

PLENARY SESSION

Room: Imperial Ballroom 4,6,8

Chairman: J. BOWKER, CANMET, Canada

INTRODUCTORY REMARKS — 9:00

PLENARY 1 — 9:10

WORLD NICKEL, SUPPLY, MARKETS AND THE CHINA FACTOR.

C. TWIGGE-MOLECEY, Managing Director China, Hatch, Canada

A review of the impact of new extractive technology on the nickel supply side and a discussion of the role of China's growth on the demand side will be given. The factors that support China's long-term growth will be discussed, as well as the factors that can derail their explosive growth.

PLENARY 2 — 9:50

REFLECTIONS ON PIPELINE MATERIALS IN THE 21ST CENTURY.

A. MURRAY, Professional Leader – Engineering, National Energy Board, Canada

In this, the sesquicentennial year of Bessemer's successful patenting of his steel making process, quality control remains a key element in the development of steels for use in pipelines. In North America, per capita energy consumption has grown by 250% over the past 80 years and the new sources of supply have tended to be located in remote areas or in deep water. From a materials viewpoint, it is generally the case that pipeline requirements are becoming more severe both for new construction and those remaining in service. Some multi phase pipelines, in deep water, are operating at temperatures in excess of 120°C, with high shut in pressures and high concentrations of carbon dioxide. Offshore pipeline construction and operating practices create some unique challenges for pipeline materials. Current proposals for onshore pipelines in remote areas call for the use of high strength steels in order to reduce material quantities and associated transportation and construction costs. The higher strength requirement comes at the cost of reduced ductility – a possible concern with strain based design approaches, while weldability and fracture control are other factors to be considered. The long term performance of composite materials have yet to be fully proven but show considerable promise as an alternative to high strength steel. And what are the implications on material requirements of a Hydrogen based energy economy and pipeline distribution system?

It is notable that the majority of pipelines are of small diameter and form parts of either gathering or distribution systems. While in the latter case the product is invariably dry and sweet, in many production areas, reservoirs produce substantial quantities of water and / or sour product, and rather than being shut in, are in the current climate of tight supply, driving a need for improved corrosion resistance. Meeting the various and sometimes conflicting demands for pipeline material requirements is a complex task and one which will require all of our ingenuity and skill.

PLENARY 3 — 10:30

FUEL CELLS — A SOURCE OF RENEWABLE ENERGY.

M. VELJKOVIC, Director General, NRC – Institute for Fuel Cell Innovation, Canada

The replacement of environmentally unfriendly fossil fuels with renewable energy resources has a fundamental role to play in resolving environmental pollution and global warming problems. In addition, the diminishing conventional fossil fuel sources dramatically increases the importance of renewable alternative energy sources. The recent advance and development of hydrogen and fuel cell technologies contributes to global energy security and decreases the demand for fossil fuels affecting climate change on our planet. Fuel cells have the potential to be developed and used in various applications, such as stationary, portable, and transportation.

In the past twenty years, Canada has developed its world-leading position in the development and commercialization of fuel cells and related products. Many Canadian fuel cell producers have formed international strategic alliances with other industries who will be the end users of this technology (for example: GM (Hydrogenics), Ford/Daimler Chrysler (Ballard) etc.). In addition, the Government of Canada is investing \$215 million towards the development of hydrogen and fuel cell technology as a part of the total one billion dollar investment in climate change and Kyoto Protocol commitments. This is accelerating the adoption and application of Canadian Fuel Cell technologies and opening a new export market for Canadian industry.

NRC as the premier research and development organization within the government of Canada has the mandate of providing vital scientific and technological services to research and industrial communities. The Institute for Fuel Cell Innovation (IFCI) is leading NRC's National Fuel Cell Program and is working closely with academic, government, and industrial organizations to create a fuel cell technology cluster across Canada and to fulfill the innovation needs of Canadian fuel cell companies. The key programs at IFCI include: PEMFC (Polymer Electrolyte Membrane Fuel Cells), SOFC (Solid Oxide Fuel Cells), Hydrogen generation and infrastructure, and Technology demonstration. NRC-IFCI's impact on the fuel cell industry can be seen through the development and transfer of targeted and collaborative research projects addressing strategic and current technical gaps and providing infrastructure for research, development

and demonstration. Finally, the IFCI has been a catalyst in the coordination of industry's response to current commercialization barriers.

Canadian businesses, government and academia have made a significant investment in fuel cells. Canada is well positioned to gain substantial economic benefits from the fuel cell industry as it commercializes.