



February 2014

Carmagen. Partnering in Engineering Excellence.

Plant Visitation to Assist Process Technology Selection

By Jerry Lacatena

Frequently when a refining company decides to pursue installation of a new or unfamiliar process technology in their facilities, they go through technology screening, bid solicitation, and rigorous technical and commercial evaluations to arrive at the best choice. Part of the evaluation may be to visit existing plants that are of similar design, style, and capacity to the target design of interest. Sometimes the visit may follow shortly after selection, if the client is more aware of the licensor design specialties, issues, etc. In other cases, the visit may occur before selection to assist in the decision process. The licensor or contractor usually arranges visitation meetings and a unit walk-thru at the sites.

This article is only intended to provide general insights for potential topics to include in a plant visitation, and can vary based on how sophisticated/informed the visitors are. The expectation is that a site visit agenda/questionnaire would be tailored to a specific technology, licensor or contractor offering in advance, and be useful to capture information gathered in a systematic way, particularly where more than one site is involved.

Generally, the objectives of a visit are to better understand the unit visited, how that may increase confidence in the licensor's proposed design for the client, and focus attention on potential considerations/issues/desired provisions for potential investigation, during engineering.

The visit agenda/questionnaire may also consider topics such as the following, recognizing that these are illustrative rather than considered comprehensive:

Operations

Start-up

- Did the plant commissioning and startup proceed as planned? Were they aware of any areas where improvements would have facilitated startup, such as training, licensor support, process design features, mechanical design features, etc.?
- Did the unit meet performance guarantees during the initial test run on design feedstock (i.e., product yield/quality, catalyst life, etc.)? How could operation be improved?

Work Highlights

Process, Operations & Safety

- Provided process support and prepared novel conceptual design concepts for a commercial-size facility to capture CO₂, building upon CEI's prior support for the pilot unit, which had been constructed earlier.
- Prepared a Process Design Specification covering the implementation of protective systems on several fired heaters in a refinery in Central America.
- Continue to provide facilitator and designer support on numerous HAZOP, project safety review, and Transient Operations HAZOP (TOH) efforts at numerous refinery locations and clients.
- Performed Cold Eyes Review of domestic refiner's delayed coker design yields vs. current operating performance with alternate feed blend, and consulted on other operating considerations.

Reliability & Maintenance

- The last in a series of pre-turnaround (T/A) planning review visits was made to a European refinery that had a refinery-wide T/A scheduled. Significant progress had been made in implementing many of the recommendations that were made during prior visits. The turnaround was successfully completed within the expected schedule and budget.

Unit Reliability

- How long has the unit been in operation, and what is the average annual on-stream time?
- What were the major causes for downtime (i.e., process, maintenance, equipment issues, utility issues, etc.)?
- What improvements could be considered to decrease downtime?

Maintenance

- What areas require the greatest attention (i.e., fouling, corrosion, materials/fabrication, equipment, etc.)?
- What improvements could be considered to decrease/increase unit run lengths or reduce turnaround duration, if any?

Sparing

- What spare equipment was included in the design and why (i.e., fouling, corrosion, safety, etc.)?

Instrumentation

- Is the control system suited to the process for startup, normal, and emergency operations?
- Was any issue encountered with control flexibility to establish stable conditions?
- Were any special safety controls implemented later?

Environmental

- Does the unit produce pollutants which pose unusual, difficult disposal, treatment, or monitoring issues?
- What special measures are required for waste disposal?
- What is the unit's safety record, and what design features would possibly make the unit safer?

Feed and Product Quality

- What is the range of feeds/properties that have been processed in the last two years?
- How does the unit respond to changes in feed composition and operating severity?
- What feed impurities and properties most affect product quality, and how are they routinely analyzed?
- Were product specifications generally met, and what are the products used for?

Plant Capacity

- What are the design capacity and turndown flexibility of the unit? Has the unit performance been satisfactory with respect to these areas? Have any bottlenecks been identified, or have the units proven to provide more flexibility or capacity than originally expected?
- Were there subsequent modifications made to the unit and why (i.e., bottlenecks, Encon, etc.)?
- What is the overall unit plot size?

Licensor Service

- To what extent has the licensor or contractor been involved in training, troubleshooting problems if any, and providing continuing support? Is there a follow-up technical support agreement with the licensor?

Documentation

- Were design packages complete, operating manuals adequate for training, and analytical test methods sufficient?

Specific Technical Questions

- These would depend on the specific technology and licensor, novelty and experience base of the process, and service application of interest. Mature technologies may be more readily prepared than ones that have been recently commercialized. Carmagen has technical specialists who are familiar with virtually all areas of process technology and issues of significance, and can assist clients with process technology selection, site visits, and follow-up technical support on behalf of the client as appropriate.

Clearly, the extent of information obtained during a site visit depends on the openness of the site, confidentiality requirements, etc. But plant visits are a useful approach that many refining companies take at the appropriate stage of a project.

About the Author

Jerry Lacatena has over 35 years of process engineering experience in a broad range of design applications and technologies. He is a proficient and organized multi-tasker, having extensive plant design experience on numerous revamp and grassroots projects throughout the world, with projects ranging from feasibility studies, technology evaluation, FEED, EPC development, to plant performance testing. Jerry has excellent presentation, communication, coordination, and interpersonal skills utilized to develop strong working relationships with team members, clients, vendors, sub-contractors, and technical licensors.

Please contact Jerry Lacatena (jlacatena@carmagen.com) if you'd like more information on Carmagen's expertise in this area.

