

the monitoring of atmospheric concentrations of sulphur dioxide and nitrogen dioxide. They perform a unique function in the monitoring of air pollution. The joint use of the networks of ground sensors and remote sensing equipment is used as a tool for modeling air pollution episodes and various research investigations of air pollution problems.

Additional specialized optical systems for monitoring gases are manufactured by the company, including the GASPEC® infrared system for remote detection of gases, and its Correlation Interferometer that is used in related areas. These instruments are generally manufactured on special order for governmental agencies such as NASA.

SURTRACE® – This system is a helicopter-mounted airborne geochemical technique which uses a long flexible probe mounted beneath the helicopter to vacuum surface microlayer samples of material off the ground. Special tape sampling equipment is carried in the helicopter to store the samples sequentially, and a technique known as LASERTRACE has been developed for providing 25 element analyses of the minute traces of material collected from the ground surface. The analytical technique is fully automated and computerized and is capable of high volume production. The system has already been used successfully in operational programs. Experience to date with the equipment has been restricted to mineral type surveys, however, potential applications in the hydrocarbon field have been established by the use of related ground equipment over oil fields. A ground version back-pack model has also been successfully used.

AIRTRACE® – This is a system that extracts and analyzes aerosol in the atmosphere and is a forerunner of the SURTRACE system. Although the AIRTRACE equipment is operational, its usage is limited to specific meteorological conditions. This limitation results in high costs of surveys and hence is a restriction on more general use of the AIRTRACE method.

AIRBORNE LASER FLUOROSENSOR – This is a successful airborne laser that has been constructed for a Canadian government organization and has functioned very effectively in tests and surveys designed to detect and classify oil slicks.

GASPEC – A remote sensing gas filter cell spectrometer which NASA Langley Research Center has used in flight tests and which has proven satisfactory in monitoring atmospheric carbon monoxide. This equipment was incorporated as one of the five experiments carried on board the first Space Shuttle. The experiment is based on Barringer's design, and the space flight hardware was constructed by TRW Systems Group. The experiment was very successful and new data on the global distribution of carbon monoxide has been published.

The GASPEC concept is also to be used in the ERBS (Earth Radiation Budget Satellite) wherein it will detect HF, HCl, CH₄, and NO by looking at the rising and setting sun from the satellite (the HALOE or HALogen Occultation Experiment).

MERCURY SPECTROMETER – A mercury spectrometer, and speciation train for separately analyzing for elemental mercury, mercuric chloride, methyl mercuric chloride and dimethyl mercury has been developed and a custom instrument delivered, complete with calibration system. The instrument is capable of detecting 5 picograms of mercury per second; more than adequate to monitor mercury in the natural (clean) environment.

MICROWAVE EMISSION DETECTOR – A new detector of both metals and non-metals (Br, Cl, C, F, Hg, P, S) for gas chromatography has been developed. It uses

a polychromator and a Beenakker cavity continuing helium at atmospheric pressure stimulated by microwaves to provide simultaneous detection to limits of 5 to 30 picograms per second and dynamic ranges over a thousand.

Average Work Force: (Canada Only)

Engineers – Scientists – 36
Technical Support – 20

Barringer Research retains on staff a diverse group of Scientists and Engineers in the physical sciences. Barringer Magenta retains expertise in analytical chemistry, geochemistry and microbiology. The professional and supporting technical staffs shown above are for the metropolitan Toronto location only. The total US and Canadian professional strength is 52 Scientists and 13 Engineers.

Gross Sales: 1980 – \$6.3M (Business Volume-Canada)
1981 – \$5.3M
1982 – \$4.3M

Plant Size: Barringer Resources Inc, Barringer Research Ltd, and Barringer Magenta Ltd lease the following office and laboratory space:

Location	Sq Ft	Purpose
1626 Cole Blvd Golden, Colorado	15,200	Office & Laboratory
304 Carlingview Dr Rexdale, Ontario	28,700	Office, Laboratory & Mfg
1455 Deming Way Sparks, Nevada	7,200	Laboratory
5161 Ward Road Wheat Ridge, Colorado	3,000	Laboratory
3750 19th St, N. E. Calgary, Alberta	2,900	Laboratory
Field Aviation Hangar Malton (Toronto), Ontario	1,000	Avionics Workshop

Experience: Barringer experience is world-wide. Recent R&D clients include British Petroleum, Petro-Canada Explorations Inc; TRW Systems Group (USA); National Research Council of Canada; Canadian Department of National Defense; Ontario Hydro; Department of Supply & Services (Canada); Rexnord Inc (USA); Atomic Energy of Canada Ltd; NASA Langley Research Center (USA); and Atmospheric Environment Services (Canada). Previous contracts for the USAF include one for Wright-Patterson AFB, OH – "Remote Detection of Chemical Vapors using Correlation Interferometric Techniques" in 1969; and one contract for Brooks AFB, TX – "Development of a Hydrazine/Carbon Monoxide GASPEC" in 1976-1979.

Keywords: 7 = Electronics; 9 = Environment; 10 = Image Processing & Optics; 11 = Lasers; 17 = Software Services; Infrared Instrumentation = 7; Airborne Surveys = 9; Environmental Analysis = 9; Remote Sensing = 9; Trace Gas Detection = 9; Spectroscopy = 11; Geographic/Geologic Analysis = 17; Electro-Optics = 10; Signal Processing = 7; Data Analysis = 7; Metal Detection = 7; Instrument Manufacture = 7; Remote Gas Detection = 9; Airborne Laser Fluorosensor = 11; Hazardous Gas Detection = 9.

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