



Sign Up with the Oilfield News Online



www.oilfieldnews.ca

www.wilsonimmigration.com
 What Immigration, Naturalization & Citizenship
 Your gateway to a new life.
 660 Rocky Mountain Plaza, 615 Macleod Trail SE, Calgary AB
 Phone: 403.264.2923 / Fax: 403.266.5182
 403.266.7143
 Toll Free: 1-888-657-8255
 Ann Wilson, CHRP, ICCRC R421415
 (Formerly Citizenship Judge)
 ann@wilsonimmigration.com

Published By: NEWS COMMUNICATIONS since 1977

Saturday October 15th, 2016

ALBERTA GOVERNMENT EYES GEOTHERMAL FIX TO ABANDONED WELL CRISIS

AB considers converting disused wells to geothermal energy systems. Oil firm to coproduce oil and geothermal heat in Saskatchewan - two firsts for Canada.

Alberta Energy may promote the conversion of disused oil and gas wells into geothermal systems as a partial solution to the province's abandoned well crisis. "Using abandoned wells for geothermal is a complex issue that requires further input and consultation from a broad range of stakeholders," says Alberta energy minister Marg McCuaig-Boyd. "I have asked government staff to consider this option as we move forward with our climate plan and also in our considerations of the entire liability management system." A government official says the province aims to have policies in place before April, which may include tax and carbon credits. Mitchell Pomphrey, CEO of Pomphrey Industries, who is a key figure in Canada's first abandoned oil well-to-geothermal heating system conversion, has navigated his way through the byzantine overlapping regulations of Alberta Energy and Alberta Energy Regulator. "In Alberta, the regulatory pathway for converting a hydrocarbon well is complex as geothermal simply doesn't exist as a regulated resource," he says. The Alberta government is expected to separately address other abandonment solutions following an appeal of the Redwater Energy bankruptcy decision by the AER next year. In May, an Alberta court awarded lending institutions the right to a bankrupt company's profitable oil and gas wells, leaving the province and taxpayers holding the bag on the company's suspended and abandoned assets. The AER's interim response was to double its Liability Management Rating—a solvency test for oil firms looking to buy a well—to 2.0. The majority of Alberta's oil companies—70 percent—have an LMR below 2.0 and will now have to pay a deposit when buying a well. This will slow down the cascade of majors selling low-producing wells to junior and mid-cap firms. Clifford Johnson

QC of Field Law's energy group says the changes to the LMR, "may well have a chilling effect on investment in the energy industry, and lead to more insolvencies and thus more orphan wells." Some oil firms see converting their wells to geothermal systems as a solution to the abandonment question. Sundial Energy is central to a feasibility study into developing Canada's first geothermal heating project from a producing oil well. "In the short term, in the case of an active well, a producer adds value by heating a greenhouse," says Sundial CEO and former rig hand, Jason Edwards. "In the long term, at the end of a well's life, it avoids abandonment costs—so long as the government recognizes the change of use—by continuing as a geothermal system." The study indicates that geothermal could generate \$1 million in revenue annually from heating facilities for year-round tomato growing. The Calgary-based oil firm that is spearheading this pilot on one of its Saskatchewan wells asked not to be named in this story. Geothermal power generation is another option for coproduction of oil and geothermal energy. Texas is a hotbed of well-to-geothermal conversions, including a 1 mw coproduction project. In Mississippi, coproduction from an oil field water flood injection system produces 19 kw of power. In North Dakota, coproduction powers a 250 kw system. The power supply is lower-cost than other available sources. Mobile, 125-kw, off-the-shelf power generation units can be moved to another pad when the flow rate decreases over a well's lifetime. The North Dakota project is in the Williston Basin—where across the border in Saskatchewan, Deep Earth Energy Production (DEEP) is developing Canada's first commercial geothermal power system. Its \$40-million purpose-drilled geothermal project will pilot a 10-mw plant with a 5 mw net output—half of the power is consumed by the system. Studies in Alberta, near the Rockies where hot rock oil wells are located, indicate that similar plants could be built for \$10 million plus by using abandoned wells instead of drilling one. A 10-mw plant could power a town the size of Hinton, population 10,000. Dan Claypool,

CONSOLIDATE ALL YOUR BILLS
MANAGEABLE MONTHLY PAYMENTS!
 Homeowners & Commercial Borrowers

Simple Financing for Residential & Commercial

Bank Turned You Down?
 But Not Ready to Pay 18%?
 Call Us Today For An Approval!



Frank Hickey, B.A.,
 President/Mortgage Broker

Our Staff Has Over 70 Years of
 Top Quality Experience
 in Finding Solutions for YOU

WE MAKE HOUSE CALLS AND/OR YOU CAN APPLY BY PHONE OR EMAIL



Trevor Hickey, B.A.,
 Mortgage Associate

concord
 MORTGAGE GROUP LTD. email: frank@concordmortgage.ca
 web: www.concordmortgage.ca

(403) 290-1990

a veteran rig manager, says "One well out there even produced boiling mud." Geothermal power is nothing new in the oil industry. Chevron has been a global leader in geothermal power generation since the 1960s, operating plants in Asia and North America. But the company only uses it for sites where hot rocks are close to the surface, which is not the case in the prairies. So far, only a handful of wells have been identified that have bottom hole temperatures of 120 – 130 degrees Celsius, are three to 3.5 kilometers deep and near to a market and a transmission line tie-in station—the criteria needed for conventional geothermal power production. Tom Ogryzlo, a director of Toronto-based Polaris Infrastructure, which operates a 72 mw geothermal project in Nicaragua, says: "Heating is probably the best use of geothermal energy in most of Western Canada considering the amount of high temperature fluids normally required for power generation." There are, however, low-temperature (80 degrees Celsius) power modules, such as those being brought to commercialization stage next month by Thermal Electronics Corp based in Aurora, Ontario. But many of Alberta's

wells have down hole temperatures as low as 30 degrees Celsius, which works only for geothermal heating systems. Converting just 10 percent of Alberta's 78,000 suspended wells to geothermal heating systems could create work for hundreds of service firms and defer the cost of abandonment for producers. By November, eight service firms, including a drilling crew, will start a three-day work over program to prepare an abandoned well in Leduc, Alberta—the living-energy-project—for geothermal conversion. This space heating pilot will provide open-source data. "Repurposing existing oil and gas wells to generate geothermal energy would require much of the same services required to complete or work over oil and gas wells," says Petroleum Services Association of Canada CEO, Mark Salkeld. It would put people and equipment to work without having to re-invent the wheel to develop new equipment or expertise, he says. "It would mean jobs and the retention of expertise and skilled labor that many PSAC member companies are struggling to retain during this downturn." Furthermore, it would further establish Albertan



LAKELAND HEALTH CARE

lhcbonnyville@gmail.com

- ~ Drug & Alcohol Testing
- ~ Hearing, Audiometric Tests
- ~ Audiometric Tracking
- ~ Pre-employment Medicals
- ~ Pulmonary Function Testing
- ~ DNA/Paternity Testing
- ~ Mask Fits (Quantitative)
- ~ Mobile Unit
- ~ St. Johns, AB & Sk First Aid Classes
- ~ Custom Molded Ear Plugs

We Can Go To Wherever You Need Us

**Mobile Unit is equipped to do all testing for high volumes.
Anywhere, Anytime.**

780 826 5964

BONNYVILLE

780 639 4528

COLD LAKE

AFTER HOURS ---- 780 573 4449

and Canadian well decommissioning expertise as world class, potentially boosting oil service exports. It would also provide export opportunities for Canadian drilling firms in countries that have geothermal potential, yet lack an oil industry. Dr Faisal al-Thani of the Qatar Society of Petroleum Engineers says, "Canada's technology and innovation is world class and is highly regarded in the Middle East."

Mark Scholz of the Canadian Association of Oilwell Drilling Contractors agrees. "These types of innovations, once proven, are just another example of the forward thinking in the Canadian oil and gas industry," he says. "Removing the burden of abandonment, while creating renewable thermal energy, could prove beneficial for both the industry and the environment. It means viable work for service rigs and other service contractors while at the same time providing lower costs for their customers." If the two Canadian well-conversion pilots prove the technology to be economically viable for space heating and help create regulatory blueprints, they could create a new agro-oil industry, potentially reducing our reliance on imported produce. Converting 10 percent of Alberta's suspended wells, according to one estimate, would boost the area under greenhouse glass in Alberta by 440 percent, creating 5,000 permanent, year-round jobs in agriculture. The economics vary greatly from well to well depending on depth, heat and permeability of the rocks, and well condition, structure and location. Wells can produce up to three times

more heat energy than the electrical energy needed to pump the water around the pipeline loop. However, the electrical energy is more expensive per unit than the natural gas or propane that would otherwise be used for heating greenhouses. Pumphrey, whose company designs and installs solar power and storage systems, including greenhouse technology, says, "Most disused wells are on remote, off-grid sites where trucking in diesel to power a greenhouse or a geothermal system pump is prohibitively expensive. Solar systems and storage—especially in southern Alberta, which gets more sun than anywhere else in Canada—is significantly more cost competitive." Recent advances in LED lighting technology—cutting to one sixth the power conventional bulbs need—make year-round illumination possible. Pumphrey Industries has co-designed a renewables system, made by oil service workers, to power the geo system of what will be Canada's first abandoned oil well conversion. Another option for powering geothermal systems is cogeneration—when its waste heat supplements geothermal heat, cogeneration efficiency for methane or propane fueled units is up to 90 percent. They could be used in regions of low solar activity or in conjunction with solar power in winter. Fluid output is also central to the geothermal viability. Claypool says: "The volume of fluids produced and well depth are key to temperature loss as they rise to the surface." He cites 6,500 feet deep wells at Wizard Lake (50 kilometers

south of Edmonton) he worked at, which produced 15,000 b/d and the temperature only dropped from 77 degrees Celsius to 63 degrees. "Had they only produced 2,000 b/d they would have lost far more heat," he says. This is crucial to circulating water from a disused well, which incurs the pumping costs. It's less important in a producing well that's being converted to coproduction as the power costs are already factored in to oil production. Flow rates also impact the use of disused gas wells—most producing gas wells don't have the lift to bring enough water to surface, so can't be used for coproduction—as they have smaller bores than oil wells. A typical abandoned gas well, once it's filled with water will only produce 20 liters/second, but geothermal power production requires 60-70 liters of water per second. Many of the well owners who stand to gain the most from geothermal energy coproduction are those operating stripper oil wells—some produce up to 99 percent water. Turner Valley south of Calgary has such wells, and being at 5,000 to 7,000 feet depth they have temperatures that are excellent for space heating, although probably not for conventional geothermal power systems. Stripper wells are among the hardest hit by low prices, so additional revenue from geothermal energy, and potential carbon and tax credits for such conversions, could be the lifeline that many operators desperately need. Once a stripper well shuts down it is unlikely to start up again. These wells typically only produce two to 15 b/d, yet are very important to the industry—in the U.S. they account for more than 500,000 b/d and impact North American oil prices. Converting them to coproduce heat—or even power that's cheaper than the current source that drives the oil well and operations—might tip the balance of profitability, keeping them in production and their operators out of bankruptcy. The flow rate of water in the rocks themselves is also key to geothermal systems—over-extraction can lead to the rocks near the well cooling faster than the heat is replaced. A geothermal system has to be designed to produce at a replenishable rate to achieve sustainability. Low permeability is less of an issue for greenhouses whose temperatures have to be below 40 degrees Celsius. In summer, the geothermal heat exchanger system becomes a coolant pumping hot water underground to replenish the rocks' heat. If regulations changed to recognize change of use over a well's lifetime, suspended and zonal abandoned wells would

avoid the \$100,000 to \$300,000 surface abandonment costs of removing a road and well head and plugging the well bore just below the surface. Banks won't lend to abandon wells but they will lend to build greenhouses. Furthermore, oil companies could form joint ventures with farmers who own the land where the wells are located. To be converted to a geothermal system a suspended well would only need the deeper, concrete plug to be put in place just above the casing perforations making it into a zonal abandoned well. In the future, as oil prices rise and the well is brought back into production, the geothermal system would coproduce heat alongside oil, if the regulations were changed to permit such multiple change of use over a well's lifetime. Suspended, producing and zonal abandoned wells look more economically attractive for conversion than fully abandoned wells. In the case of fully abandoned wells, instead of offsetting abandonment costs, drillers have to go through their second cement plug just below the surface, followed by a wireline checking for obstacles and measuring the temperature gradient, and pressure testing to confirm the casing integrity, which would cost \$100,000 plus. Another financial advantage in the face of coming federal and provincial methane regulations and carbon pricing is that geothermal systems put a pair of eyes on potential leaks from disused wells. Any venting would instantly trigger a sudden pressure change in a geothermal system, and methane-grabbing technology can neutralize it or put it to use. Field Law's Johnson says the private initiative to convert disused wells to geothermal could have two very positive impacts: A potential reduction in orphan well numbers and heat generation without burning fossil fuels. "Hopefully this innovative initiative will get the support it deserves," he says.

MEDICAL JOURNAL

WWW.MEDJOURNAL.CA



PH: 1-800-293-9865

FAX: 1-800-309-1190

Economic benefits of LNG project outweighed 'significant adverse' effects, cabinet decided

Federal cabinet decided environmental harm would be balanced by economic value of project. The federal cabinet knew there would be "significant adverse environmental effects" from the Pacific NorthWest LNG pipeline but approved it anyway, believing economic benefits of the project justified the decision, according to Privy Council documents. The orders are the written public record of cabinet decisions made behind closed doors. They show in clear terms what was at stake as the cabinet made its decision.

On Sept. 27, cabinet gave the green light to the massive \$36-billion project that would bring natural gas from northeastern B.C. to a plant in Prince Rupert to be liquefied and then exported to Asia. As she made the announcement, Federal Environment Minister Catherine McKenna said she believed the project's environmental effects can be balanced off. "I am confident — with the 190 legally binding, and scientifically determined conditions — that we will address the most important environmental impacts to ensure this project proceeds in the most sustainable manner possible," McKenna said at the time.

But the documents show a more stark choice went on behind the scenes. "The minister has decided that the project is likely to cause significant adverse environmental effects," said the cabinet order. But it adds those effects are balanced

off by the huge economic benefits the project could bring. "Whereas the Pacific NorthWest LNG project would contribute to Canada's long-term economic prosperity.... Therefore, his excellency the Governor in Council (Governor General), on the recommendation of the minister of the environment ... decides that the significant adverse environmental effects that the Pacific NorthWest LNG project ... is likely to cause are justified in the circumstances." "This is a direct tradeoff," said Smithers, B.C., lawyer Richard Overstall. He represents the environmental group Skeena Wild, which is concerned about the project's effects on salmon, and the Gitwilygoots, one of nine Northern Tsimshian tribes and is the tribe that asserts aboriginal title to lands that include the Lelu island and Flora Bank sites of the LNG project. He thinks the federal government soft-pedalled the downside when it announced the decision. "That balancing of environment and global warming with present economic prosperity wasn't put out in such stark terms," he said in an interview. "They talked a lot about the process but they didn't actually talk about what the justification was and this is the first time I've actually seen it in writing." But McKenna said her government made it quite clear there would be effects. "The significant effects are really on the [greenhouse gas] emissions, which is why it's so important that we have a plan," she said in an interview. "We limited the emissions, we put for the first time a hard cap on emissions on this project. But clearly there are significant emissions even though this is going to China ... where natural gas can

replace coal," said McKenna. The maximum cap on emissions from the LNG refinery means direct greenhouse gas emissions from the project will be limited to 4.3 million tonnes of carbon dioxide per year, 900,000 tonnes less than what had initially been proposed by the project. McKenna also pointed out that B.C. has agreed to increase its carbon tax to further offset the increased emissions. "So when we made this announcement I was with Premier Christy Clark, and she agreed that her carbon price had to go up. She agreed you can't have major projects go ahead that have significant emissions without taking action." But the decision has left the NDP's environment critic wondering

about the Liberal government's promise to do things differently when it comes to approving to big energy projects. "They seem to be thinking it's a simplistic process," said Linda Duncan. "That all they need to do is get together a group of 'experts' and send them out to talk to Indigenous Canadians and maybe some other people who are concerned and then just check that box and then you approve it." Duncan said people along the route of several major proposed projects are starting to wonder what's going on. "When are we going to have this promised improved process for reviewing major projects?"



INGRAM-MALO
TECHNOLOGY CORPORATION

780 497-7779
13727 93 st Edmonton alberta T5E 5V6

SCS SAFETY COORDINATION SERVICES
Safety Compliance Health Environmental Learning Leaders

Working safely may get old, but so do those who practice it. Because life and limb are on the line, we have assembled the best safety training instructors anywhere.

www.safetycoordination.com

On-site & On-location Training
7 Days A Week

780.485.3585

7633 50 St, 2nd Flr.
Edmonton AB
T6B 2W9

- * First Aid
- * TDG
- * H2S Alive
- * Ground Disturbance
- * Confined Space Entry/Rescue

Keeping You Safe



www.leducsaafety.com 1903 - 4th Street, Nisku AB

P: 780.955.3300 * F: 780.955.7651 * T: 1.800.668.4299