

GEOPHYSICAL REPORT

on the

AIRBORNE MAGNETOMETER SURVEY

Of The Scott and Thelma Claims

And Mineral Lease M-14

Situated in the

Campbell Lake Area, Nanaimo Mining Division

Centered at

Latitude 50°1'N; Longitude 125°37'W N.T.S. 92K/4

Survey conducted on behalf of

Georgia Mines Ltd. (N.P.L.)

bу

Geo-X Surveys Ltd. Vancouver, B.C.

JULY 30, 1969

Report By:

D. R. Cochrane,

P. Eng.

James Cerne, M.S.





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GEO-X SURVEYS LTD. 627 HORNBY STREET, VANCOUVER 1, B. C.

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Department of

Mines and Petroleum Resources

ASSESSMENT REPORT

NO. 2507 MAP

SUMMARY and RECOMMENDATIONS:

On May 31, 1969, Geo-X Surveys Ltd. completed 41 line miles of total field aeromagnetic surveying on the Scott and Thelma claims group, situated near Campbell Lake, B.C. and on behalf of Georgia Mines Ltd. (N.P.L.).

The survey was completed in an Excalibur 800 fixed wing aircraft with a Varian V4937A proton precession magnetometer (-1 gamma); SDV 4991 digital recorder and analog chart recorders. Flight line positioning was facilitated by 35 mm. strip photography matched to mosaics prepared from Government airphotos (see accompanying Figure 3). Terrain clearance was recorded in analogue mode by radar-type pulse altimeter.

Data processing was conducted by Geo-X Surveys Ltd. personnel using IBM equipment in Vancouver.

The total field isomagnetic plan (Figure 4, 1":1000') was plotted by a computer-plotter unit at a contour interval of 100 gammas.

The area surveyed is characterized by an almost central block of high magnetic response, surrounded by areas of low response. One embayment in the high response area appears to correlate well with a previously determined geochemical high,

and ground magnetometer low. Two features of similar magnetic appearance and four linear magnetic features related to the embayments are worthy of further investigation.

Respecting submitted,

James Cerne, M.S.

INTRODUCTION:

On May 31, 1969, Geo-X Surveys Ltd. of Vancouver,
British Columbia, on behalf of Georgia Mines Ltd. (N.P.L.),
conducted an airborne magnetometer survey over a group of claims
in the Campbell Lake Area, Nanaimo Mining Division, Vancouver
Island, Province of British Columbia.

A total of 41 line miles of total intensity airborne magnetometer surveying was conducted. This report describes the instrumentation, field procedure and data processing, and discusses the results obtained.

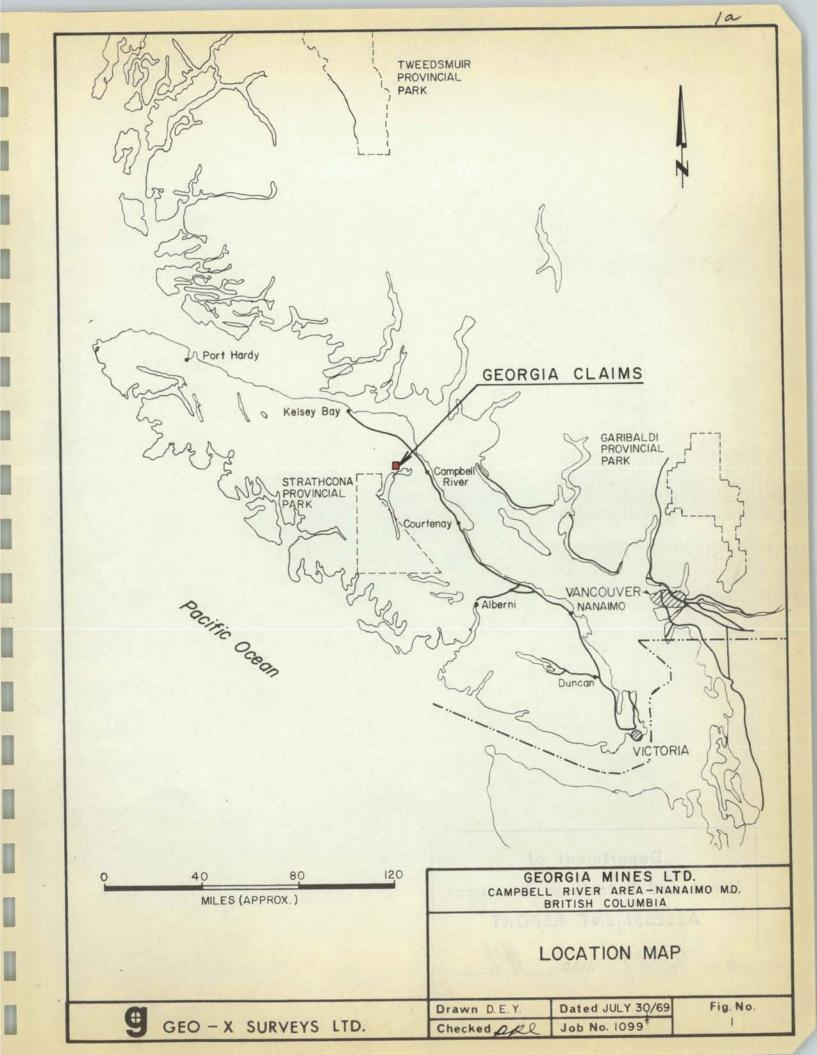
LOCATION and ACCESS:

The group of claims covered by this report is centered at latitude 50°1'N and longitude 125°37'W some 25 road miles west of Campbell River, B.C. The property is roughly centered between Martha Lake to the north, and Becher Lake to the south. The National Topographic system reference square for topographic maps are 92K/4 and 92F/13 east.

Access to the property is by motor vehicle from the town of Campbell River, along hard surface and various gravel roads.

CLAIMS and OWNERSHIP:

The property in the Campbell Lake area, Nanaimo Mining .



Division on which the airborne magnetometer survey was conducted consists of a mineral lease and some 28 contiguous mining claims listed as follows:

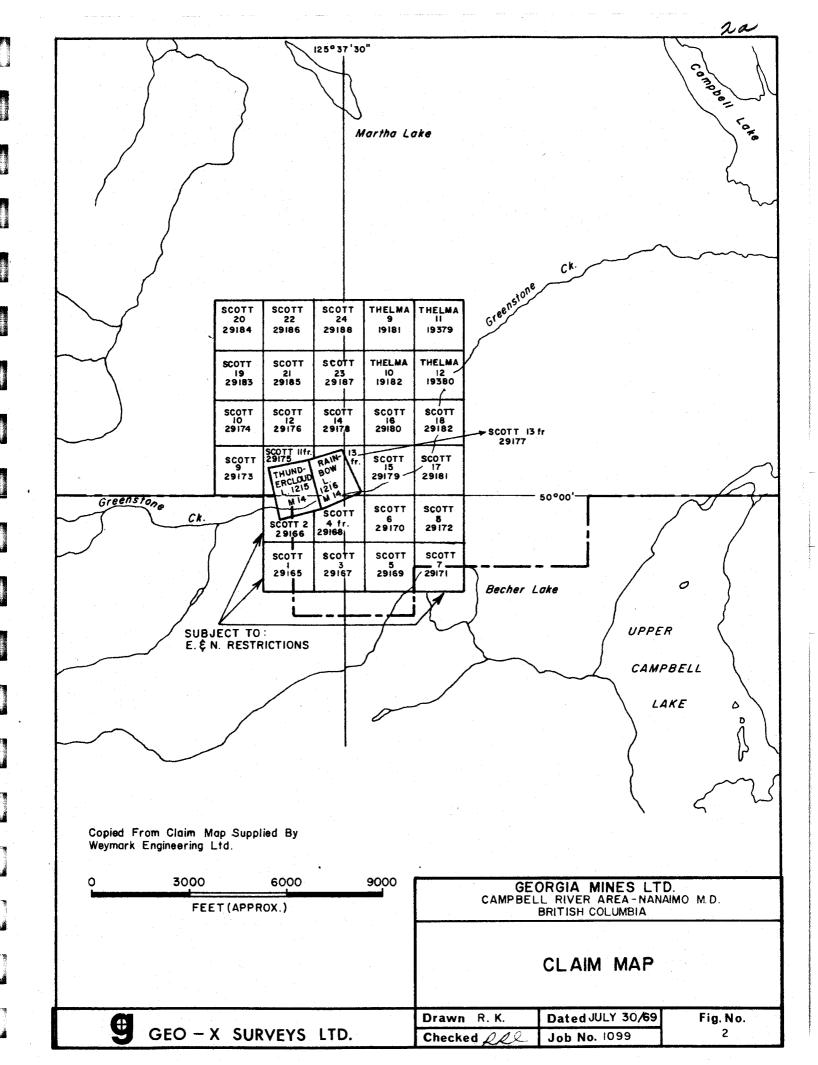
Claim Name	Record Number
Scott Nos. 1, 2 Frs.	29165, 29166
Scott Nos. 3-10	29167, 29174 incl.
Scott No. 11 Fr.	29175
Scott No. 12	29176
Scott No. 13 Fr.	29177
Scott Nos. 14-24	29178-29188 incl.
Thelma Nos. 9, 10	19181, 19182
Thelma Nos. 11, 12	19379, 19380
Mineral Lease	M-14

GENERAL SETTING:

The claims lie within the Nanaimo lowland physiographic subdivision of Vancouver Island, British Columbia. This strip of land, lying along the northeastern coast of the island, is characterized by relatively low relief and gently rolling topography below 2000 feet in elevation. "The lowland consists of many low, wooded, cuesta-like ridges separated by narrow valleys. The ridges are underlain by hard sandstone or softer rocks or along fault zones". (Holland, B.C. Dept. of Mines and Petroleum Resources, Bull. No. 48).

The claim block lies on a north-easterly sloping surface, with elevation ranging from 1900-900 feet. The property is roughly bisected by Greenstone Creek, with many small lakes in the vicinity.

- 2 -



The local geology consists of Mesozoic sediments and volcanics, with some intrusives (sketch map accompanying the July 31, 1965 Gunnex Ltd. Geochemical Survey map). The entire area was covered by glacial ice, and glacial drift covers much of the bedrock.

AIRBORNE FIELD PROCEDURE:

The total intensity of the geomagnetic field was measured and recorded along 23 flight lines, at an average terrain clearance of 450 feet. Cross flight lines 1 to 22 have a general north-south bearing while line 23 has an east-west bearing.

The survey was flown in a fixed wing aircraft, towing an airfoil sensor containing a proton magnetometer. Digital and chart recorders, camera and altimeter were mounted in the aircraft. The magnetometer and chart recorder measured and recorded the magnetic field intensity. At one second intervals, the field amplitude and fiducial number were recorded on punch tape by the digital recording system. At thirty second intervals, the time and line number were punched on the tape. At two second intervals, a split image camera simultaneously photographed (1) the terrain, and (2) the clock and fiducial

display panel. Thus each terrain photograph is bordered by a photograph of the clock and fiducial number.

The terrain clearance was measured with a Bonzar pulse type radar altimeter and recorded by a G-2000 chart recorder.

Solar flare warning and predictions, issued daily at the Space Disturbance Forecast Center in Boulder, Colorado, were used to schedule the flight during a magnetically quiet period.

The punch tape, chart and strip photograph processing is described in the following section.

DATA PROCESSING:

The data processing procedure consisted of four steps, discussed under the following headings:

- 1. Flight line X-Y positioning.
- 2. Editing of the paper tape.
- 3. Tabulation of critical fiducial numbers and their X-Y coordinates.
- 4. Contour plotting.

1. Flight Line X-Y Positioning:

From the aircraft, while the lines were being flown, the flight lines were roughly positioned on government aerial photographs. In the office, the beginning and end of each flight line was marked on the strip photographs. From the strip photos Geo-X personnel transferred the flight lines on to a mosaic prepared from the government photos. An X-Y coordinate system was also superimposed on the flight line mosaic with +Y north and +X east (see Figure 3). Thus, every position along a flight line was defined in terms of X (number of feet east of the origin) and Y (number of feet north of the origin), and has a corresponding magnetic value in gammas.

2. Editing of the Paper Tape:

A listing of the contents of the paper tape was made by IBM of Vancouver. The listing was examined and compared with the analog record as a guard against possible machine or operator error. The magnetic readings for areas of flight line intersection were compared as a check on the time variations of the geomagnetic field.

3. Tabulation of Critical Fiducial Numbers:

The first and last fiducial number on each line were tabulated along with their X-Y coordinates. In addition, points where the flight line changed direction were tabulated along with the appropriate fiducial number. The tabulated information was keypunched onto computer cards, and sent with the punch tape to IBM.

4. Contour Plotting:

TBM fed the punch tape to its computer, along with the X-Y coordinates of the start, end and any changes of direction that may have occurred in the flight line. The data sampling interval along the flight lines was roughly 170 feet and every other data point was plotted. The magnetometer readings were evenly spaced along the line segments and contoured by a computer-plotter unit at a contour interval of 100 gammas.

RESULTS/ DISCUSSION/ INTERPRETATION:

Introduction:

Since ferromagnetic susceptibility and natural rock magnetism change measurably from one rock type to another, accurate detailed mapping of the geomagnetic field often provides valuable information about the subsurface geology (even in heavily drift covered areas). Aeromagnetic surveys provide new knowledge of the type, general attitude, configuration and complexity of the geosuperstructure and often identify local elements which sometimes indicate ore. Aeromagnetic prospecting can be applied to the delineation of buried contacts and disruptions, or the location of areas of possible plutonic differentiation and its varied products. Considerable speed and accuracy is inherent in this survey method. When it comes to interpretation, however, there are two factors which can exert considerable influence. The first is geologic control, which reduces the number of variables that the interpreter must consider. The second is data analysis, which is essentially the use of filtering techniques. Filtering can remove noise, regional variation, and the effects of various physical phenomena (such as the effect of topography, or changing depth of burial). In addition, interpretation techniques (explaining the data) must be flexible enough to be revised in the light of new geological, geochemical or geophysical information.

This Survey:

A total intensity isomagnetic field plan is presented as Figure 4. The horizontal scale if l":1000' (approximately). The planimetry has been derived from uncontrolled airphoto mosaics. Some distortion is inevitable. The map depicts the intensity of the geomagnetic field present at the given nominal altitude on the particular flight day.

A general graphic interpretation accompanies this report and is designated Figure 5. It is basically a "manual" qualitative analysis of the magnetic features rather than a "computational" quantitative one. Considerable reference has been made to the aerial photography, available geology and geophysics in the preparation of the accompanying interpretation map.

INTERPRETATION:

For the following discussion refer to Figures 4 and 5.

The recorded local total field magnetic intensity varied from a maximum of 58300 gammas to a minimum of 56400 gammas. Ground magnetometer, geochemical and EM results for the property, produced by Gunnex Ltd., of Vancouver, were used as interpretation aids. The general interpretation map (Figure 5) illustrates the primary features to be discussed, and has been

contoured to draw attention to magnetic patterns.

The magnetic intensity background for the area is approximately 57100 gammas. Four areas of anomalously high response have been designated H_1 through H_A , and three areas of below average response are designated L_1 , L_2 and L_3 . A good correlation exists between L_1 and a reported high geochemical value of 600 p.p.m. of THM and a low in the ground magnetometer results. The ground magnetometer map generally resembles the airborne isomagnetic map in the area of overlap, since both display a ridge of high response extending from the north into an area of generally lower response. The apparent correlation of L_1 , with the geochemical high suggests that L_2 and L_3 may also be areas of interest. Feature L_2 lies at the intersection of linear features C-C', B-B', and D-D', and thus, may be structurally controlled. Feature L_3 lies on linear A-A', and on the perimeter of a high intensity response area. The specific cause of the magnetic highs and of features L2 and L3 should be investigated, as they may be of some economic interest. The intersection of these magnetic responses with linear magnetic features are prime target areas.

D. R. Cocheaner F. Eng.

PERSONNEL

NAME:

COCHRANE, Donald Robert

EDUCATION:

B.A.Sc. - University of Toronto M.Sc. (Eng.) - Queen's University

PROFESSIONAL

ASSOCIATIONS:

Professional Engineer, (P. Eng.), registered in British Columbia,

Ontario, Saskatchewan.

M.C.I.M.M., M.E.I.C., M.G.A.C.,

M.M.A.C.

EXPERIENCE:

Engaged in the Profession since 1962 while employed with Noranda Exploration Co. Ltd., Quebec Cartier Mines Ltd., Meridian Exploration Syndicate.

Experience in West Indies, Central and South America, U.S.A. and Canada.

PERSONNEL

NAME:

CERNE, James

EDUCATION:

B.S. Geology (June 1967)

Case Institute of Technology - Cleveland,

Ohio.

M.S. Geophysics (August 1968)
California Institute of Technology Pasadena, California.

EXPERIENCE:

July 1965 - June 1967 - Metallurgy Dept., Case Institute of Technology - Student Asst.

June - September 1967 - N.A.S.A. Manned Spacecraft CNT. Lunar and Earth Sciences Div., Geophysics Group, Houston, Texas.

September 1967 - August 1968 - California Institute of Technology, Seismological Laboratory, Graduate Research Asst.

September 1968 - present. Employed by Geo-X Surveys Ltd. as Geophysicist.

PERSONNEL

Name:

WHITE, Glen E.

Education:

B.Sc. Geophysics - Geology University of British Columbia.

Professional Associations:

Associate member of Society of Exploration Geophysicists.

Experience:

Pre-Graduate experience in Geology-Geochemistry-Geophysics with Anaconda American Brass.

Since Graduation in 1966 in Geophysics - Geology, has obtained experience in Mining Geophysics with Sulmac Explorations Ltd.

Airborne Geophysics with Spartan Air Services consulting on second derivative.

Micro-Gravity project with Velocity Surveys Ltd.

Recently acted as mining Geophysicist and technical Sales Manager in the Pacific north-west for W.P. McGill and Associates.

Presently employed as Airborne and Mining Geophysicist with Geo-X Surveys Ltd.

Active experience in all Geologic provinces of Canada has been obtained.

PERSONNEL

Name:

PASCHE, Juergen

Education:

Mittelschule - equivalent to Grade 12. Completed apprenticeship as precision mechanic with Carl Zeiss - Graduate Electrical Technology.

Experience:

3 years - Electro-Technician with SIEMENS of Braunschweig, Germany.

3 1/2 years - Seismic Party Chief with PRAKLA Association for practical deposit research in Germany - including field experience in Switzerland, Italy, and North Africa.

PERSONNEL

Name: KEY, Robert A.

Education: Grade XII Diploma.

1 year Petroleum Geology at the Institute

of Technology and Arts in Calgary.

Experience: 2 years in Steam Heating Design Drafting.

12 years with Mobil Oil Canada Limited,

Senior Draftsman.

PERSONNEL

Name: YIP, David Edward

Education: Grade 12 - Majors: Science, Mathematics,

Social Studies and

Industrial Arts.

Lake Cowichan Secondary School

l year - Vancouver Vocational Institute -

Drafting Training.

Experience: Presently employed by Geo-X Surveys Ltd.

since November 27, 1967 as Draftsman.

CERTIFICATE

NAME:

MALESKU, Terrance D.

EDUCATION:

Grade XII - Balfour Technical School, Regina, Saskatchewan.

EXPERIENCE:

September 1961 - September 1965 as Geological Draftsman for Marathon Oil Co., Regina, Saskatchewan.

September 1965 - December 1968 as Structural Draftsman for Con-Force Products, Regina, Saskatchewan.

April 1969 - presently employed as Geological Draftsman for Geo-X Surveys Ltd.

PERSONNEL

NAME:

DOBSON, Lionel John

EDUCATION:

June 1966 - Grade 12; Brentwood College, Mill Bay, B.C.

May 1968 - 1st year University; University of Victoria, Victoria, B.C.

December 1968 - Private Pilot licence - Victoria Flying Club.

EXPERIENCE:

September 1968 - April 1969 - Mapping Assistant.

May 1969 - June 1969 - Survey Assistant.

The above positions - Employed by B.C. Government, Victoria.

June 1969 - present - Employed by Geo-X Surveys Ltd. as Air Crew Navigator and Photo Co-ordinator.

PERSONNEL

NAME:

SCOTT, Alan Richard

EDUCATION:

Senior Matriculation - Southern Okanagan Secondary School, Oliver, B.C.

3rd Year Science - Geophysics Major University of British Columbia.

EXPERIENCE:

Department of Water Resources, Southern Okanagan Lands Project, Oliver, B.C. - Instrument Operator (Transit - 5 months).

March to June 1968 - Employed by Geo-X Surveys Ltd. doing Induced Polarization, Electromagnetic and Magnetometer Surveys all under professional supervision.

April 1969 - Presently employed by Geo-X Surveys Ltd. - same capacity as previous year.

PERSONNEL AND DATES WORKED

The following Geo-X Surveys Ltd. personnel were employed on the Georgia Mines Ltd. airborne magnetometer survey project.

A. FIELD WORK

G. E. White Navigator

J. Pasche Flight Operator May 31, 1969

B. DATA PROCESSING AND REPORT PREPARATION

G.	E. White	Geophysicist	May 21, 31
J.	Cerne	Geophysicist	June 11, 12 July 29, 30
D.	R. Cochrane	P. Eng.	July 11, 29.

C. DRAFTING AND REPRODUCTION

R.	Key	Draftsman	May 16, 20, 26 June 2-4, 9, 10, 13; July 18
D.	Yip	Draftsman	May 30 June 2, 5, 12 July 17, 18
J.	Carvajal	Draftsman	June 10, 11 July 15
Т.	Malesku	Draftsman	May 16, June 12 July 18, 21, 24
	Scott	Geophysical Technician	June 5
Ľ.	Dobson	Navigator	June 10

Mould

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COST BREAKDOWN

The following is a cost breakdown for an Airborne Magnetometer Survey conducted over the Scott and Thelma claims by Geo-X Surveys Ltd. through an Agreement with Georgia Mines Ltd.

Geo-X Surveys Ltd. provided the following for an all inclusive price.

- (a) Air Photo Mosaic
- (b) Aeromagnetic Survey Coverage
- (c) Base Map Preparation
- (d) Preliminary Data Preparation
- (e) Computer Data Processing
- (f) Report Preparation
- 41 line miles at \$61.00 per line mile

ALL INCLUSIVE TOTAL PRICE

\$2,500.00

S. L. Sandner,

President.

frontel Contrale

GEO-X SURVEYS LTD

SPECIFICATIONS OF THE V-4937A MAGNETOMETER SYSTEM

Performance

Range: 20,000 to 100,000 gamma (worldwide) Sensitivity: $\pm 1/2$ and ± 1 gamma in any field.

Sampling

Rate: manual and "clock" operation permits any

timing sequence.

Power Requirements

22-30 V, 6 amps for magnetometer, 60 watts for analog recorder and 100 watt maximum for digital recorder.

Physical Specifications

Console: size - 19 x 17 x 24 inches; Weight 68 lbs.

Analog

Recorder: dual channel - $15 \times 10 \times 10$ inches, 30 lbs.

Scanner-

coupler: fucical counter, ident. control, 24 hr. clock,

40 lbs.

Recorder: size - 14 x 11 x 28 inches; Weight 41 lbs.

Data Output

Digital

Recording: BCD 1-2-4-8 (four line output)

"O" state - 18 to -30v through 100K ohms

1 state -1 to +3v through 100k ohms

Print

Command: Positive going 12 to 25v pulse; 15M second.

Auxiliary

Channels: A & B for radio altimeter and navigation equipment.

Analog

Recording: Galvanometric -1 mA full scale into 1500 ohms

Potentiometric: 100mV full scale. Minimum load

resistance 20K

Full scale resolution of the least most significant digits of the total geomagnetic field 0-99, 0-999 at 1 gamma sensitivity; 0-49, 0-499

at 1/2 gamma sensitivity.

Instrument Specifications

Camera

4.44

Type: Neyhard Automax 35 m.m. pulse camera

Model: G-2 with auxiliary data box

Pulse Rate: Up to 10 frames per second

Film Format: 0.738" x 0.738" square picture with

0.200" x 0.738" data area.

Magazine: Mitchell 400 foot 35 m.m.

Lenses: (a) 17 m.m. F/14 Super-Takumar Fish-eye

(b) 35 m.m. F/2.0 Super Takumar

Data Box: (a) 24 hour Accutron Clock

(b) Frame counter

(c) Available for optional feature

Dimensions

(less magazine): 8 3/8" high, 4 1/2" deep, 6 1/4" wide.

Weight

(less lens and

magazine): 12 lbs.

INSTRUMENT SPECIFICATIONS

Aircraft

Type and Model: Excalibur 800

(Beechcraft Twin Bonanza modified by

Swearingen Aircraft, San Antonio,

Texas)

Power: Two 400 H.P. Lycoming 10-720-AIA

engines.

Gross Weight: 7900 pounds

Empty Weight: 5300 pounds

Useful Load: 2600 pounds

Fuel Capacity: 230 gallons (U.S.)

Performance at

7900 lbs. Gross: Climb - 1535 feet per minute (at sea level)

Cruise - 230 miles per hour.

Range - 1200 miles.

