Findings ring true globally

Canada Feels Demographic Crunch

By SUSAN R. EATON
EXPLORER Correspondent

Earth scientists, it seems, are more relevant than ever to the Canadian oil and gas industry.

"Human Resources Needs in Earth Sciences in Canada," issued recently by the Canadian Federation of Earth Sciences (CFES), is dubbed Canada's "first-ever" multi-sector survey – spanning government agencies, academic institutions and the petroleum, mining, environmental and geotechnical industries.

The report voiced concerns about declining student enrollments juxtaposed against a graying population of geoscientists across the board (with the exception of the environmental industry, Canada's fastest growing employment sector).

Its findings include: The impending demographic crunch and the projected shortage of highly qualified professionals could threaten the future viability of Canada's earth science sectors.

With a population of about 20,000 earth scientists, Canada has a history steeped in mining and oil and gas exploration – the very health of Canada's Gross Domestic Product hinges upon the sustainable harvesting of the country's natural resources.

The recent global economic turmoil, however – coupled with a 70 percent decline in world oil prices – has forced the oil and gas sector to slash capital expenditures and reduce workforces.

A scant six months ago, Calgary-based oil and gas companies were aggressively competing for both entry level and experienced earth scientists; today, layoffs in the oil and gas sector have translated into an uncertain future for geoscientists.

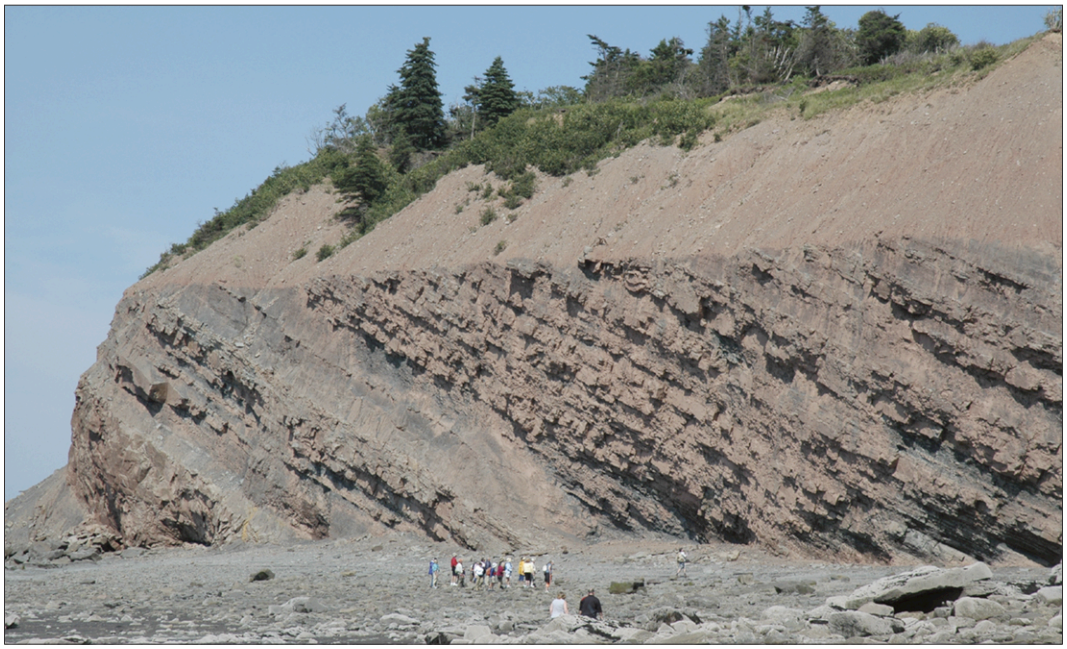

Photo by Rob Fensome, Geological Survey of Canada

A vanishing breed? A recent survey suggests a looming shortage of Canadian geoscientists because of several factors. One appeal that the profession can claim is the opportunity to visit magnificent sites (above) like the late Carboniferous alluvial sequence at Joggins, Nova Scotia, Canada. Joggins is a UNESCO World Heritage site – and a great place for geologists to visit.

Human Resource Study Was Extensive

The CFES or FCST (the "Fédération canadienne des sciences de la Terre") is an umbrella organization comprising 12 technical and learned societies and interest groups, including the Canadian Society of Petroleum Geologists.

Striving to be the unified voice for earth sciences in Canada, the CFES engages the general public, producing outreach, education and career materials on earth sciences for K-12 school children and university students.

Additionally, the organization advocates the use of sound scientific data to shape industry and government policies on resource extraction, the management of the natural environment and the mitigation of natural disasters.

During its human resources study, the CFES polled 20 percent of Canada's earth scientists, or roughly 4,000 individuals representing more than 117 organizations. Additionally, the CFES survey integrated data from 8,600 geoscientists represented by the Canadian Council of Professional Geologists.

The CFES report can be viewed at http://www.geoscience.ca/CFES_HR_requirements_Canadian_earth_sciences.pdf.

Outside the Box

The CFES survey provides both an historical overview of employment trends and lays out a road map to bridge the growing capacity gap, addressing human resource needs during the next five years.

Canadian oil and gas leaders say the report's findings are timely and relevant as the industry weathers the current economic storm, navigates uncertain waters and shifts its business model from exploring for conventional to unconventional resources in the Western Canadian Sedimentary Basin.

"No one has ever looked at purely earth sciences across the industrial sectors, at demographics and future trends," says AAPG member Ian Young, past president of the CFES and EnCana Corporation's vice president-business affairs Canadian Foothills. "To me, the results of the survey are even more urgent because we're experiencing a recession."

Young

CFES data indicate that university enrollment at the B.Sc. entry level tracks the boom and bust cycles of commodity prices for metals and oil. Between 1986 and 1999 – tumultuous years for the global oil and gas industry – academic enrollment plummeted in undergraduate earth science programs. Canada's oil and gas industry simultaneously experienced waves of layoffs and dramatically reduced the recruitment of university graduates, resulting in today's bimodal distribution of new hires and baby boomers.

"When the demand side (for oil) picks up again, we're going to have a worse human resources problem," Young warned.

"People have described mining and oil and gas as the two solitudes," he said, pointing to Canada's traditional employers of earth scientists. "Hopefully, there's more work for geoscientists in geotechnical, environmental and mapping applications."

Eaton

David Eaton, professor of geophysics and head of the Department of Geoscience at the University of Calgary, echoes Young's comments.

"We need to think outside the box," he said. "Geology and geophysics students receive unique, hands-on exposure to important real-world problems, preparing them for many careers paths – from law to education – in addition to traditional professional employment in the oil industry."

The University of Calgary's geoscience department has established four main areas of technical expertise: exploration geophysics, petroleum and energy-related geoscience, environmental geoscience and solid earth processes.

"The current generation of students across Canada is environmentally savvy. We need to demonstrate to them the fundamental role of environmental geoscience," Eaton said, suggesting at the same time that the oil and gas sector needs to dispel some public misperceptions about its environmental track record.

According to the CFES report, the environmental sector's need for earth scientists is expected to grow by more than 30 percent during the next five years alone – this sector is attracting an ever-increasing percentage of Canada's young geoscientists.

The Graduates

With a compliment of 480 undergraduate and 170 graduate students, the University of Calgary is, by far, Canada's largest earth science degree-granting institution – in fact, according to Eaton, this department represents approximately 15 percent of Canada's entire undergraduate geoscience population.

At a time when most other Canadian universities are experiencing falling earth science enrollments, the University of Calgary – located at the epicenter of Canada's oil patch – is recruiting new faculty members in response to increased student numbers and generous industry funding, including EnCana's recent endowment of a chair in unconventional gas research.

"The Canadian oil patch is unusual, globally, in that it prefers bachelor graduates for entry level hires and molds them into the corporate culture," Eaton explained. "It reflects a tradition here."

Eaton suggested, however, that the current economic downturn may produce a greater demand for M.Sc. graduates who possess broader levels of expertise.

"Exploration and production activities are getting more challenging," he said, citing:

✓ A growing focus on unconventional resources in Western Canada.

✓ A recently announced $100 million mapping program of the Canadian Arctic by the Geological Survey of Canada.

✓ Advancements in carbon capture and geological sequestration.

"As we move forward from conventional to unconventional resources, there are different skills required," Young said about the changing face of oil and gas exploration in Canada.

"We're moving from 'romantic' pioneering exploration teams working in undeveloped basins to a new reality," he added, "where earth scientists are part of multi-disciplinary teams trying to extract the most from the rocks."

According to the CFES findings, education requirements vary by sector, with the environmental and mining sectors

continued on next page

continued from previous page


Leckie

employing a far larger percentage of master's graduates than the oil and gas sector. Not surprisingly, government and research agencies hire earth scientists with master's and doctorate degrees.

"I like the CFES report," says Dale Leckie, another AAPG member and chief geologist at Nexen Inc. "It's timely, appropriate and it agrees with the research I've been doing during the past couple of months."

As Nexen's chief geologist, Leckie's job includes the recruitment of new graduates and the establishment of formalized, in-house mentoring and training programs for new hires or those individuals with zero to five years of industry experience.

Leckie, also president of the Society for Sedimentary Geology (SEPM), points to a shortage of young trained specialists in the oil and gas industry, a group that the CFES describes as the HQPs.

"If we discourage the new graduates, we will be facing the same shortage when the industry picks up again," he said. "And it's not just layoffs – it's also the lack of hiring."

Leckie indicated that Nexen was honoring job offers to this year's crop of university graduates, while continuing to invest in the training of its new hires.

"The CSPG saw this demographic crunch coming in the mid-1980s," says AAPG member Graeme Bloy, president of the CSPG and vice president of exploration for Canada Capital Energy Corp.

According to Bloy, the CSPG has a bimodal membership distribution skewed toward the "baby boomers."

The CSPG's health, he says, depends upon young geologists entering the field.

In response, the CSPG has allocated a "significant" budget for education and outreach, targeting both university and K-12 students.

"At least 50 percent of earth science graduates don't even make it into their chosen field," he said.

Bloy was surprised that the CFES report did not address gender issues, indicating that more than 50 percent of


Bloy

Canada's Earth science students are female.

"In the oil and gas industry we've seen such a large increase in women working in the geosciences," said Bloy, a 30-plus-year industry veteran.

"The industry has not historically had a long-term view of manpower management," he continued. "We have some challenging times ahead in terms of keeping the younger people in the business.

"This crash," he warned, "will severely impact succession planning in companies." ❑

To read more about this subject, visit the AAPG Web site. www.aapg.org


Photo courtesy of Elisabeth Kosters

Dalhousie University students analyzing tidal sediments in Minas Basin, Nova Scotia.

'To Do' List

While there was no "one-size-fits-all" solution – each sector faces its unique challenges – the CFES provided the following action plan:

✓ Raise general public awareness of the role of earth sciences in society.

✓ Canada's future challenges include energy, water, material needs and short- and long-term natural hazards.

✓ Influence education curricula at the provincial level and increase its efforts to recruit students into earth science curricula.

✓ Increase Canada's annual output of B.Sc. graduates in earth sciences.

✓ Push to increase employment opportunities for immigrant professionals in the earth science sectors.

✓ Provide mentors and experienced scientific leadership to younger staff.

✓ Advocate for increased research funding for all sectors of earth science disciplines.

– SUSAN R. EATON