Case Study

Denver Technology

Crude Scheduling Manager Application
BP Refinery (Kwinana) Pty Ltd

Client Profile

BP is one of the world's largest energy companies, with an annual turnover of US$262 billion, 96,200 employees, 28,500 service stations and 19 refineries.

(Source: 2005 Annual Report and Accounts)

Established in 1955, BP Refinery (Kwinana) Pty Ltd is Australia's largest and most complex petrochemical refinery, producing a range of products for both domestic and international markets. Occupying some 250 hectares of land on the shore of Cockburn Sound in Western Australia, BP Kwinana has 145 storage tanks, refines 138,000 barrels of crude oil per day, and supplies most of Western Australia's fuel needs, while exporting around 15% of product interstate and 15% overseas.

For further information about BP Refinery (Kwinana) Pty Ltd, please visit www.bp.com.au.

Business Situation

Refinery operations are scheduled 5 to 6 weeks in advance using ***xlCSM*** *(Excel Crude Scheduling Manager)*, a sophisticated Microsoft Excel® workbook with an Oracle® Database back-end.

Developed by BP Kwinana as a single-user forward planning tool, *xlCSM* accommodates the scheduling of activities that occur relatively early in the refining process, including:

- Ship arrivals, and transfers of crude oil from these vessels to the refinery's crude oil tanks.
- Road train arrivals, and transfers of crude oil from these vehicles to the refinery's crude oil tanks *(i.e. road loading)*.
- Transfers of oil from the refinery's crude oil tanks to its *Crude Distillation Units (CDUs)*.
- Transfers of oil between the refinery's crude oil tanks *(i.e. via tank gravitation)*.
- Decommissioning *(shutdown)* of refinery resources *(e.g. tanks, CDUs, jetties)*.

xlCSM helps the Refinery Planner capture planning information for scheduling purposes *(e.g. crude grade code, quantity to be delivered, delivery date, destination tank)* and model business constraints *(e.g. tank, CDU and jetty availability, flow rates)* to improve operating efficiencies.

Denver's successful outsourcing relationship with BP Kwinana commenced in 1989 and has expanded to encompass a diverse range of services including IT infrastructure management, project management, database administration, applications design, development and support, and assistance with the ongoing maintenance of business-critical process control networks.

When BP Kwinana elected to outsource the ongoing maintenance and support of *xlCSM* in June 2005, Denver's industry experience and reputation for quality, excellence, innovation and value proved decisive. Working with refinery staff, Denver subsequently assisted in indentifying the following opportunities to improve *xlCSM*:

- **Inability to schedule tank-sharing events**

  xlCSM's original designers did not anticipate circumstances where two *Crude Distillation Units (CDUs)* might draw from the same tank(s) simultaneously *(the only time that tank usage may overlap)*. Consequently, attempts by the Refinery Planner to schedule such events invariably resulted in details being calculated incorrectly *(e.g. duration, flow rates, tank volumes, etc)*.

- **Lack of automatic interface with ROT *(the Refinery Operating Targets system)***

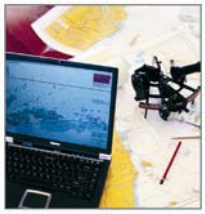
  Yet another Excel-based workbook application, *ROT* facilitates fine tuning of the refinery schedule and is part of SCOT, a larger project intended to improve the tracking of planned refinery schedules against required products.

- **Slow schedule recalculation process**

  Changing an event that occurs early in a given schedule affects subsequent events, but the speed of the recalculation process to propagate the effects of such a change was relatively slow.

- **Poor back-end database access times**

  xlCSM's mechanism for loading and saving schedules from the Oracle® Database back-end was relatively slow and inefficient.



Challenge

In August 2006, BP Kwinana invited Denver to deliver a Crude Scheduling Manager solution for the refinery, replacing or enhancing *xlCSM*, and incorporating the improvements identified above. The scope of this undertaking was inclusive of project management, requirements determination, solution design/architecture, coding, testing and deployment, user training, documentation and post deployment support.

Additional challenges to the success of this engagement included:

- Fixed price nature of the project;
- Inherent complexity of the *xlCSM* application;
- Plethora of technical design/architecture alternatives and options for the new/enhanced system *(e.g. Excel workbook, standalone Windows .NET application, web based application, availability of 3rd party software components for business graphics/charting functionality, etc);*
- New and existing external application interface requirements *(e.g. ROT/SCOT, PPEFA, MEGA XL)*; and
- Stakeholder availability.

Solution

Denver proposed a staged approach to this undertaking; effectively front-ending the business risk into a proof-of-concept phase *(inclusive of requirements analysis, design and prototyping)*, which if successful, could be followed by a development phase *(inclusive of final design and implementation)*. Key deliverables were identified and agreed with BP Kwinana in the project plan.

Early within the project's proof-of-concept phase, Denver successfully designed and prototyped a series of enhancements to *xlCSM* which demonstrated the ongoing viability of an Excel VBA solution to deliver the desired improvements, and precluded the need to redevelop/re-platform the application.

Benefits Achieved

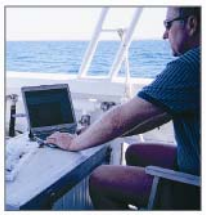
Denver delivered the CSM Project to specification, ahead of schedule and under budget, in accordance with BP Kwinana's stated objectives.

Denver's commitment to industry best practice for project management and software development was instrumental in the success of this project, and ensured that scope variations (inevitable in an undertaking of this complexity) were agreed and approved by BP Kwinana

The project exceeded BP Kwinana's expectations, overcoming significant technical challenges to provide a cost-effective solution for increased operational efficiency, productivity and flexibility.

"Refinery environments are by their very nature highly dynamic and demanding workplaces driven by the constant need to improve operational efficiency. Consequently, we require experienced technology partners with innovative solutions and the capacity to adapt to our changing circumstances. Denver's ability to improve the functionality, flexibility and performance of the refinery's Crude Scheduling Manager application reflects the business value they have consistently delivered to BP since 1989."

Tim Verne
Business Information Manager
BP Refinery Kwinana Pty Ltd



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