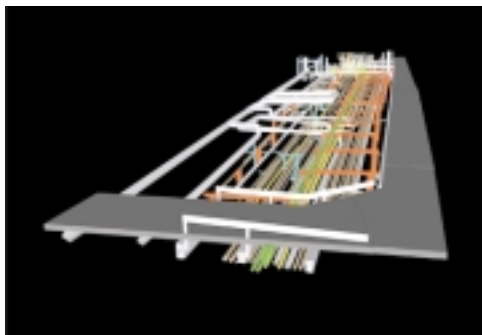


Project Name:	Piping Retrofit Project
Project Description:	Creating accurate as-builts and a better design for a piping upgrade on a tight schedule
Scope:	540' long x 40' wide x 12'deep, produce 2D AutoCAD files
Owner:	Chevron
Project Date:	November, 1999



“We needed a footprint design for replacing and rerouting the two lines, but with Cyrax we got actually much more - we got a “rat’s eye view” of the “snake-pit”, the entire pit of complex piping. The 3D model is useful for detecting possible interferences with existing piping + support that the piping may encounter.”

Peter Jones, Chevron Project Manager

BACKGROUND: Chevron Corporation’s Richmond, CA refinery needed to replace a 6" and an 8" sour water pipe where the pipe wall was found to be under Tmin (minimum required thickness), thus posing a safety risk. An overriding consideration was that the work had to be done by December 31, 1999 to allow cost accrual in the desired budget period. After soliciting a bid from its in-house as-built and design resources, Chevron retained ConneXsys, an engineering firm also located in Richmond, to create as-built documentation and do the design work for the upgraded piping system.

PROJECT DESCRIPTION: The project area is a ground-level open pit along a road. The pit contains about two dozen pipes covering an area roughly 40' wide x 540' long. The challenge facing ConneXsys was to complete the survey and design in the allocated three weeks, two weeks sooner than the competing bid from Chevron's in-house design office. ConneXsys used their *Cyrax* 2400 3D laser scanner to create a 3D image of the entire 540' long pit, including pipes, supporting piles, beams and two bridges. A crew of two mounted the scanner on a pick-up truck and stopped at selected intervals adjacent to the pit to capture 22 scans along the way. The process required two days. Following scanning, two designers performed the design work in 15 working days, of

which 1 day was spent registering the 22 scans together and the other 14 days were spent doing actual modeling and design. Visual interference checking and conceptual design of the piping upgrade were conveniently performed within Cyra Software using the 3D as-built model.

PROJECT FACTS

Field scanning: 2 days
Crew: 2
Number of scans taken: 22
Modeling time: 2 weeks

Joe Heffner, Project Manager at ConneXsys, suggested that since the team is still in the learning phase, he expects that future jobs will take even less time.

BENEFITS: Chevron’s main goal was to finish the project design and construction within the 13 weeks preceding December 31, 1999 and this was accomplished. To meet his deadline, the project manager decided against the use of an in-house design team that proposed tackling the as-built manually, because they could only commit to a five week turn-around. Using the speed of the *Cyrax* system, ConneXsys was able to deliver a final engineering design two weeks earlier than the in-house team.

From ConneXsys’ point of view the project had many successful elements:

- ☑ The 3D as-built model allowed better design and communication of the proposed piping tie-in points to the client.
- ☑ The crew collected a rich set of data, which they can use later for future design and revamp without the need of a new survey.
- ☑ There was the added benefit of job safety and convenience, since the crew did not have to crawl under the two bridges to collect hard to get data.

CYRAX BENEFITS

Contractor was able to finish a tight deadline design and construction project two weeks earlier than the competing conventional method