

SHELIN CHUGH
VICE-PRESIDENT, ENGINEERING
EPIC CONSULTING SERVICES
1900, 540 – 5th AVENUE SW
CALGARY, ALBERTA T2P 0M2
PHONE (403) 444-1413
FAX (403) 444-1424

Summary of Experience

A Professional Engineer with 22 years of experience in the areas of Reservoir Engineering & Simulation, Production Operations, Gas Plants and Property Evaluations. Broad exposure to heavy, medium and light crudes, low and high pressure gas fields, fractured and tight reservoirs

Employment History

Consultant Experience

GentryResources	Aug – Oct 2007
• Evaluate Pekisko potential oil and gas development	
Enhance Energy	June – Oct 2007
• Simulate CO ₂ development of Clive D2 D3 reservoirs with 300 wells	
Yellow Brick Energy	Dec – June 2007
• Assess various properties for acquisition	
Penngrowth	Dec – Jan 2007
• Assess feasibility of thermal potential for oilsands property	
Marathon	May – July 2006
• Evaluate and explain performance of thermal pilot for acquisition	
OMV Austria	Sept 2005 – July 2007
• Evaluate feasibility of injecting acid gas Reyersdorfer or Schoenkirchen reservoirs for improved gas recovery. Update model as new geological interpretation provided.	
Kereco	Sept – Dec 2005
• Evaluate performance to date and feasibility of CO ₂ flooding at Sturgeon Lake South	
Provident Energy	May – Sept 2005
• Review miscible flood performance and NGL availability	
Canadian Forest	May – Oct 2005
• Review performance of Keg River waterflood	
Paramount Energy	Jan – Aug 2005
• Analysis of pool performance and connectivity at Hardy and presentation at gas over bitumen hearing	
Acclaim Energy	Aug – Dec 2004

- Acheson review resulted in recommendation for blowdown to proceed
 - Mitsue simulation to find drilling and recompletion opportunities underway
- Enerplus June – Oct 2004
- Pembina Cardium streamline simulation of 200 wells resulted in 10 drilling and 15 recompletion opportunities in mature pool
- Sifton Energy Oct 2004
- Evaluation of Garrington Cardium Unit 3 development potential
- Ketch
- Evaluation of Nisku pool for waterflood potential
- Krang Energy Jan – Nov 2004
- Richdale tight gas modelling
 - Esther tight gas modelling
 - Worsley gas reserves
 - Stanmore pool reserves
 - Provost tight gas modelling
- Arc Resources March–April 2004
- Evaluation of billion barrel field for acquisition
- Shell Canada Ltd. May-August 2004
- Assessment of cold production potential over lands in Peace River area
- Galleon Energy April – Dec 2004
- Evaluation of pool reserves in tight carbonate
 - Evaluation of multiple waterfloods in Brooks area
 - Identified waterflood upside in Taber area
- Silverbolt July 2004
- Simulation of tight pool with significant gas cap and oil leg
- Real Resources Feb – Apr 2004
- Waterflood assessment via simulation of Ferrybank pool
- Galleon Energy Sept – Dec 03
- Halfway J Pool,
 - Little Bow I & T
 - Evaluation of Wymark tight gas infill drilling potential via simulation
- Prime West June – July 03
- Evaluation of Steelman Units and area for acquisition
- Encana Sept – Oct 03
- Analysis of Leahurst Glauco B waterflood potential
 - Analysis of Leahurst Glauconitic D waterflood potential
 - Evaluation of Halrkirk Upper Manville I waterflood potential
- Acclaim Energy
- Analysis and ranking of eight pools under waterflood

Apache Canada	Oct 02 – Dec 03
<ul style="list-style-type: none"> • Full field simulation of 2700 wells at Hatton for field development planning • Assessment of CO₂ potential for 1000 well field (Midale) • Tight gas assessment for infill drilling to 40 acre spacing at Hatton 	
Revolution Energy	Aug – Sept 03
<ul style="list-style-type: none"> • Simulation of primary and waterflood recovery of Nordegg Leaman pool 	
Highpoint Resources	May – July 03
<ul style="list-style-type: none"> • Study of Desan Lake area pools to estimate gas reserves 	
Columbus	March 03
<ul style="list-style-type: none"> • Waterflood optimization of Sparky Wainright Pool 	
Lockwood Resources	Feb 03
<ul style="list-style-type: none"> • Material balance and pool depletion strategy for Campbell Morinville pool 	
Venture Energy	Jan 03 – Mar 03
<ul style="list-style-type: none"> • Evaluation of infill opportunities in tight, heterogeneous sands at Doddsland • Evaluation of Parkman for acquisition 	
Barrington Resources	Nov 02
<ul style="list-style-type: none"> • Eyehill Sparky Waterflood evaluation and application 	
Northrock Energy	Feb 02 – Dec 02
<ul style="list-style-type: none"> • Kisbey waterflood evaluation for unitization 	
Keywest Energy Ltd.	Feb 02 – Dec 02
<ul style="list-style-type: none"> • Analytical assessment of pool performance of Jumpbush, followed by simulation • Assessment of pool performance for acquisition of Sturgeon Lake • Evaluation of Bashaw Nisku G & L pool for acquisition • Bashaw D2C evaluation for acquisition • Material balance of Chigwell properties • Optimization of injection efficiency at Chin Coulee • Evaluation for acquisition of Spirit River Charlie Lake pool • Leahurst evaluation of pool performance and infill drilling opportunities 	
Progress Energy	
<ul style="list-style-type: none"> • Two Creek B waterflood evaluation and simulation • Two Creek A waterflood evaluation and simulation 	
NAM, Netherlands	Aug 01 – Dec 01
<ul style="list-style-type: none"> • Modeling of various steamflood options for Schoonebeek field 	
Star Oil & Gas	Apr 01 – Nov 01
<ul style="list-style-type: none"> • Simulation of 150 well carbonate pool 	
Apache USA	May 01 – Aug 01
<ul style="list-style-type: none"> • Build 800 well streamline model 	
Samson Indian Band	May 01 – Dec 01

- 3D modeling of pool for equity dispute
- Barrington Resources Ltd. May 01 – May 01
- Review of volatile oil pool reserves and concurrent production potential
- Arc Resources, Calgary Oct 00 – Nov 00
- Streamline simulation of 230 well pool
- Shell Canada, Calgary, Alberta Jan 00 – Sep 00
- Conversion of 4 models from MoRes to Eclipse
- Arc Resources, Calgary, Alberta Apr 00 – May 00
- Streamline simulation of 50 wells underwaterflood to identify infill opportunities
- Passage Energy, Calgary, Alberta Nov 99 - Mar 00
- Reserves and production profile for reservoir under water coning, infill & drainage assessment
- Chevron Canada, Calgary, Alberta Oct 99 – Jun 00
- History match of 300 well sector model under waterflood and miscible flood
- Santos, (based in Adelaide, Australia) Feb 99 - Sep 99
- Selection of pilot area, characterization and simulation of 4 Tcf tight gas, multi-layered reservoir
- Gulf, Calgary, Alberta Aug 98 - Nov 98
- Simulation of acid gas injection effects into producing Westeros South pool
- Suncor, Calgary, Alberta Apr 98 - Aug 98
- Simulation of tight gas reservoir to determine optimal drainage method for 350 Bcf pool
- Petroleum Technology Alliance Consortium Feb 98 - Apr 98
- Simulation to test advantage of cyclic waterflooding in heavy oil reservoir
- Ulster Petroleum, Calgary, Alberta Feb 98 - Apr 98
- Single well simulation (in Wimborne D2A pool) found oilwell draining 1.75 sections.
- Woodside Petroleum, (based in Perth, Australia) Jun 97 – Dec 97
- Used compositional simulation to determine impact of condensate dropout in the Perseus (12 tcf) field
 - Reviewed complex Goodwyn (8 tcf) full field model and implemented changes to reduce run times by factor of seven.
- Shell Canada, Calgary, Alberta Jun 96 – Dec 99
- Prepared response to AEUB for queries on Belloy simulation submitted in support of early blowdown. Also provided support on general reservoir engineering issues.
 - History match of miscible flood pattern which showed solvent override. Recommended use of horizontal solvent injector to mitigate override and improve recovery in mature EOR area.
- Parker & Parsley, USA Oct 95 - Jan 99
- Review of material balance for the O'Daniel lease
 - Design of pulse test in naturally fractured reservoir via analytical and simulation techniques.

- Review and rationalization of large production database for eventual use in simulation

Crestar, Calgary, Alberta

Feb 96 – Oct 96

- Evaluation of heavy oil potential using cold production and SAGD
- Scoping study of steam assisted gravity drainage (SAGD) in heavy oil pools.

YPFB, Bolivia

Nov 95 - Jan 96

- Technical audit of the Monteagudo oilfield to determine if the field had been developed properly and if the waterflood had been implemented correctly.

Chauvco, Calgary, Alberta

Nov 95

- Built analytical model of steam drive and assessed SAGD potential for thermal project at Marsden.

Applied Reservoir Engineering (Calgary)

Suncor, Calgary, Alberta

Sep 94 - Jul 95

- Completed black oil simulations for the Blueberry North and South pools in N.E. B.C. This reservoir was quite heterogeneous and faulted thereby making for a difficult history match.

Outrider Resources, Calgary, Alberta

Mar 95 – Apr 95

- Performed material balance with error analysis for the Lanaway pool.

Husky Oil Operations Ltd (Calgary)

Heavy Oil Business Unit

Jun 93 – Jun 94

- Evaluation of drilling locations (in conjunction with geologist), recompletions, workovers and equipment upgrades. Prepared budgets and monitored performance. Responsible for overall field development including business strategy and cost.
- As the reservoir / production engineer, on a team comprised of two other key members (geologist and operations engineer), increased Edam oil production by 1400 bbl/d (or 55%). This was accomplished by drilling 11 consecutive successful wells which added 1.2 Million barrels recoverable reserves and 700 bbl/d production. An additional 700 bbl/d production was gained by undertaking a general field optimization program (equipment upgrades & start-ups) . Cold production technology was used extensively.
- Based on an analysis of declining production from the 11 horizontal wells in the Edam Field, identified it as a poor application of horizontal wells due to soil mechanics and fluid flow considerations. Further horizontal drilling in the area was therefore suspended (saving \$600,000 per well) until further production technological advances occurred.
- Conducted a detailed review of Edam's reserves, resulting in a 20% increase and re-evaluation to \$33 Million . These reserves were confirmed by the external consultants.

Select Properties Group

Jun 91 - May 93

- Reserve evaluation of area assets and making recommendations regarding all operating issues such as tie-in of reserves, drilling infills and selection of workover candidates. Joint Venture Representative for assets such as Wapiti, Liege, Hamburg, Cecil.

- Evaluated \$28 Million worth of properties for divestiture . This was a significant portion of the Pod's value which was ultimately sold for \$105 Million. Also evaluated \$8 Million of properties for acquisition .
- Recognized true worth of Liege (low pressure gas field with 300 Bcf gross) which increased selling price from \$2.5 Million to \$6.5 Million.
- Technical and operating committee representative for the Hamburg, Manir and Sinclair unitizations.
- Optimized timing of gas bank withdrawal for incremental \$1.4 Million gain.
- Recognized gas drainage scenario at Pouce Coupe and launched rateable take application with the ERCB. Ultimately settled with competitor prior to hearings for 4 times the original offer.
- Optimized business interests through Gas Cost Allowance (GCA) acceleration and Crude Oil Royalty Holiday Program (CORHP) benefit increase, which resulted in savings of \$300,000 and \$150,000 respectively.
- Evaluated and presented properties worth \$3 Million as part of the Northern Alberta Divestiture Team.

Conventional Oil & Gas (COG)

Nov 88 - May 91

- Exploitation and development of lands, assessing potential for drilling, completions, workovers, tie-ins, farmin/farmout, GTO and GPP.
- Coordinated administrative duties included mail ballots, AFE's, processing agreements, budgets and performing economic analysis for projects under \$ 300,000.
- Initiated and completed study aimed at identifying opportunities to tie-in shut-in reserves. A number of opportunities were acted upon in the existing business climate.
- Identified that a Joule Thompson plant on a gas well with strong water drive would save \$1 Million on tie-in of gas well compared to conventional compressor / dehy installation.
- With reservoir engineer, performed reservoir / gas gathering system study which suggested that the requested compression would not be the best course of action, thereby saving the Company \$600,000.
- Developed and executed Husky's position on the Hamburg rateable take / common processor hearings by the ERCB. Appeared as witness before the Board.
- Monitored the operating & financial performance of 150 financial leases with 200 wells .

Canterra Energy Ltd. (acquired by Husky Oil) Calgary, Ab.

Production Engineer

Jun 85 - Oct 88

- Performed debottlenecking studies (via HYSIM) of gathering system
- Replaced equipment such as semi-lean air coolers.
- Designed, procured and supervised construction of liquid sulfur degassing pit at Okotoks which was built for \$500,000. (30% under previous estimates).
- Developed methodology for hydrocarbon component based allocation of plant products (worth \$50 Million per plant). Implemented a novel idea which saved \$80,000 on testing of well liquid rates.
- Provided detailed specifications for automation of field & plant data gathering and reporting.

Teaching Assistant

Sep 83 - May 85

Technical University of Nova Scotia, Department of Chemical Engineering

Completed courses towards a Masters degree prior to being hired by Canterra Energy. Also taught as part time teaching assistant during 83/84 semesters.

Research Assistant

Summers 82-83

Technical University of Nova Scotia, Department of Chemical Engineering

Won NSERC grants for the following research projects :

- 1983 - Start development of models to simulate the impact of coal quality on the economics of power generation.
- 1982 - Investigate the performance of an electrochemical reactor designed to remove pollutants from effluent gases at pulp mills

Education

M.Eng in Petroleum Eng., University of Calgary, 1994

B.Eng in Chemical Eng., Technical University of Nova Scotia, 1983

B.Sc in Chemistry, Dalhousie University, 1981

Awards

1984 - 1980 Fund Scholarship

1983 - NSERC Undergraduate Research Grant

1982 - NSERC Undergraduate Research Grant

Publications / Presentations

Co-author of following presentations/papers

1. *Full-Field Modeling Using Streamline-Based Simulation: 4 Case Studies*, SPE paper 66405, Prepared for presentation at the SPE Reservoir Simulation Symposium held in Houston Texas, 11-14 February 2001
2. *Using a Stochastic 3D Model to determine Optimal Infill Potential of a Mature Gas Field: A Case History*, SPE 62901, presented at the Annual Technical Meeting, Dallas, Oct, 2000.
3. *Analysis of Production Data to Improve Characterisation of In-situ Megascopic Reservoir Permeability*, SPE 59761, presented at the Gas Technology Symposium, April 2000..
4. *Material Balance for Multi-layered, Commingled, Tight Gas Reservoirs*, SPE 59760, presented at the Gas Technology Symposium, April 2000, Calgary.
5. *Mainstream Options for Heavy Oil: Part 1 – Cold Production*, CIM, 1997 ATM, JCPT, April 2000
6. *Simulation of Horizontal Wells to Mitigate Miscible Solvent Gravity Override in the Virginia Hills Margin*, CIM, 1997 ATM, JCPT February, 2000.
7. *Optimization of the Blueberry Debolt Oil Pool : Significant Production Increases for a Mature Field*, CIM 1997 ATM, JCPT Special Edition, Dec, 1999.
8. *Gas Cap Blowdown of the Virginia Hills Belloy Reservoir*, CIM, 1998 ATM.
9. *Mainstream Options for Heavy Oil: SAGD*, SPE 78942.
10. *Streamline Technology for the Evaluation of Full Field Compositional Processes; Midale, A Case Study*, SPE 89363, 2004 IOR Conference.

11. "Field-Scale Compositional Simulation of a CO₂ Flood in the Fractured Midale Field", *CIM paper 2004-200, CIPC Conference 2004, Calgary, Alberta, Canada, June 8 – 10, 2004.*
12. "Tight Gas Diagnostics: To Drill or Not to Drill?", *CIM paper 2004-212, presented at the Petroleum Society's Canadian International Petroleum Conference 2004, Calgary, Alberta, Canada, June 8 – 10, 2004.*
13. "Development Of The Strasshof Tief Sour Gas Field Including Acid Gas Injection Into Adjacent Producing Sour Gas Reservoirs", *SPE 100328, SPE Europec/EAGE Annual Conference, Vienna, Austria June 2006*
14. "History Matching Standards; Quality Control and Risk Analysis for Simulation", *CIM 2006-129, Calgary, Alberta June 13-15, 2006*

Presentations / Courses

Reservoir Surveillance at CIPC 2006 conference
 Waterflood Surveillance for Asset Optimization and Acquisition,(CIM & Industry course), 2003,2004, 2005
 Understanding Your Waterflood: The New Tools, CIPC conference, June 2002
 Are You Getting the Most Efficiency from Your Waterflood? , April, 2002

Other Activities

Member of Editorial Review Board of JCPT 1998-Present
 Member of CIM ATM Organizing Committee 1995,1996

Computer Proficiency

Project manager for development of Epic's ResAssist, the graphical user interface to 3DSL streamline engine. Also responsible for Epic's computing strategy.

VIP	Reservoir simulation
ECLIPSE 100/500	Reservoir simulation
IMEX9400	Reservoir simulation
DRS	Reservoir simulation
MoRes	Reservoir simulation
Libra	Fluid characterization
PEEP	Economics
GEOSCOU	Well & production data
HYSIM	Pipeline & process simulation
GASDEL	Gas deliverability
WELLTEST NFR	Pressure transient analysis
FAST	Pressure transient analysis
FLOWTRAN	Process simulation

All major general PC software, NT4/Windows 2000 Professional, Unix, and use of such software on Unix workstations (SGI, Sun, IBM, Intel)

Professional Affiliations

Member of APEGGA
 Member of SPE
 Member of CIM Petroleum Society

Member of Canadian Heavy Oil Association

Professional Development

Thermal Recovery	U of C	1997
Petroleum Geology	OGCI	1996
Numerical Methods in Chemical Engineering	U of C	1994
Air Pollution	U of C	1994
Reservoir Simulation	U of C	1993
Reactor Design	U of C	1993
Production Engineering	U of C	1993
Secondary & Tertiary Recovery	U of C	1992
Well Test Analysis	U of C	1991
Production Forecasting	CIM	1991
Introduction To Petroleum Geology	PITS	1991
Horizontal Wells	U of C	1991
Well Operations Engineering	CIM	1990
Reservoir Engineering	U of C	1990
Basic Applied Open Log Interpretation	Hitchner	1989
Production Operations 1	OGCI	1988
Gas Production Engineering	OGCI	1987
Natural Gas Processing Technology	U of C	1986
Natural Gas Processing Principles	U of C	1985
Special Topics (Process Simulation)	TUNS	1984
PJVA Joint Venture Agreements	PJVA	1990
Time Management	in-house	1986
Project Management	in-house	1986
Problem Solving/Decision Analysis	in-house	1985
Operations Research (Business)	Dalhousie	1984