EXECUTIVE SUMMARY

Energy wells have been drilled in Alberta since the 1880s and technology, best practices and rules have changed immeasurably since then. At the end of a well's useful life cycle the well needs to be decommissioned and if necessary, the wellbore repaired to ensure that there is hydraulic isolation between porous intervals and to ensure the well is not leaking to surface and will not leak. The well is then 'closed' or abandoned.

Alberta currently has an immense liability inventory of over 90,000 inactive wells that need closure. Another 100,000 marginal wells will be inactive in a few years. The situation is further compounded by roughly 40,000 wells that are leaking to surface and an estimate of tens of thousands of wells that are not leaking to surface, but which require hydraulic isolation between porous intervals in the wellbore.

Currently about seven percent of new wells drilled in Alberta leak from the time they are drilled. Petroleum Technology Alliance Canada ("PTAC") has engaged InnoTech and part of the agreement is to provide a summary of best practices in drilling and primary cementing that deliver the best opportunity for long term well integrity.

Well construction on modern wells is highly complex and there is immense pressure in the industry to drive down costs. With an intense economic turn down in the Canadian oil and gas industry activity, there has also been a tremendous loss of highly qualified personnel in the workplace. The need for published best practices in this space is very significant.

Well integrity has been compromised in the past due to a lack of technology, a dearth of published best practices related to well integrity, outdated rules and drilling departments operating in silos in which ultimate well integrity is not a key consideration for the full life of the well.

In this report important planning steps along with appropriate drilling and primary cementing operations are identified which enhance well integrity. A well should be drilled safely, without incidents, on budget and produce a wellbore that is ideal for running and cementing casing. There are a multitude of factors and risks to consider along with appropriate mitigation procedures. The same is true of primary cementing.

Any incremental cost of drilling and cementing a well properly, rather than inappropriately, is absurdly low relative to the cost of remediating wells after drilling. Preventing incidents by following best practices will ultimately reduce costs.

Industry recommended practices (IRPs), other published best practices and technology developed in Canada are utilized worldwide in well construction. Documents such as this report, along with other publications, may provide guidance for regulators, for standards and seed material for new IRPs.