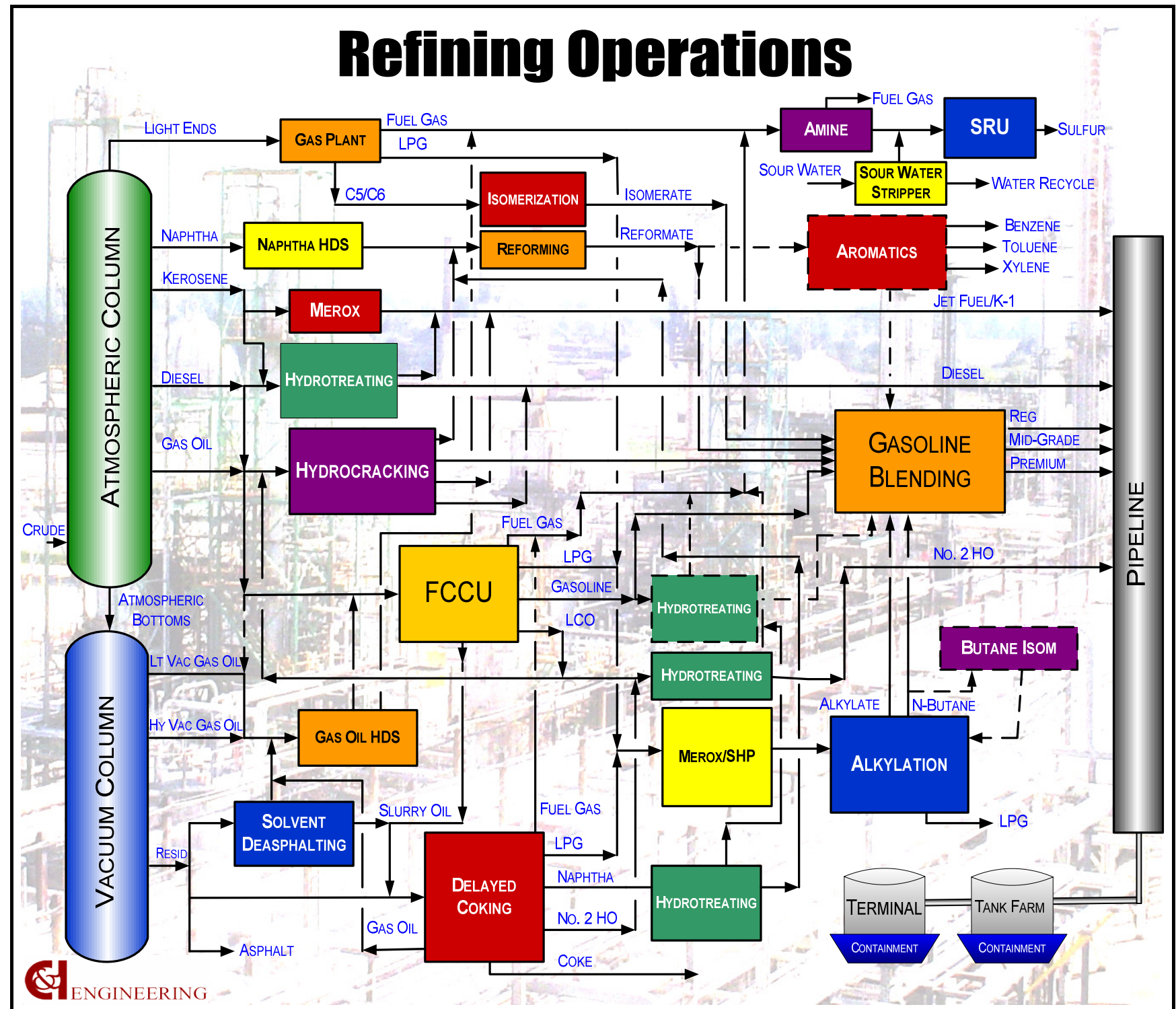
Project Controls provides cost estimating and risk analysis. This group is an integral part of the overall project team, providing cost reports and schedules utilizing programs such as ICARUS, Primavera, and MS Project.

**PROCUREMENT**

C&I provides a full spectrum of Procurement services to support C&I projects, as well as on an individual need basis for our clients. Our professional staff combines strong negotiating skills with state-of-the-art technology for purchasing and tracking equipment and services. We are an active member of NAPM.

**PROJECT MANAGEMENT**

It all begins with first-rate Project Management. C&I firmly believes in a gated approach to project management. This Gated Approach ensures the appropriate effort is allotted to each phase. A project is progressed only if it meets the overall project objectives. C&I's Project Managers & Project Engineers, all Project Management Institute certified, execute this gated process on all projects. Our goal is to provide true Value Engineering, uniquely assessing areas such as technology selection, process simplification, design to capacity, and customized specifications. By the end of the FEED/FEL, P&IDs will reflect high value results. Spending time and effort in the front-end phases (front-end loading) ensures a quality definition of scope, schedule, cost and risk. The resulting formula is quite simple:  
Time + Effort = Quality Definition.



GATED PROJECT MANAGEMENT APPROACH				
STAGE	CONCEPTUAL	FEASIBILITY	DEFINITION	IMPLEMENTATION
Grade:	PRELIMINARY	FACTORED	AFE QUALITY	DETAILED
Purpose:	Identify options per opportunity & need	Assess economics of the concepts & set initial budget	Definition of selected concept & funding for approval	Check or control estimate
Project Scope:	General requirements established	Physical assets defined	Scope finalized - change management to revise	Change control process in effect
Estimate Accuracy Range:	+/-50%	+/-30%	+/-10%	Decreasing to zero
Engineering Completed:	Less than 5%	20% to 30%	50% to 70%	90% to 100%
P&IDs / PFDs:	Preliminary PFD or equipment list	PFDs and preliminary P&IDs	Site specific value engineering	Final drawings with adjustments for changes
Project Schedule:	Duration estimates, Project Logic Developed	Milestone dates identified	Design, permitting & construction detailed	Adjustments for actual activities & time frames

**HOW WE DO IT**  
**Are all engineering firms the same?**

C&I's optimal size, project management approach, creative solutions, and industry experience make the difference.

**Commitment to Project Success**

Ensuring your projects are completed on time, on budget, and with the utmost quality is priority one. Our 25 years of experience makes this a reality for you.

**Recognized Industry Leader**

Nationally, C&I has been ranked 19th in refining by Engineering News Record, giving you confidence your projects are in the right hands.

**We design it as if we have to run it**

Critical thinking and creativity fuel our unique solutions. C&I's plantside experience allows us to design it for you as if we were to run it. C&I can supplement the Owner's Team.

**Gated Project Management Philosophy**

Our early involvement in the conceptual and feasibility phases ensures project success during definition, implementation and start-up. This allows us to positively influence both your project's cost and schedule.

**Our Firm**

C&I Engineering, established in 1983, is a full-service, employee-owned firm providing engineering, procurement and total project management. We are nationally recognized for our refining capabilities. C&I has the background, resources and financial strength to handle complex, multi-disciplined projects with the very highest standards of service. We uniquely combine the deep resources and talent of a large firm with the close and direct interaction of a small firm - a combination our clients appreciate and expect. C&I firmly believes in relationships with our clients that go beyond individual projects - relationships based on trust.



**ENGINEERING**

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