

Bill 16, 2011: Alberta Paves the Way for Cleaner Coal with In Situ Coal Gasification

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Legislation commented on:

[Bill 16 – Energy Statutes Amendment Act, 2011](#)

On 13 May 2011, the Legislative Assembly of Alberta passed the *Energy Statutes Amendment Act* (“Bill 16, 2011”). Bill 16, 2011 amends the following acts: the [Alberta Utilities Commission Act](#), RSA 2007, c A-37.2, the [Coal Conservation Act](#) (CCA), RSA 2000, c C-17, the [Electric Utilities Act](#), RSA 2003, c E-5.1, the [Gas Utilities Act](#), RSA 2000, c G-5, the [Oil and Gas Conservation Act](#) (OGCA), RSA 2000, c O-6, the [Oil Sands Conservation Act](#) (OSCA), RSA 2000, c O-7, and the [Pipeline Act](#) (PA), RSA, c P-15. The amendments entered into force on 13 May 2011.

Bill 16, 2011 implements two central amendments to the regulatory regime of the above mentioned energy laws. The first amendment removes the **Industrial Development Permit** (IDP) legislation (see ERCB [Bulletin 2010-42](#)). In short, section 51 of the CCA, section 111 of the OGCA and section 27 of the OSCA cancel existing IDPs. The general repeal of these provisions makes it unnecessary to apply for an IDP in the future. See previous post by Nigel Bankes [here](#). The second amendment clarifies the ERCB’s authority to regulate **in situ coal** development and sets out the requirements for in situ coal projects (see ERCB [Bulletin 2009-36](#)).

This note primarily focuses on the legislative amendments with respect to in situ coal gasification (ISCG) and in situ coal liquefaction (ISCL). A major target of Bill 16 is to accommodate in situ coal gasification and liquefaction in Alberta’s regulatory regime. After a brief explanation of the technology and the reasons for its promotion, this post introduces the most important legislative amendments that address in situ coal gasification. This post will describe the legislative changes for in situ coal gasification. The description also applies to in situ coal liquefaction.

ISCG – A New and Promising Technology for Alberta

Different terms are used in order to describe the same process: “in situ coal gasification” and “underground coal gasification” (UCG). UCG is the more frequently used term in the technical and international literature. However, the Alberta legislature decided to use the term “in situ gasification”.

ISCG is different from coal gasification. Coal gasification takes place on the surface and requires special plants, large coal storage facilities and gasifiers. ISCG converts coal underground (in situ) into synthesis gas or syngas, also called “product gas”. In order to extract the syngas,

injection and production wells are drilled from the surface into the coal seam. The wells are linked together; then catalysts are injected into the injection well. Different catalysts are used depending on the quality required for the syngas. Preferred catalysts are, for example, air, oxygen, CO₂, water steam, H₂ or a mixture of possible catalysts. Then the coal is ignited in a controlled manner. The produced gas is a mixture of CO, H₂, CH₄, CO₂, and other constituents which flow to the surface via one or more production wells. Depending on the composition and quality of the syngas, it is used for a variety of applications, such as generation of electricity, production of liquid hydrocarbon fuels, natural gas surrogates, and valuable chemical products.

ISCG is an attractive technology since it offers the opportunity to make use of coal seams which are not minable according to conventional mining methods because of the depth, quality, surface or social constraints and remoteness from markets or transport. Other advantages of ISCG as opposed to surface mining are, *inter alia*, lower capital investment costs, no human labour underground, minimum surface disruption. Pore space vacated by these operations may be used for Carbon Capture and Storage (CCS). Concerns with ISCG are in particular groundwater contamination and subsidence.

Currently, all countries with major coal reserves are doing research in ISCG. Two motives explain the interest in ISCG. First, there is increased global energy demand and increased concerns to reduce energy imports so as to enhance energy security. Secondly, in a carbon-constrained world, ISCG offers a technology which emits less CO₂ than conventional surface mining and also creates the possibility to use the mined coal seams for CCS. Alberta has the largest coal reserves in Canada. The Energy Resources Conservation Board (ERCB) estimates Alberta's remaining established coal reserves to be 33.4 Gt (31 December 2008) which includes all types of coal. 22.7 Gt (68%) of the 33.4 Gt is considered to be recoverable by underground mining methods. And 10.8 Gt are recoverable by surface mining. According to the ERCB the ultimate potential is 620 Gt and the ultimate in-place coal resource comprises 2000 Gt. The estimated comparable total coal reserves of the United States is about 2000 Gt.

According to the ERCB, Alberta is a prime candidate for ISCG because of the province's coal quality and quantity. The ISCG industry has already shown interest in Alberta coals. The ERCB received applications for ISCG projects in 2007 to 2009. A review of the *CCA* and the *OGCA* revealed the need to clearly and explicitly address ISCG in the regulatory framework, in particular regarding the ERCB's legislative authority and the requirements for a project. The ERCB formed a multidisciplinary team in January 2009 in order to propose a legislative framework for ISCG projects. Bill 16, 2011 is the result of that process.

Bill 16, 2011 – Implementation of ISCG into the Regulatory Regime

Generally, the underground process for ISCG is mainly regulated under the *CCA* and the [Coal Conservation Regulations](#) (*CCR*), Alta Reg 270/1981. However, from a regulatory view ISCG seems to be similar to in situ oil sands development since it uses wells for resource recovery. Therefore, the ERCB suggested using the regulatory model of the *OGCA*, [Oil and Gas Conservation Regulations](#) (*OGCR*), Alta Reg 151/1971, PA and [Pipeline Regulation](#), Alta Reg 91/2005 as an analog for ISCG for these components (wells, pipelines, and facilities). Bill 16, 2011 adopted this approach.

The amended *CCA* contains redefined and new terms such as coal, coal seams, evaluation well, observation well, in situ coal gasification, in situ coal liquefaction, in situ coal scheme, synthetic coal gas, and synthetic coal liquid. Section 1(1) (f.2) of the *CCA* defines **in situ coal gasification**

as the thermal or chemical conversion of coal into synthetic coal gas in an underground coal seam using an industrial process. **In situ coal liquefaction** means the thermal or chemical conversion of coal into synthetic coal liquid in an underground coal seam using an industrial process (1(1)(f.3)). When the *CCA* refers to **in situ coal scheme** it means an operation for the purpose of in situ coal gasification or in situ coal liquefaction (1(1)(f.4)).

Part 6 of the *CCA* regulates the development, operation and abandonment of in situ coal schemes. All wells, namely evaluation, observation, production and injection wells, have to be licensed under the *OGCA* (ss 28 to 31.7 of the *CCA* in conjunction with the *OGCA*). Persons who want to undertake any operations preparatory or incidental to the drilling, construction or operation of an in situ coal scheme, need an approval (s 29 of the *CCA*). A person is eligible to apply for an approval if this person is entitled to the rights to the coal and the petroleum and natural gas in the coal seam to be converted by the in situ coal scheme (s 30(1) of the *CCA*). Pursuant to section 9 of the *CCA*, the ERCB is authorized to make regulations relating to specified aspects of in situ coal schemes. This allows regulatory requirements to be refined as experience with ISCG continues.

Conclusion

Alberta's geology offers the opportunity to extract coal with ISCG technology that is otherwise difficult to mine. With ISCG, more coal is accessible for the energy supply of citizens and industry. The ISCG industry has already started projects where ISCG is applied. The project [Swan Hills](#) is supported by the province of Alberta with CAD 285 million as part of its CAD 2 billion [CCS funding project](#). Bill 16, 2011 is the first step in addressing ISCG technology in Alberta's energy regulatory regime. The central changes addressing ISCG are new and amended definitions, extended application and purposes of the *CCA* to include ISCG, clarified authority of the ERCB and the further refinement of regulatory requirements. However, as experience with ISCG evolves, being a technology in its infancy, the regulatory regime will have to be adapted.

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