



Instant Report		
pd)	Gas (mcf/d)	Water (bw)
	3,053	
0	1,436	
0	390,548	6,98
Oil (mbo)	Gas (mmcf)	Water (mbw)
	978,214	N/A
	3,882	
0	279,831	
0	955	



CATALYST

Resource Play Evaluation Platform

Advisors to the Resource Sector. . . Leading with Ideas!

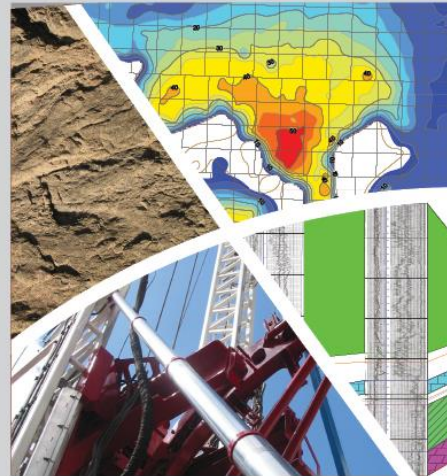
Innovative, client-driven E&P solutions since 1987.

- Over 300 clients worldwide, from juniors to super-majors
- 70+ interdisciplinary staff, including 50 technical professionals
- A long history of research and development
- Independent, third-party analysis and business-oriented solutions
- Three service-oriented divisions: Data, Intelligence, Expertise

DATA

INTELLIGENCE

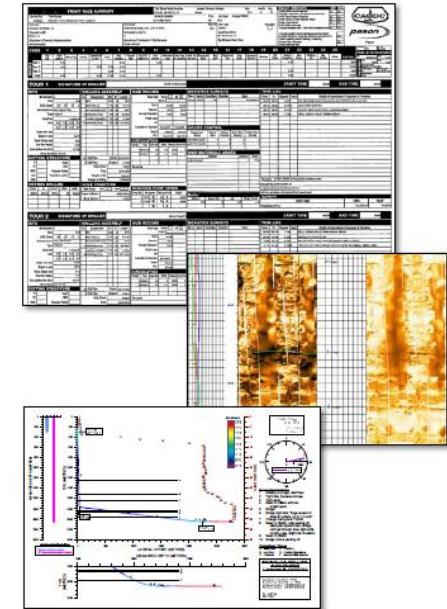
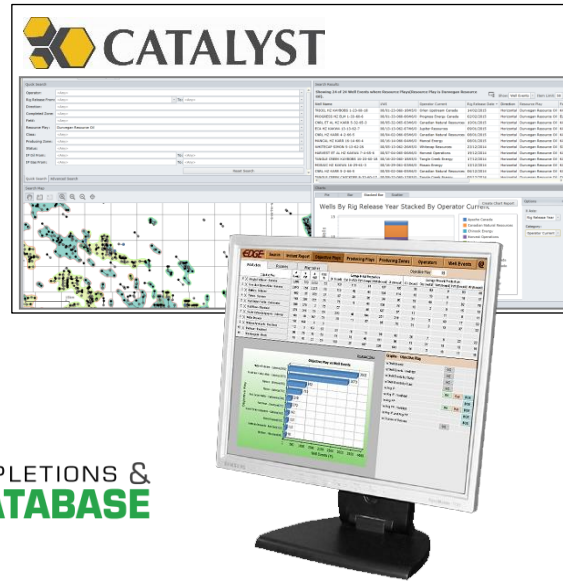
EXPERTISE





WELL COMPLETIONS &
FRAC DATABASE

OPTIMIZE
YOUR
**COMPLETION
SUCCESS**



Frac Database

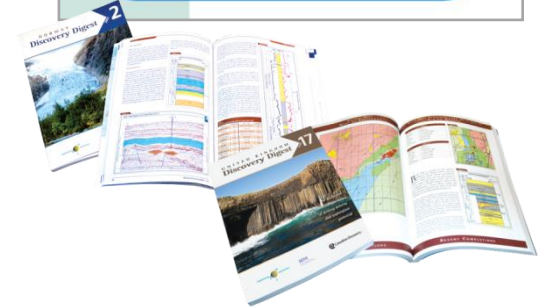
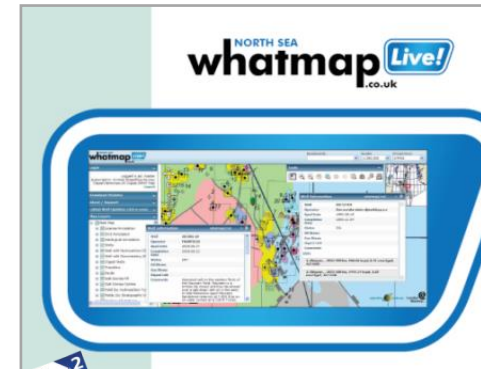
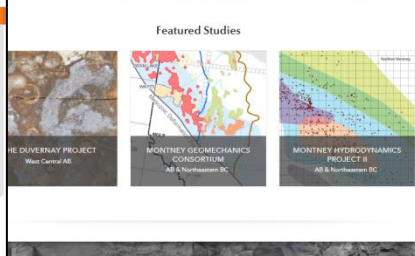
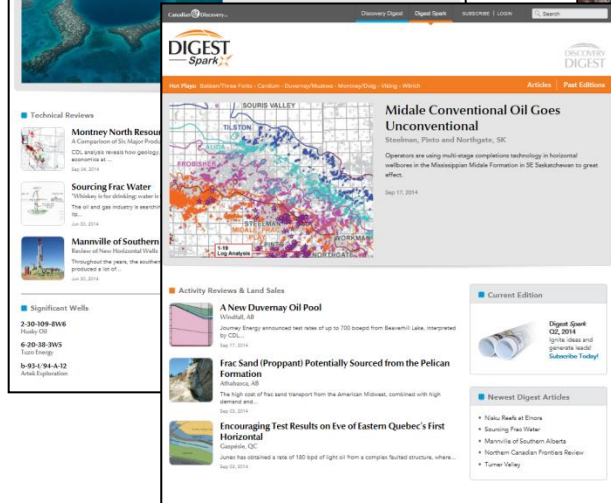
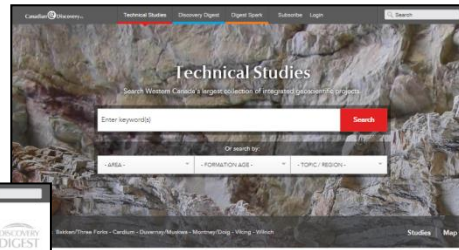
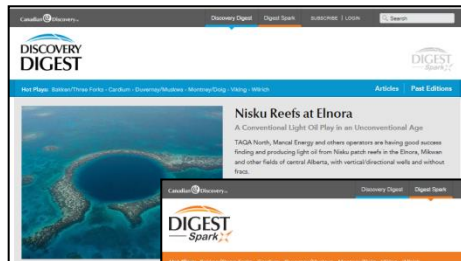
- Digital completions & fracturing data for multi-stage horizontals
- 35,000+ wells, plus detailed drilling and completion source documents
- Over 100 client companies
- Supporting applications

Catalyst

- A fast, intuitive online evaluation platform to get to our data
- Best-in-class CDL datasets – geological plays, wells, production, EURs, technology and costs
- Interactive spreadsheets, graphing and mapping capabilities

Data Services

- Consulting and data exchanges
- Drilling and geomechanics
- Completions and fracturing
- Rock properties
- Integration with other oil & gas data sets



Discovery Digest/ Digest Spark

- Industry-leading E&P research, technical analysis and reporting
- Since 1987
- Recently upgraded
- High market penetration, platform for communicating to industry

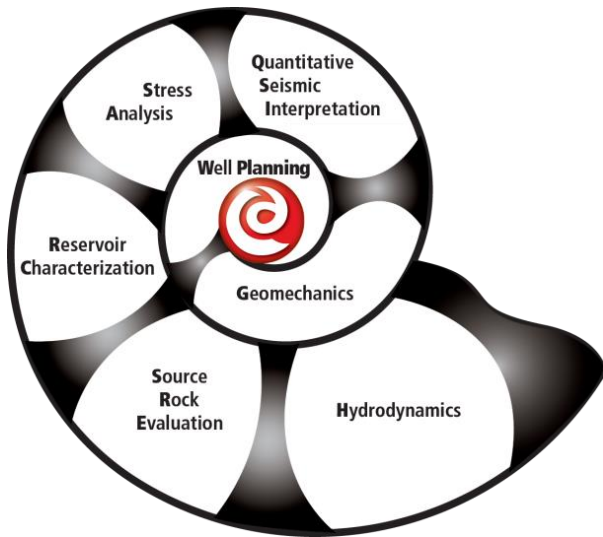
Technical Studies Online Library

- Western Canada's largest collection of integrated geoscientific projects
- All CDL and RPCL non-confidential work
- Extensive coverage and varying scope

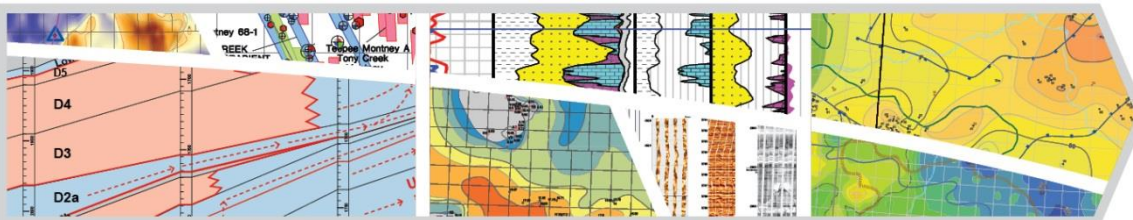
UK & Norway Publications/Maps

- UK Discovery Digest
- Norway Discovery Digest
- whatmapLive!
- 50/50 UK JV Partner: Exploration Geosciences

Integrated Expertise in Geology, Hydrodynamics, Quantitative Seismic Interpretation and Geomechanics



Basin to Wellbore Scale Insights



- International expertise
- Over 200 North American non-exclusive studies
- Resource Play, Oil Sands and conventional expertise
- Online study library available

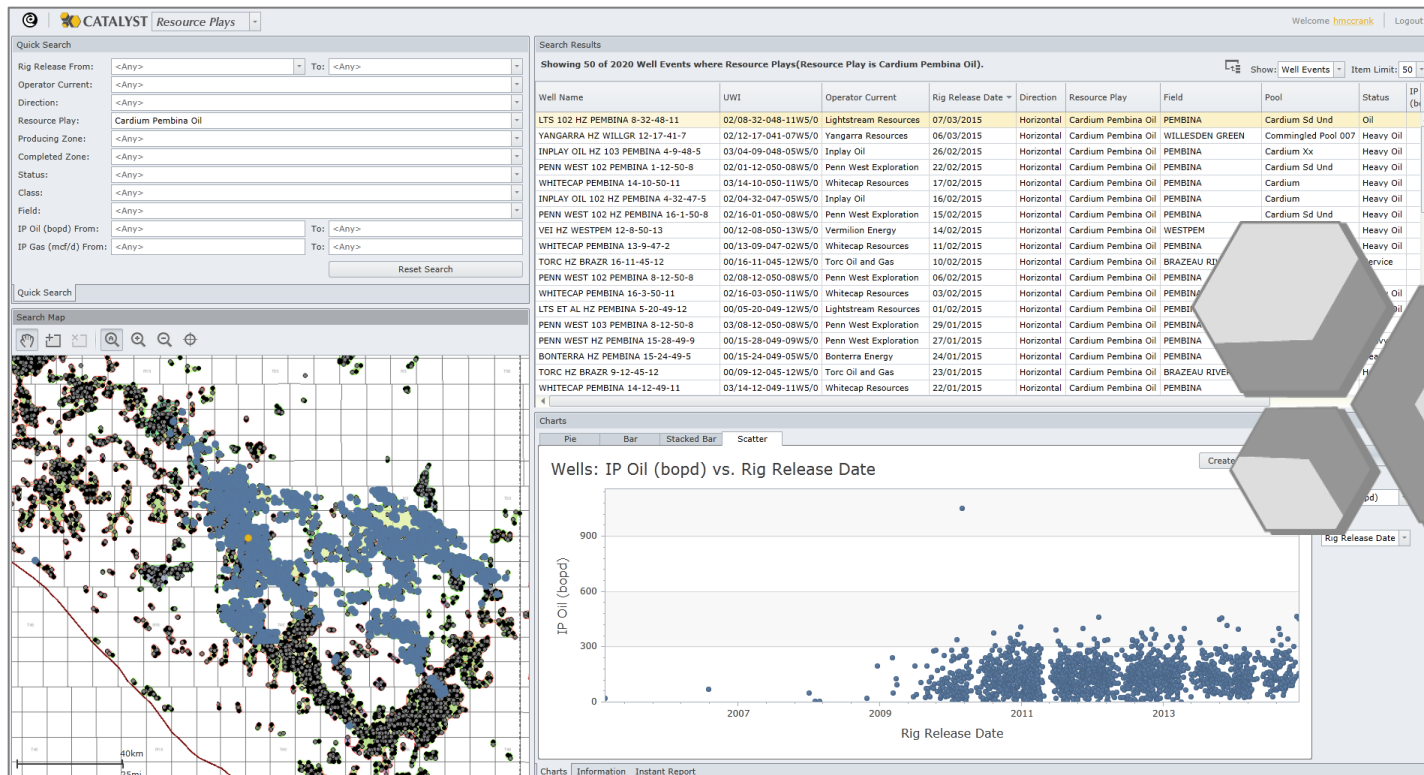


CATALYST OVERVIEW

Quantify risks and opportunities in minutes with Canadian Discovery's CATALYST application.

CATALYST delivers the metrics, analytics and geological context needed to stay ahead, whether you're looking to explore, develop, buy, sell or lend in Western Canada.

- Designed specifically for Resource Play analysis
- Combines pre-loaded, best-in-class Canadian Discovery Ltd. (CDL) datasets with interactive mapping, graphing and spreadsheet tools
- Includes the popular Instant Report feature to generate custom analytics in seconds!



Continuously updated with high quality data, CATALYST is infused with Canadian Discovery's in-depth insight into geological plays, drilling, completions (and more!) to enable effective scoping and apples-to-apples comparison.

For all of Western Canada:

- Activity – licenses, spuds
- Well data – header info, operator, prod zone, dates
- Production data – IPs, monthly rates, cums

For Resource Play wells:

- Geological plays
- Type-curve derived EURs
- Technology – type, stages
- Costs – drilling, completions

EDGE

 **CATALYST**

	EDGE	CATALYST
Focus/Plays	Conventional	Resource Plays
Coverage	1995 to present (350, 000 Wells)	All wells (775, 000 and growing!)
Production	Basic Data	Extensive metrics
EURs	Fitted exponential decline	CDL-derived probabilistic type curves
Costs	PSAC-derived	WCFD-derived (best-in-class)
Mapping	Static	Interactive, dynamic and searchable
Tables/Graphs	Pre-set and fixed	Customizable, more ways to mix & match
Instant Reports	One option	Multiple analysis options
Updates	Quarterly	Continuous
Access	Desktop only	Accessible online anywhere



CATALYST DATA

Focus on Evaluations and Decisions

- Catalyst provides a unique and deep dataset to assess available opportunities
- Attention to detail in preparing data allows decisions to be made with confidence
- High quality data allows users to focus effort on evaluations and decisions NOT on data collection and aggregation

- Data behind Catalyst that allows our users to focus on evaluations and decisions
 - ◉ Geological descriptions
 - ◉ Type curves and EURs
 - ◉ Drilling and completion costs
 - ◉ Completions technology

- Not all rock within resource plays are created equal
- Pressure and temperature determine the maturity of the hydrocarbon
- Facies and pressure determine the productive capability
- Facies determines the reservoir capacity

- Based on its extensive experience and geological expertise CDL has divided all resource plays into play regions
- Division into smaller plays with consistent properties provides a reasonable basis of comparison

Grouping Data for Repeatable Results

- **For the Montney 22 separate plays have been identified based on:**
 - ◉ 4 geological facies (distal siltstone, wave dominated shoreface, dolomite coquina and shoreface)
 - ◉ 6 reservoir pressure regimes (deep basin < 8kPa/m, deep basin 8-10 kPa/m, deep basin 10-12kPa/m, deep basin >12 kPa/m, aquifer 8-10 kPa/m, aquifer <8 kPa/m)
 - ◉ 4 reservoir temperature regimes (<60 °C(oil), 60-80 °C(liquids rich gas), 80-100 °C (liquids rich gas and free C5) and >100 °C (dry gas))
- **Comparison of results based on similar reservoir properties provides:**
 - ◉ Basis for consistent, repeatable results
 - ◉ Effective comparisons of type curves, EURs, completion costs, drilling costs and operating practices

Probabilistic Type Curve Methodology

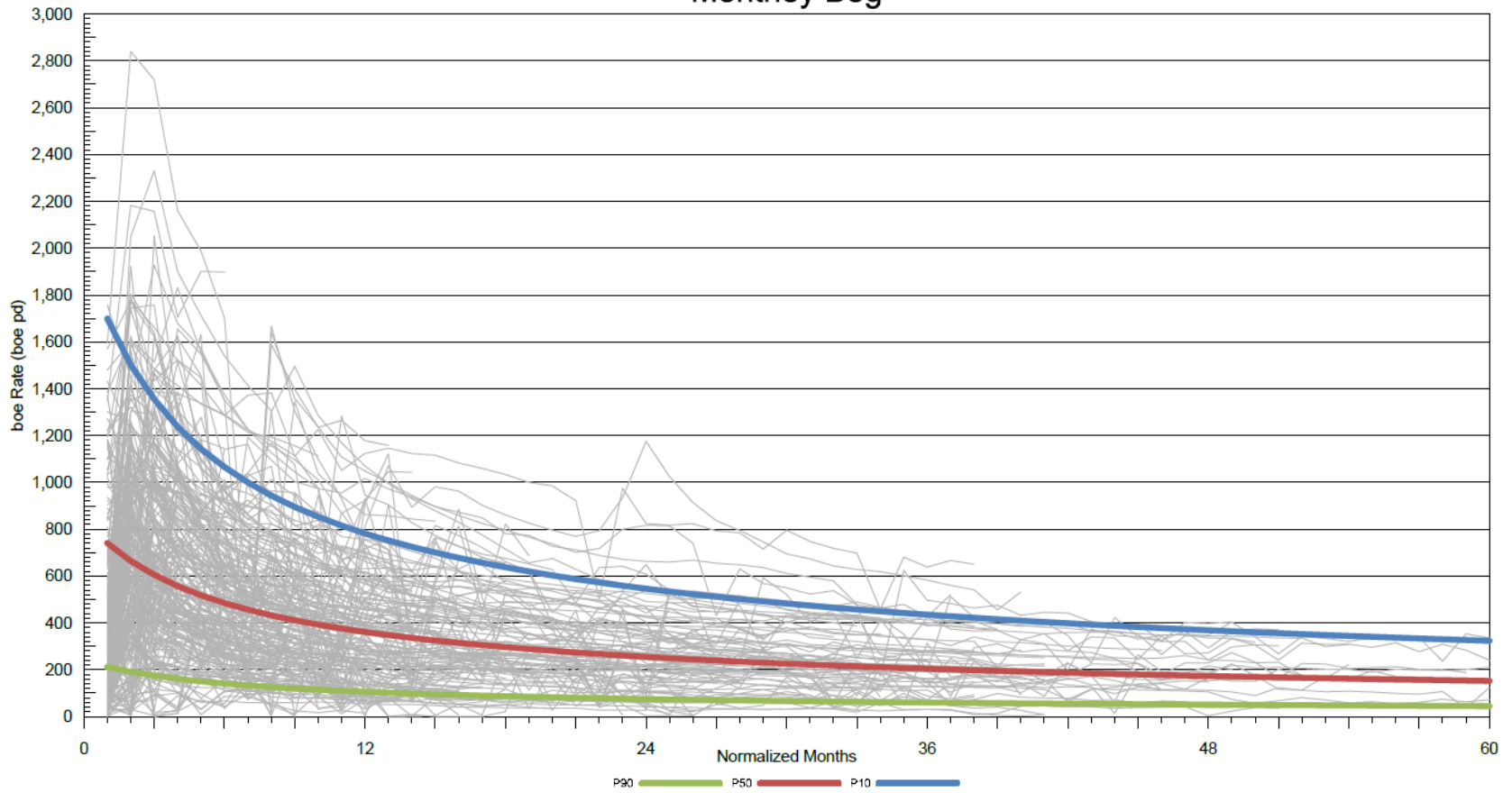
- Type curves are a long established industry practice for production forecasting and economic evaluations.
- Horizontal wells with multi-stage completions in unconventional reservoirs present a new complexity.
- The **SPE and USGS** Report 2013-1109 set out the standardized methodology for the development of Probabilistic-Type Curves (PTC) and the determination of Estimated Ultimate Recovery (EUR) from resource play wells.
- CDL follows this methodology.
- Primary product, gas or oil, is forecast. By-products, NGLs or natural gas and NGLs, are added as a ratio to the primary product forecast.

Probabilistic Type Curve Development

- Within each domain or area of interest the producing unconventional wells are identified.
- These are individually reviewed to select those wells that are “typeable” (min 6-mo consistent production history)
- Assignment of terminal decline characteristics
- Probabilistic analysis is run on the typeable well group to generate PTCs (P10, P20, P30, ... P90)
- By-products are added as a ratio to the primary produced fluid:
 - ◉ for oil wells, GOR (scf/bbl)
 - ◉ for gas wells, estimated free liquids recovery and yield (bbl/mmscf)

Probabilistic Type Curve Development

Probabilistic Type Curves (boe)
Montney Beg



Drilling and Completions Costs

- Costs are estimated using a proprietary algorithm and checked against actual costs, the algorithm is unique for each resource play
- Drilling cost variables are TD, TVD and drilling days
- Completion cost variables are proppant amount, fluid volume, technology, fluid type and completion days

- Completion information is sourced from Canadian Discovery's Well Completions & Frac Database (WCFD)
- The WCFD has detailed completion information on over 36,000 wells that used multi-stage, horizontal technology

 WELL COMPLETIONS &
FRAC DATABASE



OPTIMIZE
YOUR
**COMPLETION
SUCCESS**



CATALYST APPLICATION



Data | Intelligence | Expertise

catalyst.canadiandiscovery.com








WHAT'S NEXT?

Canadian  Discovery Ltd.



Data | Intelligence | Expertise

- Regular User Group forums will start in early 2016
 - ◉ Review of new features
 - ◉ Forum for giving feedback and ideas for improvements
- Ongoing development
 - ◉ EUR's currently available for Montney, Cardium, Viking and Bakken (over 60% of Resource Play wells)
 - ◉ EUR's will be continually added for both vertical and resource play wells
 - ◉ New features coming up:
 - Integration of WCFD
 - Ability to create user templates for searches, table view, exports, etc.
 - More instant reports

-  **Annual Online Subscription**
-  **Company-Wide Access** Base price includes three concurrent seats, or upgrade to unlimited access
-  **Technical Support and Training** Dedicated staff to answer questions and provide workshops

For more information or to book an in-house demos please contact info@canadiandiscovery.com

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