

GLOBAL THERMOELECTRIC POWER SYSTEMS Ltd

Code: GTP

Address: P. O. Box 400
Bassano, Alberta, Canada T0J 0B0

Contact Mr. Donald W Peterson, President - (403) 641-3512

History: Global is a privately held Canadian company that was incorporated in 1975. The Global operation, originating employees, equipment, and thermoelectric science & technology, was originally a major part of the Thermoelectric Division of 3M Company of St Paul, Minnesota. All facilities are at the above Canadian location.

Capability: The Global corporate mission is the commercial application of mature, field-proven remote power technology, coupled with an ongoing commitment to research & development of promising remote power technologies. They are regarded as a complete manufacturing and marketing organization, and as a result of the above mission, are engaged in extensive R&D of thermoelectrics, combustion, and electronics. Their Bassano headquarters accommodates both administrative and production facilities, as well as an engineering department, and research & development laboratories.

Global's product is a line of high reliability thermoelectric power systems for remote unattended stations requiring 10 to 1000 watts continuously. They have provided the Sandia Laboratories with power systems for SALT-type monitoring in the USSR-systems that not only provide the required power, but cannot be undetectably tampered with. This latter property results from the fact that the Global power systems have no moving parts and generally do not malfunction. Their production capacity is about 16 generators per week. Manufacturing of the thermoelectric generators is accomplished through various stages of mechanical and electronic assembly, back-filling, lead checking, and basic machining. Their shop capabilities can easily hold tolerances to the required ± 0.001 inch. The high technology semiconductor thermoelectric materials and hermetically-sealed thermopile power units are manufactured entirely on site. This is predominately for reasons of quality control and due to the highly specialized skills and equipment required. They are apparently the world's sole commercial source for sintered, doped lead-telluride thermoelectric elements meeting the US Government's standard for 3M-type ES1101 characteristics. It is interesting to note that Global thermoelectric generators have powered telemetric transmissions back to earth during Apollo moon missions. Their systems are performing today in some 40 countries, accumulating a total of well beyond 15,000 years of reliable operations.

Recognize that while thermoelectrics is a relatively mature technology, the development of remote power in general is still in its infancy. The company is therefore striving for the development of lower cost, more widely applicable power sources incorporating proven thermoelectric technology with newly developing manufacturing techniques. Their applied research is directed toward the fields of solid state physics, heat transfer & storage, and gas & fluid dynamics while development is actively underway in combustion technology, thermoelectric metallurgy, piezoelectric ultrasonic atomization, electronic & electrical engineering, and new burner systems. An additional goal is to improve their attainable weight to power ratio by a factor of 2. Their current units range

from about one pound per watt for convection cooled units to 0.2 pound per watt for forced convection cooled units. Recent ongoing experiments were in the areas of fuel atomization and increasing the combustion characteristics of diesel fuel. This R&D has led to the production of 60 units for Nippon Electric Co of Japan delivered to Madagascar. These are convection cooled units using primarily Bunker C-Type fuel.

Global has recently been funded by the Alberta Government to a level of approximately \$2M (1982). This level of funding is expected to continue for the next five to six years. The goal is to lower the production cost of thermoelectric generators, thereby lowering the cost per watt of electrical power produced. The Canadian Government has assisted Global in obtaining \$800,000 in new CNC Automated Machinery and in the \$1.2M development of a light weight portable 100 watt generator for the US military use on the battle field. The Canadian Department of National Defense is buying \$6.5M of the 100 watt prototypes.

Average Work Force: PhDs - 1
Engineers - 21
Others - 58

Gross Sales: \$2.0M (Historical)
\$4.7M (Current - 1982)
\$5.0M (Projected - 1983)
\$2.5M (Funded R&D - 1983)

Plant Size: 77,000 sq ft

Equipment: Because of the special requirements associated with the manufacturing of long life, hermetically sealed semiconductor thermopiles, Global has special equipment/instruments such as a helium mass spectrometer, TIG & MIG welding equipment, induction heater (for preparation of special alloys), vacuum & back filling equipment, an extensive line of automated CNC equipment, and two 8'x8'x8' environmental chambers capable of military specification testing.

Experience: Global's power systems markets are in the areas of telecommunications (radio repeater sites); cathodic protection; telemetry; supervisory control & signals; and navigation & positioning. Customers include US EPA, US Army, Exxon Corp (US), Mountain Bell (Boise, Idaho), Continental Telephone of the West (Phoenix, AZ), Texas Instruments, Teledyne Geotech, Amoco Pipeline Co (New Mexico), Nippon Electric Co, ARAMCO/PETROMIN (Saudi Arabia), Algeria Post & Telegraph (Algeria), Abu Dhabi National Oil Co, Shell Canada, Marinav Corp (Canada), Offshore Navigation Canada Ltd, NNPC (Nigeria), and Dome Petroleum (Canada). As can be seen, Global has world-wide experience with major organizations. They are currently working with the US Army and indirectly with the USAF (ASD) through the USA. They are interested in working directly with the USAF and appear to have considerable technology and experience to offer. They are very R&D oriented in addition to offering a reliable product line.

Keywords: 4 = Chemistry; 5 = Communications; 7 = Electronics; 8 = Energy; 20 = Miscellaneous; Power Supplies = 5, 7, 8; Remote Power Supplies = 5, 7, 8; Auxiliary Power Units = 8; Thermoelectric Power Units = 8; Unattended Power Supplies = 8; Generators = 8; Thermoelectric Generators = 8; Applied Research = 4, 8, 20; Combustion Technology = 8, 20; Thermoelectric Research = 8; Power Sources = 5, 7, 8; Portable Power Supplies = 5, 7, 8; Portable Power Sources = 5, 7, 8.

Revised: Dec 83