CALRESOURCES

- Tool — Entera
- Industry — Petroleum

OVERVIEW

Pumping 155,000 barrels each day, CalResources is California's top oil producer. But until recently, it demonstrated less leadership in its use of information technology: The company's databases were swallowing important information in a patchwork of mainframe and desktop applications that could not communicate with each other. As a result, data was isolated and hard to reach.

CalResources' solution was to convert a key suite of well-management to a three-tiered client/server architecture. The three-tiered architecture not only opened its systems but also reaped a speedy pay off in productivity and investment. The Bakersfield Company's strategy and its state-of-the-art system have paid off handsomely: The two divisions that have implemented the new applications are enjoying the easy access to data that the new system affords as well as realizing significant productivity boosts.

Formerly a division of Shell Exploration and Production Co., CalResources is now an independent oil-production company wholly owned by Shell. It employs 1,000 people and generates $260 million in annual revenues.

The momentum for the new applications began in the company's Diatomite division, located 50 minutes northwest from Bakersfield. In the daily operations of the division's 1,500 wells, database accessibility plays a key role in the work of the field maintenance staff. But information that was vital to the wells' "down-hole" operations--details on maintenance and repairs as well as the locations of the rods and pumps--was locked within a set of reliable but incompatible systems running on different platforms.

To automate the collection and maintenance of the well data, for instance, Diatomite used three Hewlett-Packard Real-Time Application Programs, or RTAP systems, customized by parent company Shell. The RTAP systems run under HP-UX on HP9000 workstations and communicate via a wireless system to programmable logic controllers (PLCs) at the wells.

Then there was the mainframe-based SIDRIS production and accounting database, which ran under IBM SQL/DS, the precursor to DB2. A daily upload provided SIDRIS with operations data generated by yet another set of programs, a group of DOS-based standalone applications, used by the field maintenance staff.

What's more, hardcopy handoffs among the various systems meant plenty of re-keying. The operators at the Diatomite unit would enter data into the RTAP systems and then pass along a printout to clerks who retyped the data into one of the PC applications. Data inaccuracies often resulted, with no process in place for corrections to be made.

To pull together and integrate the data, Diatomite's field operations requested a new computer system. Like the Diatomite division, CalResources'Computer Systems department understood the benefits that would come from a new, easy-to-use application and data store, says computer systems manager Ruben Mendoza. Improved systems would accelerate oil production, improve resource scheduling, and enhance equipment utilization and failure analysis, he says.

But rewriting the company's existing applications for a distributed platform would be a massive and expensive undertaking. When Mendoza attended a Cambridge Technology Group executive session, he found the three-tiered client/server technology and Borland's Entera intelligent middleware to be well suited not only for the integrated application Diatomite had desired, but also for the company's other three units.

ADVANTAGES OF THE THREE-TIERED APPROACH

Borland's approach to three-tiered technology offered CalResources several advantages. First, software developers could program at the application programming interface (API) level rather than the socket level, which would substantially simplify the task of exchanging data between the RTAP systems and the Oracle database. ROI was also a critical issue, with CalResources specifying a speedy development pay-back of less than one year.

Perhaps most important, Borland's tools let CalResources immediately tackle a core business application--the software it used to manage the wells--rather than start with a secondary application.

DATA THAT'S ACCURATE AND ACCESSIBLE

The new three-tiered client/server application, called the Well Information Tool, or WIT, helped CalResource accomplish all of that. WIT gathers the information in the company's eclectic mix of platforms and databases into a central data store and provides accessible and accurate information on the wells' operations.

The company's original plans for WIT included support for both UNIX and Windows clients. After the UNIX version of WIT was developed, however, porting it to the

desktop PC proved difficult, and it was decided that it would be more cost effective to focus on Windows clients and rewrite the application using Windows development tools.

WELL WORTH IT

WIT has been rolled out to a second division, the Tulare unit, and is now managing operations at 4,000 wells. CalResources expects to roll it out to the remaining two divisions by the end of 1996.

"We're now managing data from the well right through the [production] process," says Tom Woodard, senior production engineer. "We can take the data electronically, feed it directly to the Oracle database server, and combine it with vendor information." At Diatomite, the Oracle relational database server runs on an HP9000 Model 800 G50 server. On the system's front-end, nearly 70 Microsoft Windows clients run on 66-MHz 486 PCs with 16MB of RAM.

PLANNING PREDICTIVE MAINTENANCE

In addition to sharing data and opening up the databases, WIT helps CalResources keep its oil wells working better and longer. Rather than respond to breakdowns caused by worn-out pumps or casing corrosion, CalResources wants to put its wells on a plan for scheduled maintenance. The idea is to replace parts before they break down--but not too soon. The WIT data helps the field staff evaluate repairs and maintenance and determine their cost effectiveness before prioritizing them.

Tracking repair data over several years will enable CalResources to predict breakage, thereby scheduling the downtime for repairs, which often take 18 to 30 days, and cutting the daily downtime costs of $190,000 in lost oil production.

The company is already on its way to better predictive maintenance: Since installing WIT, Diatomite has reduced the number of service visits for each well from one to three per year to .44 per year.

NEW GRAPHIC CAPABILITIES

Designed as an operational tool, WIT has also found extensive use among CalResources' engineers because of its graphical displays. WIT reads data on the wells' mechanical details, such as the casing and the pump, and then puts its Windows front end to use to display a graphic that depicts the well bore, or the hole in the ground.

The diagrams have become important time-savers in well administration. On a drawing that shows how deeply the pump is located within the well, for example, a double click of the mouse opens a window filled with a raft of data, such as the type and size of the pump and the location of perforations, or the holes through which oil seeps in. "It gives you a quick reference to see if your data is in sync," says Allison.

FUTURE PLANS

CalResources also plans to share appropriate data from WIT with service companies. Already the pump vendor relies on WIT-generated data, and the contractors that own and maintain the rigs connect to CalResources' network and WIT via PCs in the field offices. Soon, electronic data interchange (EDI) capabilities and wireless links will connect the companies from their own offices and even from the rigs.

More databases are being downsized to the Oracle database--including the two SQL/DS production databases--so the information accessed through WIT continues to grow.

"We plan to combine WIT with the well casings damage database troubleshooting tables, and corrosion and geological data to make design predictions," says Woodard. "Eventually, we'll rely on artificial intelligence systems to determine when to service the wells and perform preventative maintenance."
"Using Borland's tools, we can adapt our databases over time yet still recognize immediate benefits from the client/server environment," says Mendoza. "The tools are our key to leveraging older technologies. Because of Borland Entera, we expect our productivity and return on investment to continue to improve."