Society of Petroleum Engineers
Annual Conference and Exhibition
Denver 2003

‘Square Sail’ – Petrotech gets our ‘cutest booth’ prize

Introduction

The message from the keynote addresses was fairly consistent. We need oil and will do for a few decades to come. Oil supply is OK for the next decade. In fact production may not yet have peaked. Historical data is unreliable as today’s enhanced reserves are ‘counted back’ to the year of discovery. An aging workforce is a concern and gas supplies to North America are a critical issue. Environmental issues were practically absent from the debate – surprising since CO2 sequestration was a popular topic in the paper session.

We noted a lot of buzz around coupling surface facilities and reservoir models. This can be just at the design phase – or taken a step further to veritable simulation and optimization ‘Sim/Opt’. Here real-time data feeds from a ‘digital oilfield’ are used to control production. Techniques borrowed from the refinery are being suggested as having widespread application to the oilfield. Today, the techniques are not quite ready for prime time. Downhole controls equip a minute fraction of the world’s reservoirs. Interestingly though, it is the older fields with high gas or water content and gas lift issues which are most likely to benefit from application of Sim/Opt. But there is reticence to putting sophisticated and potentially delicate equipment down hole.

Highlights

Contents

Keynotes

Stuart R. McGill President ExxonMobil Production Co.

You cannot ignore the relationship between energy use and economic prosperity. Access to energy is a requirement for progress in the third world. Energy products need to be affordable and reliable to support rising standards of living.

Peter Davis – Chief economist BP

Showed slide of scaremongering books – 'the coming oil crisis', 'the end of cheap oil', 'Hubbert's peak' etc. But the reality is that oil supply is OK for the short term – and that 'momentum is there to meet demand for the rest of the decade and beyond.' Davis challenges the idea that world oil production has already peaked claiming that post 9/11 demand (especially for air transport) has depressed conventional production. Hubbert curves may have meaning at a local scale but are questionable when aggregated to basin or global scale. Davies showed that summing logistic curves from various oil provinces produced various peculiar forecasts of production. Shape depends on demand and timing. The Hubbert curve/peak is not a valid tool for forecasting. Supply is a function of demand which is a function of price, technology and government policy. Reserve data is no less reliable. Some reserves are wildly overstated and some (SEC) underestimated. Some oil is found by politicians, not explorers. World oil reserves are apparently increasing despite the fact that production has exceeded discovery for 20 years or so. This is a data issue as enhanced production for a field is counted back to the year of its discovery – so that all Forties oil was 'discovered' in 1974.

Kemble Bennet Texas A&M

Technology is the answer. 3D/4D, artificial lift, the digital oilfield of the future (DOFF). All have contributed to breathe new life into old fields – reversing natural decline. Demographics are a concern – US enrollment in petroleum engineering courses is far below its 1984 peak of 12,000 (currently around 200) – way below 'needs'. Many workers have left the industry – the only growing segment is of 'free agents' – independent consultants. Oil is to play a major role in energy supply over the next several decades – during which time a major proportion of the workforce will vanish.

Balancing natural gas policy - Mark Sikkel, Exxon and NPC Council

National Petroleum Council (NPC) study showed a fundamental shift to a tight gas market and high prices. Two alternative scenarios are suggested. 'Conflict' – restricting supply and simultaneously encouraging demand – will push gas prices to $6 per BTU. 'Alignment' of policies on supply and demand will lead to moderate prices of around $3. A maturing conventional N. American resource base will only supply 75% of demand. Reserves per well are trending down while decline rates are increasing. Non conventional (coal bed methane, tight gas and shales) will fill the gap. Increased access (to Rockies, Offshore CA, Florida and Eastern Seaboard, but still excluding National Parks) could save US gas consumers $300 billion (over next 20 years?). New supplies – LNG and Arctic will help. Overall the report recommends a 'balanced future' with a $ trillion savings to consumers over next 20 years.

Nasser Jeidah, Qatar Petroleum

Qatar's North Field has over 100 years of production at present rates (but as Jeidah revealed later in his talk, QPC intends to augment production massively to respond to growing world LNG demand.) Quatar's $1 billion LNG facility has a 30 mta capacity. Qatar is N° 4 exporter in 2002 with 12% of world trade. Japan and Korea are the main markets. World LNG demand is doubling every 10 years. By 2010, US LNG demand is forecast as 25% of world production.

John Gibson Halliburton

'I'm a geologist – so I can do the arm-waving'. Gibson was recently preparing a talk to Wall Street analysts and believed that he had found an explanation for declining rig counts beyond the obvious one, that activity is in decline. If rigs are getting more efficient, then maybe fewer rigs are drilling the same or maybe more feet. He checked some statistics to discover that, for wells in the 10,000-15,000 ft range, there has been no change over a 20 year period – rigs still drill about 30 wells per year. 'Efficiencies' are touted by marketing departments. We tend to focus on successes and exceptional achievements. But in the 'middle of the Gaussian distribution, technology just is not influencing drilling'.

Q&A

How were the new numbers for world production forecast obtained?

Davis We look at capacity rather than production (= demand). Capacity adds 2-5 million bbl/day to production. Moreover, capacity is growing both in and out of OPEC – capacity will likely exceed demand for the next several years.

Gibson – You cannot build an industry on the assumption of monotonic price increase. Our ROCE is not as good as other industries.

Who should be developing new technology?

Gibson – With the exception of a few supermajors, most oil companies' expenditure on R&D is insignificant. Service sector bears huge part of the burden. Academia is a decade behind industry.

Climate change absent from debate so far?

Sikkel – did not look at this much – but this will lead to more pressure on natural gas.

Davis – Policies have little impact on consumption. A long term issue re demand. Policies not in place. Will be an issue over next 20 years.

Exhibitors – Hardware

Ask Labs Data Trap, a bolt-on data logger

Bolt-on hardware data logger for gas well test and measurement. Data logged to CompactFlash card (64MB). Can be downloaded periodically or transmitted by radio. Used by Marathon. Record pressure, plow, temperature, tank level etc. SPE 62881 – Field application of production analysis.

URL www.asklabs.com

Divestco The Rat, adopted by ExxonMobil

Exxon have adopted the Rat for worldwide use as data capture tool.

Contact Butch Butler Butch.butler@divestco.com .

URL www.divestco.com

E2 Business Services E2 'PhoneHome', intelligent remote video surveillance

Remote video surveillance link to rigsite – can be used to read car number plates. Motion detector triggers recording. Can log-in over the web to video camera.

Contact Rod Clay rclay@e2bsi.com

URL www.e2bsi.com

IHS Energy iMonitoring will integrate FieldDirect

iMonitoring hardware.

IHS Energy has acquired Luna's iMonitoring unit which will integrate IHS' FieldDirect. The hardware from iMonitor featured in last year's report from the SPE ACTE and comprises a line of solar powered well data connection systems and remote automation technology.

URL www.ihsenergy.com

Katchkan Anti-spill drilling devices

Model of zero spill containment system[1].

Innovative zero-spill, 100% containment system. A variety of devices catches spills on rig floor – or below the platform. For very environmentally stringent requirements.

Contact Esther Rondeau erondeau@katchkan.com .

URL www.katchkan.com

[1] Image courtesy Katchkan.

PetroTech SILD, innovative use of drillstring for well testing.

SILD (means herring in Norwegian) is an innovative 'testing while drilling' device that uses the drillstring to perform a well test. A pig is sent down the drill string and pulled out – sucking up to 3 cu. m. of formation fluid into test tool. Sample chamber contains multiple sensors for temperature, salinity, ph etc. The environmentally-friendly well test is 'between wireline and production test. Sponsors Shell, Hydro, Statoil and Halliburton. Photo of 'square sail' not sure why.

Contact Bjorn Dybdahl petrotech@petrotech.net.

URL www.petrotech.net

Schlumberger PVT Express, new rigsite PVT analysis

PVT Express[2].

PVT Express performs full PVT study at the wellsite in about 8 hours. Currently stand-alone web-based system – but will later integrate DecisionPoint. Uses PVT Record – its own database – rolls in lab-based PVT measurement.

URL **www.slb.com**

vMonitor Inc. Investment from BakerHughes

vMonitor technology allows remote data acquisition, and wireless communication. Web-based automation software for data acquisition, data management and integration. vMonitor has received an equity investment from Baker Hughes Inc. And will be working with Baker Hughes' units Centrilift, Baker Petrolite and QuantX.

URL www.vmonitor.com

[2] Image courtesy Schlumberger.

Exhibitors – Services

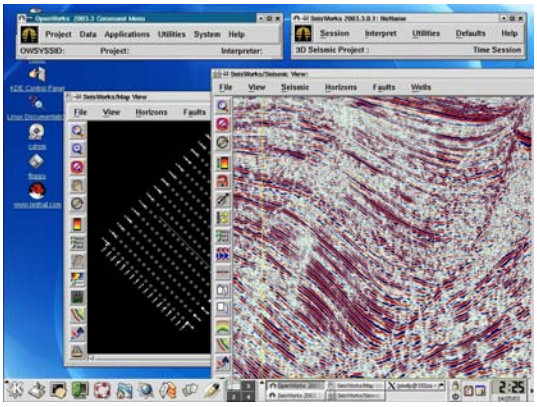
Gaffney-Cline 'SWAT–team' consulting service

Decision Cycle Compression (DCC) employs a swat team approach to problem solving. GCA consultants act as a facilitator team for a three week period. A new way of working or of selling GCA's consulting services? Maybe a bit of both.

Contact Tarek Ghazi tghazi@gaffney-cline.com .

URL www.Gaffney-Cline.com

Knowledge Reservoir Linux migration study



Landmark on Linux[3].

KR also offers help piloting Landmark application deployment on Linux. "Everyone is currently in pilot stage – Linux is mature, but most application ports not yet ready for prime-time".

ChevronTexaco Deepstar commercialization. 36 fields, 81 reservoirs and 264 wells. Scanned seismic, log plats, summary production data and decline forecast. Metrics used during evaluation of new acreage as 'reality check'.

KR also showing its best practices knowledge base developed and maintained (but not updated) for BP.

Contact Mike Sternesky msternsky@knowledge-reservoir.com .

URL **www.knowledge-reservoir.com**

Exhibitors – Software

Aclaro Software PetroLook Planning Module

A new portfolio optimization/planning module for Petrolook has been developed in conjunction with John Howell's company, Portfolio Decision Inc.

Contact Christoph Faig christoph@aclaro.com .

[3] Image courtesy Knowledge Reservoir.

URL www.aclaro.com

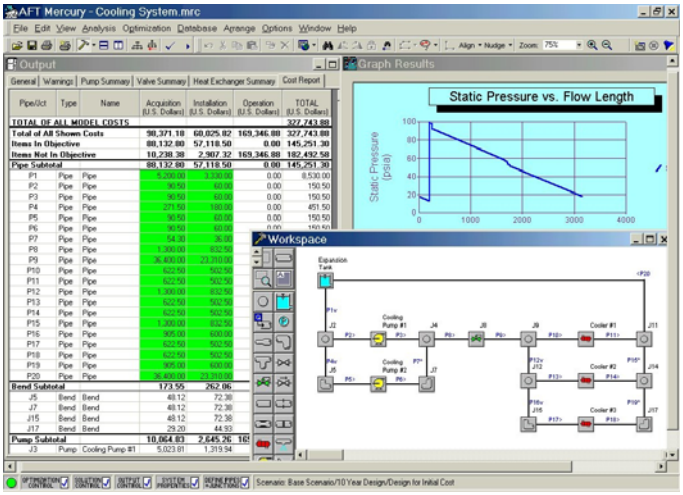
Advanced Resources Intl. Meteor V1.1

Meteor V1.1 ARI's production type-curve program for tight-formation gas wells. Features include: multi-layered reservoir capability, variable compressibility, and the ability to efficiently evaluate large number of wells.

Contact Lawrence Pekot lpekot@adv-res.com.

URL www.adv-res.com

Applied Flow Technology AFT Mercury 5.0



Cost and engineering study of cooling facility[4].

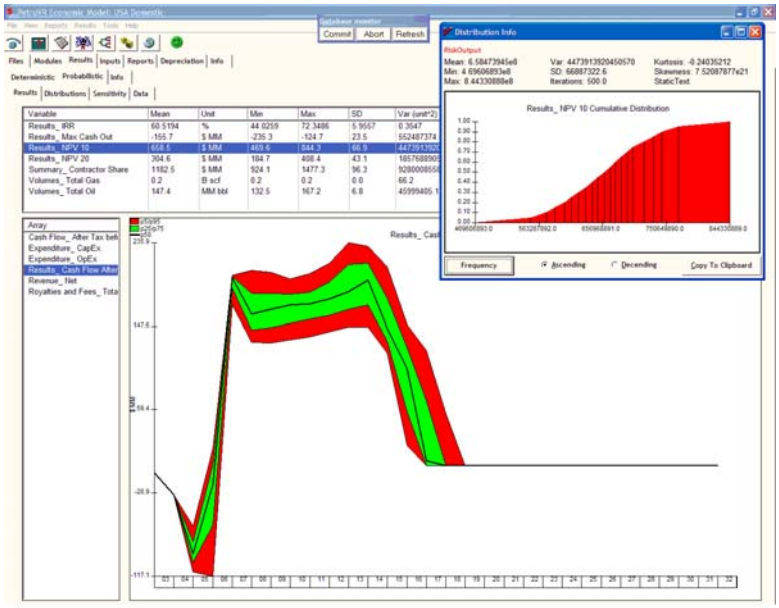
Mercury provides 'intelligent sizing' of pipelines by coupling network flow modeling with optimization.

Contact Tom Glassen tomglassen@aft.com .

URL www.aft.com

[4] Image courtesy Applied Flow Technology.

Caesar Systems TeamVR object oriented database for PetroVR



Monte Carlo simulation of reserves, construction time, and facility limitations[5].

Gas demand and deliverability using Caesar Systems PetroVR to identify and mitigate risks such as schedule slippage, HSE (high activity in fabrication yard – leading to increased risk of injury deemed to be main HSE risk). New collaborative business simulation software – Team VR. Takes PetroVR to an object oriented database from Gemstone – models reservoir, well, facility. FlashVR is a new infrastructure tool that uses 'GRID computing' (United Devices GridMP) to distribute calculations – allowing other PetroVR tools to be accessed through a web browser.

Contact Jill Wyatt jwyatt@caesarsystems.com .

URL www.caesarsystems.com

Case Services Lowis real time simulation and optimization

Lowis RT automated SCADA and production management software for well management optimization.

Contact Steve Slezak steve@caseservices.com.

URL www.caseservices.com

Decision-Team Decide V4.0 real time optimization

The new release of Decide (V4.0) is aimed squarely at the emerging real-time optimization segment. Novelties include optimum use of SCADA and full real-time reservoir surveillance. Decide integrates information from SCADA, simulators, FieldView and TOW into a central Decide database. Two-way integration with ARIES is claimed to re-introduce functionality that was lost when ARIES moved from DOS to Windows. A 'hybrid artificial intelligence' approach makes the system 'self-learning'.

[5] Image courtesy Caesar Systems.

Contact Georg Zangl gzangl@decision-team.com .

URL www.decision-team.com

Dynamic Graphics EarthVision, cellular gridding option

New cellular gridding option allows for 'automated' creation of upscaled grids for use in Eclipse, VIP, CMG etc. directly from EarthVision.

DGI is working with Baker Hughes Inteq on well planning – will incorporate rock mechanics from BHI's Advantage and be released as an EarthView option mid 2004. EarthVision uses the OpenWorks dev kit, but DGI failed to access the GeoFrame dev kit (seen as a competitor by Schlumberger?) – now looking at an OpenSpirit link.

Contact Art Paradis art@dgi.com .

URL www.dgi.com

Epoch Well Services MyWells.com, daily report portal

myWells.com is a single point of information on operational activity including electronic tour sheets, drilling and mud logs. Logs can be plotted and data queried with secure user access to the data hosting service.

Contact Brandon Fos Brandon.fos@epochwellservices.com .

URL www.myWells.com

Fekete FAST coalbed methane reservoir analysis.

FAST CBM a toolkit coalbed methane development and reservoir analysis. Data can be imported from PI/Dwights, Merak and .csv files.

Contact Kevin Dunn Kevin@fekete.com .

URL www.fekete.com

Femlab Multiphysics module for MatLab

A 'multiphyisics' add-on for MatLab. Used by Schlumberger and Shell to model coupled physical problems – heat, stress, rock physics, fluid flow etc. A stand-alone version will be released RSN.

Contact info@femlab.com.

URL www.femlab.com

Fugro-Jason FastTracker, structural and flow model integration

Fast Tracker integrates structural modeling, reservoir-property modeling, upscaling and direct output to most flow simulators, into one package.

Fugro-Jason issued a position statement re its acquisition of Petcom. The company is committed to ongoing support of Petcom's PowerLog 'the leader in Windows-based petrophysics'.

Contact Bart Vos bvos@jasongeo.com.

URL www.jasongeo.com

Geomechanics International GMI Imager OpenWorks integration

GMI Imager integrates (read/write) with OpenWorks Emerald.

Contact Lisa Dell'Angelo dellangelo@geomi.com .

URL www.geomi.com

Geoservices gWeb, real time , web-based mud logging

Geoservices new real-time information and communications platform geoservicesWEB hosts client's wellsite information. G-WEB provides document management system and real-time data transmission, integrating data and documents from multiple vendors. GWeb uses Visean's software and security is provided from RSA SecurID.

Contact Elliot Wall Elliot.wall@geosrv.com .

URL www.geoservices.com

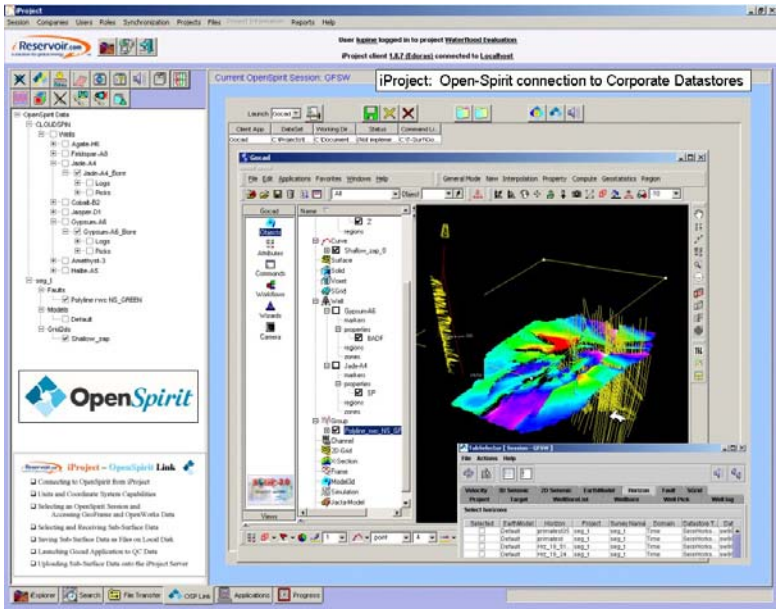
Guydon Software Services SMARTS real-time monitoring of fraccing

Stimulation monitoring and reservoir testing software (SMARTS) provides real time monitoring of the frac process. Works by volumetrics – fluid pumped forecast vs. actual. Used by Halliburton in Canada. Targets service companies and major operators. New version out RSN.

Contact Gary Cooper gary@guydon.com.

URL www.guydon.com

iReservoir iProject, Open Spirit link and turnkey flow modeling service



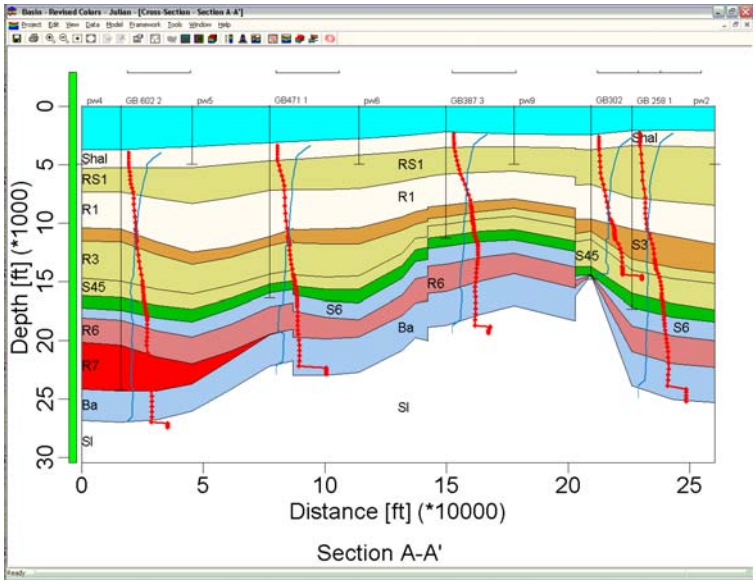
IProject Open Spirit Link[6].

Web enabled project collaboration tool with Data viewers for QC. IProject leverages OpenSpirit data interface and can launch GoCad and Petra from iReservoir. The company also offers a turnkey service providing a model that is flow-calibrated with production data, and constrained to geology and seismics.

Contact Kevin Godbey godbey@ireservoir.com .

URL www.ireservoir.com

Knowledge Systems *DrillWorks2004, geomechanical modeling package*



Basin mdeling in Drillworks 2004[7].

[6] Image courtesy iReservoir.

DW 2004 is described as 'an integrated family of products for geopressure and wellbore stability'. DW Expert - a 'pore pressure toolbox' that can include proprietary methods – or uses built-in industry standard techniques. Log data is transformed into pore pressure (e.g. with Bowers method). View RhoB and overburden gradient in 3D display. Export to DW predict for well planning.

SafeSeal – new application to check that seal can hold a given hydrocarbon column – used in well planning to test prospect validity.

PressBase is a relational database that stores geopressure-related data.

Contact Julian Poole poole@knowsys.com.

URL www.knowsys.com

Maurer Technology Tally Sheet V2 for Pocket PV

MTI and the Department of Energy have released version 2 of the Electronic Tally Sheet for Pocket PC. This free program allows users to build an inventory or tally sheet for tubular products and downhole tools. The Tally Sheet runs on HP/Compaq iPAQ and other Pocket PCs.

Contact Tim Williams twilliams@maurertechnology.com.

URL www.maurertechnology.com

Oildex Production Connect, hosted real-time production data

Production Connect is a web-based exchange of production and sales volume information for the exchange of real-time information with working interest owners. The paper-free Production Connect exchange eliminates faxing, mailing and replacement of lost documents.

Contact Karey Goebel kgoebel@oildex.com

.

URL www.oilidex.com

Oildex SpendWorks V5.0 enhancements

Spendworks 5.0 simplifies the process of ordering and paying for goods and services while providing information to track and evaluate spending patterns.

Contact Peter Flanagan pflanagan@oildex.com .

URL www.oildex.com

[7] Image courtesy Knowledge Systems.

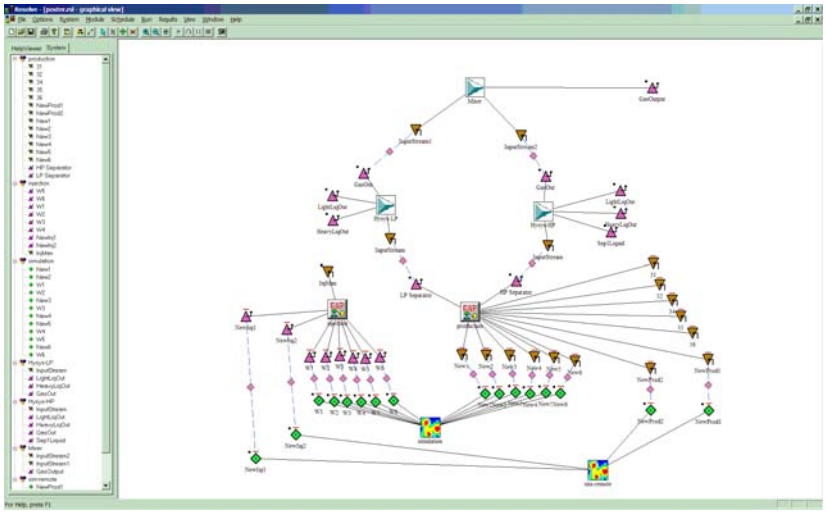
Optimization Petroleum Technologies Inc. PEOffice, "the Petroleum Engineer's 'Microsoft Office'"

PE Office performs production data statistics and analysis, performance analysis, optimization and forecasting. Database independent – runs on Oracle, SQL Server, Access etc. Released in 2002 to Chinese market. Now available in international version.

Contact Chin Wang chin@optpt.com .

URL www.optpt.com

Petroleum Experts Resolve simulates complex facilities



Parallel Reveal connected to GAP surface network controlling 3 Hysys models[8].

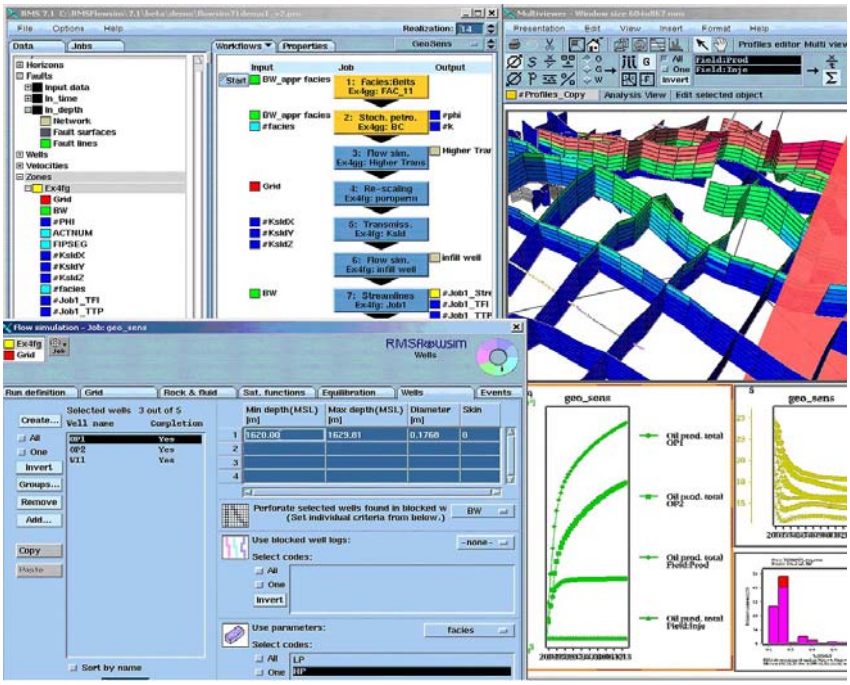
Connect multiple simulator outputs and multiple fields to 'arbitrarily complex' surface facilities.

Contact David Hopkinson Edinburgh@petex.com .

URL www.petroleumexperts.com

[8] Image courtesy Petroleum Experts.

Roxar FlowSim, reservoir simulator embedded in RMS



Simulator now embedded in geomodel[9].

New product from Roxar – an 'Eclipse/VIP class simulator embedded in RMS' – although the initial intent is not to compete head on with these market leaders in the full-blown simulation market. By bringing dynamic flow modeling into the geological model, Roxar hopes to bring simulation to a wider user base. It will be possible to screen more scenarios before building the full-scale model. Static and dynamic data is kept in the same database. Decisions made are tracked and stored. Geologists and engineers 'speak the same language'. A demo showed how multiple realizations of the geological model can be conditioned to dynamic data and matched with well test data. Pressure pulse data was analyzed with well to well animation. The new dynamic options integrate the RMS tree-view workflow manager and support data mining of production data and infill well planning. Impressive stuff even if it does still require a stupendous amount of tabular data entry. Modeling speed can be optimized by tweaking options in the intelligent coarsening process, itself conditioned by streamline calculations of drainage.

Contact Tony Fitzpatrick Tony.fitzpatrick@roxar.com.

URL www.roxar.com

Scandpower OLGA 2000 New real-time 'window into the pipeline'

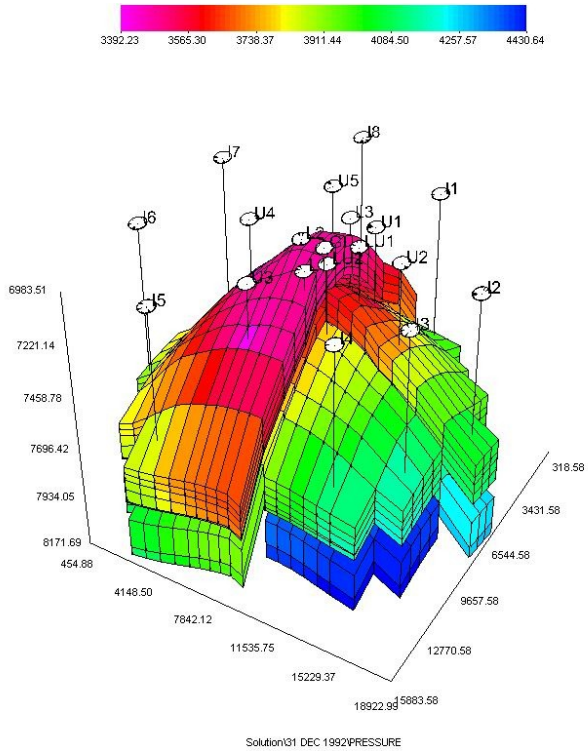
Scandpower's Olga 2000 system models wellbore – pipeline fluid flow. The APIS real time add-on allows couples calculations to SCADA or DCS controls to provide a 'window into the pipeline'. Used to design lifecycle management and optimization systems.

Contact Allan Rydahl ary@scandpower.com.

URL www.olga2000.com

[9] Image courtesy Roxar.

ScienceSoft S3Graph, new 3D module



New 3D data module for S3Graph[10].

Preview of new 3D module – tba year end 2003. Data mining and graphing for reservoir simulation and production data. An OEM version is embedded in Landmark's VIP SimResults tool. Also working with Franlab. Uses Microsoft DirectX graphics – not OpenGL – expect to leverage gaming cards eg NVidia to allow high end visualization on PC. Works with Eclipse, VIP, MORE, SURE, FrontSim etc.

Q What of .NET?

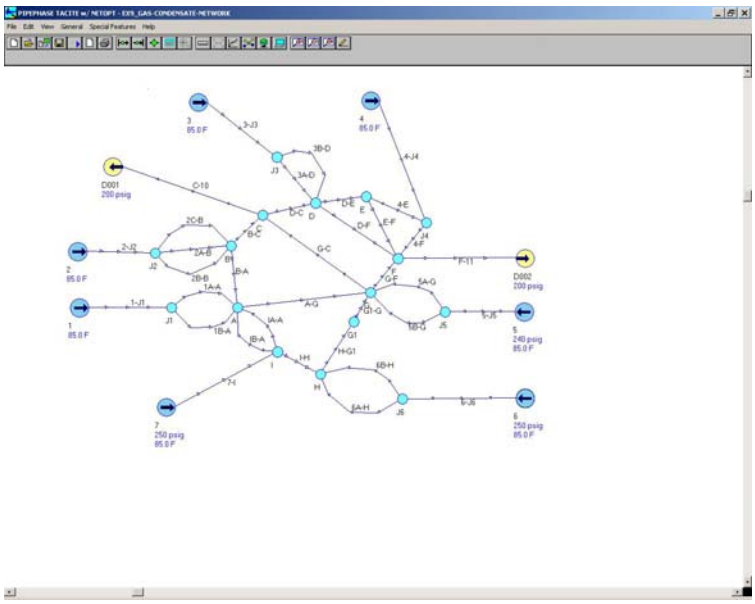
A Wait till next year for stable version from Microsoft.

Contact William Wood William@sciencesoft.co.uk

URL www.sciencesoft.co.uk

[10] Image courtesy ScienceSoft.

SimSci-Invensys- PipePhase V8.0



Pipephase network model[11].

Developed by Chevron and acquired by Invensys 25 years ago. PIPEPHASE Version 8.0 represents a major release with new features. A new Pipeline Device allows users to copy/paste pipeline profiles and other tabular data from Excel. New VFP Device generates Vertical Flow Performance for well characterization.

The compositional flash algorithm is now 'more robust' when supercritical calculating fluid properties. Data entry has been upgraded to standard Microsoft grid widgets with copy/paste functionality.

Users can now take advantage of a new, fully COM compliant API layer to run Pipephase as a slave application from third party applications, such as Excel. Pipephase 8.0 also has excellent on-line documentation for this feature.

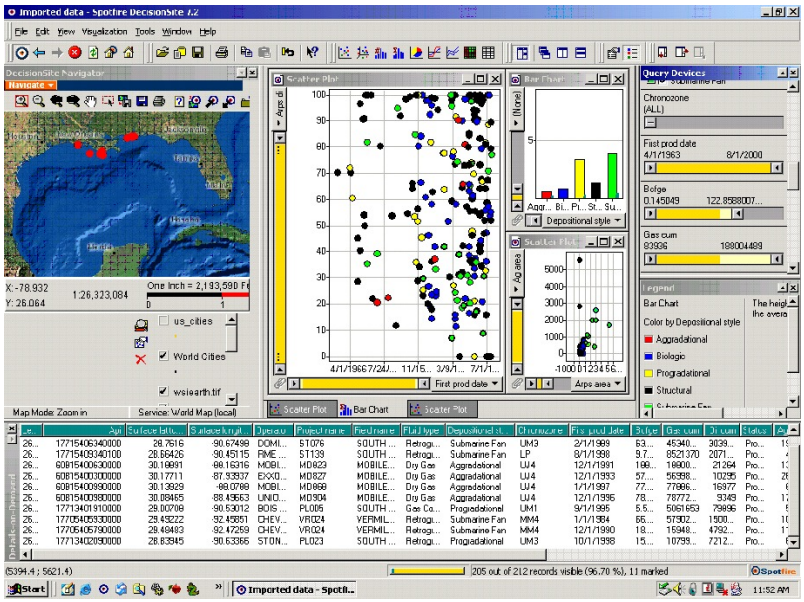
Contact Yong You Yong.you@invensys.com .

URL www.simsci.com

[11] Image courtesy SimSci-Invensys-.

SpotFire

IHS GOM data bundled with Spotfire



Spotfire bundled with IHS GOM data[12].

Working with demo data set from IHS on Gulf of Mexico deepwater study. Compare two different estimates of oil in place – show discrepancies through decline curve analysis. Plan acquisitions by looking for inactive wells with sizable OOIP on similar criteria. SpotFire is a bit bewildering – but definitely powerful. If there are determinant statistics hidden in you data – this is the tool to weasel them out.

Contact Tim Loser Tim.loser@spotfire.com.

URL www.spotfire.com

StreamSim Technologies 3DSLNet, hosted StreamSim

3DSLnet is StreamSim's new service to run 3DSL remotely from any client, world-wide. At the end of the simulation, output is compressed, encrypted and transferred back to the client machine. All data is immediately destroyed on the server as soon as it is transferred back to the client. Interfaces with Scandpower Petroleum technology's MEPO optimizer.

URL www.streamsim.com

GeoKnowledge GeoX Workbench V5.2 includes multiple scenarios

GeoX/gPortfolio assess the consequences of 'drilling out' a collection of interdependent exploration ventures. GeoX/gScenario supports multiple scenarios decision making including all uncertainties and risks.

[12] Image courtesy SpotFire

.

Contact Rosella Gonzales rosella.gonzales@geoknowledge.com .

URL Www.geoknowledge.com

Calsep PVTSim V13, new COM-based integration framework

PVTsim V 13 includes a new COM-based database framework which eases third party use of PVTsim. PVTSim data can now be crowsed and edited through Excel, Access and scripting languages such as VBScript and Jscript. One use is to input PVT lab analyses into the PVT database. Calsep is working on a new heavy oil viscosity model to be released in V. 14.

Contact Niels Lindeloff nl@calsep.com.

URL http://www.calsep.com/

GeoKnowledge Direct hydrocarbon indicator workshop

GeoKnowledge's Direct Fluid Indicator risk modelling workshop (to be held on the 4th December 2003) promises to help companies mitigate risks associated with DHI indicators.

Contact Rosella.gonzales@geoknowledge.com.

URL www.geoknowledge.com

IHRDC IPIMS.ep new multi-media training system

IPIMS.ep is a multimedia e-learning and knowledge management system for upstream petroleum technology. Video, text and graphics are provided on diverse upstream topics. Knowledge communities are housed at www.ipims.com.

Contact Jeannie Perdue.

URL www.ihrdc.com www.ipims.com

Papers of note

We strongly recommend the acquisition of the SPE CD-ROM of the 2003 ACTE proceedings. Here follows some papers of particular interest from the information technology perspective. But for those interested in simulation and optimization, many other relevant papers are available on the CD. The proceedings CD can be obtained from www.spe.org.

SPE 84167 Onshore drilling center as the new work space - Mike Herbert et al., ConocoPhillips Norway.

Reports on successful use of remote visualization and control center on Ekofisk. Developed with Halliburton/Sperry-Sun, InSite and Sense Technology. Drilling, geosteering and cementing operations all carried out remotely from Stavanger-based center.

SPE 84065 Cluster-based simulation in Saudi Aramco - Walid Habiballah.

Aramco will require 50 large scale reservoir simulations in 2006 (upwards of 1 million cells) – a 20 fold increase over 2000. Looking for a cost-effective platform. Opted for a PC cluster with a high speed

switch. Uses POWERS simulator, a dual parallel scheme with grid partitioning, an MPI switch and OpenMP. The 9.6 million cell model of the Gahwar field matched 50 years of history from 3,200 wells in 8.3 hours. Parallel scalability was tested up to 125 processors and found to be 90% linear (computation was 'super-linear' but the network slowed things down). Grid partitioning schemes are critical for performance. 4 clusters, each with 128 processors are now installed.

Q&A

What tools for history matching?

A Energy SciTech's EnAble.

32 or 64 bit?

A 32 – we like commodity hardware.

Visualization?

IHD (Interactive Hierarchical Display)

SPE 84064 Self-learning reservoir management - Luigi Saputell, University of Houston.

Real-time has different meanings – can be from fast (flow control at surface and SCADA) through planned well shut in, injection planning to slow (asset management). The scope of optimization also varies – from single well focus to field-wide. In general the different numerical models used in optimization are not coupled. University of Houston has developed a hierarchical 'data-driven' model of a self-learning, self-optimizing process. The control system uses Model Predictive Control a 'very mature technology' taken from refinery control systems to optimize parameters such as what bottom hole pressure is needed to maximize production. In multivariate optimization the least work path from existing to desired performance is determined by 'exciting' the system with small random perturbations. Multi-level (short and long term) optimization is reduced to a linear optimization problem of Net Present Value (NPV).

SPE 84066 Wellsite Information Transfer Standard update – Matthew Kirkman, BP

Update on WITSML – covered in previous Technology Watch Reports.

SPE 84592 Iterative integration of dynamic data in reservoir models – Kashib et al. University of Calgary.

A probabilistic methodology integrating multi-phase, multi-well production data into reservoir models was developed. The algorithm can integrate data types such as time-lapse seismic. The paper develops a 'rejection scheme' to ensure model convergence offering computational time saving.

SPE 84166 Gas lift automation; real time data to desktop optimization - Reeves et al. BP America, Inc.

Paper offers detailed description of the use of real time data for production optimization of BP's GOM Amberjack field. Wellhead surveillance, gas lift automation and the availability of real time data provided a 7% production gain (600 BOEPD). Links between sophisticated well and integrated asset modeling software are currently being developed and may be widely available within a few years.

SPE 84607 Portfolio development planning for operational and strategic decisions – Koosh et al., Caesar Systems.

Paper describes the use of Caesar Systems PetroVR to build an integrated planning tool for BP's Trinidad and Tobago gas business. The system offered insights 'that would otherwise not be gained'. The cross discipline integration ensured 'a better general understanding of the assets'.

SPE 84142 United Nations framework classification for world petroleum resources - Ahlbrandt et al., US Geological Survey.

Paper describes an extension of the UN framework classification for solid fuels and mineral commodities (UNFC) to include oil and gas. Work builds on SPE, World Petroleum Congresses (WPC) and AAPG classifications. The goal is to provide a framework for worldwide extractive industry reporting. Should integrate new accounting and reporting standards.

SPE 84220 Coupling of a surface network with reservoir simulation - Kosmala et al., Schlumberger

Describes work done for Norsk Hydro on a controller linking reservoir and network simulators. An optimizer ensures optimal management of the coupled system. The system was applied to a water-alternating-gas (WAG) injection in two North Sea field. The coupled system gave 'more accurate and realistic results in all cases'.

SPE 84437 Organizational design optimization in an E&P company - Hal Rabbino, Strategic Clarity.

Paper describes the Goals, Resources, Actions, Structures, and People (GRASP) methodology for analyzing the business strategy of a typical E&P organization. Hydrocarbon resources can be better managed by balancing the focus across all of the upstream activities. New opportunities for working together more effectively and more profitably may emerge than are currently available under the traditional silo-based approach.

SPE 84434 Application of lean six sigma in oilfield operations - Buell et al., ChevronTexaco

Six Sigma is a process improvement methodology that focuses on delivering products at lower cost with improved quality and reduced cycle time. Six Sigma was developed in high-tech manufacturing in the 1980's. Application of Six Sigma is recent and limited. The paper presents examples of Six Sigma application in well testing, rod pump repair, water treatment, oil treatment, well stimulation, and production logging. Systematic application of Lean Six Sigma and ISO quality systems provides a 'disciplined structure for gaining process knowledge and delivering business results'.

SPE 84439 Using visualization tools to gain insight into your data - Plaisant et al., University of Maryland

Paper shows how novel tools can be used to gain insight into data. A 'TreeMap' divides the display area into a nested sequence of rectangles whose areas correspond to an attribute of the data. Used on the Smart Money website (http://www.smartmoney.com/marketmap). A second tool SpaceTree was also used to provide insight into ChevronTexaco's production reporting and compressor management. Both Treemap and SpaceTree have been developed at the University of Maryland Human-Computer Interaction Laboratory - www.cs.umd.edu/hcil.

SPE 84440 Building a dynamic interactive information website with artificial intelligence - Shaw et al., Baker Atlas

Paper describes the design of an 'interactive information management site' for use by Baker Atlas employees. Paper addresses design issues such as data component selection, multimedia assets (html, images, text, PDF). Various knowledge management initiatives – 'Virtual Engineer' and 'Log Advisor' were rolled-up into the portal. Baker's development leverages Oracle and a BroadVision portal to enable role-based information access. The site has 1600 internal and 1200 external users.

SPE 84444 Virtual file room storage and retrieval of electronic documents - Liddell et al. Anadarko Petroleum Corp.

Paper describes management of well and field-related engineering datafiles with an operating-system independent solution which supports data sharing. Standard data storage and taxonomy was developed in this web-based application. J2EE standards were used. Engineers can quickly identify key attributes of a data file and upload it to the server. The Virtual File Room front-end was developed using JSP and Java Script.

SPE 83978 Classification scheme determines how 'real-time' an organization is - Richard Reese, Case Systems.

Evaluates how 'real time' you are in asset measurement, interpretation optimization and control.

Real time optimization report

Oil companies are playing catch up with power and refining in real time optimization (RTO). Opportunities in RTO are not just in the high end of the production business – with high-tech fiber-equipped offshore wells and sophisticated downhole instrumentation. RTO has a role to play in the much larger market of 'dumb wells' and old fields where surveillance and alarms may be of critical importance to safety. Software for integrated asset modelling – such as that from Petroleum Experts (Prosper GAP and MBAL) makes models sustainable. E-Petroleum Services also work in this space – where 'a lot of data is gathered, but little is analyzed'. One speaker reported that the technology has gone beyond the 'business case' and is part of an endemic way of doing business – as for refinery control systems. Well Dynamics operates in the high-tech end of downhole actuators and control and reported that today, only about 160-170 wells worldwide are equipped with intelligent control valves. These systems can produce rapid payouts but are still some ways from widespread acceptance. One issue is the perceived fragility of the downhole equipment – "I don't want jewellery in my wells!"

SPE facts

A surprising facet of the SPE ACTE is the near-absence of any member-level activity in the official program. The Member Meeting and AGM took place as a low key meeting of regional representatives on the Sunday and the Technical Interest Groups were hard to find too. There was one TIG meeting – of the Real Time Optimization TIG, and a TIG organizational meeting. Real Time Optimization TIG – SPE members can sign up to the TIG on http://communities.spe.org.

55,000 members, petroleum engineers not in majority – chemical engineers, geophysicists etc. Incoming president Kate Baker (BP). Technical Interest Groups (TIG)s of varying success (in general rather low participation – although many lurkers). SPE boasts very solid finances. Net assets of $30 million. Income $7.6 million from meetings, $1.2 million from publications, $2.4 million from dues. Expenditure, $11.6 million staff and $1.5 million on website. Currently seeking an extra $5 million for enhancements to spe.org ($5 million spent on www.spe.org last year).

The SPE has a drive underway to raise $5 million for revamp of www.spe.org – 'the knowledge portal' – to re-invent the SPE search engine. 500,000 papers were downloaded last year. Technical Interest Groups (TIGS) were 'upgraded' from email to online web pages. Plans for e-education, streaming conferences, globalization, translations, and financial transactions. Already received $400k from board of SPE, $1 million from ChevronTexaco and $250k from EnCana. Apache, BP and Exxon also major contributors.

Technology Watch Reporting Service

This report was produced as part of The Data Room's Technology Watch service. For details, please contact:

The Data Room

Email info@oilit.com

Website

Tel +331 4623 9596

Fax +331 4623 0652

