

### 9.2.5.3 Science and technology

The Science and Technology Sector carries out a broad range of scientific research pertaining to the earth sciences — geodesy, geology, geophysics, mineralogy, metallurgy and geography. The Sector comprises, in addition to the Surveys and Mapping Branch whose functions are described in Chapter 1, the Geological Survey of Canada, Canada Centre for Mineral and Energy Technology, the Earth Physics Branch, the Polar Continental Shelf Project, the Explosives Division and the Canada Centre for Remote Sensing.

**The Geological Survey of Canada** provides a systematic knowledge of the geology, mineral and fuel resources of the country and assists in the effective use and conservation of resources, and in the management and preservation of man's environment throughout Canada. Continuing research projects, especially those involving a major component of laboratory work, have given rise to the establishment of teams with unique capabilities in such areas as mass-spectroscopy and isotope dating, including: the development of instrumentation and continuing refinement of techniques in support of field research; geochemistry, especially projects in which new field techniques have been developed; biogeochemistry, involving geology, geochemistry and botany; clay mineralogy; and various geophysical projects, especially in the development of remote sensing devices. Research tools and systems that have been developed include: high resolution aeromagnetic survey systems; ground gamma-ray spectrometry; development of airborne gamma-ray spectrometry for the search for radioactive minerals; practical methods of field geochemistry for prospecting; field methods for detection of Radon-222 in streams and sediments to outline uranium-bearing areas; and a method of tracing mineral trains in glacial deposits back to source as an aid to prospecting. In addition, the Geological Survey has led the world in rapid reconnaissance geological mapping using helicopters and other aircraft, especially in the field techniques developed and applied to the mapping of the arctic regions.

**The Canada Centre for Mineral and Energy Technology** is an interdisciplinary applied science institution engaged in research in non-renewable mineral resources and metals. Its facilities include a Mining Research Centre which carries out research on such problems as stability of underground and open-pit mines, methods of rock breakage, problems of environmental engineering and methods of obtaining maximum performance in mining operations. The Centre's general objective is to provide leadership in ensuring a sound scientific base for new technology and in stimulating the application of advanced technology to the extraction, processing and use of minerals and fuels in Canada and in the improvement of metal products. Specifically, it aims to improve the efficiency of the mining, processing and use of mineral resources and of metals and alloys; to improve the recovery of low-grade mineral resources and to minimize waste; to recognize problems in industry and undertake research, or give advice, on methods of solving these problems; to predict shortages and substitutions from technological market trends and to undertake research on mineral resources of potential value. It plans its activities in terms of its mission-oriented research, conducting basic research only when purely scientific data are required for technological purposes. As a corollary, the Centre has had to build up additional facilities to support its specialized activities, such as facilities for the carbonization of coal, the study of corrosion, and for pilot-scale mineral processing and foundry investigations.

**The Earth Physics Branch** investigates the magnetic, gravity and seismic characteristics of the earth as a whole and of the Canadian land mass in particular. It utilizes the results of its research and of the research done elsewhere to obtain new and more detailed knowledge of the Canadian land mass, leading to improved magnetic and gravity charts, knowledge of earthquake hazards and detection of underground nuclear explosions. Some major programs are: studies on the properties and characteristics of the earth's crust and deep interior; study of the magnetic field in Canada and its variations, both to aid navigation and to investigate the ancient history of the earth; and study of variations in the gravitational field in Canada, relating this to the shape of the earth and to problems in accurate surveying. The Branch is concerned with the recovery of meteorites and investigation of meteorite craters. Branch scientists conducted the world's first systematic search for ancient meteorite craters using air photographs, maps and other information. Sixteen impact sites have been identified in Canada and a greater number of possible sites are under investigation. These investigations have been