

NORTHWEST TERRITORIES - THE NEW FRONTIER!

Bill Gwozd, Manager, Gas Services & Jim Oosterbaan, VP, Gas Services

The southern portion of the Northwest Territories has recently emerged as an exciting new area of potential gas activity, with several recent announcements of significant discoveries in the Ft. Liard area. This activity follows more than 25 years of restrictions on exploration and development activity north of 60° in the Northwest Territories. This article outlines the regulatory/royalty regime, gas price expectations, transportation and midstream opportunities, and the reserve/production status in the Southwestern Northwest Territories.

VERY ATTRACTIVE ROYALTY REGIME

The royalty regime in the Northwest Territories compares favourably with others in Western Canada. Gas royalties for the first 18 months of production are only 1% of Gross Revenue, significantly lower than anywhere else in onshore North America. The royalty percentage increases every 18 months until the maximum of 5% is reached by year six of production. After payout the rate changes to the greater of 30% of net revenues or 5% of gross revenues. The royalty regime fosters a positive environment for exploration and development activity by:

- recognizing stability through regular issuance of new exploration rights
- allowing gas explorers to choose the pace of exploration and development
- rewarding high risk frontier exploration with a profit-sensitive royalty regime.

GAS PRICE - SURGED SINCE THE MID 1990s

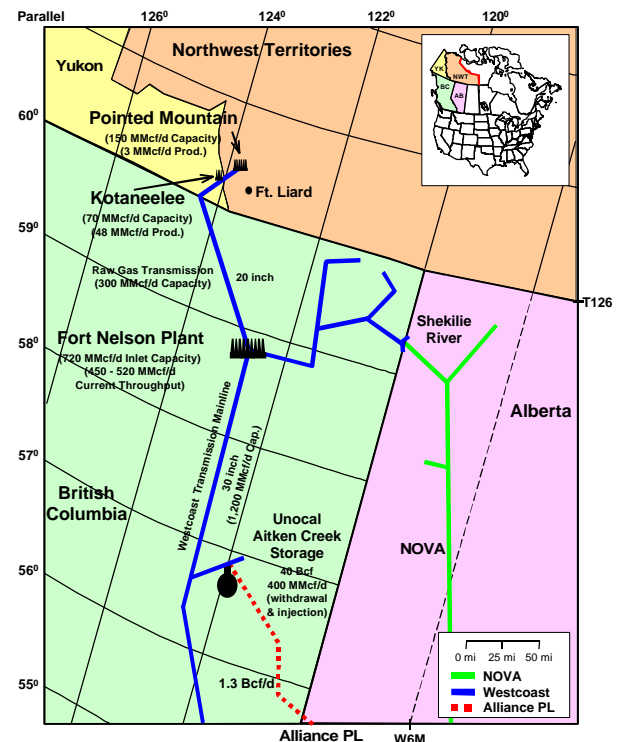
Gas production economics for the emerging Ft. Liard gas producing region suggest that a sustained Empress gas price of Cdn\$2.92/Mcf (US\$1.93/Mcf) will drive gas directed drilling activity. Almost a dozen gas producers (including two majors: Chevron and Amoco) were attracted to the potential of the region in the mid '90s when Empress gas prices climbed from

the 1990s low of Cdn\$1.00/Mcf (US\$0.66/Mcf). As a result of lifting the moratorium after the 1977 Berger Commission report (which addressed the cultural, economic, and environmental impacts of gas pipeline construction in the MacKenzie Valley and the Western Arctic), northern gas drilling resumed in the mid-1990s and focused upon the Ft. Liard basin just north of Alberta and B.C. The current level of gas prices in the Western Canada and the expectation that these gas price levels will be sustained suggest that gas directed exploration and development will flourish in this region.

TRANSPORTATION AND MIDSTREAM OPPORTUNITIES - STRONG COMPETITION

The map below presents the transportation and midstream infrastructure that serves the Ft. Liard area in the southern Northwest Territories.

NWT Transportation and Midstream Infrastructure



An unusual aspect is the *availability of capacity* at the three processing plants (Ft. Nelson, Pointed

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1998 - SPENDING STRONG, BUT AT WHAT COST? 1998 CANADIAN F&D RESULTS MIXED

Plus, Just What Do We Mean by Technology?

Robert Vargo, VP, Canadian E&P Services

A year ago, our Fall newsletter highlighted the Canadian industry's 1997 F&D performance. F&D costs were flat from 1996 to 1997, due to an increased activity level overall and corresponding increases in reserve additions, both oil and gas. 1998 saw product prices strengthen for gas, while the oil price dropped to near record lows throughout the year. With rapidly expanding gas pipeline export capacity in the 1998 to 2000 timeframe, we expected that the industry's gas emphasis (relative to oil) would increase in 1998. The F&D results bore out that prediction, but the cost level increased to levels unseen in recent years.

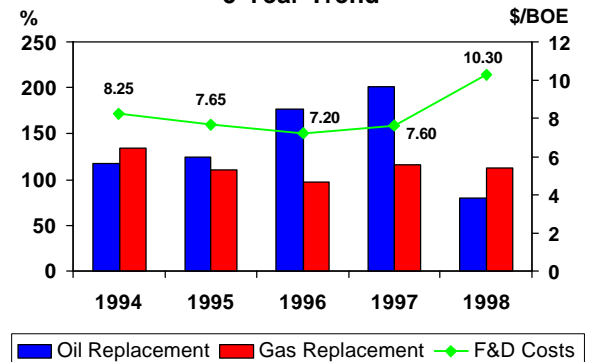
Overall, F&D costs in the Canadian industry increased by 35%, from \$7.60/BOE in 1997 to a whopping \$10.30/BOE in 1998. The increase in F&D costs from 1997 to 1998 was driven by a combination of factors. In addition, significant increases were recorded in many of Ziff Energy's oil and gas strategy areas across Western Canada. Interestingly, the 1998 increase in F&D costs occurred while the industry's relative amount of investment in exploration versus development remained flat from 1997 to 1998 at 38%.

In 1998, overall capital reinvestment (total capital expenditures for Exploration & Development, but *not* for M&A, divided by total BOE production) fell

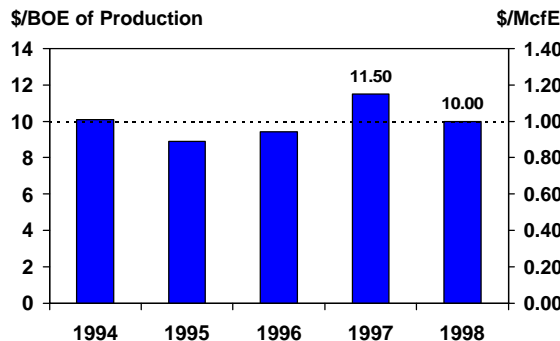
from just over \$11.50 in 1997 (the highest of the 90s), to \$10.00 in 1998. Surprisingly, despite the talk of "doom and gloom", the **1998 spending level was still above the long-term average!**

As expected, from 1997 to 1998 the volume of oil reserve additions plummeted, and production replacement dropped from 201% to only 79%. This decrease was driven by the oil price collapse in 1998, a dramatic contrast to the heady activity (especially for heavy oil) in 1997. Gas production replacement declined slightly, from 116% to 114%. Overall BOE production replacement in the WCSB declined from 152% in 1997 to 97% in 1998, the lowest rate since 1993.

**Production Replacement and F&D
5-Year Trend**



**Capital Re-Investment Levels
5-Year Trend**



Crown land acquired by industry in Western Canada was down significantly in 1998, from 6.9 million hectares to 3.9 million hectares, a 45% decrease. The average cost also decreased from \$220/Ha in 1997 to \$190/Ha in 1998. The volatility and uncertainty surrounding oil prices, coupled with scaled-back capital spending programs, has caused the 1998 trend of declining land sales to continue into the first half of 1999. Hectares acquired at Western Canadian land sales in the first two quarters of 1999 are off 27% compared to the first half of 1998.

Oil well completions reported by industry fell to 3,140 for 1998, a 63% reduction from the prior year's results. Development wells dropped disproportionately (down by 80%), while exploration wells fell only 20%. Heavy Oil experienced the greatest reduction, down more than 75% from 1997 levels.

The gas emphasis of 1998 resulted in 4,582 gas well completions, only 6% lower than 1997. However, exploration completions were up 50%, nearly offsetting the reduction in development completions of 20%. The first six months of 1999 showed a similar emphasis on gas, up 16% from the first six months of 1997, and again with a heightened exploration emphasis.

It will be interesting to see what results the industry produces in 1999. As prices for gas remain high with increased pipeline export capacity, and oil prices continue their strong recovery from recent depths, it remains to be seen how quickly the industry can return to cost levels and replacement rates of previous years.

ROLE OF TECHNOLOGY & SUCCESS

One area that ZEG analyzes as part of its F&D study each year is the impact of technology on successful Exploration & Development strategies. It's important to understand that technology has a number of different meanings and components to it. First, there are *computer-based information technologies*, which can be further classified between *technical IT* (2D/3D seismic workstations, AVO processing, reservoir simulation, etc.), and *commercial IT* (economics evaluation systems, risk analysis systems, MIS, etc.). Second, there is the "*science behind the technologies*", many of which are geology-based and may or may not even require the use of computer workstations (sequence stratigraphy, geochemistry, structural geology, etc.). Lastly, there has been the huge technological impact of "*operational*" technologies,

such as MWD/LWD, horizontal drilling, underbalanced drilling, etc.

While it's easy to make the blanket statement that technology has had a significant impact on the oil & gas industry recently, one should be clear and concise regarding the definition of technology. In many of the strategy areas where ZEG analyzes technology usage versus E&P performance, often *one* broad definitional type of technology will correlate to enhanced performance. For example, 3D seismic and related technologies (migration, inversion and velocity modeling) correlate to low cost explorers in Northern Alberta, and the Plains and Foothills of B.C. On the other hand, in basins such as Saskatchewan & Alberta Heavy Oil, Northern & Southern Alberta Shallow Gas, and SE Saskatchewan Oil, geology fundamentals like structural geology, petrography, and sequence stratigraphy correlate to low cost explorers.

In some cases operational technologies have first come to prominence in Western Canada, and only now are coming to the forefront in the rest of the world (e.g. underbalanced drilling, SAGD). In other cases, technical IT was first developed in other parts of the world, and may or may not be entirely appropriate for use in Western Canada (e.g. prestack depth migration for subsalt imaging). These differences are often driven by the regional character of the WCSB in contrast to many other active basins of the world.

The applicability and business value of any type of technology is more important than the bells-and-whistles, "gee-whiz" aspect. This is one area we will continue to analyze in more detail in the future.

For information on Ziff Energy's 13th annual Western Canada Finding and Development Cost study (185 pages, August 1999), contact Bob Vargo, Vice President, or Len Cyca, Project Manager at (403) 265-0600.



GAS SALES TO GENERATE ELECTRICITY IN NORTH AMERICA

Growing, but Hard to Track

Dr. Tom Woods, VP, U.S. Gas Services

UNITED STATES

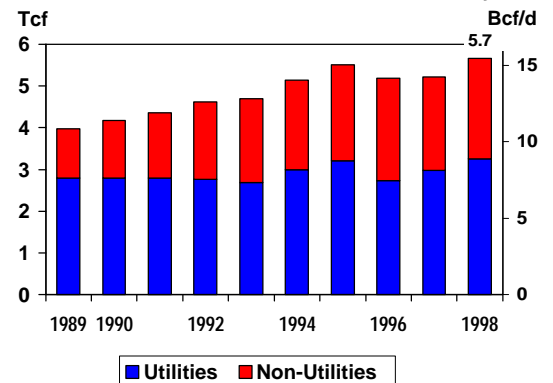
In 1998, more than 11% of electricity in the United States was generated from non-utility sources (e.g. cogeneration, merchant power plants), double from 6% in 1989. Because gas sales to non-utilities (e.g. industrial cogeneration, merchant power plants) in the United States are reported as *industrial* gas sales, the trends in gas sales to electric utilities significantly *understate* the actual level of gas sales to generate electricity.

Although non-utility facilities only generate a modest share (11%) of electricity in the United States, more than two-thirds of this non-utility electricity generation is gas-fired. This is in sharp contrast to electric utilities, where coal and nuclear dominate, and gas provides less than 10% of electricity generation.

Electricity generation has played a significant role in increased gas sales in North America during the 1990s. The relative importance of sales to utility and non-utility generation, however, has been quite different in the United States and Canada. In the United States, the growth in gas sales to generate electricity during the 1990s has been dominated by sales to non-utility customers, whereas in Canada, sales to utilities dominate. Given the recent, large sales of existing, gas-fired power plants by electric utilities and the large number of proposed new, gas-fired merchant (non-utility) power plants, tracking gas sales to generate electricity in the United States will be complex.

Since 1989, the U.S. Department of Energy, Energy Information Administration has explicitly reported non-utility generation of electricity. *Gas sales to generate electricity in the United States (utilities plus non-utility) were 5.7 Tcf in 1998, 29% of total U.S. gas consumption. This use is up 42% from 1989, when only 4.0 Tcf of gas sales were for electricity generation. Almost three quarters of this growth was increased gas sales to non-utilities, which have doubled since 1989. In 1989, gas sales for non-utility generation were 1.2 Tcf,*

U.S. Gas Sales to Generate Electricity

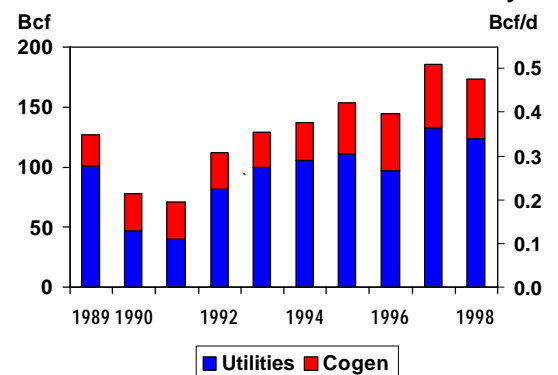


accounting for less than 30% of the gas used to generate electricity in the United States. By 1998, gas sales for non-utility generation were 2.4 Tcf, 42% of the U.S. gas used to generate electricity. In 1998, gas sales to electric utilities were only 17% higher than in 1989 --- very slow growth.

CANADA

The picture in Canada is different. First, gas use to generate electricity in Canada is fairly minimal -- only 3% of U.S. use; and the use of gas in non-utility generation of electricity plays a smaller relative role. Between 1989 and 1991, gas sales to electric utilities in Canada fell more than one half, principally due to a large decline in gas-fired generation of electricity by utilities in Alberta and

Canada Gas Use to Generate Electricity



British Columbia. Despite this large decline, gas use to generate electricity was still 25% higher than 1984 - 1988 gas use.

Since 1991, gas used to generate electricity in Canada has grown steadily. Industrial gas use for cogeneration has about doubled since 1991, and sales to electric utilities have more than tripled! Most of this growth was in Western Canada. By 1995, total gas use exceeded the 1989 peak, and in 1997 reached a new record level.

NORTH AMERICA

In the United States, almost 60% of the total increase in gas sales during the 1990s has been to generate electricity (utility plus non-utility)! As a result, 29% of U.S. gas sales in 1998 was used to generate electricity, up from 24% in 1990. In Canada, more than a third of the growth in gas sales during the 1990s was to generate electricity, and the share doubled between 1990 and 1998, reaching 8%. This is still less than one-third of the U.S. share, reflecting the dominance of coal-fired capacity in Alberta and Saskatchewan, nuclear capacity in Ontario, and hydroelectric capacity in the rest of Canada.

The large growth in non-utility generation of electricity in the United States has also significantly affected the growth in reported gas sales to industrial customers. Industrial gas sales in 1998 were 1.6 Tcf higher than in 1990, and more than 1 Tcf of that growth was for non-utility generation of electricity.

In the future, with the continued unbundling of electricity generation by utilities to merchant power companies, most of the growth in gas sales to generate electricity in the United States could be reported as industrial sales. Because non-utility generation is currently reported only on an annual basis in the United States, there will be a *significant time lag* in identifying to what extent gas sales for electricity generation have grown. As a result, the most recent levels of U.S. gas sales to generate electricity will have to be estimated, using a combination of gas sales to industrial and utility customers.

While Canadian data explicitly report utility and “non-utility” (i.e. cogeneration) gas use on a monthly basis, the algorithms used to allocate the most recent gas sales data in Canada do not reflect the actual level of gas sales by end-use market. The monthly data are seldom *final* until after the United States has published annual, non-utility generation data.

Therefore, while gas sales to generate electricity are expected to continue to play a major to dominating role in the growth of North American gas sales in the future, the current availability of data will make it difficult to develop timely indicators of current gas sales to generate electricity. Ziff Energy will be developing methods to better track gas used to generate electricity in the coming year.

Ziff Energy Group Bursaries - Mount Royal College (Calgary)

Ms. Sara Vallie has been awarded Ziff Energy Group's Tom J. Clay bursary for a student enrolled in the **School for Business & Entrepreneurial Studies** at Mount Royal College. Sara is a student in the Business Administration program. Mount Royal College offers a broad spectrum of educational opportunities, serving the petroleum industry and the Calgary community. Congratulations Sara.



ZIFF ENERGY GOES INTERNATIONAL WITH ITS REDUCING FIELD OPERATING COSTS/ BEST PRACTICES (RFOC) STUDIES

Special Focus on Deepwater SubSea Operations

Adrian Goodisman, VP, E&P Services & Robert Vargo, VP, Canadian E&P Services

INTERNATIONAL EXPANSION

Throughout the 1990s, Western E&P companies have been focusing their efforts on exploring for and developing growth prospects in new, frontier, international oil and gas basins. These regions bring larger prizes to the players who have the capability, capital, technology and risk profile to operate there. This is particularly true, given-on average-the relatively small size and low productivity in onshore North American basins. This, combined with the recent mega-merger phenomenon is driving BP Amoco/Arco, Exxon/Mobil, Total/Petrofina, and other Majors to seek larger and larger growth opportunities overseas.

In particular, international regions like West Africa, Asia-Pacific and Latin America have attracted great interest from Western E&P companies recently. West Africa has seen some of the most significant increases in activity lately, from billion dollar investments and huge deepwater discoveries in offshore Angola, to renewed interest arising from political stability in Nigeria. Asia Pacific has also experienced increases in activity recently, including deepwater discoveries in offshore East Kalimantan, Indonesia, in addition to some recovery, at long last, from the extended regional recession. Latin America is opening up to new investment in nearly every country, with international operators bidding on exciting Brazilian offshore acreage, several years after oil opportunities opened in Venezuela.

International operators bring their own resources to bear in these regions, including technology, resources, capital (both intellectual and cash) and overall Western management practices. One of the practices that Ziff Energy Group (ZEG) is bringing to these regions is benchmarking, and best practices analysis, to help companies reduce their operating costs.

POWER OF THE DATABASE

In North America, ZEG has developed the **world's largest database of field operating costs** and associated **operating practices**. The entire database represents total operating cost spending in excess of \$6 billion annually. Benchmarked fields range from shallow gas and low productivity heavy oil in Alberta, Canada, to deepwater oil production in 5,000+ feet water in the Gulf of Mexico. The entire database includes data on 1,700 fields --- roughly 1,300 are onshore and 400 are offshore, including 80% of the total Deepwater production in the Gulf of Mexico.

ZEG believes in operating cost benchmarking that captures costs at the lowest level possible, at the field where value-adding changes can be made. In North America, we have been able to do this by comparing different fields' operating costs by product mix and by strategy area --- "like" fields are compared to other similar fields.

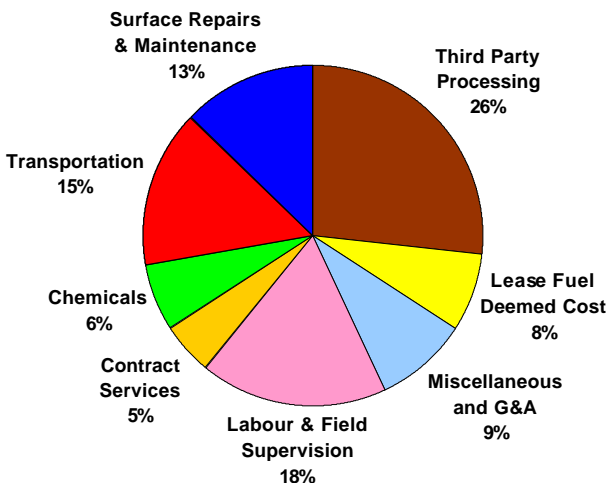
Further breakdowns are made depending on the basin being analyzed. Gulf of Mexico (Shelf) fields are grouped by operating cost drivers such as product (oil/gas), distance from their shorebase (to analyze transportation costs), and age of the platform (vintage). Gulf of Mexico (Deepwater) fields are analyzed based on the type of platform technology utilized (fixed platform, compliant tower, floating production system, tension leg platform, SPAR and sub-sea completions). For our onshore studies, fields are grouped by a variety of characteristics, such as product type, reservoir depth, and drive mechanism.

International operators with either onshore or offshore operations now have access to a very powerful tool to help manage their business. International operators will be able to compare their costs and operating practices to many similar type North American fields.

DEEPWATER RESULTS & SUBSEA FOCUS

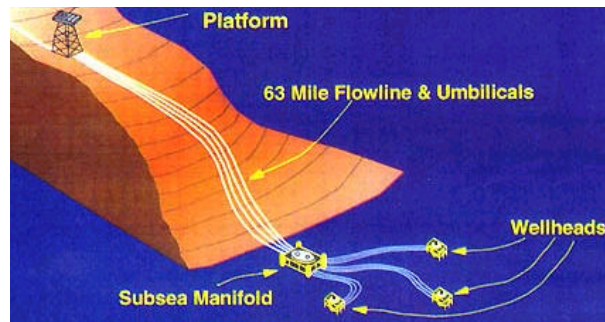
Our recent Gulf of Mexico (Deepwater) study analyzed 30 fields, comparing the operating costs of companies using similar development systems in water deeper than 600 feet. **SubSea production systems** were found to have the **greatest variability** in operating costs of any development option --- the cost difference between the high and low-cost subsea operation is \$7.50 per BOE! In contrast, operating costs for other platform types fell into a much tighter range: jacket and compliant platforms have a \$2.25 difference between high and low-cost operators, while floating and tension leg platform costs vary by \$3.00 per BOE. The average cost for all development systems combined was under \$2.00 per BOE. The three largest expense components are third party processing, labor and field supervision, and transportation. The pie chart illustrates Deepwater operating costs.

Gulf of Mexico Deepwater Study - Operating Cost Breakdown



Ziff Energy Group is presently conducting its 2nd Deepwater operating cost and best practices study. Based upon client input, this study will include **International Deepwater producing assets**.

As with other studies, ZEG's RFOC studies also focus on *best operating practices*. For example, in the Gulf of Mexico (Shelf) study, operating practices investigated included labor, transportation and logistics, compression and chemical treating. Clients for the second Deepwater study wanted to focus on **SubSea operations**, to explore and highlight the lessons learned from SubSea operators around the world. **Halliburton SubSea**, our technology partner for this study, is working with our Deepwater team to identify best operating practices around SubSea operations. Operating practices to be investigated include: key data and planning requirements, hardware selection and testing, logistics and installation procedures, surveillance & operating procedures and training. Additionally, issues of overall uptime, maintenance, and component reliability will be investigated.



Clients wanting more information on the Deepwater study should contact Hank Kelly, VP, Offshore at 1-888-736-5780.



ZIFF ENERGY GROUP PARTNERS WITH HALLIBURTON AND SCHLUMBERGER Partners Will Help Identify Technology-Based Best Practices

Adrian Goodisman, VP, E&P Services & Richard Tucker, VP, Marketing

Ziff Energy Group has developed and maintains an extensive **database of leading operating practices** by basin (offshore and onshore). The process to identify these practices is rigorous, and includes questionnaires to clients, on-site interviews with field superintendents, and a detailed analysis of cost data to substantiate which operating practices are truly leading. We challenge ourselves, and our clients, to identify the "golden nuggets" that really can benefit all operators in a basin.

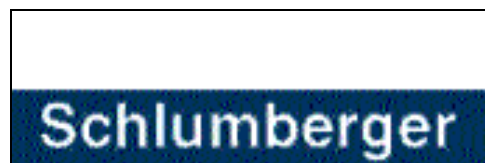
For two of our recent offshore studies, we have partnered with leading oilfield service providers to add additional value to our clients. Where service providers have in the past held client forums to collect and share user feedback on technology applications, Ziff Energy's methodology represents the next generation of client feedback, designing, collecting, and analyzing empirically "real world" results to measure the linkage between success and the use of technology.

Our initial **Gulf of Mexico F&D study** measures F&D costs in seven different strategy areas in the Gulf, employing the approach used successfully in Canada since 1996. We are also investigating the "Why" --- efficiencies of exploration, exploitation

and development programs in the F&D process. To fully support the investigation, experts across four **offshore divisions of Schlumberger** are participating, with our clients, to identify **which technologies** are key to success in each of the specific strategy areas.

The clients in our **International Deepwater Reducing Field Operating Costs/Best Practices study** decided to focus on best practices in SubSea Operations. Therefore, **Halliburton-SubSea** is joining the project as our Technical/Operations Advisor for the Best Practices section of the study. Leveraging off the expertise of Ziff Energy Group, Halliburton-SubSea, and our SubSea deepwater clients, the study is investigating and highlighting the lessons learned from SubSea operations *around the world*, in areas such as flow assurance, seabed/surface facilities, production wells, and injection wells.

Because our E&P clients face significant cost pressures in both Capex and Opex operations, Ziff Energy continues to seek innovative approaches to deliver in-depth, high value and most importantly, practical and useable analysis to now over 100 clients in North America and internationally.



ZIFF ENERGY INTEGRATES E&P SERVICES GROUP

Adrian Goodisman, VP, E&P Services

To better serve our North American clients, and our growing International client base, the E&P Services team of Ziff Energy was recently restructured.

Ziff Energy Group is structured into two primary business lines:

- **North American Gas Services**, which provides research and analysis on all links of the natural gas value chain from wellhead to burner tip, including regulatory issues and areas of energy convergence.
- **E&P Services**, which provides benchmarking and custom consulting services as detailed below.

Since the opening of our Houston office, Ziff Energy has run its Canadian E&P Services from its office in Calgary, while the U.S. operations have been managed out of the Houston office. Given the company's growth during the last two years, particularly in the U.S. and internationally, Ziff Energy has restructured its *U.S. and Canadian E&P Services* into *one integrated business unit*.

Clients will benefit from this restructure in a number of ways:

- we have strengthened our ability to provide integrated, *cross-border services* to the full spectrum of our client base in both Canada and the U.S. These services include M&A entry into Canada for E&P and service companies, and highlighting our large Houston office (20) can introduce Canadian E&P companies and service companies to the U.S. oilpatch.
- Staff in both offices have strong operations experience across the globe. As we expand our benchmarking services, particularly in the areas of helping international clients reduce their field operating costs and implementing leading North American field operating practices, our *International clients* will get the benefit of a seamless operation.

The new E&P Services business unit will provide two types of services:

E&P Benchmarking

Ziff Energy is well established as the **leading North American E&P benchmarking company**, having completed over 55 studies in the last 10 years. The three main types of studies focus on *Finding and Development Costs, Reducing Field Operating Costs/Best Practices, and Heavy Oil Benchmarking*. The firm has also completed studies focusing on People Productivity (Head Office Staffing), Energy Capital Project Benchmarking, and Gas Marketing Costs. Additionally, Ziff Energy can design *custom performance benchmarks* that are appropriate to the needs of your company.

Custom Consulting

Our team is uniquely situated to assist clients with all facets of the E&P business. We provide assistance to companies such as mentoring change, designing improvement programs, undertaking highly specific tasks (e.g. electrical audits), and examining issues such as poor well performance. In addition to our E&P clients, we also have broad contacts with Service Companies, Acquisition and Divestment firms, and Engineering firms.

Our management and strategic analysis is able to assess corporate and asset performance on an individual *basin, cross-basin, and/or cross-border basis*. By using efficient research techniques and various databases, Ziff Energy can screen, rank and profile corporations and assist in due diligence for asset acquisitions. Additionally, by leveraging our proprietary field level operating cost database and our extensive industry contacts, Ziff Energy Group is able to act as an *"intermediary"* whereby buyers and sellers can conduct U.S. asset transactions in a "non-competitive" environment.

Mountain, and Kotaneelee) and Westcoast's sour gas gathering system. Recent work by the Ziff Energy Group shows about 200+ MMcf/d of unused capacity on the Westcoast-operated facilities could serve the Ft. Liard area. Consequently, it is likely that the initial gas production from the Ft. Liard region will flow to Westcoast facilities, perhaps by spring 2000, as this transportation and gas processing option is the most cost effective for gas producers.

Transport and process tolls to Empress, Alberta using existing infrastructure will be Cdn\$1.15/Mcf (US\$0.76/Mcf for 18% sour gas). The cost to transport and process to Sumas (British Columbia/Washington border) is 20% cheaper (Cdn\$0.95/Mcf, US\$0.63/Mcf), *providing* pipeline capacity downstream of the Ft. Nelson plant is available.

Despite Westcoast having excess transportation and processing capacity in the region, there is **significant competition** by midstream firms, to provide alternatives to the Ft. Liard gas producers. The composition of the raw gas (e.g. the H₂S content) will impact the options available. The options range from connecting to existing facilities, to bypassing the Westcoast gathering and processing facilities and connecting to the Westcoast mainline downstream of the Ft. Nelson processing plant. The additional supply in the region is attracting interest of holders of transportation capacity on the Alliance pipeline who are seeking incremental gas supply. Members of the Ft. Liard producers group (Anderson, Berkley, Canadian Forest, Chevron, Paramount, Purcell, Ranger, Suncor) are working together to ensure the efficient development of infrastructure in this region.

Midstream opportunities will arise to gather and process gas. Providers such as AltaGas, ATCO, Gulf Midstream, TransCanada Midstream and others can potentially offer competitive services to gas producers for gas gathering and processing.

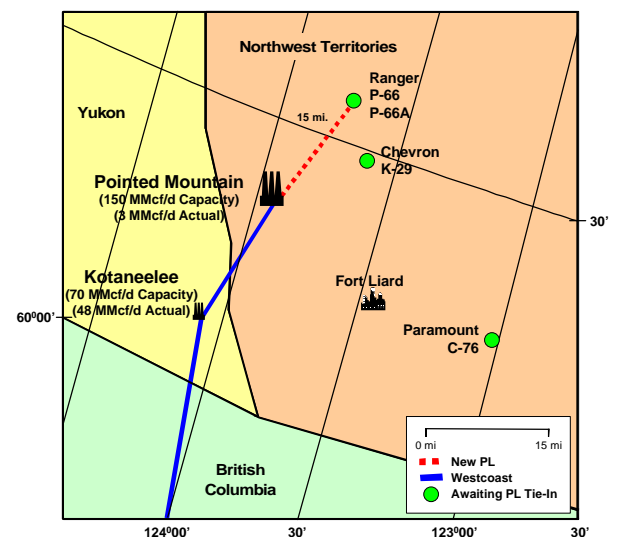
RESERVES: PRODUCTION BY MID 2000

The July 1999 Canadian National Energy Board (NEB) assessment of resources states that the

entire Northern Frontier region (which includes Ft. Liard area) contains over 100 Tcf of gas resources, of which 85% is undiscovered. The assessment is based on estimates from a 1994 technical report and an update published last year and excludes the results from the 1998/99 winter drilling activity. Geological assessment by the NEB indicates the potential for over 1,600 gas pools, ranging from under 1 Bcf to more than 200 Bcf (Chevron/Purcell) reported its K-29 well as 400 to 600 Bcf).

Current gas production from the Northwest Territories comes from a single gas well operated by Amoco at Pointed Mountain. Although gas production has declined to only 3 MMcf/d, the field has produced 320 Bcf. The map below shows the location of recent successes reported by operators in the Ft. Liard area: Chevron/Purcell K-29 well (100 MMcf/d), Paramount C-76 (70 MMcf/d) and Ranger/Forest P-66/P-66A (20 MMcf/d). Chevron/Purcell finished drilling K-29 (10,000 ft.) six weeks ahead of schedule and 20% under the Cdn\$20 million budget. New gas production from these high deliverability gas wells is expected to flow by mid 2000.

Important Northwest Territories Gas Wells



For further information about this article or Ziff Energy Group's Western Canadian Supply and Deliverability Study, please contact Bill Gwozd at 1-800-853-6252 (e-mail bgwozd@ziffenergy.com).

WELCOME OUR NEW SENIOR STAFF



Robert J. Vargo, MBA - Vice President, Exploration & Production Services, Canada

Mr. Vargo leads the Canadian E&P Group in Calgary, which is responsible for the **Corporate X-Ray Benchmarking Studies** and related **custom consulting** services. Bob gained experience with Ernst & Young Calgary, providing multi-client benchmarking studies for upstream oil & gas companies, pipelines and gas processing facilities. He has led these engagements throughout North America, and successfully marketed and delivered the first benchmarking studies of upstream oil & gas companies in the Asia-Pacific region. His experience includes consulting to foreign contractors and state oil companies in Indonesia, Thailand and Egypt. Bob gained high-technology experience as a Practice Manager at Landmark Graphics Corporation in Calgary and Houston, using his benchmarking experience to support market research, client analysis, and post-sales value propositions. Bob has a BA in Russian Language and International Studies from Trinity University in San Antonio, Texas, and an MBA from the University of Texas at Austin.



Steven D. Turk, P.E., MBA - Project Manager

Mr. Turk is a petroleum engineer with 24 years experience in the exploration & development sector. His broad background includes drilling engineering and management, production engineering and field operations, engineering management, and gas operations. Steve spent the majority of his career with Cabot Oil & Gas Corporation, a mid-sized U.S. independent. His geographic background spans four onshore basins: the Mid-Continent, the Rockies, Appalachia and the Gulf Coast. He has focused on operating cost optimization, economic evaluation and asset rationalization. His **downstream** background includes management of operations and engineering for a large intrastate pipeline and the associated storage and processing assets. A former RFOC client, Steve is now responsible for managing various RFOC regional-benchmarking studies within the United States. He has a Bachelor of Science Degree in Geology from Edinboro State University (PA), a Bachelor of Science Degree in Petroleum and Natural Gas Engineering from Pennsylvania State University, and an MBA from Oklahoma City University (honors).



Philip A. (Phil) Moses, B.Sc. Geol. - Project Manager

Mr. Moses has over 25 years of E&P experience, primarily in the U.S. Gulf of Mexico, as well as the north Sea. He is highly experienced in reservoir characterization techniques, economic analyses, and project management. Phil held various leadership roles for 14 years with Mobil Oil in New Orleans, Louisiana. He has a comprehensive knowledge of and wide experience in all aspects of petroleum exploration and production in the offshore Gulf of Mexico and North Sea, particularly in offshore field exploitation and development. Phil is *Project Manager* for the *U.S. Gulf of Mexico Finding and Development Cost Study*. He has a Bachelor of Science degree in Geology and Geography from the University of London, U.K. and is concluding a Master of Science degree in Petroleum Engineering from Louisiana State University, Baton Rouge.



Timothy Powell, M.S., B.Sc. - Project Manager

Mr. Powell has over 15 years of industry experience in offshore Gulf of Mexico operations. He worked eight years with Marathon with positions in production, construction and reservoir engineering. His most recent experience was with Seagull Energy as an Area Operations engineer responsible for all offshore Texas properties. He is currently the *Project Manager* for the 1999 *Gulf of Mexico/International Deepwater Reducing Field Operating Cost/Best Practices* study, and will also be the Project Manager for the Gulf of Mexico Shelf #3 Reducing Field Operating Costs/Best Practices Study.

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