

Project Report

**Airborne Gravity Survey
QUEST South, British Columbia - 2009
Geoscience British Columbia Society**

Sander Geophysics



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*Pictures courtesy of
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I. INTRODUCTION

Sander Geophysics Limited (SGL) conducted a high-definition airborne gravity survey for Geoscience British Columbia Society (GBC) in the QUEST South area of British Columbia. *Figure 1* shows the geographical position of the survey area. Please refer to *Appendix I* for a Company Profile of Sander Geophysics Limited. The survey was flown from September 1 to November 1, 2009.

The total size of the survey was 25,010 line kilometres (see *Appendix II*). A total of 41 production flights were performed using a Grand Caravan C208B, registration C-GSGJ, and a Diamond Twin Star DA-42, registration C-GSDK. The survey operations were conducted from South Cariboo Regional Airport (CZML), and Kelowna International Airport (CYLW).

The traverse lines were flown at 2000 m spacing and oriented east-west respective to the UTM zones 10N and 11N. The control lines were flown at 20 km spacing, except for control line 801, and oriented north-south respective to the same UTM zones. Since the survey spanned two UTM zones, the lines slightly change direction at the zone boundary. Control line 801 was flown along that boundary, and was separated from adjacent control lines by a maximum of 20 km. The survey was flown at a height of 200 m above a drapage surface which was designed taking into account the expected terrain, Transport Canada regulations, and the performance of the aircraft at the altitudes to be encountered. The average ground speed was about 90 knots.



Picture 1: Survey Area from C-GSGJ

II. SURVEY AREA

The survey block is situated in the southwestern part of British Columbia province, Canada. The survey block consists of an irregular polygon, with a maximum length of 352 km and a maximum width of 171 km (survey location map *Figure 1*). The relief in the survey area ranges from rolling hills to steep mountains. The elevation varies from 61.9 m to 2586.5 m above mean sea level.

Line coordinates of all flown survey lines are listed in *Appendix III*. Note that lines were originally planned separately for UTM Zones 10 and 11 (*Appendix II*) but were flown continuously across the boundary during the survey, and a new line numbering scheme was adopted. The survey block is located within the perimeter defined by the following coordinates in *Table 1*:

Corner	UTM-X	UTM-Y	Corner	UTM-X	UTM-Y
1	549123.07	5796053.60	23	707198.80	5742107.52
2	550139.49	5733359.64	24	682811.92	5765587.76
3	565179.28	5670514.81	25	668790.63	5796101.72
4	583441.88	5636138.15			
5	594721.72	5589944.51			
6	611372.92	5535156.71			
7	634469.74	5499168.64			
8	658640.83	5466403.38			
9	675631.51	5430258.85			
10	695881.19	5430988.57			
11	696777.43	5450826.46			
12	696240.30	5490574.47			
13	715577.17	5518505.51			
14	737162.64	5518442.50			
15	753121.25	5541969.10			
16	753713.78	5563624.88			
17	760696.54	5578127.53			
18	766605.03	5592630.18			
19	751028.10	5609818.51			
20	736525.45	5628618.25			
21	720411.39	5643658.04			
22	710742.96	5656012.15			

Table 1: Survey Geographical Coordinates in WGS-84 UTM 10N

QUEST South, British Columbia - 2009

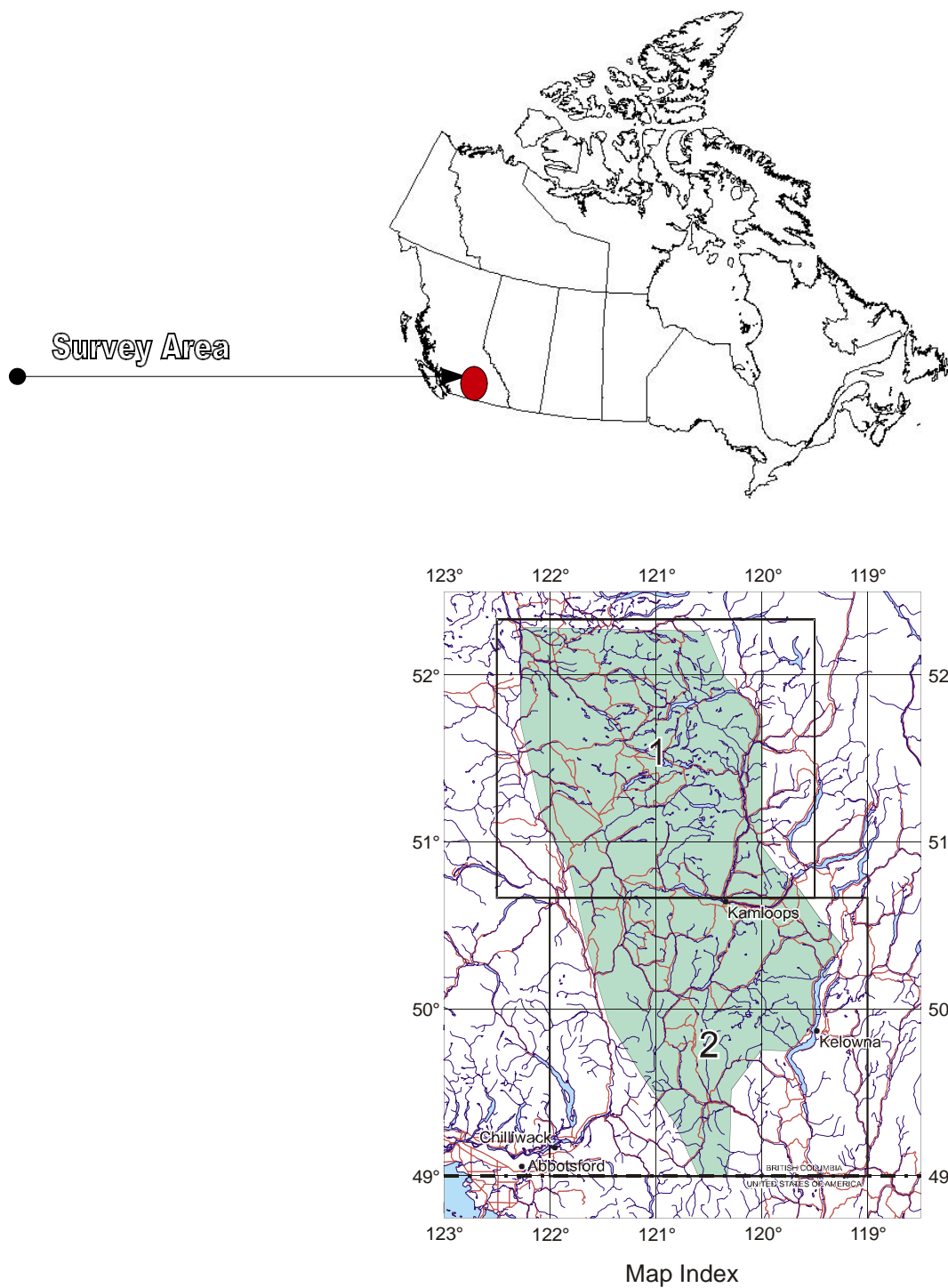


Figure 1: Survey Area Map

III. SURVEY EQUIPMENT

SGL provided the following instrumentation for this survey (see *Appendix IV* for further details):

Airborne Gravity System

SGL AIRGrav G2-7 and G1-A

SGL's airborne gravimeter uses a Schuler tuned inertial platform. This platform supports three orthogonal accelerometers, which remain fixed in inertial space, independent of the manoeuvres of the aircraft, allowing precise correction of the effects of the movement of the aircraft. Accelerometer data are recorded at 128 Hz. SGL's airborne gravimeter is tolerant of turbulent conditions and delivers good results when flown under normal weather and turbulence conditions, similar to the conditions required for high-resolution magnetometer surveys. The instrument delivers gravity data consistently with a noise level better than 0.5 mGal with a half sine wave ground resolution of 1.8 to 2 km.

Airborne Navigation and Data Acquisition System

Sander NavDAS

The NavDAS is the latest version of airborne navigation and data acquisition computers developed by SGL. It displays all incoming data on a flat panel screen for real-time monitoring. The data is recorded in database format on a solid-state internal hard drive and a removable hard drive simultaneously for transfer of data to the field office. The computer incorporates a magnetometer coupler, an altimeter analogue to digital converter and a 12-channel, dual-frequency GPS receiver NovAtel Millennium which automatically provides the UTC time base for the recorded data. In addition to providing essential post-mission positional data, the NavDAS computer processes user-received GPS or real-time differentially corrected GPS (RDGPS) data and compares the data to the coordinates of a theoretical flight plan in order to guide pilots along the desired survey line in three dimensions.

Navigation and Flight Path Recovery System

NovAtel OEMV

Navigation and flight path recovery were provided by the SGL NavDAS system. The Cessna Grand Caravan system utilizes two NovAtel OEMV GPS Receivers connected to the navigation computer with a sampling rate of 0.1 s. The Twin Star system utilizes one NovAtel OEMV GPS Receiver connected to the navigation computer with a sampling rate of 0.1 s.

Reference Data Acquisition System

SGL Gnd-Acq (GND1 & GND2)

The Reference Data Acquisition computer is a portable PC-Pentium with an internal GPS card. The time base (UTC) of both the ground and airborne systems is automatically provided by the GPS receiver, ensuring proper merging of both data sets. The reference data acquisition computer



displays all incoming data on a LCD flat panel screen for visual inspection. The GPS data, sampled every 0.1 s, were recorded on the internal hard drive of the computer using the same format as the airborne data.

GPS Base Station Receiver

NovAtel OEMV

The NovAtel OEMV, used for the reference stations, forms an integral part of the SGL GND-ACQ system. The OEMV may be configured to receive real time differential corrections from any of the SBAS, CDGPS or Omnistar services. They provide averaged position and raw range information of all satellites in view, sampled every 0.1 s. The comparative navigation data supplied during all production flights allows for post-processed differential GPS (DGPS) corrections for every survey flight.

Altimeters

SGLas-P - Riegl LD90-31K-HiP Laser Rangefinder (both aircraft)

The Riegl laser altimeter is an eye safe laser, has a range of 1500 m, a resolution of 0.01 m with an accuracy of 5 cm. The sample rate is 0.3 s.

TRT ERT 530A Digital Radar Altimeter (C-GSGJ)

The TRT radar altimeter has a resolution of 0.5 m, an accuracy of 1%, a range of 1 to 2,400 m and a 10 Hz data rate.

King KRA-10A Radar Altimeter (C-GSGJ)

The King radar altimeter has a resolution of 0.5 m, an accuracy of 5%, a range of 6 to 760 m, and a 10 Hz data rate. This system is employed as a backup system and not actively employed for survey guidance or data acquisition.

TRA 3500 Radar Altimeter System (C-GSDK)

The TRA 3500 Radar Altimeter unit provides AGL altitude information from 0 m up to 762 m maximum. The system consists of a TRA 3500 receiver/transmitter unit, two antennas and one TRI 40 indicator. The TRA has an accuracy of 5 to 7%.

Sander Digital Barometric Pressure Sensor

The barometric pressure sensor measures static pressure to an accuracy of ± 4 m and resolution of 2 m over a range up to 30,000 ft above sea level. The barometric altimeter data is sampled at 10 Hz.

Survey Aircraft

Cessna Grand Caravan 208B

The Cessna 208B Grand Caravan is an all metal, high wing single-engine aircraft powered by a Pratt & Whitney Canada PT6A-114A engine driving a constant speed, full feathering, reversible propeller. The aircraft has fixed gear, extendable flaps, manually adjustable trim tabs, full de-icing equipment, and sufficient avionics for instrument flying. The aircraft is equipped with a rigid aluminium and composite material 3 m tail stinger designed to accommodate the magnetometer sensor. There is a camera hole in the belly of the aircraft and provisions for numerous other survey and navigation systems. The airframe has been extensively modified to reduce the magnetic signature of the aircraft by replacing ferromagnetic parts with those made from special non-magnetic stainless steel or aluminium. Several wiring changes have also been made to the electrical system to reduce the magnetic field variations around the aircraft. The aircraft has a Canadian registration C-GSGJ and conforms to Canadian aeronautical regulations in survey configuration. A complete description of this survey aircraft is given in *Appendix V*.

Diamond DA42 Twin Star

The DA42 Twin Star combines the benefits of outstanding safety and ideal flight characteristics. Ultra-light, high-strength composite materials are used throughout its construction. The Twin Star uses Thielert Centurion 2.0 litre turbo diesel engines that can run on either diesel or Jet A1 fuel. With just the standard tank (52 US gallons), the aircraft's sensationally efficient fuel consumption gives a maximum range of 900 nm, depending on power setting. With long range fuel tanks, range is increased to over 1300 nm. Another groundbreaking innovation is the fully integrated DA42 Twin Star cockpit with its ultra-modern Garmin G1000 avionics system, which has at its heart, two large-format 38 cm colour TFT screens. The system is a modular design with open architecture. The airframe has been extensively modified to reduce the magnetic signature of the aircraft by replacing ferromagnetic parts with those made from advanced non-magnetic alloys. Several wiring changes have also been made to the electrical system to reduce the magnetic field variations around the aircraft. The fully equipped DA42 can operate at a wide range of speeds, varying from a minimum survey speed of 90 knots to a maximum of 150 knots (IAS). No other aircraft can match the flexibility of the turbo diesel-powered DA42. The aircraft has a Canadian registration C-FSDK and conforms to Canadian aeronautical regulations in survey configuration. A complete description of this survey aircraft is given in *Appendix V*.



Picture 2: Diamond Twin Star and Grand Caravan in Background

Data Processing Hardware and Software

Processing was performed on two Pentium microcomputers equipped with MS Windows operating system and optimized for processing tasks. SGL's proprietary geophysical software was used for data processing.



IV. SURVEY SPECIFICATIONS

Data Recording

The following parameters were recorded during the course of the survey:

- Aircraft altitude measured by the barometric altimeter at intervals of 0.1 s.
- Terrain clearance provided by the radar altimeters at intervals of 0.1 s.
- Terrain clearance provided by the laser altimeters at intervals of 0.3 s.
- GPS positional data: (latitude, longitude, height, time, and raw range from each satellite being tracked) recorded at intervals of 0.1 s.
- Gravimeter data recorded with a 128 Hz sampling rate, accuracy to less than 1 mGal.
- Digital video recorded at 30 Hz

Technical Specifications

The contract specified the following technical requirements:

- (a) Airborne Gravity.....the gravity line noise from intersection differences will be less than 0.7 mGal RMS for all intersections in the survey area, and will be less than 1.25 mGal RMS for an individual flight line, §after the following processing steps:
 - i. Application of a 100 second line filter. The 100 second line filter is defined as having 0% pass at 70 seconds, 100% pass at 168 seconds, and a frequency mid-point of 100 seconds.
 - ii. Application of a 0th order (i.e. one constant shift per line) levelling.

§ Note that areas with steep, large amplitude, linear gravity anomalies may have slightly higher intersection differences caused by directional filtering of those anomalies.
- (b) Location (x, y, z).....≤ 5 m in X, Y, Z after differential correction
- (c) Horizontal deviation from planned flight lines.....not > 100 m for a distance of > 4 km (subject to the pilots' discretion in the interest of safety)
- (d) Vertical deviation from planned drape surface.....not > 15m for a distance of > 7 km (subject to the pilots' discretion in the interest of safety)



- (e) GPS satellites..... ≥ 4 common satellites on the airborne and ground GPS data
- (f) Data gaps..... ≤ 0.5 sec in any of the following channels: time, AIRGrav xyz accelerations, and airborne or ground GPS xyz

Data falling outside these specifications would be re-flown at SGL's expense. However, for minor departures, re-flights may be waived if, after due discussion and in the judgement of client's representative, the data collected is adequate for the purpose for which it was flown. The following lines were re-flown to improve the data quality and meet the technical specifications above:

Original Flight		Re-Flights		
Line	Flight	Line	Flight	Reason
604.00	116	604.01	125	gravity data
6023.00	121	6023.01	128	gravity data
6040.00	118	6040.01	128	gravity data
6063.00	212	6063.01	128	gravity data
6065.00	212	6065.01	213	gravity data
7065.00	125	6065.01	213	gravity data
6090.00	210	6090.01	125	gravity data
7090.00	210	6090.01	125	gravity data
6098.00	204	6098.01	127	gravity data

Survey Line Specifications

Survey lines were flown with the following specifications (line direction is with respect to the UTM zone reference frame):

	Line Direction	Line Spacing (m)
Traverse Lines	90° /270°	2000
Control Lines	0° /180°	20000

Terrain Clearance

The survey was flown using a pre-planned drape surface designed to guide the aircraft over the topography in a consistent manner as close to target clearance as possible. The drape surface was prepared using digital elevation model (DEM) data from the Shuttle Radar Topography Mission (<http://srtm.usgs.gov/>) for the area in question. The DEM included an extension beyond the survey boundary to allow the aircraft to achieve the drape clearance before coming on line.



The drape was created using climb and descent rate of 250 ft/nm along the survey lines. This rate was chosen to create a gentle flight path for the gravity system and is below the maximum climbing and descending capabilities of the survey aircraft. The drape based on topography was modified to maintain a minimum clearance of 1000 ft AGL above built up areas and 2000 ft AGL above provincial parks and reserves, as directed by Transport Canada.



V. SYSTEM TESTS

Gravimeter Calibration

The gravimeters were calibrated using the Natural Resources Canada reference gravity station at Kamloops airport which has a value of 980937.171 mGal and Kelowna airport which has a gravity value of 980850.57 mGal.

For flights out of Kelowna, the Kelowna reference value was adjusted to account for the height of the gravimeter installed in each aircraft using a vertical gradient of 0.3086 mGal/m. For the Grand Caravan C-GSGJ an adjustment for a height of 1.7 m gives the calibration value of 980850.05 mGal. For the Diamond Twin Star C-FSDK, an adjustment for a height of 1.3 m gives the calibration value of 980850.17 mGal.

For 100 Mile Ranch, calibration was achieved whilst operating from the Kelowna airport. Ten minutes of data were collected in Kelowna in C-GSGJ, and keeping all systems running the aircraft was flown to Kamloops and parked within 50 m of the gravity reference station. Another ten minutes of data were recorded, and then the aircraft returned to Kelowna again for a second period of ten minutes recording to close the loop. Data recorded was compared to the 1.7 m height adjusted Kelowna reference value (given above) and to the 1.7 m height adjusted value at Kamloops of 980936.646 mGal. Based on this data and using data already recorded at 108 Mile Ranch, the calibration for C-GSGJ for 108 Mile Ranch was determined to be 980916.565 mGal. This was height adjusted by -0.4m to find the value for C-FSDK determined to be 980916.69 mGal.

On start up, before each flight, the AIRGrav systems automatically aligned their platforms. Before and after each flight, the consistency of the measured gravity was confirmed by recording data at the aircraft parking spot. The results, presented in *Figure 2*, are given as deviations from the local gravity value.

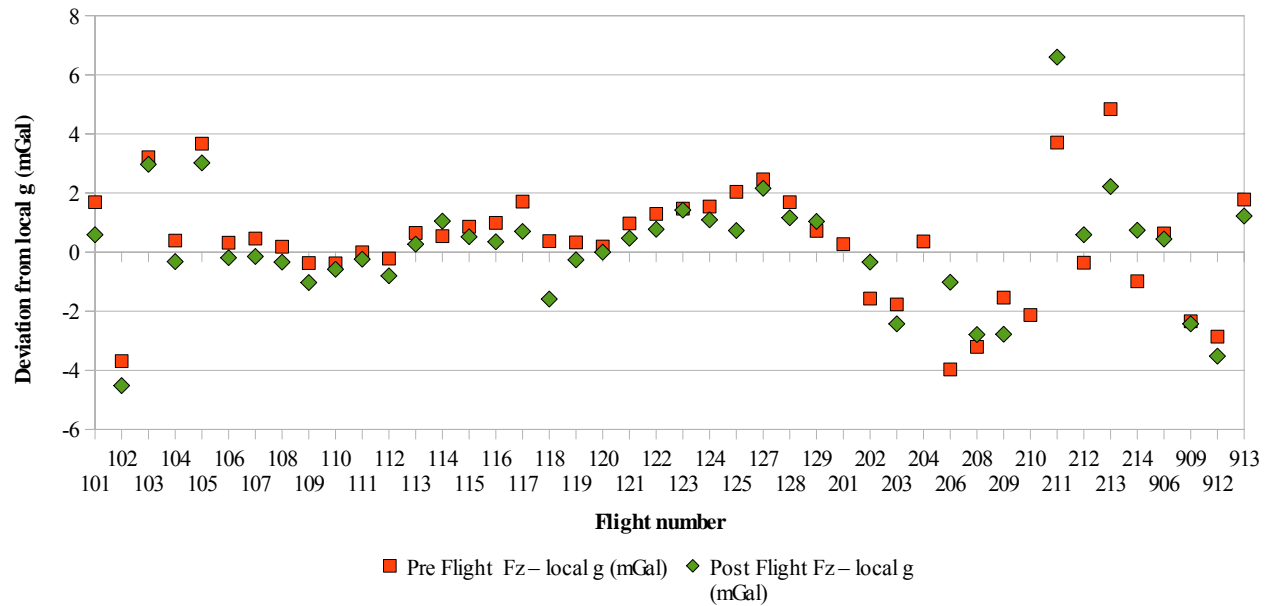
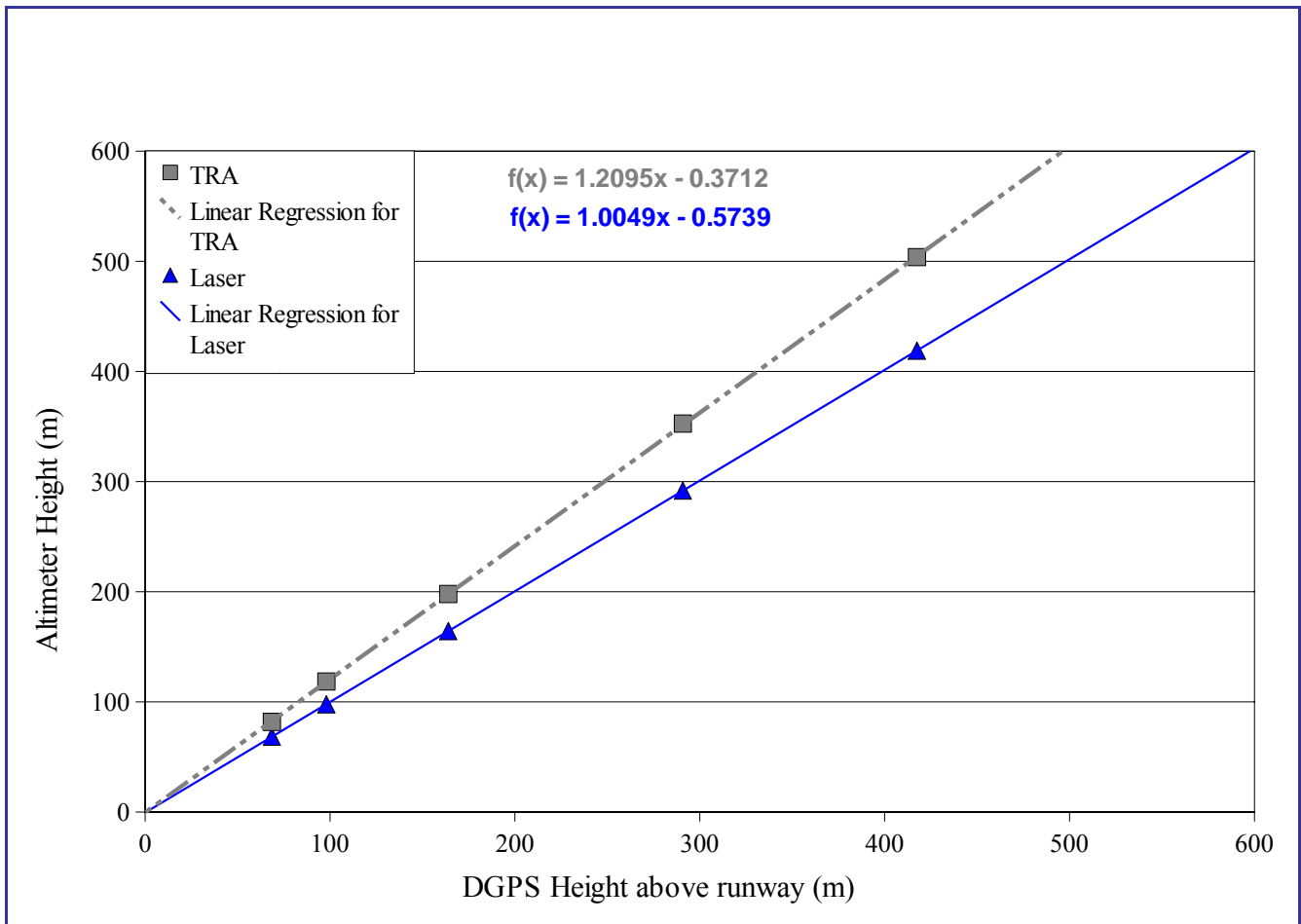


Figure 2: Deviations from Local Gravity

Altimeter Calibration

A test flight to calibrate C-FSDK's altimeters was flown on August 13, 2009 over the runway at Gatineau Airport, close to Ottawa. C-GSGJ's altimeters were calibrated on October 24, 2009 over the runway at Kelowna International Airport. Five passes were made over the runways with clearance heights ranging from 0 to 400 metres. The altimeter values were compared to the post-flight differentially corrected GPS altitude. An ideal altimeter would yield a slope of 1, and an intercept of 0 m. The results of these tests are plotted in *Figures 3 and 4*. The linear coefficients were used to correct the altimeters during post-processing.

**Figure 3: Altimeter Test, C-FSDK**

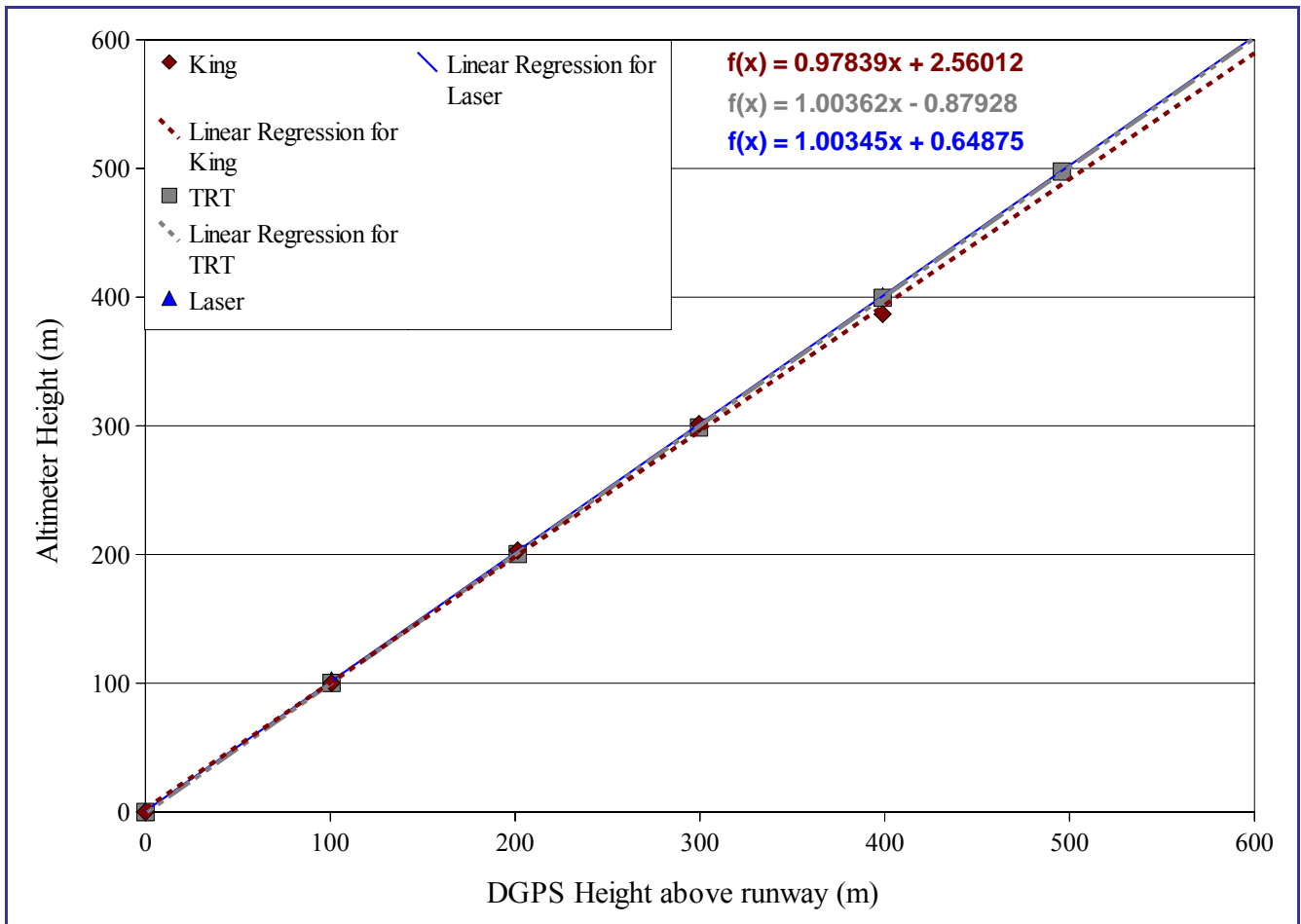


Figure 4: Altimeter Test, C-GSGJ



VI. FIELD OPERATIONS

Flight operations were conducted from 108 Mile Ranch (CZML) and Kelowna Airports (CYLW). The field office was established at the 108 Miles Hills Health Ranch until September 23, 2009, and subsequently at the Okanagan Seasons Resort at Kelowna. Two reference base stations were set up in the airport hangar attic at 108 Miles Airport (GND1 and GND2), and inside a building under renovation at the resort in Kelowna (GND3 and GND4). GPS antennae were set up on the roofs of the buildings in both places to provide a clear view of the sky. Power was provided to the ground station using a grid feed and a battery backup.

The position of the GND1 and GND2 ground stations were differentially corrected using data from GPS reference stations Penticton (DRAO), Calgary (PRDS), Williams Lake (WILL) and Whistler (WSLR), which are part of the International GPS Service (IGS) Network, using data recorded on days 238, 239 and 240 of 2009. The position of GND3 and GND4 ground stations were corrected from the same GPS reference stations using data recorded on days 269, 270, and 271. The positions of the GPS antennae after differential correction were (WGS-84 datum):

	GND1	GND2	GND3	GND4
Latitude:	N 51:44:33.25	N51:43:33.19	N 49:53:21.87	N 49:53:21.90
Longitude:	W 121:20:17.16	W121:20:17.37	W 119:25:04.32	W 119:25:04.19
Elevation (m):	946.19	946.2408	370.06	370.2

These ground stations were used to apply post-mission differential corrections to the GPS position of the aircraft. The survey was completed in twelve weeks. Please refer to the Weekly Reports in *Appendix VI* for details.

Operational Issues

Forest fires in and close to the survey block, as well as rain and overcast conditions forced occasional production delays.

Field Personnel

The following technical personnel participated in field operations:

Party Chief/Geophysicist:	Alison McCleary
Geophysicist:	Sol Meyer / France Belley
Aircraft Mechanic:	John Sevenhuysen
Aircraft Pilot:	Steve Gebhardt / Randall Forwell / Andre Lafontaine
Aircraft Co-Pilot :	Galen Smith / Kim Steingass / Vince Duchesne
Technician:	Johnathan Drolet



Picture 3: Twin Star landing at South Cariboo Regional Airport (CZML)



Picture 4: Grand Caravan landing at Kelowna International Airport (CYLW)

VII. DIGITAL DATA COMPILATION

Preliminary processing for on-site quality control was performed in the field as each flight was completed. This included verifying the data on the computer screen, generating traces of all of the data channels, and creating preliminary data grids. Final data processing and map production were performed at the SGL head office located in Ottawa, Canada.

Gravity Data

Gravity data are recorded at 128 Hz. Accelerations are filtered and decimated to match GPS measurements using specially designed filters to avoid biasing the data. Gravity is calculated by subtracting the GPS-derived aircraft accelerations from the inertial accelerations. In survey flying, accelerations in an aircraft can reach 0.1 G, equivalent to 100,000 mGal. Data processing must extract gravity data from this very noisy environment. This is achieved by modelling the movements of the aircraft in flight by extremely accurate GPS measurements. The calculated gravity is corrected for the Eötvös effect and normal gravity and the sample interval is reduced to 2 Hz. These operations are all performed by SGL's proprietary GRAVGPS software.

The following standard corrections were applied to the gravity data:

- Eötvös correction, $Eötvös = -v_x^2 / [(r/\sqrt{(1-e_2\sin^2\Phi)}) + h] - 2(0.00007292115\cos\Phi v_x) - v_y^2 / [(r(1-e_2)/\sqrt{(1-e_2\sin^2\Phi)^3}) + h]$ where Φ is the latitude of the aircraft, v_x and v_y are the velocities of the aircraft in the x (east) and y (north) direction, r is the Earth's radius at the equator (6378137 m), Φ is the latitude, e_2 is a correction for Earth's flattening towards the poles (0.00669437999013), and h is the altitude of the plane above the GRS-80 ellipsoid;
- Normal gravity, $g = 9.7803267714(1 + 0.00193185138639\sin^2\Phi) / \sqrt{(1 - 0.00669437999013\sin^2\Phi)}$, where Φ is the latitude of the aircraft;
- Free air correction, $g_{fa} = -0.3086h$, where h is height of the aircraft in metres above mean sea level;
- Bouguer, $g_{sb} = 2\pi\gamma\rho h = 0.041925\rho h$, where γ is the Universal Gravity constant, ρ is density for this project, and h is height of the surface of land or sea in metres above mean sea level;
- Curvature of the earth, $g_{ec} = (1.464 h - 0.3533 h^2 + 0.000045 h^3)(\rho/2.67)$, where h is height of the surface of land or sea in kilometres above mean sea level and ρ is density for the project;
- Terrain, g_t . See below for a description of the terrain correction technique;
- Static correction, g_{sc} , based on static ground recordings and repeat lines;
- Level correction, g_{lc} , based on line intersections;

Thus, Bouguer anomaly = $G - g_{fa} - g_{sb} - g_{ec} + g_t - g_{sc} - g_{lc}$, where G is the calculated gravity adjusted for Eötvös effect and normal gravity.

Terrain Corrections

Shuttle Radar Terrain Mission (SRTM) data was used to calculate the terrain corrections for gravity processing. The SRTM data contains information in a grid with 100 m cell spacing, which is more dense than the line spacing for this survey, and therefore provides terrain data at a better resolution between the survey lines. Coverage up to 167 km from the survey block was kept for accurate regional corrections.

The presence of several significant lakes within the survey area was taken into account in the calculation of the terrain corrections. Depths of lakes were obtained from the government of British Columbia Ministry of the Environment web page as follows: <http://a100.gov.bc.ca/pub/fidq/bathyMapSelect.do>. A density of 1.00g/cc was used for the fresh water in the lakes. In Addition, regional terrain corrections are effected by the presence of the Pacific Ocean. Bathymetric data was obtained from the U.S. National Oceanic and Atmospheric Administration National Geophysical Data Centre web site as follows: http://Topex.ucsd.edu/pub/srtm30_30plus/.

Terrain corrections were computed using software developed for SGL by the University of Calgary Geomatics department. The algorithm calculates terrain corrections using 2D FFT methods with a constant density. The terrain and Bouguer corrections were calculated on the bedrock using various densities. Through discussions with the client, the density of 2.67 g/cm³ was chosen as the most appropriate density for the area and subsequently used in final processing.

Terrain corrections are filtered to match the degree of filtering applied to the gravity data as described below.

Line Adjustments

The gravimetric data were levelled to compensate for instrument variations in two steps. A single constant shift determined from ground static recordings (described above in Section V – SYSTEM TESTS) was applied on a flight-by-flight basis. The pre- and post-flight readings were averaged for each flight and the difference between the average value and the local g value was removed. This acts as a simple but effective coarse levelling of the data.

Intersection statistics are then used to adjust individual survey lines. Unlike magnetic levelling, individual intersections are not used to make corrections. Instead, intersection differences from whole lines are averaged together thereby reducing errors from noise in the line data, and a single adjustment is applied to each survey line and each control line. The influence of noise on the statistics is further reduced by filtering the data before calculating differences at intersections. The degree of filtering required is dependant on the number of intersections that will be averaged. The more intersections there are, the less filtering is required to remove the effects of noise. Therefore, less filtering is required for control lines since they cross many traverse lines, whilst the opposite is

true for traverse lines. For very long survey lines it may be necessary to calculate adjustments to sections of each line based on statistics from groups of intersections rather than from entire survey lines.

The adjustments are then smoothed and applied to line data that has been filtered to different degrees as described below. The degree of filtering applied to the data in order to calculate adjustments is independent of the degree of filtering applied to the data itself. Grids of adjusted data are inspected to determine if adjustments as determined are appropriate and the degree of filtering applied may be altered in response.

Isostatic Correction

The principle of isostasy states that mass excesses, i.e. topographic loads at the surface, are compensated by mass deficiencies at depth, which are referred to as isostatic roots. The boundary between the Earth's crust and the Earth's mantle, also called Moho discontinuity, is therefore deeper below mountains. The effect of these mass deficiencies are not accounted for in the Bouguer correction. It results in an inverse correlation between broad Bouguer anomaly lows and positive topography. The isostatic correction removes the gravity effect of the isostatic roots.

The isostatic correction for the survey area was calculated using the Airy-Heiskanen model, a crustal density of 2.67 g/cm^3 , an average Moho depth of 30 km, and the same bathymetric data as used for the terrain correction (http://Topex.ucsd.edu/pub/srtm30_plus/). This correction was subsequently applied to the terrain corrected Bouguer anomaly gravity data. The computation of isostatic correction and the preparation of the isostatic residual gravity map was performed using SGL's proprietary software.

Gridding And Filtering

Statistical noise in the data is reduced by applying a cosine tapered low pass filter to the time series line data. The degree of line filtering employed depends on the noise level of the data and resolution required. The degree of line filtering is always slightly less than the subsequent grid filtering to avoid biasing the data in the grid. For this survey, a 50 second half wavelength filter was employed. Having selected a suitable line filter, the data is gridded using a minimum curvature algorithm that averages all values within any given grid cell and interpolates the data between survey lines to produce a smooth grid. The algorithm produces a smooth grid by iteratively solving a set of difference equations minimizing the total second horizontal derivative while attempting to honour the input data (Briggs, I.C, 1974, *Geophysics*, v 39, no. 1). Grids were generated using a 500 m grid cell size.

Low pass filtering, directly equivalent to spatial averaging, is then applied to the grid to cancel out noise and achieve better noise reduction than is possible by simply increasing the degree of line filtering. Essentially, the survey area is over-sampled by a line spacing that is smaller than the grid filter used. A range of grid filters are used and evaluated for noise levels and signal content. Final



data for this survey was filtered with a 3 km half-wavelength (6.0 km full-wavelength) grid filter. The full-wavelength filtering parameters are 0% pass at 4.5 km, 100% pass at 9.0 km.

A gravity processing flowchart is presented in *Figure 5*.

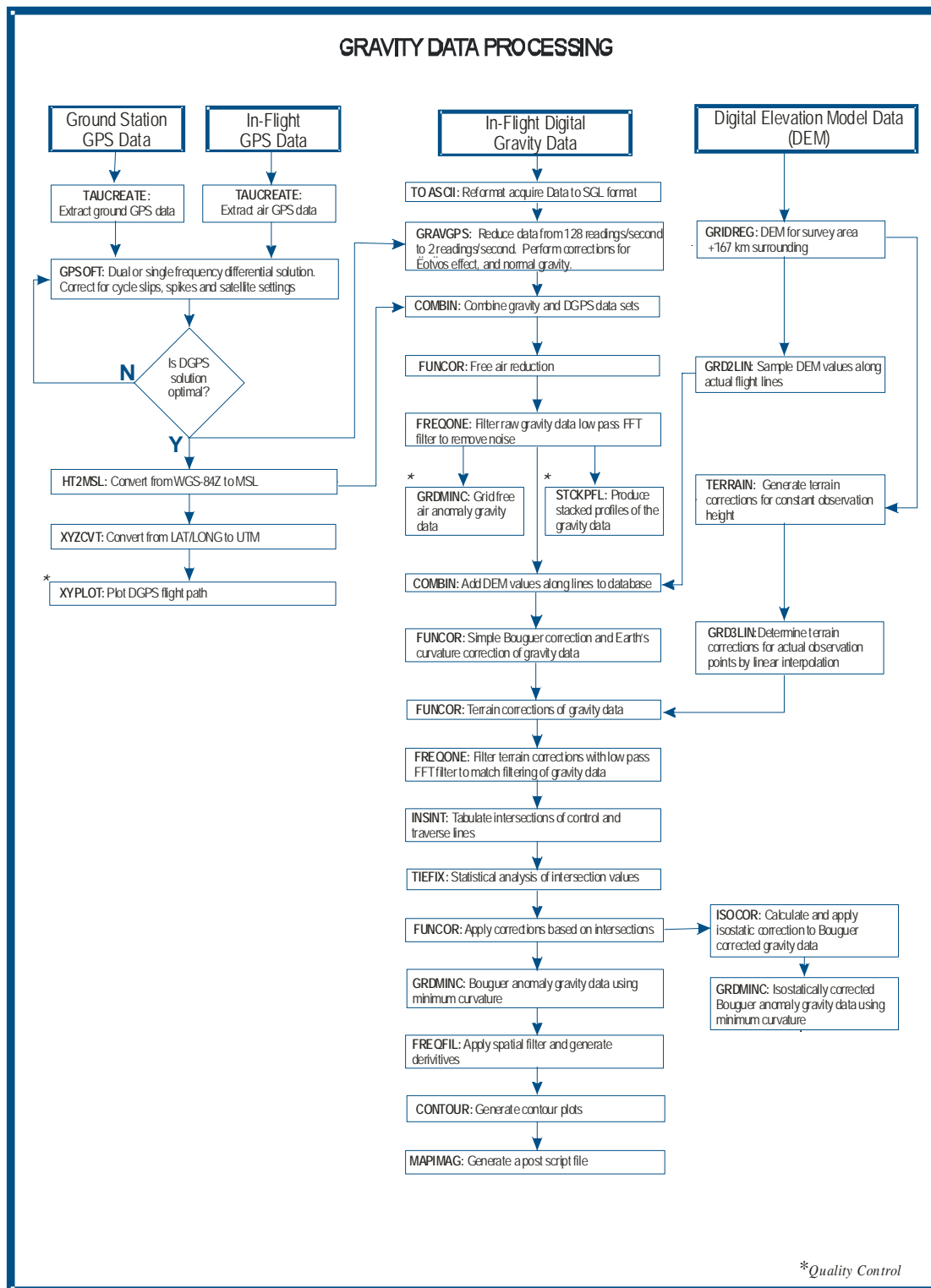


Figure 5: Gravity Data Processing Chart



Radar, Barometric and Laser Altimeter Data

The barometric altitude in metres was recorded at 4 Hz but was not used in processing because of the availability of more accurate GPS altitudes. The terrain clearance as measured by the radar altimeter in metres was recorded at 10 Hz. The laser altimeter recorded terrain clearance at 3.3 Hz. The raw radar data were filtered to remove high frequency noise using a 67-point low pass filter (Figure 6).

Even though the laser altimeter can record returns from more than 700 m above the ground with a high degree of certainty, some laser data dropouts occurred while flying over the mountainous parts of the survey area due to high terrain clearance. Radar data was substituted for missing laser data when available for creation of the final altimeter channel, although some gaps still remained in mountainous areas. These few remaining gaps were filled with data from the Shuttle Radar Topography Mission (SRTM). The final data were plotted and inspected for quality and gridded to make a "full feature" digital elevation model.

Radar and laser data were also processed with an iterative de-spiking routine to remove early laser returns from trees and gridded to provide a "bare earth" version of the digital elevation model. Resolution of trees was superior in the laser data compared to the radar data. No attempt to remove trees was attempted for line data using substituted SRTM data because it does not resolve the trees at all.

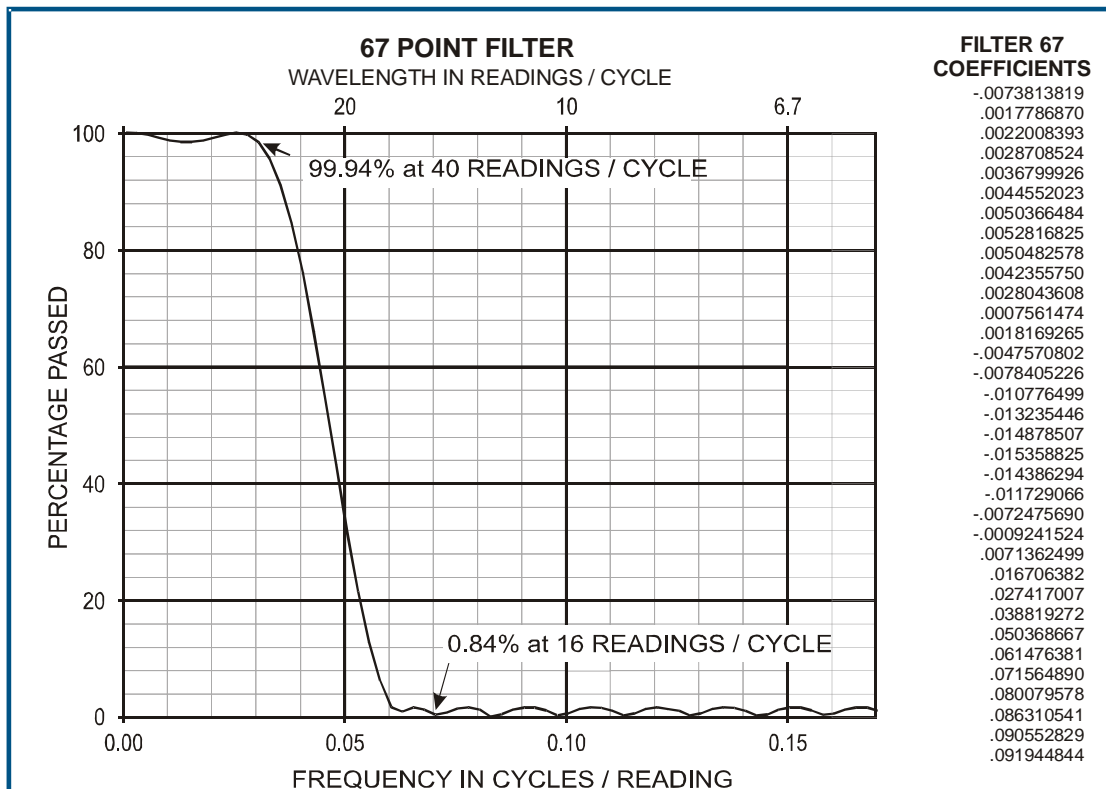


Figure 6: 67 Point Filter

Positional Data

A number of programs were executed for the compilation of navigation data in order to reformat and recalculate positions in differential mode. SGL's GPS data processing package, GPSoft, was used to calculate DGPS positions from raw 10 Hz range data obtained from the moving (airborne) and stationary (ground) receivers using the combinations of L1 and L2 phase signal. The DGPS is processed repeatedly to obtain optimal aircraft accelerations for the calculation of gravity. The general data flow for positional processing is illustrated in *Figure 7*.

Positional data were recorded in the WGS-84 datum in latitude and longitude. For processing purposes, the WGS-84 UTM data were calculated in Zone 10N. Parameters for the GRS-80 ellipsoid as used by the WGS-84 datum are:

Ellipsoid:	GRS-80
Semi major axis:	6378137.0
1/flattening:	298.257222

Coordinates in NAD-83 are used for the final data and map products. NAD-83 uses the same ellipsoid as WGS-84 as defined above. Transformation from WGS84 to NAD-83 is defined by the following parameters:

X Shift	0.991 m
Y Shift	-1.9072 m
Z Shift	-0.5129 m
X Rotation	1.2581E-7 rad
Y Rotation	0.3599E-7 rad
Z Rotation	0.5607E-7 rad
Scale Factor	0.0

Digital data is provided in NAD-83 UTM 10 and UTM 11N, as well as in NAD-83 using the BC Albers Conic Equal Area Projection. Maps are printed in NAD-83 UTM 10N. The parameters of the BC Albers projection are given below.

Central Meridian	W 111:00:00
Central Latitude	N 45:00:00
False Northing	500000 m
False Easting	500000 m
Latitude 1	N 12:00:00
Latitude 2	N 18:00:00

Elevation data were recorded relative to the GRS-80 ellipsoid and transformed to mean sea level (MSL) using the HTv2.0 geopotential model from the Canada Geodetic Survey Division (GSD) of Natural Resources Canada.

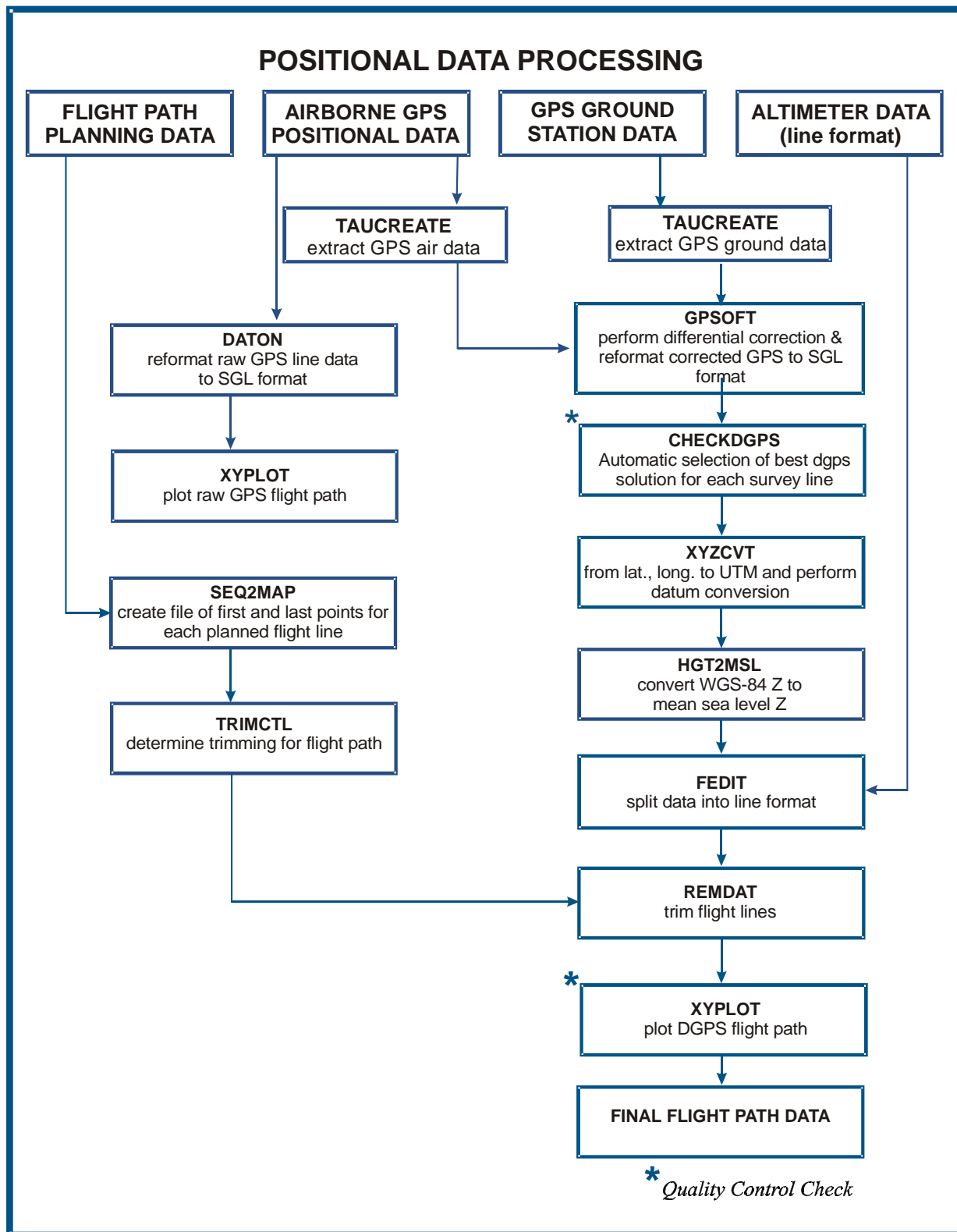


Figure 7: Positional Data Processing



VIII. FINAL PRODUCTS

Geosoft GRIDS

Grid cell size = 500m

Name	Units	Description
10N-BOU_G.grd	mGal	Bouguer gravity, 3km half-wavelength filter, 2.67 g/cc, NAD-83 UTM 10N
10N-FRE_G.grd	mGal	Free air gravity, 3km half-wavelength filter, NAD-83 UTM 10N
10N-FVB_G.grd	Eötvös	FVD of Bouguer gravity, 3km half-wavelength filter, 2.67 g/cc, NAD-83 UTM 10N
10N-BOU-IS_G.grd	mGal	Isostatic corrected Bouguer gravity, 3km half-wavelength filter, 2.67 g/cc, NAD-83 UTM 10N
10N-FVB-IS_G.grd	Eötvös	FVD of isostatic corrected Bouguer gravity, 3km half-wavelength filter, 2.67 g/cc, NAD-83 UTM 10N
10N-TER_G.grd	m	non-Bare-Earth terrain, NAD-83 UTM 10N
10N-TER-BE_G.grd	m	Bare-Earth terrain, NAD-83 UTM 10N
11N-BOU_G.grd	mGal	Bouguer gravity, 3km half-wavelength filter, 2.67 g/cc, NAD-83 UTM 11N
11N-FRE_G.grd	mGal	Free air gravity, 3km half-wavelength filter, NAD-83 UTM 11N
11N-FVB_G.grd	Eötvös	FVD of Bouguer gravity, 3km half-wavelength filter, 2.67 g/cc, NAD-83 UTM 11N
11N-BOU-IS_G.grd	mGal	Isostatic corrected Bouguer gravity, 3km half-wavelength filter, 2.67 g/cc, NAD-83 UTM 11N
11N-FVB-IS_G.grd	Eötvös	FVD of isostatic Bouguer gravity, 3km half-wavelength filter, 2.67 g/cc, NAD-83 UTM 11N
11N-TER_G.grd	m	non-Bare-Earth terrain, NAD-83 UTM 11N
11N-TER-BE_G.grd	m	Bare-Earth terrain, NAD-83 UTM 11N
ALB-BOU_G.grd	mGal	Bouguer gravity, 3km half-wavelength filter, 2.67 g/cc, NAD-83 BC ALBERS
ALB-FRE_G.grd	mGal	Free air gravity, 3km half-wavelength filter, NAD-83 BC ALBERS
ALB-FVB_G.grd	Eötvös	FVD of Bouguer gravity, 3km half-wavelength filter, 2.67 g/cc, NAD-83 BC ALBERS
ALB-BOU-IS_G.grd	mGal	Isostatic corrected gravity, 3km half-wavelength filter, 2.67 g/cc, NAD-83 BC ALBERS
ALB-FVB-IS_G.grd	Eötvös	FVD of isostatic Bouguer gravity, 3km half-wavelength filter, 2.67 g/cc, NAD-83 BC ALBERS
ALB-TER_G.grd	m	non-Bare-Earth terrain, NAD-83 BC ALBERS
ALB-TER-BE_G.grd	m	Bare-Earth terrain, NAD-83 BC ALBERS



Geosoft format ASCII line data (Grav.XYZ)

COL	NAME	FORMAT	UNIT	DESCRIPTION
1	SECOND	F10.2	second	Fiducial Time
2	YEAR	A6	-	Year
3	DAY	A5	-	Day of year
4	FLT	A4	-	Flight number
5	LINE	A8	-	Line number
6	LATNAD83	F15.7	degrees	Latitude NAD-83
7	LONGNAD83	F15.7	degrees	Longitude NAD-83
8	UTMXN10N	F15.2	m	NAD-83 UTM 10N X
9	UTMYN10N	F15.2	m	NAD-83 UTM 10N Y
10	UTMXN11N	F15.2	m	NAD-83 UTM 09N X
11	UTMYN11N	F15.2	m	NAD-83 UTM 09N Y
12	ALBERSNX	F15.2	m	NAD-83 ALBERS X
13	ALBERSNY	F15.2	m	NAD-83 ALBERS Y
14	GPSZNAD83	F10.2	m	Height above NAD-83 ellipsoid
15	MSLZ	F10.2	m	Height above mean sea level
16	LALT	F10.1	m	Laser altimeter
17	BareLALT	F10.1	m	Bare-Earth Laser altimeter
18	FZ	F12.2	mGal	Gravimeter vertical acceleration
19	AZ	F12.2	mGal	GPS vertical acceleration
20	GRVRAW	F12.2	mGal	Raw gravity (FZ - AZ), unfiltered
21	GRVLAT	F12.2	mGal	Latitude corrected gravity, unfiltered
22	GRVEOT	F12.2	mGal	Eötvös corrected gravity, unfiltered
23	GRVFRA	F12.2	mGal	Free air gravity, unfiltered
24	GRVFRA100	F10.2	mGal	Free air gravity, 50 s half-wavelength line filter
25	GRVFRAL100	F10.2	mGal	Free air gravity, intersection adjusted, 50 s half-wavelength line filter
26	BATH	F10.2	m	Terrain used for Bouguer correction, using SRTM data with bathymetry for lakes
27	TERRAIN	F10.2	m	Terrain used for Bouguer correction, using SRTM data only
28	SBGCOR	F10.2	mGal	Simple Bouguer correction, 2.67g/cc density
29	GRVBGL100	F10.2	mGal	Simple Bouguer gravity, intersection adjusted, 50 s half-wavelength line filter, 2.67g/cc density
30	ISOGRVBGL100	F10.2	mGal	Isostatic corrected Simple Bouguer gravity, intersection adjusted, 50 s half-wavelength line filter, 2.67g/cc density
31	GRVFRAL3KM	F12.2	mGal	Free air gravity, 42 s half-wavelength line filter, 3 km half-wavelength spatial filter
32	GRVBGL3KM	F10.2	mGal	Simple Bouguer gravity, 42 s half-wavelength line filter, 3 km half-wavelength spatial filter, 2.67g/cc density



33	FVDBGL3KM	F10.2	Eötvös	First vertical derivative of simple Bouguer gravity, 42 s half-wavelength line filter, 3 km half-wavelength spatial filter, 2.67g/cc density
34	ISOBGL3KM	F10.2	mGal	Isostatic corrected Simple Bouguer gravity, 42 s half-wavelength line filter, 3 km half-wavelength spatial filter, 2.67g/cc density
35	FVDISOBGL3KM	F10.2	Eötvös	First vertical derivative of Isostatic corrected simple Bouguer gravity, 42 s half-wavelength line filter, 3 km half-wavelength spatial filter, 2.67g/cc density

Map Products

The following products are provided as paper maps, at a scale of 1:500,000 (1 sheet per product) and 1:250,000 (two sheets per product), In the NAD-83 datum, and projected in UTM 10N. See *Appendix VI* for report size maps.

Map Name	Units	Description
BOU	mGal	Final terrain corrected Bouguer Gravity, 3 km half wavelength filter, 2.67 g/cc with flight path
FRE	mGal	Free Air Gravity, 3 km half wavelength filter with flight path
FVB	Eötvös	First Vertical Derivative of Final terrain corrected Bouguer Gravity
DTM	m	Full feature Digital Terrain Model; colour and contours



IX. PROJECT SUMMARY

SURVEY LOCATION		
Survey Title:	An Airborne Gravimetric Survey over the QUEST-South Project Area of British Columbia	
Survey Location:	Southeastern part of British Columbia, Canada	
Survey Duration:	September 1, 2009 to November 1, 2009	
Client:	Geoscience British Columbia Society (GBC)	
Address:	410 – 890 West Pender Street Vancouver, BC V6C 1J9	
Client Contacts:	C.D. ('Lyn) Anglin, PhD. Tel: (604)662-4147 ext 23 Email: anglin@geosciencebc.com	
Field Office Location:	108 Mile Ranch, BC - north end of block Kelowna, BC - south end of block	
Airport Used:	South Cariboo Regional Airport (CZML) Kelowna International Airport (CYLW)	
SURVEY SPECIFICATIONS		
Horizontal/Vertical Datum:	WGS-84	
Raw Recorded Data:	WGS-84	
Delivered Data:	NAD-83	
Line Direction:	Traverse: E-W	Control: N-S
Line Spacing:	Traverse: 2000 m	Control: 20000 m
Total km Flown:	25,010 lkm	
Survey Speed:	90 knots (ground speed)	
Survey Altitude:	200 m (nominal)	
Survey Flight Numbers:	101-128 (C-GSGJ), 201-213 (C-FSDK)	



SURVEY AIRCRAFT AND EQUIPMENT	
Aircraft Used:	Cessna Grand Caravan (C-GSGJ), Diamond DA42 (C-FSDK)
Radar Altimeter:	King, TRT, TRA
Laser Altimeter:	Riegl LD90-31KHiP
Barometric Sensor:	Sensotec
Gravimeter (Air):	G2-7 and G1-A
GPS Receiver (Air):	C-DAC: NovAtel OEMV GPS Receiver
DGPS Receiver (Air):	NovAtel OEMV GPS Receiver
GPS Receiver (Local Ground):	NovAtel OEMV GPS Receiver
GPS Receiver (Local Ground):	NovAtel OEMV GPS Receiver
FIELD PERSONNEL	
Party Chief/Geophysicist:	Alison McCleary
Geophysicist:	Sol Meyer / France Belley
Aircraft Chief Pilot:	Steve Gebhardt
Aircraft Captain:	Randall Forwell, André Lafontaine, Kim Steingass
Aircraft co-pilot:	Galen Smith, Vince Duchesne
Aircraft Maintenance Engineer:	John Sevenhuysen, Harley Melnick
Technician:	Jonathan Drolet
DATA PROCESSING PERSONNEL	
Data Processing Manager	Martin Bates
Gravity Data	Dragos Bologa, Sol Meyer
Flight Path and DEM Data	France Belley
Maps	Fatima Mechennef
Report Compiler	Alex Taylor



APPENDIX I

SGL COMPANY PROFILE





SANDER GEOPHYSICS

COMPANY PROFILE

Sander Geophysics Limited (SGL) provides worldwide airborne geophysical surveys for petroleum and mineral exploration, and geological and environmental mapping. Services offered include high resolution airborne gravity, magnetic, electromagnetic, and radiometric surveys, using fixed-wing aircraft and helicopters.

HISTORY

Dr. George W. Sander (1924-2008) founded SGL in 1956, to provide ground geophysical surveys. The first airborne surveys were performed as early as 1958, and by 1967 airborne geophysical surveys were the company's main focus. Operations have expanded steadily since SGL was founded more than 50 years ago.

WORLDWIDE OPERATIONS

SGL's head office and aircraft maintenance hangar are located at the International Airport in Ottawa, Canada. Sander Geophysics has operated on every continent including Antarctica, and under diverse conditions ranging from the tropics, deserts, mountains, and offshore.



SGL head office and hangar in Ottawa, Canada

Facilities at the head office include a state of the art data processing department with an integrated digital cartographic department and a fully equipped electronics workshop for research, development and production of geophysical instruments. A Transport Canada Approved

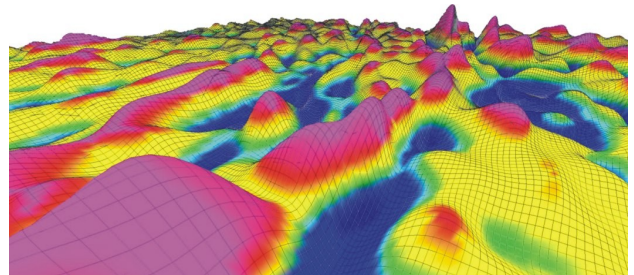
Maintenance Organization (AMO) for fixed wing aircraft and helicopters allows most aircraft maintenance and modifications to be performed in house.

SERVICES

Airborne Services

- ▶ Gravity
- ▶ Magnetic Total Field
- ▶ Magnetic Gradient
- ▶ Electromagnetic
- ▶ Gamma-ray Spectrometer
- ▶ Scanning LiDAR

AIRGrav (Airborne Inertially Referenced Gravimeter) SGL offers gravity surveys with AIRGrav, which was designed specifically for the unique characteristics of the airborne environment, and is the highest resolution airborne gravimeter available. AIRGrav can be flown in an efficient survey aircraft during normal daytime conditions and is routinely flown in combination with magnetometer systems in SGL's airplanes and helicopters.



AIRGrav data: 3d image of the first vertical derivative of terrain corrected Bouguer gravity

Data Processing

Immediate data processing is part of SGL's standard quality control procedure, and provides clients with rapid results for evaluation while a survey is in progress. Sander Geophysics offers a full range of data enhancement programs and integrated interpretation services by experienced

SANDER GEOPHYSICS

260 Hunt Club Road, Ottawa, Ontario K1V 1C1 Canada

Phone: 613-521-9626 Fax: 613-521-0215 Email: info@sgl.com Website: www.sgl.com

EXPLORATION

RESEARCH

INTERPRETATION

geoscientists. Available products in digital and/or hard-copy include:

- ▶ Contour, colour or shaded relief maps of any parameter or combination of parameters
- ▶ NASVD processed gamma-ray spectrometer data
- ▶ Filtered line or grid products such as vertical or horizontal gradients, frequency slices, high/low-pass or band-pass filtered, amplitude of the analytic signal, reduction to the pole, upward or downward continuation
- ▶ Computed depth to basement
- ▶ Calculated digital terrain models
- ▶ Two or three-dimensional modeling
- ▶ Cultural editing
- ▶ Complete geophysical interpretative reports

Environmental Monitoring

The company also provides environmental monitoring services using gamma-ray spectrometers and specialized processing to detect and quantify natural and anthropogenic radiation.

HEALTH & SAFETY

Sander Geophysics is a founding and active executive member of the International Airborne Geophysics Safety Association (IAGSA), which promotes the safe operation of helicopters and fixed-wing aircraft on airborne geophysical surveys.

SGL has developed and implemented a Safety Management System (SMS) and comprehensive Health, Safety and Environment (HSE) policies that govern all aspects of company operations. Safety initiatives include:

- ▶ Project-specific Aviation and Personnel Risk Analyses (ARA and PRA) for all surveys
 - ▶ Real-time satellite tracking of aircraft
 - ▶ HSE and First Aid training for all field personnel
 - ▶ Low-level flight training and aircraft simulator training for pilots
- Advanced safety training appropriate to the location, such as water-egress, wilderness survival, etc.

SGL's excellent safety record is attributed to the quality and experience of its survey crews. This, combined with management's ongoing commitment to safety helps to ensure that Sander

Geophysics is a safe and reliable choice for airborne geophysical surveys.

PERSONNEL

Sander Geophysics has over 160 experienced full-time employees, including geophysicists, software and hardware engineers, aircraft maintenance engineers and pilots.

AIRCRAFT

SGL owns and operates fifteen aircraft, including eight turbine Cessna Grand Caravans, all equipped for geophysical surveys. The Grand Caravans have been modified to allow the installation of a tri-axial magnetic gradiometer system. The company's fleet also includes three all composite Diamond DA42 Twin Stars, modified for gravity and horizontal magnetic gradient surveys, and an AS350-B3 helicopter equipped for gravity, magnetic and radiometric surveys. Extensive modifications have been made to all of the survey aircraft to accommodate geophysical instruments and to reduce the aircraft's magnetic field. Typical Figures of Merit for SGL's fixed-wing aircraft are less than 1 nT. The company's aircraft are flown and maintained by licensed and experienced permanent employees of Sander Geophysics.



SGL's aircraft

RESEARCH & DEVELOPMENT

Nearly one-third of SGL's resources are devoted to developing new and more efficient instrumentation and techniques for airborne geophysical surveying, and to further refine its full suite of software for geophysical data processing.



APPENDIX II

PLANNED SURVEY LINES



PLANNED SURVEY LINES
QUEST SOUTH B.C. 2009 - WGS 84

SEGMENT NO	START		END		LENGTH	
	LAT	LONG	LAT	LONG	NM	KM
C0601.0	N51:28.98	W122:12.02	N52:18.77	W122:11.13	49.84	92.30
C0602.0	N50:59.72	W121:55.43	N52:18.63	W121:53.53	79.00	146.30
C0603.0	N50:22.86	W121:39.39	N52:18.44	W121:35.93	115.71	214.30
C0604.0	N49:53.51	W121:23.50	N52:18.21	W121:18.34	144.87	268.30
C0605.0	N49:37.02	W121:07.43	N52:17.94	W121:00.75	161.13	298.41
C0606.0	N49:21.69	W120:51.48	N52:17.62	W120:43.17	176.19	326.30
C0607.0	N48:59.79	W120:36.02	N52:09.71	W120:26.02	190.23	352.30
C0608.0	N48:59.43	W120:19.63	N51:54.22	W120:09.46	175.11	324.30
C0701.0	N49:46.33	W119:43.58	N50:51.70	W119:47.36	65.49	121.28
C0702.0	N49:59.09	W119:27.55	N50:37.29	W119:29.54	38.26	70.86
C0801.0	N51:01.10	W119:59.58	N49:46.44	W120:00.39	74.76	138.45
T6001.0	N48:59.89	W120:36.60	N48:59.51	W120:19.30	11.40	21.11
T6002.0	N49:00.97	W120:36.55	N49:00.59	W120:19.24	11.40	21.11
T6003.0	N49:02.06	W120:37.27	N49:01.66	W120:19.11	11.96	22.14
T6004.0	N49:03.16	W120:37.99	N49:02.74	W120:18.97	12.51	23.17
T6005.0	N49:04.25	W120:38.71	N49:03.82	W120:18.84	13.07	24.21
T6006.0	N49:05.34	W120:39.43	N49:04.89	W120:18.71	13.63	25.24
T6007.0	N49:06.44	W120:40.15	N49:05.97	W120:18.58	14.18	26.27
T6008.0	N49:07.53	W120:40.87	N49:07.04	W120:18.44	14.74	27.30
T6009.0	N49:08.63	W120:41.59	N49:08.12	W120:18.31	15.30	28.33
T6010.0	N49:09.72	W120:42.32	N49:09.20	W120:18.18	15.85	29.36
T6011.0	N49:10.81	W120:43.04	N49:10.27	W120:18.05	16.41	30.39
T6012.0	N49:11.91	W120:43.76	N49:11.35	W120:17.97	16.93	31.35
T6013.0	N49:13.00	W120:44.49	N49:12.43	W120:17.93	17.42	32.26
T6014.0	N49:14.10	W120:45.21	N49:13.51	W120:17.90	17.91	33.18
T6015.0	N49:15.19	W120:45.94	N49:14.59	W120:17.86	18.41	34.09
T6016.0	N49:16.28	W120:46.66	N49:15.67	W120:17.82	18.90	35.00
T6017.0	N49:17.38	W120:47.39	N49:16.75	W120:17.79	19.39	35.92
T6018.0	N49:18.47	W120:48.12	N49:17.82	W120:17.75	19.89	36.83
T6019.0	N49:19.56	W120:48.85	N49:18.90	W120:17.71	20.38	37.74
T6020.0	N49:20.66	W120:49.93	N49:19.98	W120:17.68	21.10	39.08
T6021.0	N49:21.77	W120:51.63	N49:21.06	W120:17.64	22.24	41.18
T6022.0	N49:22.87	W120:52.27	N49:22.14	W120:17.60	22.67	41.98
T6023.0	N49:23.97	W120:53.44	N49:23.22	W120:17.57	23.45	43.43
T6024.0	N49:25.07	W120:54.62	N49:24.30	W120:17.53	24.23	44.88
T6025.0	N49:26.17	W120:55.79	N49:25.38	W120:17.49	25.01	46.32
T6026.0	N49:27.27	W120:56.97	N49:26.45	W120:17.45	25.80	47.77
T6027.0	N49:28.37	W120:58.14	N49:27.53	W120:17.42	26.58	49.22
T6028.0	N49:29.47	W120:59.32	N49:28.61	W120:17.38	27.36	50.67
T6029.0	N49:30.57	W121:00.50	N49:29.69	W120:17.34	28.14	52.12
T6030.0	N49:31.67	W121:01.67	N49:30.77	W120:17.31	28.92	53.57
T6031.0	N49:32.77	W121:02.85	N49:31.85	W120:17.27	29.71	55.01
T6032.0	N49:33.87	W121:04.03	N49:32.91	W120:16.40	31.03	57.47
T6033.0	N49:34.97	W121:05.22	N49:33.96	W120:15.19	32.58	60.33
T6034.0	N49:36.06	W121:06.40	N49:35.01	W120:13.98	34.12	63.19
T6035.0	N49:37.16	W121:07.58	N49:36.06	W120:12.77	35.66	66.05
T6036.0	N49:38.26	W121:08.70	N49:37.11	W120:11.56	37.16	68.83
T6037.0	N49:39.36	W121:09.72	N49:38.16	W120:10.35	38.61	71.50
T6038.0	N49:40.45	W121:10.75	N49:39.21	W120:09.14	40.05	74.17
T6039.0	N49:41.55	W121:11.78	N49:40.26	W120:07.93	41.49	76.83
T6040.0	N49:42.64	W121:12.81	N49:41.31	W120:06.71	42.93	79.50
T6041.0	N49:43.74	W121:13.83	N49:42.36	W120:05.50	44.37	82.17
T6042.0	N49:44.83	W121:14.86	N49:43.41	W120:04.28	45.81	84.84
T6043.0	N49:45.93	W121:15.89	N49:44.46	W120:03.07	47.25	87.51
T6044.0	N49:47.02	W121:16.92	N49:45.50	W120:01.85	48.69	90.18

PLANNED SURVEY LINES
QUEST SOUTH B.C. 2009 - WGS 84

SEGMENT NO	START		END		LENGTH	
	LAT	LONG	LAT	LONG	NM	KM
T6045.0	N49:48.12	W121:17.96	N49:46.54	W120:00.30	50.35	93.24
T7045.0	N49:46.52	W120:00.51	N49:46.99	W119:41.56	12.29	22.76
T6046.0	N49:49.21	W121:18.99	N49:47.62	W120:00.32	50.98	94.42
T7046.0	N49:47.61	W120:00.31	N49:48.10	W119:40.29	12.99	24.05
T6047.0	N49:50.31	W121:20.02	N49:48.70	W120:00.31	51.64	95.64
T7047.0	N49:48.69	W120:00.30	N49:49.21	W119:39.01	13.80	25.56
T6048.0	N49:51.40	W121:21.05	N49:49.78	W120:00.30	52.30	96.85
T7048.0	N49:49.77	W120:00.30	N49:50.32	W119:37.73	14.62	27.08
T6049.0	N49:52.49	W121:22.09	N49:50.86	W120:00.29	52.95	98.06
T7049.0	N49:50.85	W120:00.29	N49:51.42	W119:36.45	15.44	28.59
T6050.0	N49:53.60	W121:23.71	N49:51.94	W120:00.28	53.98	99.98
T7050.0	N49:51.93	W120:00.28	N49:52.53	W119:35.17	16.26	30.10
T6051.0	N49:54.68	W121:24.16	N49:53.02	W120:00.28	54.26	100.49
T7051.0	N49:53.01	W120:00.27	N49:53.64	W119:33.89	17.07	31.62
T6052.0	N49:55.78	W121:25.20	N49:54.10	W120:00.27	54.92	101.70
T7052.0	N49:54.09	W120:00.26	N49:54.75	W119:32.61	17.89	33.13
T6053.0	N49:56.87	W121:26.24	N49:55.18	W120:00.26	55.57	102.92
T7053.0	N49:55.17	W120:00.25	N49:55.86	W119:31.32	18.71	34.64
T6054.0	N49:57.96	W121:27.04	N49:56.26	W120:00.25	56.07	103.85
T7054.0	N49:56.25	W120:00.24	N49:56.96	W119:30.04	19.52	36.16
T6055.0	N49:59.05	W121:27.51	N49:57.34	W120:00.24	56.36	104.38
T7055.0	N49:57.33	W120:00.23	N49:58.07	W119:28.75	20.34	37.67
T6056.0	N50:00.13	W121:27.98	N49:58.42	W120:00.23	56.65	104.92
T7056.0	N49:58.41	W120:00.22	N49:59.18	W119:27.47	21.16	39.18
T6057.0	N50:01.22	W121:28.46	N49:59.50	W120:00.23	56.94	105.46
T7057.0	N49:59.48	W120:00.21	N50:00.26	W119:27.47	21.14	39.16
T6058.0	N50:02.30	W121:28.93	N50:00.58	W120:00.22	57.23	106.00
T7058.0	N50:00.56	W120:00.20	N50:01.33	W119:27.51	21.10	39.08
T6059.0	N50:03.39	W121:29.41	N50:01.65	W120:00.21	57.52	106.53
T7059.0	N50:01.64	W120:00.20	N50:02.41	W119:27.60	21.03	38.95
T6060.0	N50:04.47	W121:29.88	N50:02.73	W120:00.20	57.81	107.07
T7060.0	N50:02.72	W120:00.19	N50:03.49	W119:27.59	21.02	38.93
T6061.0	N50:05.56	W121:30.36	N50:03.81	W120:00.19	58.10	107.61
T7061.0	N50:03.80	W120:00.18	N50:04.57	W119:27.47	21.09	39.06
T6062.0	N50:06.64	W121:30.84	N50:04.89	W120:00.18	58.39	108.15
T7062.0	N50:04.88	W120:00.17	N50:05.66	W119:27.34	21.16	39.18
T6063.0	N50:07.73	W121:31.31	N50:05.97	W120:00.18	58.68	108.68
T7063.0	N50:05.96	W120:00.16	N50:06.74	W119:27.22	21.22	39.31
T6064.0	N50:08.81	W121:31.79	N50:07.05	W120:00.17	58.97	109.22
T7064.0	N50:07.04	W120:00.15	N50:07.82	W119:27.09	21.29	39.43
T6065.0	N50:09.90	W121:32.27	N50:08.13	W120:00.16	59.26	109.76
T7065.0	N50:08.12	W120:00.14	N50:08.90	W119:26.96	21.36	39.56
T6066.0	N50:10.99	W121:32.75	N50:09.21	W120:00.15	59.56	110.30
T7066.0	N50:09.20	W120:00.13	N50:09.98	W119:26.84	21.43	39.68
T6067.0	N50:12.07	W121:33.22	N50:10.29	W120:00.14	59.85	110.83
T7067.0	N50:10.28	W120:00.12	N50:11.08	W119:26.09	21.89	40.55
T6068.0	N50:13.16	W121:33.70	N50:11.37	W120:00.13	60.14	111.37
T7068.0	N50:11.36	W120:00.11	N50:12.18	W119:25.16	22.48	41.63
T6069.0	N50:14.24	W121:34.18	N50:12.45	W120:00.13	60.43	111.91
T7069.0	N50:12.44	W120:00.11	N50:13.28	W119:24.23	23.06	42.71
T6070.0	N50:15.33	W121:34.66	N50:13.53	W120:00.12	60.72	112.45
T7070.0	N50:13.52	W120:00.10	N50:14.38	W119:23.30	23.64	43.78
T6071.0	N50:16.41	W121:35.14	N50:14.61	W120:00.11	61.01	112.98
T7071.0	N50:14.60	W120:00.09	N50:15.47	W119:22.37	24.22	44.86
T6072.0	N50:17.50	W121:35.62	N50:15.69	W120:00.10	61.30	113.52

PLANNED SURVEY LINES
QUEST SOUTH B.C. 2009 - WGS 84

SEGMENT NO	START		END		LENGTH	
	LAT	LONG	LAT	LONG	NM	KM
T7072.0	N50:15.68	W120:00.08	N50:16.57	W119:21.44	24.81	45.94
T6073.0	N50:18.58	W121:36.10	N50:16.77	W120:00.09	61.59	114.06
T7073.0	N50:16.76	W120:00.07	N50:17.67	W119:20.51	25.39	47.02
T6074.0	N50:19.67	W121:36.58	N50:17.84	W120:00.08	61.88	114.60
T7074.0	N50:17.84	W120:00.06	N50:18.77	W119:19.69	25.90	47.97
T6075.0	N50:20.75	W121:37.06	N50:18.92	W120:00.07	62.17	115.13
T7075.0	N50:18.92	W120:00.05	N50:19.86	W119:18.89	26.40	48.88
T6076.0	N50:21.84	W121:37.54	N50:20.00	W120:00.07	62.46	115.67
T7076.0	N50:20.00	W120:00.04	N50:20.96	W119:18.10	26.89	49.80
T6077.0	N50:22.94	W121:39.46	N50:21.08	W120:00.06	63.67	117.91
T7077.0	N50:21.08	W120:00.04	N50:22.05	W119:17.30	27.39	50.72
T6078.0	N50:24.02	W121:39.52	N50:22.16	W120:00.05	63.69	117.95
T7078.0	N50:22.16	W120:00.03	N50:23.15	W119:16.50	27.88	51.64
T6079.0	N50:25.10	W121:39.41	N50:23.24	W120:00.04	63.60	117.78
T7079.0	N50:23.24	W120:00.02	N50:24.24	W119:15.70	28.38	52.56
T6080.0	N50:26.18	W121:39.47	N50:24.32	W120:00.03	63.62	117.82
T7080.0	N50:24.32	W120:00.01	N50:25.34	W119:14.90	28.88	53.48
T6081.0	N50:27.26	W121:39.95	N50:25.40	W120:00.02	63.91	118.36
T7081.0	N50:25.40	W120:00.00	N50:26.40	W119:15.92	28.21	52.24
T6082.0	N50:28.34	W121:40.33	N50:26.48	W120:00.01	64.13	118.77
T7082.0	N50:26.48	W119:59.99	N50:27.45	W119:17.27	27.33	50.61
T6083.0	N50:29.43	W121:40.72	N50:27.56	W120:00.00	64.36	119.19
T7083.0	N50:27.56	W119:59.98	N50:28.50	W119:18.62	26.45	48.98
T6084.0	N50:30.51	W121:41.10	N50:28.64	W119:59.99	64.58	119.61
T7084.0	N50:28.64	W119:59.97	N50:29.55	W119:19.97	25.57	47.35
T6085.0	N50:31.60	W121:41.48	N50:29.72	W119:59.99	64.81	120.03
T7085.0	N50:29.72	W119:59.96	N50:30.61	W119:21.32	24.69	45.72
T6086.0	N50:32.68	W121:41.87	N50:30.80	W119:59.98	65.04	120.45
T7086.0	N50:30.80	W119:59.96	N50:31.66	W119:22.68	23.81	44.09
T6087.0	N50:33.76	W121:42.25	N50:31.87	W119:59.97	65.26	120.86
T7087.0	N50:31.88	W119:59.95	N50:32.71	W119:24.03	22.93	42.46
T6088.0	N50:34.85	W121:42.63	N50:32.95	W119:59.96	65.49	121.28
T7088.0	N50:32.96	W119:59.94	N50:33.76	W119:25.39	22.05	40.83
T6089.0	N50:35.93	W121:43.02	N50:34.03	W119:59.95	65.71	121.70
T7089.0	N50:34.04	W119:59.93	N50:34.81	W119:26.75	21.17	39.21
T6090.0	N50:37.01	W121:43.40	N50:35.11	W119:59.94	65.94	122.12
T7090.0	N50:35.12	W119:59.92	N50:35.87	W119:27.97	20.37	37.73
T6091.0	N50:38.10	W121:43.79	N50:36.19	W119:59.93	66.16	122.54
T7091.0	N50:36.20	W119:59.91	N50:36.92	W119:29.13	19.62	36.34
T6092.0	N50:39.18	W121:44.17	N50:37.27	W119:59.92	66.39	122.95
T7092.0	N50:37.28	W119:59.90	N50:37.98	W119:30.29	18.87	34.95
T6093.0	N50:40.26	W121:44.56	N50:38.35	W119:59.91	66.62	123.37
T7093.0	N50:38.36	W119:59.90	N50:39.03	W119:31.45	18.12	33.56
T6094.0	N50:41.35	W121:44.95	N50:39.43	W119:59.90	66.84	123.79
T7094.0	N50:39.43	W119:59.89	N50:40.08	W119:32.61	17.37	32.17
T6095.0	N50:42.43	W121:45.33	N50:40.51	W119:59.90	67.07	124.21
T7095.0	N50:40.51	W119:59.88	N50:41.14	W119:33.77	16.62	30.78
T6096.0	N50:43.51	W121:45.72	N50:41.59	W119:59.89	67.29	124.63
T7096.0	N50:41.59	W119:59.87	N50:42.19	W119:34.93	15.87	29.39
T6097.0	N50:44.60	W121:46.11	N50:42.67	W119:59.88	67.52	125.04
T7097.0	N50:42.67	W119:59.86	N50:43.25	W119:36.09	15.12	28.00
T6098.0	N50:45.68	W121:46.49	N50:43.75	W119:59.87	67.74	125.46
T7098.0	N50:43.75	W119:59.85	N50:44.30	W119:37.25	14.37	26.61
T6099.0	N50:46.76	W121:46.88	N50:44.83	W119:59.86	67.97	125.88
T7099.0	N50:44.83	W119:59.84	N50:45.35	W119:38.42	13.62	25.22

PLANNED SURVEY LINES
QUEST SOUTH B.C. 2009 - WGS 84

SEGMENT NO	START		END		LENGTH	
	LAT	LONG	LAT	LONG	NM	KM
T6100.0	N50:47.85	W121:47.27	N50:45.90	W119:59.85	68.20	126.30
T7100.0	N50:45.91	W119:59.83	N50:46.40	W119:39.89	12.67	23.46
T6101.0	N50:48.93	W121:47.66	N50:46.98	W119:59.84	68.42	126.72
T7101.0	N50:46.99	W119:59.83	N50:47.44	W119:41.50	11.64	21.55
T6102.0	N50:50.01	W121:48.04	N50:48.06	W119:59.83	68.65	127.13
T7102.0	N50:48.07	W119:59.82	N50:48.48	W119:43.12	10.60	19.64
T6103.0	N50:51.10	W121:48.43	N50:49.14	W119:59.82	68.87	127.55
T7103.0	N50:49.15	W119:59.81	N50:49.52	W119:44.73	9.57	17.73
T6104.0	N50:52.18	W121:48.82	N50:50.22	W119:59.81	69.10	127.97
T7104.0	N50:50.23	W119:59.80	N50:50.56	W119:46.34	8.54	15.81
T6105.0	N50:53.27	W121:49.67	N50:51.30	W119:59.80	69.61	128.92
T7105.0	N50:51.31	W119:59.79	N50:51.62	W119:47.23	7.97	14.75
T6106.0	N50:54.35	W121:50.54	N50:52.38	W119:59.79	70.15	129.92
T7106.0	N50:52.39	W119:59.78	N50:52.65	W119:49.57	6.47	11.99
T6107.0	N50:55.44	W121:51.42	N50:53.46	W119:59.78	70.68	130.91
T7107.0	N50:53.47	W119:59.77	N50:53.69	W119:51.19	5.44	10.08
T6108.0	N50:56.53	W121:52.31	N50:54.54	W119:59.77	71.22	131.90
T7108.0	N50:54.55	W119:59.77	N50:54.73	W119:52.57	4.56	8.44
T6109.0	N50:57.62	W121:53.19	N50:55.62	W119:59.76	71.76	132.89
T7109.0	N50:55.63	W119:59.76	N50:55.78	W119:53.76	3.80	7.04
T6110.0	N50:58.71	W121:54.07	N50:56.70	W119:59.76	72.29	133.88
T7110.0	N50:56.71	W119:59.75	N50:56.83	W119:54.95	3.04	5.63
T6111.0	N50:59.80	W121:55.55	N50:57.78	W119:59.75	73.21	135.58
T7111.0	N50:57.79	W119:59.74	N50:57.88	W119:56.14	2.28	4.22
T6112.0	N51:00.88	W121:55.84	N50:58.85	W119:59.74	73.36	135.87
T7112.0	N50:58.87	W119:59.73	N50:58.93	W119:57.34	1.52	2.81
T6113.0	N51:01.97	W121:56.72	N50:59.93	W119:59.73	73.90	136.86
T7113.0	N50:59.95	W119:59.72	N50:59.98	W119:58.53	0.75	1.40
T6114.0	N51:03.05	W121:57.60	N51:01.01	W119:59.46	74.60	138.15
T6115.0	N51:04.14	W121:58.49	N51:02.09	W119:59.72	74.96	138.83
T6116.0	N51:05.23	W121:59.38	N51:03.17	W119:59.72	75.49	139.81
T6117.0	N51:06.31	W122:00.26	N51:04.25	W119:59.72	76.02	140.79
T6118.0	N51:07.40	W122:01.15	N51:05.33	W119:59.72	76.55	141.77
T6119.0	N51:08.49	W122:02.04	N51:06.41	W119:59.72	77.08	142.75
T6120.0	N51:09.57	W122:02.93	N51:07.49	W119:59.72	77.61	143.73
T6121.0	N51:10.66	W122:03.82	N51:08.57	W119:59.72	78.14	144.71
T6122.0	N51:11.74	W122:04.34	N51:09.65	W119:59.72	78.43	145.26
T6123.0	N51:12.83	W122:04.73	N51:10.73	W119:59.72	78.65	145.66
T6124.0	N51:13.91	W122:05.12	N51:11.81	W119:59.72	78.86	146.05
T6125.0	N51:14.99	W122:05.51	N51:12.89	W119:59.72	79.08	146.45
T6126.0	N51:16.07	W122:05.90	N51:13.97	W119:59.72	79.29	146.85
T6127.0	N51:17.15	W122:06.29	N51:15.05	W119:59.72	79.50	147.24
T6128.0	N51:18.24	W122:06.68	N51:16.12	W119:59.72	79.72	147.64
T6129.0	N51:19.32	W122:07.07	N51:17.20	W119:59.72	79.93	148.04
T6130.0	N51:20.40	W122:07.46	N51:18.28	W119:59.72	80.15	148.43
T6131.0	N51:21.48	W122:07.85	N51:19.36	W119:59.72	80.36	148.83
T6132.0	N51:22.56	W122:08.24	N51:20.44	W119:59.73	80.57	149.22
T6133.0	N51:23.65	W122:08.64	N51:21.52	W119:59.73	80.79	149.62
T6134.0	N51:24.73	W122:09.03	N51:22.60	W119:59.73	81.00	150.02
T6135.0	N51:25.81	W122:09.42	N51:23.68	W119:59.73	81.22	150.41
T6136.0	N51:26.89	W122:09.82	N51:24.76	W119:59.73	81.43	150.81
T6137.0	N51:27.97	W122:10.21	N51:25.84	W119:59.73	81.64	151.21
T6138.0	N51:29.07	W122:12.16	N51:26.92	W119:59.73	82.83	153.40
T6139.0	N51:30.14	W122:12.03	N51:28.00	W119:59.73	82.72	153.20
T6140.0	N51:31.22	W122:12.08	N51:29.08	W119:59.73	82.72	153.19

PLANNED SURVEY LINES
QUEST SOUTH B.C. 2009 - WGS 84

SEGMENT NO	START		END		LENGTH	
	LAT	LONG	LAT	LONG	NM	KM
T6141.0	N51:32.30	W122:12.13	N51:30.16	W119:59.73	82.72	153.19
T6142.0	N51:33.38	W122:12.18	N51:31.24	W119:59.73	82.71	153.19
T6143.0	N51:34.46	W122:12.58	N51:32.32	W119:59.73	82.93	153.58
T6144.0	N51:35.55	W122:12.97	N51:33.39	W119:59.73	83.14	153.98
T6145.0	N51:36.63	W122:13.37	N51:34.47	W119:59.73	83.36	154.38
T6146.0	N51:37.71	W122:13.77	N51:35.55	W119:59.73	83.57	154.77
T6147.0	N51:38.79	W122:14.16	N51:36.63	W119:59.73	83.78	155.17
T6148.0	N51:39.87	W122:14.56	N51:37.71	W119:59.73	84.00	155.56
T6149.0	N51:40.95	W122:14.96	N51:38.79	W119:59.73	84.21	155.96
T6150.0	N51:42.04	W122:15.35	N51:39.87	W119:59.73	84.43	156.36
T6151.0	N51:43.12	W122:15.75	N51:40.95	W119:59.73	84.64	156.75
T6152.0	N51:44.20	W122:16.15	N51:42.03	W119:59.73	84.85	157.15
T6153.0	N51:45.28	W122:16.43	N51:43.11	W119:59.73	84.99	157.40
T6154.0	N51:46.36	W122:16.44	N51:44.19	W119:59.73	84.96	157.35
T6155.0	N51:47.44	W122:16.45	N51:45.27	W119:59.73	84.94	157.30
T6156.0	N51:48.52	W122:16.46	N51:46.35	W119:59.73	84.91	157.25
T6157.0	N51:49.60	W122:16.47	N51:47.43	W119:59.73	84.88	157.20
T6158.0	N51:50.67	W122:16.48	N51:48.55	W120:01.37	83.84	155.27
T6159.0	N51:51.75	W122:16.49	N51:49.67	W120:03.10	82.73	153.22
T6160.0	N51:52.83	W122:16.50	N51:50.79	W120:04.84	81.63	151.18
T6161.0	N51:53.91	W122:16.51	N51:51.91	W120:06.58	80.52	149.13
T6162.0	N51:54.99	W122:16.52	N51:53.04	W120:08.32	79.42	147.09
T6163.0	N51:56.07	W122:16.53	N51:54.14	W120:09.27	78.80	145.94
T6164.0	N51:57.15	W122:16.55	N51:55.28	W120:11.80	77.21	143.00
T6165.0	N51:58.23	W122:16.56	N51:56.40	W120:13.54	76.11	140.95
T6166.0	N51:59.31	W122:16.57	N51:57.52	W120:15.29	75.00	138.91
T6167.0	N52:00.39	W122:16.58	N51:58.64	W120:17.03	73.90	136.86
T6168.0	N52:01.46	W122:16.59	N51:59.76	W120:18.78	72.80	134.82
T6169.0	N52:02.54	W122:16.60	N52:00.87	W120:20.32	71.82	133.01
T6170.0	N52:03.62	W122:16.61	N52:01.97	W120:21.06	71.34	132.13
T6171.0	N52:04.70	W122:16.62	N52:03.06	W120:21.80	70.86	131.24
T6172.0	N52:05.78	W122:16.63	N52:04.16	W120:22.54	70.38	130.35
T6173.0	N52:06.86	W122:16.64	N52:05.26	W120:23.28	69.91	129.47
T6174.0	N52:07.94	W122:16.65	N52:06.35	W120:24.02	69.43	128.58
T6175.0	N52:09.02	W122:16.67	N52:07.45	W120:24.77	68.95	127.69
T6176.0	N52:10.10	W122:16.68	N52:08.54	W120:25.51	68.47	126.81
T6177.0	N52:11.18	W122:16.69	N52:09.63	W120:25.81	68.26	126.42
T6178.0	N52:12.25	W122:16.70	N52:10.73	W120:27.00	67.51	125.03
T6179.0	N52:13.33	W122:16.71	N52:11.83	W120:27.74	67.03	124.15
T6180.0	N52:14.41	W122:16.72	N52:12.92	W120:28.48	66.55	123.26
T6181.0	N52:15.49	W122:16.73	N52:14.02	W120:29.23	66.08	122.37
T6182.0	N52:16.57	W122:16.74	N52:15.11	W120:29.98	65.60	121.49
T6183.0	N52:17.65	W122:16.75	N52:16.21	W120:30.72	65.12	120.60
T6184.0	N52:18.73	W122:16.76	N52:17.30	W120:31.47	64.64	119.71

Total control line length = 1270.58 nautical miles
= 2353.1 kilometres.

Total traverse line length = 12233.90 nautical miles
= 22657.2 kilometres.

Total length of all lines = 13504.48 nautical miles
= 25010.30 kilometres.



APPENDIX III

ACTUAL FLOWN SURVEY LINES



FLOWN SURVEY LINES									
QUEST SOUTH B.C. 2009 - WGS 84 UTM 10N									
LINE	START TIME	END TIME	(m) MIN X	(m) MAX X	(m) MIN Y	(m) MAX Y	FLGHT	DAY	YEAR
601.00	60963.50	62672.00	555518.56	555535.92	5703761.83	5796237.57	105	251	2009
602.00	64021.50	66521.00	575516.70	575536.91	5649759.26	5796224.08	105	251	2009
603.00	58496.00	62228.00	595508.64	595544.09	5581762.50	5796233.26	116	266	2009
604.00	63630.50	67994.00	615506.95	615547.30	5527761.56	5796227.85	116	266	2009
604.01	73806.50	75965.50	615470.03	615551.47	5594765.49	5715280.08	125	297	2009
605.00	69006.50	74271.50	635496.72	635539.98	5497655.88	5796246.79	119	278	2009
606.00	74852.50	80665.50	655508.69	655545.68	5469766.11	5796239.08	119	278	2009
607.00	66544.50	72975.50	675516.65	675545.10	5429777.52	5782241.26	123	285	2009
608.00	59863.00	65565.50	695502.05	695537.41	5429753.49	5754225.51	123	285	2009
701.00	61298.50	63483.00	725927.15	735713.06	5518372.25	5639435.69	119	278	2009
702.00	59191.50	60377.50	748095.01	753815.89	5542868.63	5613716.09	119	278	2009
801.00	64247.50	66672.00	710895.45	715532.53	5517711.87	5656247.46	119	278	2009
901.00	63896.50	65638.50	685504.95	685544.04	5438012.81	5536493.89	128	305	2009
6001.00	73484.00	73879.50	674739.16	696001.57	5429996.87	5430006.80	123	285	2009
6002.00	74304.50	74679.50	674716.55	696005.55	5431992.43	5432005.02	123	285	2009
6003.00	75146.50	75551.00	673792.24	696091.88	5433996.50	5434007.61	123	285	2009
6004.00	75960.00	76393.00	672836.23	696190.24	5435989.61	5436006.66	123	285	2009
6005.00	76893.00	77351.00	671901.43	696280.50	5437993.17	5438008.04	123	285	2009
6006.00	77785.00	78243.50	670976.11	696375.45	5439992.85	5440008.73	123	285	2009
6007.00	78675.50	79175.00	670022.94	696471.34	5441994.35	5442005.45	123	285	2009
6008.00	66515.00	66990.50	669081.10	696544.05	5443988.22	5444010.57	128	305	2009
6009.00	67286.50	67759.00	668150.16	696640.34	5445994.18	5446014.83	128	305	2009
6010.00	68415.00	68943.50	667217.55	696749.18	5447991.75	5448009.29	128	305	2009
6011.01	63933.00	64453.00	666275.76	696820.26	5449993.37	5450012.82	129	307	2009
6012.00	70288.50	70847.50	665334.54	696840.35	5451989.02	5452014.50	128	305	2009
6013.00	71232.00	71806.00	664375.52	696809.99	5453988.56	5454010.16	128	305	2009
6014.00	72240.00	72866.00	663451.19	696780.06	5455989.59	5456012.82	128	305	2009
6015.00	73157.00	73737.00	662497.76	696752.07	5457990.97	5458008.45	128	305	2009
6016.00	74169.00	74804.00	661576.49	696743.17	5459991.16	5460010.43	128	305	2009
6017.00	75105.50	75726.50	660623.15	696699.49	5461990.18	5462016.96	128	305	2009
6018.00	76206.00	76906.50	659682.06	696694.50	5463988.02	5464005.74	128	305	2009
6019.00	84067.00	84712.00	658734.21	696666.05	5465988.00	5466008.57	121	283	2009
6020.00	82906.50	83653.00	657390.85	696630.24	5467994.75	5468012.46	121	283	2009
6021.00	81128.00	81869.00	655245.39	696599.24	5469987.41	5470011.28	121	283	2009
6022.00	79920.00	80716.00	654415.34	696573.89	5471985.55	5472011.99	121	283	2009
6023.01	77457.50	78230.00	652962.10	696544.20	5473888.42	5474006.27	128	305	2009
6024.00	77500.50	78342.00	651475.62	696522.33	5475989.94	5476009.01	121	283	2009
6025.00	76253.00	77063.00	649997.03	696506.90	5477995.31	5478014.24	121	283	2009
6026.00	74940.00	75834.50	648537.75	696479.20	5479992.52	5480010.45	121	283	2009
6027.00	73579.00	74450.00	647063.34	696448.60	5481995.34	5482010.60	121	283	2009
6028.00	72234.00	73138.50	645580.70	696418.05	5483992.72	5484013.85	121	283	2009
6029.00	81579.00	82516.00	644096.70	696394.25	5485984.40	5486008.99	119	278	2009
6030.00	70861.00	71797.50	642613.23	696353.40	5487994.91	5488009.97	121	283	2009
6031.01	65447.00	66435.00	641142.28	696340.35	5489994.43	5490002.44	129	307	2009
6032.00	67373.50	68392.50	639659.11	697307.38	5491991.81	5492009.61	119	278	2009
6033.00	67795.00	68855.00	638199.71	698703.71	5493988.79	5494012.56	121	283	2009
6034.00	66251.00	67406.00	636714.20	700095.97	5495990.88	5496009.21	121	283	2009
6035.00	64622.50	65797.50	635255.66	701477.79	5497993.52	5498007.25	121	283	2009
6036.01	66963.00	68178.50	633856.28	702853.31	5499996.20	5500007.17	129	307	2009
6037.00	67557.50	68798.00	632576.21	704228.97	5501988.88	5502011.48	120	281	2009
6038.00	65762.50	67090.50	631278.33	705613.86	5503986.75	5504008.02	120	281	2009
6039.00	68112.00	69463.00	629997.75	707001.84	5505993.94	5506023.24	118	277	2009
6040.00	67299.00	67569.50	628724.30	645076.67	5507992.32	5508014.90	118	277	2009
6040.01	79140.50	80295.00	645023.77	708382.40	5507681.15	5508012.32	128	305	2009
6041.00	64353.50	65783.00	627426.76	709778.39	5509983.36	5510026.10	118	277	2009
6042.00	62380.50	63875.00	626160.22	711169.90	5511989.02	5512021.59	118	277	2009
6043.00	60435.00	62010.50	624865.96	712545.81	5513981.96	5514012.07	118	277	2009
6044.00	58478.50	59971.50	623597.97	713931.68	5515980.94	5516019.90	118	277	2009
6045.00	66308.00	68274.50	622287.29	738159.96	5517911.73	5519772.82	122	284	2009
6046.00	68821.00	71029.00	621020.29	739582.36	5519988.24	5521899.93	122	284	2009
6047.00	71411.00	73525.50	619723.09	741039.63	5521944.80	5524018.17	122	284	2009

FLOWN SURVEY LINES									
QUEST SOUTH B.C. 2009 - WGS 84 UTM 10N									
LINE	START TIME	END TIME	(m) MIN X	(m) MAX X	(m) MIN Y	(m) MAX Y	FLIGHT	DAY	YEAR
6048.00	73960.00	76209.00	618453.22	742464.69	5523990.59	5526142.57	122	284	2009
6049.00	76552.00	78763.50	617166.20	743914.50	5525963.23	5528267.95	122	284	2009
6050.00	79226.00	81702.00	615182.48	745357.44	5527986.60	5530387.36	122	284	2009
6051.00	59172.50	61449.50	614594.65	746795.16	5529985.05	5532512.28	211	285	2009
6052.00	61722.00	64132.50	613324.80	748242.88	5531986.74	5534638.00	211	285	2009
6053.00	64371.00	66754.50	612028.70	749675.37	5533958.27	5536753.27	211	285	2009
6054.00	67066.50	69584.50	611027.69	751098.93	5535950.79	5538858.14	211	285	2009
6055.00	64881.50	66766.00	610431.12	714894.56	5537982.68	5538095.13	127	301	2009
6056.00	67233.00	69121.50	609806.46	714871.66	5539984.73	5540021.31	127	301	2009
6057.00	62133.00	64827.50	609196.12	753886.22	5541971.13	5545125.91	124	295	2009
6058.00	61866.00	64478.50	608608.12	753761.33	5543973.02	5547121.37	127	301	2009
6059.00	69608.50	72138.50	607978.42	753554.01	5545897.46	5549113.26	127	301	2009
6060.00	72510.00	74499.00	642034.71	753456.79	5547929.12	5551114.06	127	301	2009
6060.01	81641.00	82209.50	607397.13	642094.80	5547993.83	5548010.41	128	305	2009
6061.00	66636.00	68633.50	640457.85	753509.14	5549946.44	5553125.94	213	305	2009
6061.01	82553.50	83176.00	606776.36	640508.97	5549990.23	5550018.66	128	305	2009
6062.00	74901.50	77424.00	606176.79	753556.81	5551990.97	5555137.20	213	305	2009
6063.02	70751.50	71423.50	714769.94	753623.76	5554016.10	5557149.20	213	305	2009
6063.03	69861.00	71766.00	605558.03	714836.13	5553987.96	5554016.75	129	307	2009
6064.00	85264.00	87276.50	604958.54	714692.36	5555990.41	5556020.35	128	305	2009
6065.01	71743.00	73418.50	661023.13	753732.76	5557990.54	5561171.90	213	305	2009
6065.02	74728.50	75695.00	604355.53	661097.21	5557993.81	5558017.02	129	307	2009
6066.00	85427.00	88007.00	603725.19	753783.97	5559820.58	5563183.77	124	295	2009
6067.00	82135.50	85089.50	603119.35	754592.87	5561935.40	5565246.47	124	295	2009
6068.00	78963.50	81728.50	602517.63	755587.47	5563967.23	5567349.80	124	295	2009
6069.00	75578.50	78549.50	601900.13	756586.41	5565938.38	5569423.23	124	295	2009
6070.00	72317.00	75177.50	601313.37	757613.90	5567980.58	5571516.92	124	295	2009
6071.00	70553.00	71945.00	600690.30	674222.79	5569988.86	5570014.13	124	295	2009
6071.01	72836.50	74339.00	674159.55	758604.85	5569953.05	5573608.05	129	307	2009
6072.00	65623.50	68541.50	600079.71	759615.85	5571984.66	5575698.24	124	295	2009
6073.00	61841.00	64767.00	599482.35	760623.41	5573992.94	5577787.33	122	284	2009
6074.00	58404.00	61304.50	598875.81	761494.29	5575971.74	5579865.62	122	284	2009
6075.00	66097.50	67451.00	681021.34	762333.11	5577988.48	5581934.99	208	281	2009
6075.02	76151.00	77636.00	598263.76	681075.71	5577991.51	5578011.42	127	301	2009
6076.00	64141.00	65624.00	681641.53	763170.01	5579985.26	5584018.67	208	281	2009
6076.02	76307.50	77717.50	597668.13	681678.52	5579992.99	5580008.46	129	307	2009
6077.01	66626.00	69553.00	595352.89	764024.54	5581949.85	5586090.24	214	307	2009
6078.01	69947.00	72892.50	595232.02	764874.54	5583984.86	5588166.24	214	307	2009
6079.01	73195.50	76188.50	595351.28	765707.68	5585973.83	5590237.22	214	307	2009
6080.01	63411.00	66382.00	595236.90	766555.84	5587989.41	5592321.10	214	307	2009
6081.00	57247.50	60333.50	594611.02	765247.50	5589992.13	5594215.42	208	281	2009
6082.00	60857.00	63719.00	594120.64	763564.03	5591987.11	5596095.30	208	281	2009
6083.00	68375.00	71371.00	593632.57	761870.99	5593983.97	5597954.95	209	283	2009
6084.00	71774.50	74672.50	593170.57	760161.28	5595988.59	5599831.65	209	283	2009
6085.00	75038.50	77972.00	592665.50	758472.83	5597978.65	5601698.09	209	283	2009
6086.00	78269.00	81099.00	592175.04	756772.94	5599976.02	5603572.27	209	283	2009
6087.00	61092.00	64013.50	591707.25	755082.80	5601993.13	5605441.37	210	284	2009
6088.00	64360.50	67220.50	591192.91	753403.61	5603958.12	5607313.70	210	284	2009
6089.00	67601.50	70445.50	590705.48	751685.85	5605978.83	5609185.42	210	284	2009
6090.00	70819.50	71170.50	590216.43	611078.73	5607996.33	5608006.86	210	284	2009
6090.02	84320.50	86804.00	611019.11	750151.33	5607937.11	5611062.15	127	301	2009
6091.00	83578.00	84829.00	677673.51	748690.60	5609978.42	5612955.67	117	270	2009
6091.02	78524.00	80099.50	589748.84	677733.07	5609985.77	5610016.24	127	301	2009
6092.00	81214.00	83205.00	637455.17	747242.70	5611994.06	5614842.33	117	270	2009
6092.01	80589.50	81431.00	589241.83	637523.18	5611978.33	5612007.81	127	301	2009
6093.00	78570.00	80414.50	639289.10	745776.46	5613968.35	5616735.94	117	270	2009
6093.01	81768.50	82686.50	588766.57	639347.67	5613994.18	5614014.31	127	301	2009
6094.00	75435.00	78206.00	588286.63	744338.26	5615987.72	5618616.32	117	270	2009
6095.00	72298.00	75008.50	587774.31	742865.38	5617989.23	5620518.86	117	270	2009
6096.00	64791.00	67415.50	587299.32	741420.16	5619990.33	5622403.90	117	270	2009
6097.00	62140.50	64413.00	586805.75	712111.87	5621983.97	5622022.40	117	270	2009

FLOWN SURVEY LINES									
QUEST SOUTH B.C. 2009 - WGS 84 UTM 10N									
LINE	START TIME	END TIME	(m) MIN X	(m) MAX X	(m) MIN Y	(m) MAX Y	FLGHT	DAY	YEAR
6098.00	82818.50	84940.50	616926.53	738508.69	5623975.49	5626176.51	204	264	2009
6098.01	83087.50	83598.00	586313.23	616973.47	5623994.40	5624005.04	127	301	2009
6099.00	79828.00	82477.00	585833.55	737035.19	5625986.15	5628070.79	204	264	2009
6100.00	76756.00	79429.00	585357.10	735210.17	5627988.26	5629919.43	204	264	2009
6101.00	73895.50	76457.50	584858.24	733245.01	5629981.70	5631770.02	204	264	2009
6102.00	68459.00	70977.50	584356.74	731271.32	5631978.86	5633617.23	203	263	2009
6103.00	65574.50	68010.50	583880.69	729298.73	5633989.62	5635466.54	203	263	2009
6104.00	61176.00	62905.50	583406.02	690937.03	5635986.35	5636013.68	203	263	2009
6104.01	68017.00	68643.00	690909.53	727300.34	5635996.90	5637307.30	117	270	2009
6105.00	63497.50	65345.00	582365.94	689397.18	5637988.78	5638020.05	203	263	2009
6105.01	68994.00	69645.00	689307.06	726192.00	5637972.59	5639229.38	117	270	2009
6106.00	71517.00	73451.50	581313.64	691279.14	5639979.38	5640011.60	202	260	2009
6106.01	70107.50	70665.50	691215.02	723361.16	5639982.31	5641002.09	117	270	2009
6107.00	68588.00	70414.00	580234.88	689065.29	5641987.15	5642013.30	202	260	2009
6107.01	71022.00	71578.50	689003.99	721383.38	5641991.72	5642847.77	117	270	2009
6108.00	76105.00	78588.50	579172.45	719686.59	5643950.35	5644724.98	114	264	2009
6109.00	73229.00	75737.00	578127.84	718212.85	5645983.95	5646604.93	114	264	2009
6110.00	70327.00	72826.00	577068.53	716729.17	5647994.60	5648487.85	114	264	2009
6111.00	79344.00	81842.50	575300.99	715255.84	5649994.38	5650376.81	113	263	2009
6112.00	76599.00	78979.50	574934.40	713772.74	5651991.19	5652262.39	113	263	2009
6113.00	73790.00	76243.00	573862.16	712302.17	5653992.21	5654092.64	113	263	2009
6114.00	71053.00	73431.50	572819.86	711115.47	5655992.09	5656014.88	113	263	2009
6115.00	68246.50	70689.00	571729.44	710741.85	5657989.25	5658010.87	113	263	2009
6116.00	65497.00	67935.50	570669.98	710676.48	5659981.87	5660010.27	113	263	2009
6117.00	62614.00	65109.00	569630.69	710576.49	5661987.56	5662013.49	113	263	2009
6118.00	60575.50	62285.00	568547.65	665088.97	5663987.71	5664006.47	113	263	2009
6118.01	81294.00	82066.00	665017.22	710503.96	5663989.62	5664010.59	115	265	2009
6119.00	58285.00	60022.50	567481.90	663999.69	5665989.37	5666014.80	113	263	2009
6119.01	80110.00	80950.00	663916.02	710431.64	5665994.49	5666008.19	115	265	2009
6120.00	78112.50	80581.50	566440.26	710341.79	5667987.91	5668016.34	112	260	2009
6121.00	75179.00	77750.50	565373.84	710260.92	5669990.74	5670011.87	112	260	2009
6122.00	72323.00	74864.00	564734.11	710169.55	5671986.57	5672019.71	112	260	2009
6123.00	69367.50	71963.00	564268.54	710078.32	5673989.13	5674012.25	112	260	2009
6124.00	66478.50	69052.00	563792.87	709996.17	5675992.05	5676020.48	112	260	2009
6125.00	63573.50	66115.00	563315.51	709935.83	5677983.45	5678007.05	112	260	2009
6126.00	60617.00	63215.50	562832.22	709832.89	5679901.19	5680009.99	112	260	2009
6127.00	57714.00	60248.00	562353.81	709747.99	5681986.98	5682009.12	112	260	2009
6128.00	64321.50	66927.00	561866.51	709677.76	5683990.94	5684009.81	110	258	2009
6129.00	61293.00	63913.00	561381.23	709596.86	5685975.81	5686008.47	110	258	2009
6130.00	58340.00	60990.50	560911.88	709518.33	5687989.29	5688011.79	110	258	2009
6131.00	65691.50	67576.50	560437.29	667881.82	5689986.77	5690018.37	202	260	2009
6131.01	78861.00	79568.00	667821.51	709433.18	5689991.33	5690010.77	115	265	2009
6132.00	63447.50	65203.00	559948.39	665074.58	5691982.21	5692010.24	202	260	2009
6132.01	77688.00	78460.50	665007.87	709342.60	5691997.96	5692009.13	115	265	2009
6133.00	61171.50	63093.00	559476.11	667874.03	5693988.03	5694012.46	202	260	2009
6133.01	76573.50	77290.50	667826.23	709274.81	5693995.90	5694010.95	115	265	2009
6134.00	81635.00	82172.50	558995.14	590078.47	5695984.58	5696015.15	201	258	2009
6134.01	72110.00	74243.00	590013.15	709169.60	5695993.65	5696011.59	115	265	2009
6135.00	79474.00	81307.00	558504.00	670196.83	5697978.26	5698015.38	201	258	2009
6135.01	75548.00	76242.00	670109.71	709094.47	5697989.98	5698008.28	115	265	2009
6136.00	76032.00	77945.00	558050.16	672539.29	5699983.87	5700018.72	201	258	2009
6136.01	74565.00	75203.50	672503.24	709027.48	5699989.35	5700007.16	115	265	2009
6137.00	73186.50	75627.50	557547.73	708948.14	5701978.10	5702068.65	201	258	2009
6138.00	70347.50	72807.50	555295.23	708835.57	5703965.62	5704014.01	201	258	2009
6139.00	69334.50	69976.00	555392.89	593194.45	5705988.40	5706017.98	201	258	2009
6139.01	68740.50	70707.50	593118.68	708770.42	5705981.75	5706012.87	115	265	2009
6140.00	58523.50	60703.50	581827.72	708673.16	5707990.94	5708008.54	102	245	2009
6140.03	70892.00	71366.50	555323.67	581886.36	5707996.53	5708010.86	115	265	2009
6141.00	57818.00	59780.00	555231.87	665080.66	5709989.24	5710011.11	103	247	2009
6141.01	79763.50	80511.50	665014.91	708607.76	5709992.91	5710011.97	114	264	2009
6142.00	60915.00	62816.00	555157.64	663548.88	5711989.97	5712011.87	103	247	2009

FLOWN SURVEY LINES									
QUEST SOUTH B.C. 2009 - WGS 84 UTM 10N									
LINE	START TIME	END TIME	(m) MIN X	(m) MAX X	(m) MIN Y	(m) MAX Y	FLIGHT	DAY	YEAR
6142.01	80860.50	81660.50	663503.43	708513.85	5711994.11	5712006.57	114	264	2009
6143.00	63350.50	65117.00	554684.79	653576.30	5713990.96	5714009.86	103	247	2009
6143.01	82100.50	83022.50	653529.30	708454.56	5713984.83	5714006.68	114	264	2009
6144.00	65448.00	66458.00	554206.66	609780.07	5715993.61	5716012.83	103	247	2009
6144.02	66529.00	68285.50	609717.34	708361.76	5715984.31	5716014.59	115	265	2009
6145.00	68253.00	70243.00	553727.54	666093.69	5717985.88	5718007.77	103	247	2009
6145.01	83559.50	84296.50	666004.86	708266.11	5717993.49	5718008.35	114	264	2009
6146.00	70560.00	72698.50	553243.71	672050.97	5719986.72	5720028.38	103	247	2009
6146.01	84722.00	85335.00	672012.29	708196.15	5719992.63	5720008.38	114	264	2009
6147.00	73129.00	75164.00	552778.24	670066.75	5721990.67	5722009.91	103	247	2009
6147.01	64731.00	65400.50	670003.04	708101.90	5721982.49	5722008.43	115	265	2009
6148.00	75525.50	78191.50	552283.21	708017.52	5723986.36	5724017.01	103	247	2009
6149.00	79147.00	81170.50	551823.99	668115.35	5725989.61	5726009.38	103	247	2009
6149.01	63735.00	64443.50	668020.80	707957.04	5725990.44	5726008.46	115	265	2009
6150.00	81506.50	82456.00	551325.72	604769.34	5727988.19	5728015.04	103	247	2009
6150.01	79563.00	81369.50	604701.89	707874.59	5727994.95	5728012.85	109	257	2009
6151.00	57620.00	59469.50	550850.91	654090.38	5729988.76	5730009.47	104	249	2009
6151.01	81766.00	82700.00	654027.93	707770.28	5729995.51	5730010.99	109	257	2009
6152.01	59843.50	61709.00	550390.08	653362.67	5731991.14	5732010.90	104	249	2009
6152.02	62293.50	63215.50	653329.48	707713.84	5731990.61	5732007.74	115	265	2009
6153.00	62434.50	64527.00	550032.59	668093.48	5733987.88	5734009.06	104	249	2009
6153.01	61151.50	61847.00	668024.00	707625.73	5733992.49	5734010.11	115	265	2009
6154.00	64941.00	66086.00	550021.80	613055.06	5735991.38	5736009.30	104	249	2009
6154.01	77343.00	79069.00	613018.37	707522.76	5735994.54	5736008.44	109	257	2009
6155.00	66720.00	67816.00	549975.99	613110.10	5737988.46	5738008.94	104	249	2009
6155.01	75324.50	76937.00	613015.94	707446.30	5737992.72	5738010.77	109	257	2009
6156.00	68211.50	69904.50	549939.00	646027.59	5739992.99	5740014.42	104	249	2009
6156.01	59547.00	60578.50	646012.29	707363.49	5739985.88	5740008.52	115	265	2009
6157.00	70431.00	72126.00	549910.00	649113.57	5741985.69	5742010.15	104	249	2009
6157.01	58101.00	59133.00	649023.09	707286.53	5741992.47	5742012.17	115	265	2009
6158.00	72529.00	73306.50	549880.64	594044.44	5743993.26	5744011.92	104	249	2009
6158.01	72691.50	74749.00	594002.75	705328.97	5743990.38	5744013.12	109	257	2009
6159.00	58834.00	59931.00	549837.18	610078.80	5745993.08	5746007.77	105	251	2009
6159.01	70670.50	72271.50	610006.08	703233.06	5745993.45	5746009.37	109	257	2009
6160.00	67637.50	70330.00	549813.98	701155.77	5747995.93	5748017.86	105	251	2009
6161.00	70678.00	73235.00	549793.77	699079.84	5749994.78	5750012.00	105	251	2009
6162.00	73610.00	76239.00	549759.97	696999.20	5751985.41	5752014.77	105	251	2009
6163.00	76692.00	79200.50	549714.35	695834.47	5753990.68	5754008.42	105	251	2009
6164.00	79554.00	82122.50	549689.56	692848.72	5755993.85	5756012.53	105	251	2009
6165.00	82577.50	83605.00	629909.34	690774.39	5757991.58	5758006.82	105	251	2009
6165.01	66495.00	67953.50	549666.14	629979.02	5757990.83	5758007.87	106	253	2009
6166.00	68341.50	70776.50	549629.37	688692.24	5759993.54	5760010.60	106	253	2009
6167.00	71137.00	73580.00	549575.03	686624.41	5761986.86	5762013.62	106	253	2009
6168.00	73900.00	76223.50	549553.08	684556.17	5763993.02	5764011.24	106	253	2009
6169.00	76580.50	78909.00	549518.73	682702.74	5765991.44	5766008.18	106	253	2009
6170.00	79240.50	81593.00	549489.84	681803.00	5767989.28	5768010.41	106	253	2009
6171.00	81931.00	83197.00	608618.66	680880.51	5769989.54	5770007.88	106	253	2009
6171.01	57416.50	58395.50	549472.52	608671.12	5769991.70	5770005.09	107	254	2009
6172.00	56537.50	58873.50	549433.49	679961.94	5771991.49	5772010.49	108	255	2009
6173.00	62036.00	64364.50	549403.45	679034.74	5773988.92	5774010.36	108	255	2009
6174.00	67424.50	69686.00	549349.61	678114.89	5775987.52	5776020.35	108	255	2009
6175.00	72552.00	74787.00	549336.66	677206.44	5777994.05	5778013.79	108	255	2009
6176.00	69991.50	72133.00	549293.41	676277.58	5779987.16	5780019.21	108	255	2009
6177.00	75066.00	77225.00	549278.62	675868.76	5781987.00	5782011.86	108	255	2009
6178.00	57160.50	59365.50	549233.14	674419.29	5783984.31	5784017.27	109	257	2009
6179.00	62223.50	64437.00	549198.73	673526.11	5785992.98	5786010.02	109	257	2009
6180.00	59680.50	61796.50	549155.70	672597.12	5787993.61	5788010.61	109	257	2009
6181.00	64760.00	66850.50	549127.28	671680.86	5789996.58	5790014.28	109	257	2009
6182.00	67285.00	69481.50	549114.68	670754.15	5791990.47	5792007.45	109	257	2009
6183.00	64873.00	66900.50	549074.56	669848.37	5793994.04	5794009.38	108	255	2009
6184.00	59471.50	61477.50	549050.87	668917.61	5795991.29	5796006.75	108	255	2009

FLOWN SURVEY LINES									
QUEST SOUTH B.C. 2009 - WGS 84 UTM 10N									
LINE	START TIME	END TIME	(m) MIN X	(m) MAX X	(m) MIN Y	(m) MAX Y	FLGHT	DAY	YEAR
7055.00	69865.50	70517.00	714814.89	752558.80	5537948.57	5540983.46	211	285	2009
7056.00	70928.00	71643.00	714755.14	753975.02	5539947.21	5543112.54	211	285	2009
7064.00	80367.50	81056.00	714184.00	753688.94	5555979.07	5559159.57	125	297	2009
7097.00	60473.00	60953.50	711979.38	739965.88	5622022.81	5624288.76	117	270	2009



APPENDIX IV

EQUIPMENT LIST



Equipment List

Item Name	S/N	Part Number	Description	Manufacturer
Aircraft C-GSGJ	208B-1187		Cessna 208B Grand Caravan, Engine Pratt&Whitney Canada, mod. PT6A-114A, S/N PCE-PC1283, Propeller McCauley mod. 3GFR34703-B, S/N 060348	Cessna
Aircraft C-FSDK	42.AC 071		Diamond Twin Star DA42. Engines-Thielert	Diamond
AirGrav Control Computer	GEER-08	GEER		SGL
AirGrav Control Computer	GEER-02	GEER		SGL
AirGrav Data Acquisition Computer	G-DAC-10	GDAC		SGL
AirGrav Data Acquisition Computer	G-DAC-13	GDAC	Mini GDAC	SGL
Computer - AMD	AMD-86		Processing computer	
Computer - AMD	AMD-24		AMD 750MHz	SGL
Data acquisition computer	CDAC-17		CPCI Data Acquisition computer	SGL
Data acquisition computer	CDAC-10		CPCI Data Acquisition computer	SGL
Gravimeter System	GRV G2-7		Airborne Gravimeter Platform	SGL
Gravimeter System	GRV G1A		Airborne Gravimeter Platform	SGL
Laser Profilometer	9996507	LD90-31K-HiP	LD90-31K-HiP, 11-28VDC laser rangefinder. Serial output/serial input 1-1500m capability	Riegl
Miniterminal	158055	ST/2000	model ST/2000	Termiflex
Monitor LCD 5" cockpit monitor	7217005		Model FD270AID 'The Flipper' 5" cockpit LCD monitor	Flight data Systems
Monitor LCD 6.4"	S074941260005		model LS64PA30A	Stealth Computers
Monitor LCD 7"	XE7YV-C00112	700YV	Model 700YV TFT LCD Monitor	Xenarc Technologies
Nav Display DEB (Detached Electronics Box)	7221012	FDAID-DEB-SM	Detached Electronics Box for 5" Flip down display	Flight data Systems
Power Distribution Box	PODB24-09		110/220 AC to 24DC	DUNN Systems
Power supply	30065R0008	001-4197-0000	GRPI6000 1250W, 48V Power supply	Unipower
Printer	MY59KD3244		PSC 1510, Printer/Scanner/Copier	HP
SatCom transceiver	1749	ISAT-100	8816-4147-6475	SkyTrac
SGRef Station	SGRef-05		Dual CPCI ground station - 28Vdc input	SGL



APPENDIX V

SURVEY AIRCRAFT





GEOPHYSICAL SURVEY AIRCRAFT

Cessna 208B Grand Caravan

Registration	C-GSGW	C-GSGY	C-GSGZ	C-GSGL	C-GSGV	C-GSGU	C-GSGJ	C-GSGA
Serial #	208B0646	208B0600	208B0493	208B0783	208B0524	208B0747	208B1187	208B1228

The Cessna 208B Grand Caravan is an all metal, high wing, single-engine aircraft powered by a Pratt & Whitney Canada PT6A-114A engine. This engine drives constant speed, fully feathering, reversible propeller. The aircraft has fixed gear, extendable flaps and manually adjustable trim tabs on the primary controls for the roll and pitch axis and full rudder trim for the yaw axes. The aircraft is equipped with full de-icing equipment and sufficient avionics for instrument flying including a flight control system and weather radar. Supplementary fuel can be added for transoceanic flight. The Caravan is certified for IFR flights in known icing conditions.

SGL aircraft have a rigid aluminum and composite material 3 m tail stinger designed to accommodate the magnetometer sensor. The stinger can be easily removed and the aircraft returned to its original configuration. There is a camera hole in the belly of the aircraft and provisions for other survey and navigation systems.

The Cessna Grand Caravan uses the extremely reliable Pratt & Whitney Canada PT6 turbine engine. These engines have recorded tens of millions of hours of flight time and with virtually no in-flight engine stoppages due to mechanical failure. Over 1300 Caravans are in use around the world. Because the Caravan has one engine, fixed landing gear, and no single engine control speed limitations, it is considered an easy and very safe aircraft to fly. The PT6 turbine engine provides ample power for climbing over terrain, working at altitudes up to 7,000 m and can withstand frequent rapid power changes. The low stall speeds and abundant available power, mean that the Caravan is a safe and effective aircraft for surveys which require low airspeeds, drape flying over rough topography, or flights at high altitudes.



SANDER GEOPHYSICS

260 Hunt Club Road, Ottawa, Ontario K1V 1C1 Canada

Phone: 613-521-9626 Fax: 613-521-0215 Email: info@sgl.com Website: www.sgl.com

EXPLORATION

RESEARCH

INTERPRETATION

CESSNA 208B GRAND CARAVAN SPECIFICATIONS

Crew Capacity:	• 2 pilots, 1 operator (optional)
Fuselage:	• semi-monocoque
Wings:	• strut braced, high wing
	• outboard ailerons with spoiler and trim tab
Tail:	• conventional stabilizers
	• elevators and rudder with trim
Power Plant:	
Engine:	• Pratt & Whitney Canada PT6A-114A, 675 shp, free-turbine gas engine, overhaul 3,500 hours
Propeller:	• three-blade, fully-feathering, constant-speed, reversible propeller, overhaul 3,500 hours
Systems:	• dual flight controls with IFR instruments and avionics
	• flight control system
	• 2 axis autopilot
	• weather radar
	• full airframe and propeller de-icing
Dimensions:	
Wing span	52 ft 1 in..... 16.11 m
Exterior length	41 ft 7 in..... 12.68 m
Exterior height	15 ft 5.5 in..... 4.72 m
Interior usable length	15 ft 10 in..... 4.83 m
Interior usable width	5 ft 4 in..... 1.63 m
Interior height	4 ft 6 in..... 1.37 m
Usable fuel capacity (with survey tank)	519 US gal 2011 l
Weights:	
Empty	4,237 lb 1,926 kg
Maximum take-off	9,062 lb 4,119 kg
Performance (2000 ft ASL, standard day, maximum take-off weight, 1900 rpm, 1375 ft-lb tq):	
Range, maximum range power (plus reserve)	1,450 nm 2,685 km
Cruise speed, maximum range power	155 kt 287 km/h
Fuel flow, maximum range power	50 US gal/h 189 l/h
Stall airspeed, landing configuration	61 kt 113 km/h
Service ceiling	25,000 ft..... 7,620 m
Minimum required runway length	2,500 ft..... 765 m
Rate of climb	975 ft/min 297 m/min
Maximum sustained climb gradient	650 ft/nm..... 107 m/km
Type of Aviation Fuel:	• Jet A, A-1, B, JP-1, 4, 5, 8
Maximum Endurance:	• 8 hours plus 1 hour reserve at maximum range power

PROVISIONS FOR GEOPHYSICAL SURVEYING

- **Tail stinger**, 3 m long and 21 cm in diameter, capable of housing a 5.5 kg sensor
- **HF radio**
- **Video camera mount** with 14 cm diameter glass covered opening in the belly of the aircraft
- **Two instrument racks**, standard 48 cm (19 inch) width
- **Radar altimeter**, 0-3,000 m
- **Electrical power capacity** 28 VDC at 200 amp
- **Static inverters**, 115 VAC - 400 Hz, 110 VAC - 60 Hz
- **GPS receiver and antenna plus data link for real-time corrections**
- **Provisions to mount gamma-ray spectrometer**, up to 63 litres (3,840 in³) of detector crystals
- **Provision to mount SGL airborne gravimeter**
- **Cabin fuel tank** certified for normal production flying



GEOPHYSICAL SURVEY AIRCRAFT

Diamond Aircraft DA42 Twin Star

Registration: C-FSGM	Registration: C-FSGN	Registration: C-FSDK
Serial #: 42-105	Serial #: 42-AC061	Serial #: 42-AC071

The DA42 Twin Star combines the benefits of outstanding safety and ideal flight characteristics. Ultra-light, high-strength composite materials are used throughout its construction.



The Engine

The DA42 Twin Star uses Thielert Centurion 2.0 litre turbodiesel engines that can run on either diesel or Jet A1 fuel. With just the standard tank (52 US gallons), the aircraft's sensationally efficient fuel consumption gives a maximum range of 900 nm, depending on power setting. With long range fuel tanks, range is increased to over 1300 nm.

The Avionics

Another groundbreaking innovation is the fully integrated DA42 Twin Star cockpit with its ultra-modern Garmin G1000 avionics system, which has at its heart, two large-format 38 cm colour TFT screens. The system is a modular design with open architecture.

Geophysical Survey Application

The airframe has been extensively modified to reduce the magnetic signature of the aircraft by replacing ferromagnetic parts with those made from advanced non-magnetic alloys. Several wiring changes have also been made to the electrical system to reduce the magnetic field variations around the aircraft.

The fully equipped DA42 can operate at a wide range of speeds, varying from a minimum survey speed of 90 knots to a maximum of 150 knots (IAS). No other aircraft can match the flexibility of the turbo diesel-powered DA42.

SANDER GEOPHYSICS

260 Hunt Club Road, Ottawa, Ontario K1V 1C1 Canada

Phone: 613-521-9626 Fax: 613-521-0215 Email: info@sgl.com Website: www.sgl.com

EXPLORATION

RESEARCH

INTERPRETATION

DIAMOND AIRCRAFT DA42 TWIN STAR SPECIFICATIONS

- Crew Capacity:** • 2 pilots or 1 pilot and 1 operator
- Fuselage:** • semi-monocoque, all composite
- Wings:** • cantilever, low wing
• outboard ailerons with trim tabs
• inboard split flap and outboard plain flap
- Tail:** • T-tail configuration
• elevators and rudder with trim tabs

Power Plant:

- Engine: 2 Thielert Centurion 2.0 litre (135 hp) turbodiesel engines, overhaul 1,000 hours
- Propeller: 2 MT 3-blade constant speed, full feathering propellers, overhaul 1,500 hours

Airspeed, Fuel Consumption and Range:

Maximum airspeed (IAS)	359 km/h	194 kt
Cruise speed at 80% and 10,000 ft (TAS)	319 km/h	172 kt
Fuel consumption at 80% and 10,000 ft	47.3 l/h	12.5 US gal/h
Range at 60% and 10,000 ft, standard tank	1,652 km.....	892 nm
Range at 60% and 10,000 ft, long range tank	2,091 km.....	1,129 nm

Dimensions:

Length	8.56 m.....	28 ft 1 in
Height	2.49 m.....	8 ft 2 in
Wing span	13.42 m.....	44 ft
Wing area	16.29 m ²	175.3 sq ft

Weights:

Empty	1,250 kg.....	2,756 lb
Maximum take-off weight (MTOW)	1,785 kg.....	3,935 lb
Payload	535 kg.....	1,179 lb

Fuel Capacity

Standard	197 l.....	52 US gal
Long range tank	280 l.....	74 US gal

PROVISIONS FOR GEOPHYSICAL SURVEYING

- **Wingtip stingers**
- **VHF radio and satellite phone**
- **Optional downward looking video camera and laser altimeter**
- **Instrument rack:** standard 48 cm (19 in) width
- **Electrical power capacity:** 28 VDC at 30 amp
- **Provisions to mount a GPS receiver and antenna plus data link for real-time corrections**
- **Iridium tracking**



APPENDIX VI

WEEKLY REPORTS





SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

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Week 1

SURVEY DETAILS													
Survey Name		QUEST - South BC				Client Name		Geoscience BC Society					
Survey Location		BC, Canada				Contact Name		Lyn Anglin					
Project Code		Geosci09.BC				Contact Phone		+1 (604) 662-4147					
Total Size		25,010.3 km				Client Address		440 - 890 W. Pender St					
Line Spacing		2 km by 20 km				Vancouver, BC							
Type		GRAVITY				V6C 1J9 Canada							
Aircraft 1	C-GSGJ	Aircraft 2	C-FSDK		Email	anglin@geosciencebc.com							
SURVEY PRODUCTION SUMMARY													
Production km this Week		0.0		km		Total km Flown to Date		0.0		km			
Total Remaining		25010.3		km		Total km Reflown this Week		0.0		km			
% Complete		0.0		%		Total Flight Time this Week		0.0		hrs			
Average km/Day this Week		0.0		km/day		Average km/Flt. Time this Week		0.0		km/hr			
WEEKLY PRODUCTION													
Date	Day	Flight No.		Flight Time		No. of Lines Flown		No. Reflight Lines Flown		Production km		Reflown km	
TOTALS		Aircraft 1	Aircraft 2	0.0		0.0		0.0		0.0		0.0	
17-Aug	Monday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:													
Weather:													
Remarks:													
18-Aug	Tuesday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:													
Weather:													
Remarks:													
19-Aug	Wednesday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:													
Weather:													
Remarks:													
20-Aug	Thursday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:													
Weather:													
Remarks:													
21-Aug	Friday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:													
Weather:													
Remarks:													
22-Aug	Saturday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:													
Weather:													
Remarks:													
23-Aug	Sunday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag: n/a													
Weather: n/a													
Remarks: Alison McCleary and Sol Meyer, geophysicists, arrives in 108 Mile Ranch. Survey aircraft C-GSGJ departs Ottawa, Steve Gebhardt and Galen Smith as pilots, overnight in Thunder Bay.													
Comments: Mobilization of crew to 108 Mile Ranch commences. Geophysicists on site and survey aircraft on route.													
Signed: Alison McCleary													
Week Complete? 1													

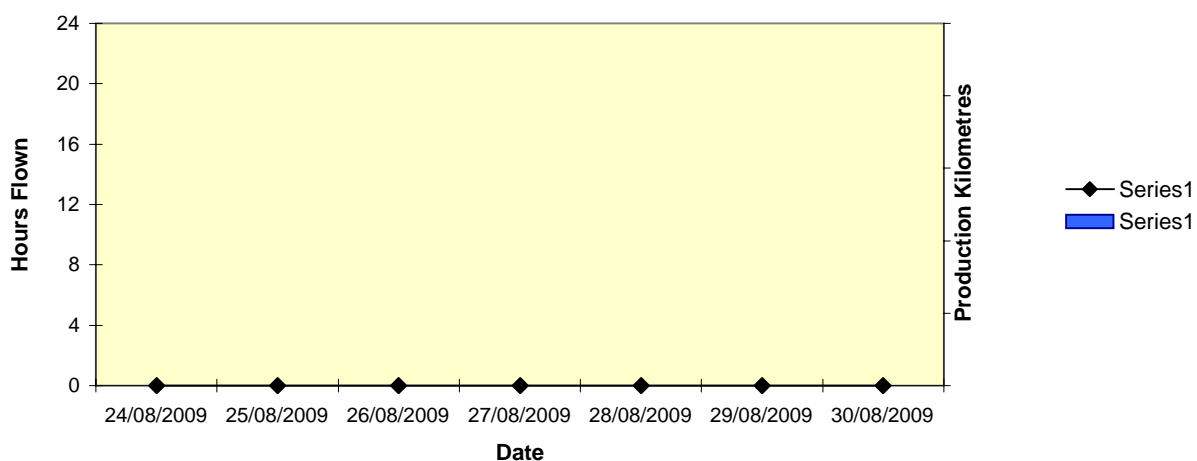
PERSONNEL ON SITE THIS WEEK					
Name	Arrival this week	Departure this week	On Site?	# of Days on Site this week	# of Days on Site to date
Alison McCleary	23-Aug		ON SITE	1	1
Sol Meyer	23-Aug		ON SITE	1	1
Steve Gebhardt	23-Aug		ON SITE	1	1
Galen Smith	23-Aug		ON SITE	1	1
John Sevenhuysen				0	0
Andre Lafontaine				0	0
Luise Sander				0	0
France Belley				0	0
Kim Steingass				0	0
Johnathan Drolet				0	0
Randall Forwell				0	0
Jean-Vincent Duchesne				0	0
Harley Melnick				0	0
Adam Dalziel				0	0

HSE Statistics	This Week	Project Totals
SGL Person Hours	30.0	30.0
Inductions	0	0
Near Miss	0	0
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case	0	0
Lost Time Injuries (LTI)	0	0

TOTALS FOR PLOT	Total Flight Time (hrs)	Total Production (km)
Monday	0.0	0.0
Tuesday	0.0	0.0
Wednesday	0.0	0.0
Thursday	0.0	0.0
Friday	0.0	0.0
Saturday	0.0	0.0
Sunday	0.0	0.0

* This table adds together values for both planes

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN





SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

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Week 2

WEEK 2

SURVEY DETAILS													
Survey Name		QUEST - South BC				Client Name				Geoscience BC Society			
Survey Location		BC, Canada				Contact Name				'Lyn Anglin			
Project Code		Geosci09.BC				Contact Phone				+1 (604) 662-4147			
Total Size		25,010.3 km				Client Address				440 - 890 W. Pender St			
Line Spacing		2 km by 20 km				Vancouver, BC							
Type		GRAVITY				V6C 1J9 Canada							
Aircraft 1	C-GSGJ	Aircraft 2	C-FSDK		Email		anglin@geosciencebc.com						
SURVEY PRODUCTION SUMMARY													
Production km this Week		0.0		km		Total km Flown to Date		0.0		km			
Total Remaining		25010.3		km		Total km Reflown this Week		0.0		km			
% Complete		0.0		%		Total Flight Time this Week		0.0		hrs			
Average km/Day this Week		0.0		km/day		Average km/Flt. Time this Week		0.0		km/hr			
WEEKLY PRODUCTION													
Date	Day	Flight No.		Flight Time		No. of Lines Flown		No. Reflight Lines Flown		Production km		Reflown km	
TOTALS		Aircraft 1	Aircraft 2	0.0		0.0		0.0		0.0		0.0	
24-Aug	Monday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Reference station and field office setup. Aircraft stays in Thunder Bay due to weather.												
25-Aug	Tuesday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Aircraft C-GSGJ ferries to Saskatoon.												
26-Aug	Wednesday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	poor visibility due to smoke, sunny												
Remarks:	Aircraft C-GSGJ ferries to Edmonton.												
27-Aug	Thursday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	poor visibility due to smoke, sunny – raining ash in late afternoon and throughout night												
Remarks:	Aircraft C-GSGJ arrives in 108. Geophysical equipment warmed up overnight.												
28-Aug	Friday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	poor visibility due to smoke, sunny												
Remarks:	Official launch of project in Kamloops. Aircraft C-GSGJ ferried to Kamloops for afternoon. Geophysical equipment ready for production.												
29-Aug	Saturday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	poor visibility due to smoke, sunny												
Remarks:	Safety meeting. Safety paperwork and survey preparations completed.												
30-Aug	Sunday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	poor visibility due to smoke, sunny												
Remarks:	First survey flight postponed and eventually canceled due to thick smoke in north half of block. John Sevenhuysen, AME, arrives in 108 Mile Ranch.												
Comments:	Mobilization to 108 Mile Ranch complete. Aircraft C-GSGJ on site and equipment ready. Official launch of project in Kamloops successful. Poor visibility due to heavy smoke caused by two large fires, one west of crew and the other west of Kamloops, delays start of production.												

Signed: Alison McCleary

Week Complete?

1

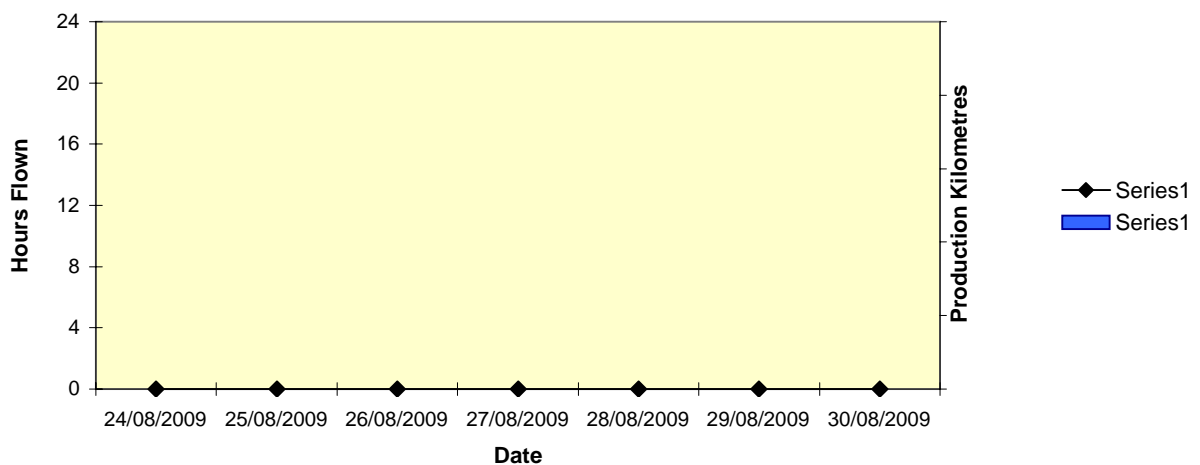
PERSONNEL ON SITE THIS WEEK					
Name	Arrival	Departure	On Site?	# of Days on Site this week	# of Days on Site to date
Alison McCleary			ON SITE	7	8
Sol Meyer			ON SITE	7	8
Steve Gebhardt			ON SITE	7	8
Galen Smith			ON SITE	7	8
John Sevenhuysen	30-Aug		ON SITE	1	1
Andre Lafontaine				0	0
Luise Sander				0	0
France Belley				0	0
Kim Steingass				0	0
Johnathan Drolet				0	0
Randall Forwel				0	0
Jean-Vincent Duchesne				0	0
Harley Melnick				0	0
Adam Dalziel				0	0

HSE Statistics	This Week	Project Totals
SGL Person Hours	217.5	247.5
Inductions	5	5
Near Miss	0	0
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case	0	0
Lost Time Injuries (LTI)	0	0

TOTALS FOR PLOT	Total Flight Time (hrs)	Total Production (km)
Monday	0.0	0.0
Tuesday	0.0	0.0
Wednesday	0.0	0.0
Thursday	0.0	0.0
Friday	0.0	0.0
Saturday	0.0	0.0
Sunday	0.0	0.0

* This table adds together values for both planes

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN





SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

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Week 3

SURVEY DETAILS													
Survey Name		QUEST - South BC				Client Name				Geoscience BC Society			
Survey Location		BC, Canada				Contact Name				'Lyn Anglin			
Project Code		Geosci09.BC				Contact Phone				+1 (604) 662-4147			
Total Size		25,010.3 km				Client Address				440 - 890 W. Pender St			
Line Spacing		2 km by 20 km				Vancouver, BC							
Type		GRAVITY				V6C 1J9 Canada							
Aircraft 1	C-GSGJ	Aircraft 2		C-FSDK		Email		anglin@geosciencebc.com					
SURVEY PRODUCTION SUMMARY													
Production km this Week		2084.6		km		Total km Flown to Date		2084.6		km			
Total Remaining		22925.7		km		Total km Reflown this Week		0.0		km			
% Complete		8.3		%		Total Flight Time this Week		15.1		hrs			
Average km/Day this Week		297.8		km/day		Average km/Flt. Time this Week		138.1		km/hr			
WEEKLY PRODUCTION													
Date	Day	Flight No.		Flight Time		No. of Lines Flown		No. Reflight Lines Flown		Production km		Reflown km	
TOTALS		Aircraft 1	Aircraft 2	15.1		13.4		0.0		2,084.6		0.0	
31-Aug	Monday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	poor visibility due to smoke, sunny												
Remarks:	Flight canceled due to thick smoke in north half of block.												
01-Sep	Tuesday	101	0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	poor visibility due to smoke, sunny in morning and rain with thunderstorms in afternoon												
Remarks:	Flight aborted due to weather and thick smoke, no production but successful test flight of all systems. Everything operational.												
02-Sep	Wednesday	102	0	2.1	0.0	1.0	0.0	0.0	0.0	148.8	0.0	0.0	0.0
Geomag:	n/a												
Weather:	poor visibility due to smoke, sunny												
Remarks:	Flight aborted due to thick smoke, forest fires and heavy low level air traffic.												
03-Sep	Thursday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	rain and thunderstorms all day												
Remarks:	No flight due to weather.												
04-Sep	Friday	103	0	7.5	0.0	7.7	0.0	0.0	0.0	1,194.9	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Full production flight.												
05-Sep	Saturday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast												
Remarks:	No flight due to weather. Aircraft maintenance.												
06-Sep	Sunday	104	0	5.0	0.0	4.7	0.0	0.0	0.0	740.9	0.0	0.0	0.0
Geomag:	n/a												
Weather:	partly sunny and cool, cloudy in afternoon												
Remarks:	Flight aborted due to weather. Aircraft maintenance continues.												
Comments:	First full production flight completed. Production slow due to poor visibility and rain. Smoke now clear so production expected to be better next week.												

Signed: Alison McCleary

Week Complete?

1

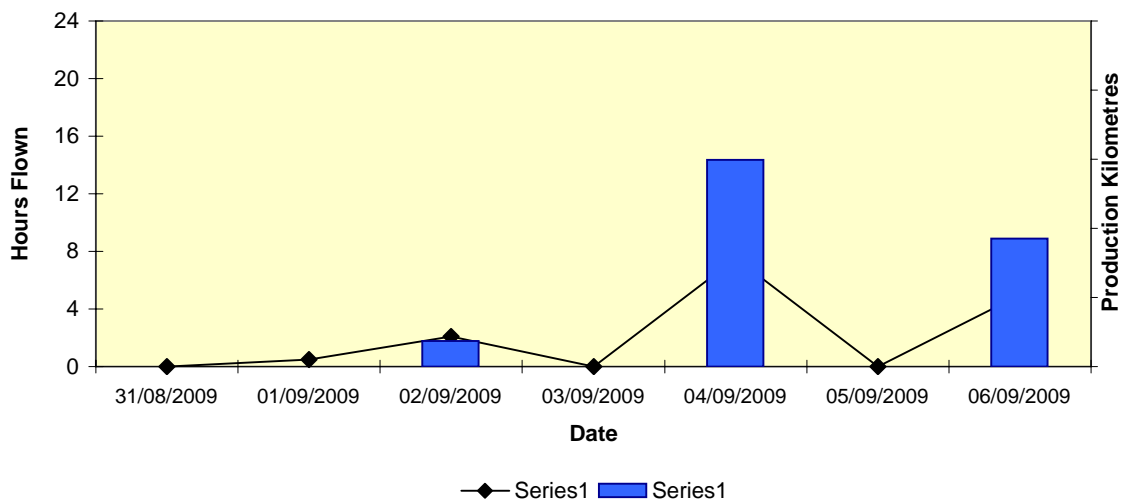
PERSONNEL ON SITE THIS WEEK					
Name	Arrival	Departure	On Site?	# of Days on Site this week	# of Days on Site to date
Alison McCleary			ON SITE	7	15
Sol Meyer			ON SITE	7	15
Steve Gebhardt			ON SITE	7	15
Galen Smith			ON SITE	7	15
John Sevenhuysen			ON SITE	7	8
Andre Lafontaine				0	0
Luise Sander				0	0
France Belley				0	0
Kim Steingass				0	0
Johnathan Drolet				0	0
Randall Forwell				0	0
Jean-Vincent Duchesne				0	0
Harley Melnick				0	0
Adam Dalziel				0	0

HSE Statistics	This Week	Project Totals
SGL Person Hours	262.5	510.0
Inductions	0	5
Near Miss	0	0
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case	0	0
Lost Time Injuries (LTI)	0	0

TOTALS FOR PLOT	Total Flight Time (hrs)	Total Production (km)
Monday	0.0	0.0
Tuesday	0.5	0.0
Wednesday	2.1	148.8
Thursday	0.0	0.0
Friday	7.5	1194.9
Saturday	0.0	0.0
Sunday	5.0	740.9

* This table adds together values for both planes

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN





SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

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Week 4

Week 4

SURVEY DETAILS													
Survey Name		QUEST - South BC				Client Name				Geoscience BC Society			
Survey Location		BC, Canada				Contact Name				'Lyn Anglin			
Project Code		Geosci09.BC				Contact Phone				+1 (604) 662-4147			
Total Size		25,010.3 km				Client Address				440 - 890 W. Pender St			
Line Spacing		2 km by 20 km				Vancouver, BC							
Type		GRAVITY				V6C 1J9 Canada							
Aircraft 1	C-GSGJ	Aircraft 2		C-FSDK		Email		anglin@geosciencebc.com					
SURVEY PRODUCTION SUMMARY													
Production km this Week		2995.8		km		Total km Flown to Date				5080.4		km	
Total Remaining		19929.9		km		Total km Reflown this Week				0.0		km	
% Complete		20.3		%		Total Flight Time this Week				20.8		hrs	
Average km/Day this Week		428.0		km/day		Average km/Flt. Time this Week				144.0		km/hr	
WEEKLY PRODUCTION													
Date	Day	Flight No.		Flight Time		No. of Lines Flown		No. Reflight Lines Flown		Production km		Reflown km	
TOTALS		Aircraft 1	Aircraft 2	20.8		22.4		0.0		2,995.8		0.0	
7-Sep	Monday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	foggy in morning, rain												
Remarks:	No flight due to weather. Aircraft maintenance complete.												
08-Sep	Tuesday	105	0	7.5	0.0	8.0	0.0	0.0	0.0	1,118.5	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Full production flight.												
09-Sep	Wednesday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	rain in morning, strong winds in afternoon, thunderstorms in area												
Remarks:	No flight due to weather.												
10-Sep	Thursday	106	0	5.3	0.0	6.0	0.0	0.0	0.0	815.2	0.0	0.0	0.0
Geomag:	n/a												
Weather:	heavy fog in morning, clear and sunny in afternoon												
Remarks:	Flight delayed due to fog. Flight short due to time constraints.												
11-Sep	Friday	107	0	1.2	0.0	0.4	0.0	0.0	0.0	52.5	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny, strong winds all day												
Remarks:	Flight aborted due to weather. Survey aircraft C-FSDK departs Ottawa, Andre Lafontaine as pilot, overnight in Thunder Bay.												
12-Sep	Saturday	108	0	6.8	0.0	8.0	0.0	0.0	0.0	1,009.6	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Full production flight. Aircraft C-FSDK ferries to Calgary.												
13-Sep	Sunday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Flight delayed due to ground power problems. Flight canceled due to sick pilot. Luise Sander, co-president, and France Belley, geophysicist, arrive in 108 Mile Ranch. Aircraft C-FSDK arrives in 108.												
Comments:	Production slow due to weather. Mobilization of second survey aircraft C-FSDK and additional crew completed.												

Signed: Alison McCleary

Week Complete?

1

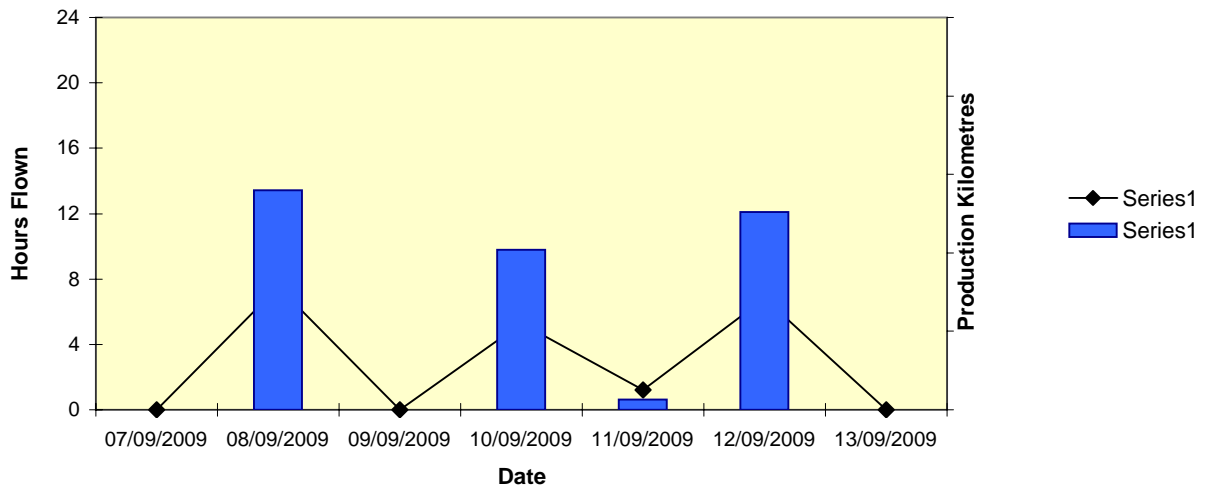
PERSONNEL ON SITE THIS WEEK					
Name	Arrival	Departure	On Site?	# of Days on Site this week	# of Days on Site to date
Alison McCleary			ON SITE	7	22
Sol Meyer			ON SITE	7	22
Steve Gebhardt			ON SITE	7	22
Galen Smith			ON SITE	7	22
John Sevenhuysen			ON SITE	7	15
Andre Lafontaine	11-Sep		ON SITE	3	3
Luise Sander	13-Sep		ON SITE	1	1
France Belley	13-Sep		ON SITE	1	1
Kim Steingass				0	0
Johnathan Drolet				0	0
Randall Forwell				0	0
Jean-Vincent Duchesne				0	0
Harley Melnick				0	0
Adam Dalziel				0	0

HSE Statistics	This Week	Project Totals
SGL Person Hours	300.0	810.0
Inductions	3	8
Near Miss	0	0
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case	0	0
Lost Time Injuries (LTI)	0	0

TOTALS FOR PLOT	Total Flight Time (hrs)	Total Production (km)
Monday	0.0	0.0
Tuesday	7.5	1118.5
Wednesday	0.0	0.0
Thursday	5.3	815.2
Friday	1.2	52.5
Saturday	6.8	1009.6
Sunday	0.0	0.0

* This table adds together values for both planes

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN





SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

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Week 5

SURVEY DETAILS													
Survey Name		QUEST - South BC				Client Name				Geoscience BC Society			
Survey Location		BC, Canada				Contact Name				'Lyn Anglin			
Project Code		Geosci09.BC				Contact Phone				+1 (604) 662-4147			
Total Size		25,010.3 km				Client Address				440 - 890 W. Pender St			
Line Spacing		2 km by 20 km				Vancouver, BC							
Type		GRAVITY				V6C 1J9 Canada							
Aircraft 1	C-GSGJ	Aircraft 2	C-FSDK			Email		anglin@geosciencebc.com					
SURVEY PRODUCTION SUMMARY													
Production km this Week		5701.3		km		Total km Flown to Date				10781.7		km	
Total Remaining		14228.6		km		Total km Reflown this Week				0.0		km	
% Complete		43.1		%		Total Flight Time this Week				40.6		hrs	
Average km/Day this Week		814.5		km/day		Average km/Flt. Time this Week				140.4		km/hr	
WEEKLY PRODUCTION													
Date	Day	Flight No.		Flight Time		No. of Lines Flown		No. Reflight Lines Flown		Production km		Reflown km	
TOTALS		Aircraft 1	Aircraft 2	40.6		39.9		0.0		5,701.3		0.0	
14-Sep	Monday	109	0	7.9	0.0	8.3	0.0	0.0	0.0	1,126.5	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Full production flight. Geophysical equipment warmed up and ready for production in C-FSDK.												
15-Sep	Tuesday	110	201	3.5	4.3	3.0	4.5	0.0	0.0	444.1	676.3	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny, strong winds in afternoon												
Remarks:	Two short production flights due to wind. Kim Steingass, pilot, arrives in 108 Mile Ranch.												
16-Sep	Wednesday	111	0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny, strong winds												
Remarks:	Flight aborted due to weather, no production. Safety meeting, all crew members present.												
17-Sep	Thursday	112	202	7.6	4.9	8.0	4.1	0.0	0.0	1,166.0	591.2	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Full production flights.												
18-Sep	Friday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast and windy												
Remarks:	No flight due to weather. Luise Sander returns to Ottawa. Johnathan Drolet, technician, arrives in 108 Mile Ranch. Geophysical maintenance completed.												
19-Sep	Saturday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast and rain, thunderstorms in late afternoon and evening												
Remarks:	No flight due to weather.												
20-Sep	Sunday	113	203	7.7	4.1	8.4	3.6	0.0	0.0	1,179.4	517.8	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny, first overnight frost												
Remarks:	Full production flights.												
Comments:	Production slow due to weather. Second survey aircraft, C-FSDK, in full production starting this week.												

Signed: Alison McCleary

Week Complete?

1

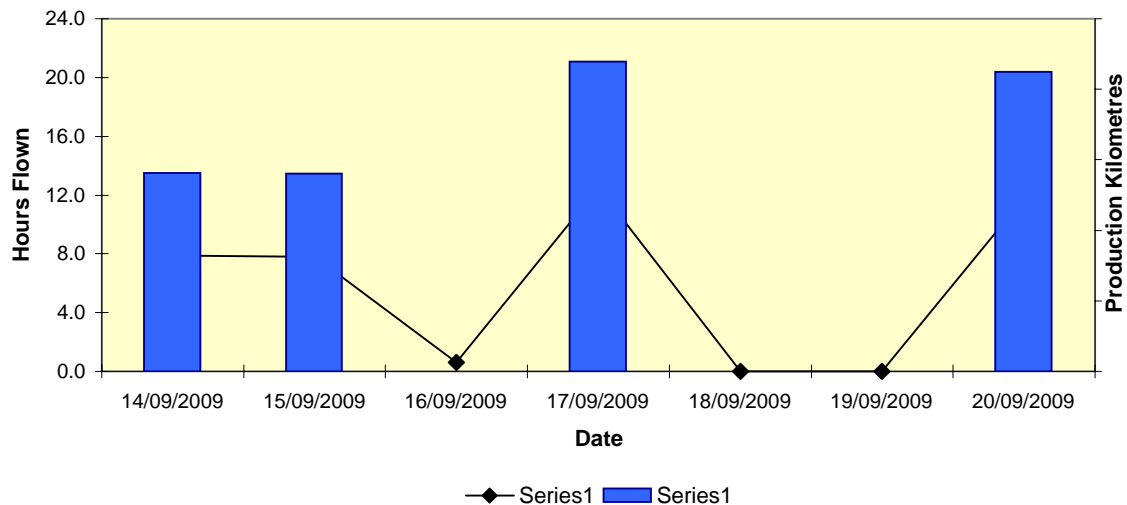
PERSONNEL ON SITE THIS WEEK					
Name	Arrival	Departure	On Site?	# of Days on Site this week	# of Days on Site to date
Alison McCleary			ON SITE	7	29
Sol Meyer			ON SITE	7	29
Steve Gebhardt			ON SITE	7	29
Galen Smith			ON SITE	7	29
John Sevenhuysen			ON SITE	7	22
Andre Lafontaine			ON SITE	7	10
Luise Sander		18-Sep	ON SITE	5	6
France Belley			ON SITE	7	8
Kim Steingass	15-Sep		ON SITE	6	6
Johnathan Drolet	18-Sep		ON SITE	3	3
Randall Forwell				0	0
Jean-Vincent Duchesne				0	0
Harley Melnick				0	0
Adam Dalziel				0	0

HSE Statistics	This Week	Project Totals
SGL Person Hours	472.5	1282.5
Inductions	2	10
Near Miss	1	1
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case	0	0
Lost Time Injuries (LTI)	0	0

TOTALS FOR PLOT	Total Flight Time (hrs)	Total Production (km)
Monday	7.9	1126.5
Tuesday	7.8	1120.4
Wednesday	0.6	0.0
Thursday	12.5	1757.2
Friday	0.0	0.0
Saturday	0.0	0.0
Sunday	11.8	1697.2

* This table adds together values for both planes

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN





SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

260 Hunt Club Road, Ottawa, ON K1V 1C1 Canada Tel: +1 (613) 521-9626 Fax: +1 (613) 521-0215 Web Page: www.sgl.com

Week 6

SURVEY DETAILS													
Survey Name		QUEST - South BC				Client Name				Geoscience BC Society			
Survey Location		BC, Canada				Contact Name				'Lyn Anglin			
Project Code		Geosci09.BC				Contact Phone				+1 (604) 662-4147			
Total Size		25,010.3 km				Client Address				440 - 890 W. Pender St			
Line Spacing		2 km by 20 km				Vancouver, BC							
Type		GRAVITY				V6C 1J9 Canada							
Aircraft 1	C-GSGJ	Aircraft 2	C-FSDK		Email		anglin@geosciencebc.com						
SURVEY PRODUCTION SUMMARY													
Production km this Week		4085.1		km		Total km Flown to Date				14866.8		km	
Total Remaining		10143.5		km		Total km Reflown this Week				0.0		km	
% Complete		59.4		%		Total Flight Time this Week				34.7		hrs	
Average km/Day this Week		583.6		km/day		Average km/Flt. Time this Week				117.7		km/hr	
WEEKLY PRODUCTION													
Date	Day	Flight No.		Flight Time		No. of Lines Flown		No. Reflight Lines Flown		Production km		Reflown km	
TOTALS		Aircraft 1	Aircraft 2	34.7		25.4		0.0		4,085.1		0.0	
21-Sep	Monday	114	204	5.1	4.6	4.2	4.0	0.0	0.0	605.8	601.2	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Flights delayed due to ground power problems. Full flight for C-FSDK, short flight for C-GSGJ due to time constraints.												
22-Sep	Tuesday	115	205	7.4	1.5	4.6	0.0	0.0	0.0	693.5	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	C-FSDK flight aborted due to technical difficulties, no production.												
23-Sep	Wednesday	116	0	3.6	0.0	2.0	0.0	0.0	0.0	482.6	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny, strong winds all day												
Remarks:	Flight aborted due to weather. C-FSDK completes pilot training flight, no production. Office and all equipment packed to move to Kelowna.												
24-Sep	Thursday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Survey aircraft, equipment and crew move to Kelowna. C-GSGJ performs gravity point transfer via Kamloops.												
25-Sep	Friday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Reference station and field office setup. Geophysical equipment warmed up. Randall Forwell, pilot, arrives in Kelowna.												
26-Sep	Saturday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny, strong winds all day												
Remarks:	No flights due to weather.												
27-Sep	Sunday	117	206	8.0	4.5	6.6	4.0	0.0	0.0	1,022.1	679.9	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Full production flights.												
Comments:	Survey production half complete, northern portion of the block finished. Crew mobilizes from 108 Mile Ranch to Kelowna to complete southern portion of block. Weather, particularly winds, continues to slow production.												

Signed: Alison McCleary

Week Complete?

1

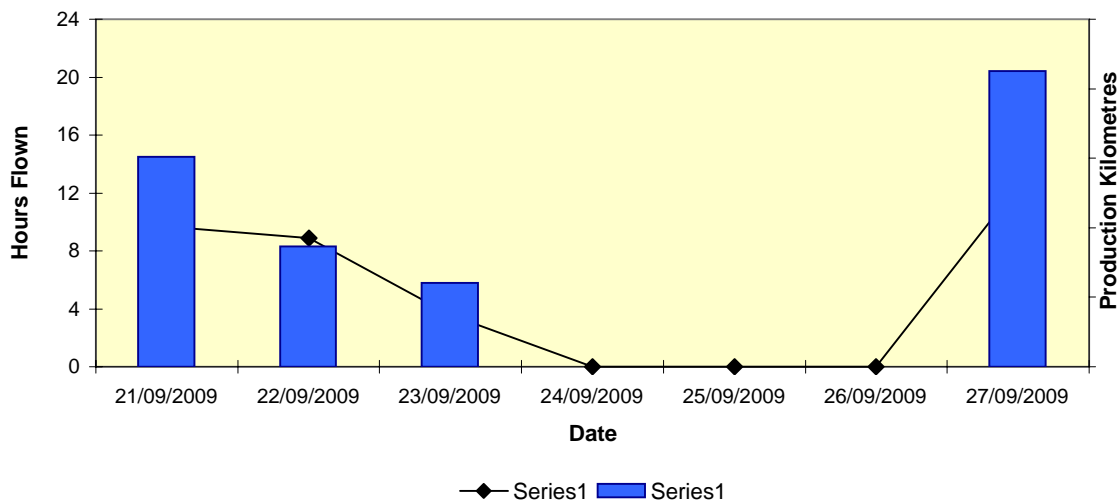
PERSONNEL ON SITE THIS WEEK					
Name	Arrival	Departure	On Site?	# of Days on Site this week	# of Days on Site to date
Alison McCleary			ON SITE	7	36
Sol Meyer			ON SITE	7	36
Steve Gebhardt			ON SITE	7	36
Galen Smith			ON SITE	7	36
John Sevenhuysen			ON SITE	7	29
Andre Lafontaine			ON SITE	7	17
Luise Sander				0	6
France Belley			ON SITE	7	15
Kim Steingass			ON SITE	7	13
Johnathan Drolet			ON SITE	7	10
Randall Forwell	25-Sep		ON SITE	3	3
Jean-Vincent Duchesne				0	0
Harley Melnick				0	0
Adam Dalziel				0	0

HSE Statistics	This Week	Project Totals
SGL Person Hours	495.0	1777.5
Inductions	1	11
Near Miss	0	1
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case	0	0
Lost Time Injuries (LTI)	0	0

TOTALS FOR PLOT	Total Flight Time (hrs)	Total Production (km)
Monday	9.7	1207.0
Tuesday	8.9	693.5
Wednesday	3.6	482.6
Thursday	0.0	0.0
Friday	0.0	0.0
Saturday	0.0	0.0
Sunday	12.5	1702.0

* This table adds together values for both planes

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN





SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

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Week 7

Week 7

SURVEY DETAILS													
Survey Name		QUEST - South BC				Client Name				Geoscience BC Society			
Survey Location		BC, Canada				Contact Name				'Lyn Anglin			
Project Code		Geosci09.BC				Contact Phone				+1 (604) 662-4147			
Total Size		25,010.3 km				Client Address				440 - 890 W. Pender St			
Line Spacing		2 km by 20 km				Vancouver, BC							
Type		GRAVITY				V6C 1J9 Canada							
Aircraft 1	C-GSGJ	Aircraft 2		C-FSDK		Email		anglin@geosciencebc.com					
SURVEY PRODUCTION SUMMARY													
Production km this Week		501.0		km		Total km Flown to Date				15367.8		km	
Total Remaining		9642.5		km		Total km Reflown this Week				0.0		km	
% Complete		61.4		%		Total Flight Time this Week				4.9		hrs	
Average km/Day this Week		71.6		km/day		Average km/Flt. Time this Week				102.2		km/hr	
WEEKLY PRODUCTION													
Date	Day	Flight No.		Flight Time		No. of Lines Flown		No. Reflight Lines Flown		Production km		Reflown km	
TOTALS		Aircraft 1	Aircraft 2	4.9		6.0		0.0		501.0		0.0	
28-Sep	Monday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny, strong winds all day												
Remarks:	No flights due to weather. Andre Lafontaine returns to Ottawa.												
29-Sep	Tuesday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast and rain, winter weather conditions in mountains												
Remarks:	No flights due to weather.												
30-Sep	Wednesday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast and rain, winter weather conditions in mountains												
Remarks:	No flights due to weather. Johnathan Drolet returns to Ottawa.												
01-Oct	Thursday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast and rain, winter weather conditions in mountains												
Remarks:	No flights due to weather.												
02-Oct	Friday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast and rain, winter weather conditions in mountains												
Remarks:	No flights due to weather.												
03-Oct	Saturday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast and rain, winter weather conditions in mountains												
Remarks:	No flights due to weather.												
04-Oct	Sunday	118	207	3.8	1.1	6.0	0.0	0.0	0.0	501.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny, strong winds all day												
Remarks:	Flights aborted due to weather.												
Comments:	Winter conditions in mountains and change of season weather inhibits production.												

Signed: Alison McCleary

Week Complete?

1

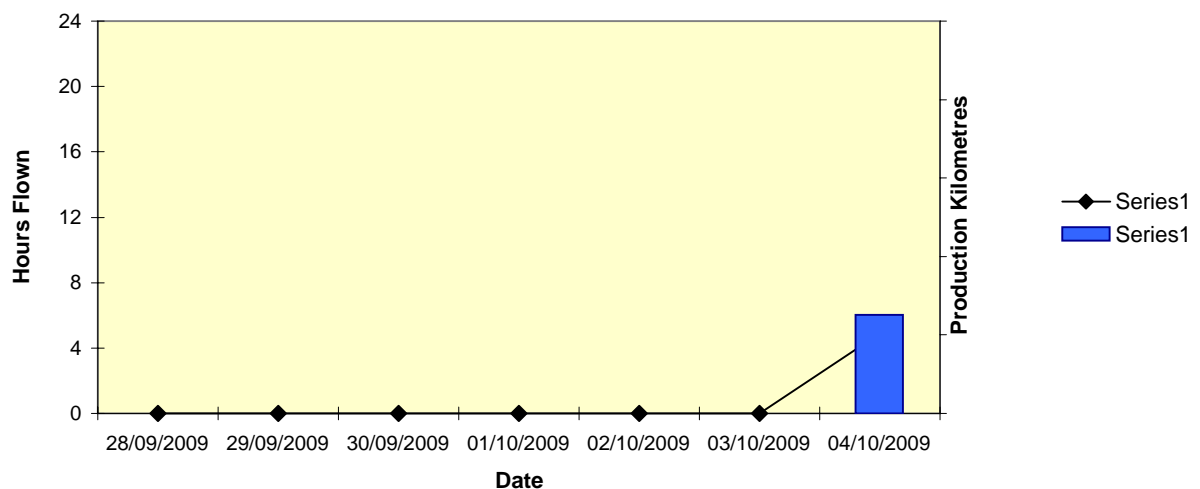
PERSONNEL ON SITE THIS WEEK					
Name	Arrival	Departure	On Site?	# of Days on Site this week	# of Days on Site to date
Alison McCleary			ON SITE	7	43
Sol Meyer			ON SITE	7	43
Steve Gebhardt			ON SITE	7	43
Galen Smith			ON SITE	7	43
John Sevenhuysen			ON SITE	7	36
Andre Lafontaine		28-Sep	ON SITE	1	18
Luise Sander				0	6
France Belley			ON SITE	7	22
Kim Steingass			ON SITE	7	20
Johnathan Drolet		30-Sep	ON SITE	3	13
Randall Forwell			ON SITE	7	10
Jean-Vincent Duchesne				0	0
Harley Melnick				0	0
Adam Dalziel				0	0

HSE Statistics	This Week	Project Totals
SGL Person Hours	450.0	2227.5
Inductions	0	11
Near Miss	0	1
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case	0	0
Lost Time Injuries (LTI)	0	0

TOTALS FOR PLOT	Total Flight Time (hrs)	Total Production (km)
Monday	0.0	0.0
Tuesday	0.0	0.0
Wednesday	0.0	0.0
Thursday	0.0	0.0
Friday	0.0	0.0
Saturday	0.0	0.0
Sunday	4.9	501.0

* This table adds together values for both planes

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN





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Week 8

Week 6

SURVEY DETAILS													
Survey Name		QUEST - South BC				Client Name				Geoscience BC Society			
Survey Location		BC, Canada				Contact Name				'Lyn Anglin			
Project Code		Geosci09.BC				Contact Phone				+1 (604) 662-4147			
Total Size		25,010.3 km				Client Address				440 - 890 W. Pender St			
Line Spacing		2 km by 20 km				Vancouver, BC							
Type		GRAVITY				V6C 1J9 Canada							
Aircraft 1	C-GSGJ	Aircraft 2		C-FSDK		Email		anglin@geosciencebc.com					
SURVEY PRODUCTION SUMMARY													
Production km this Week		4902.7		km		Total km Flown to Date				20270.5		km	
Total Remaining		4739.8		km		Total km Reflown this Week				0.0		km	
% Complete		81.0		%		Total Flight Time this Week				36.6		hrs	
Average km/Day this Week		700.4		km/day		Average km/Flt. Time this Week				134.0		km/hr	
WEEKLY PRODUCTION													
Date	Day	Flight No.		Flight Time		No. of Lines Flown		No. Reflight Lines Flown		Production km		Reflown km	
TOTALS		Aircraft 1	Aircraft 2	36.6		44.0		0.0		4,902.7		0.0	
5-Oct	Monday	119	0	7.7	0.0	7.0	0.0	0.0	0.0	1,064.9	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Only one flight today due to sick pilot.												
06-Oct	Tuesday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast, strong winds all day												
Remarks:	No flights due to weather. Aircraft maintenance.												
07-Oct	Wednesday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast, strong winds all day												
Remarks:	No flights due to weather. Aircraft maintenance.												
08-Oct	Thursday	120	208	1.7	3.7	2.0	3.0	0.0	0.0	145.7	511.2	0.0	0.0
Geomag:	n/a												
Weather:	overcast, winter weather conditions in mountains												
Remarks:	Flights aborted due to weather. C-GSGJ flight delayed due to technical difficulties.												
09-Oct	Friday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny, strong winds all day												
Remarks:	No flights due to weather.												
10-Oct	Saturday	121	209	7.3	4.5	16.0	4.0	0.0	0.0	809.3	665.4	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Flights delayed due to heavy frost conditions. Full production flights. Aircraft in hangar overnight.												
11-Oct	Sunday	122	210	7.2	4.5	8.0	4.0	0.0	0.0	1,060.0	646.2	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Full production flights. Aircraft in hangar overnight.												
Comments:	Second best production week for project with three weather days. Record low temperatures for Kelowna, -10 C in morning.												

Signed: Alison McCleary

Week Complete?

1

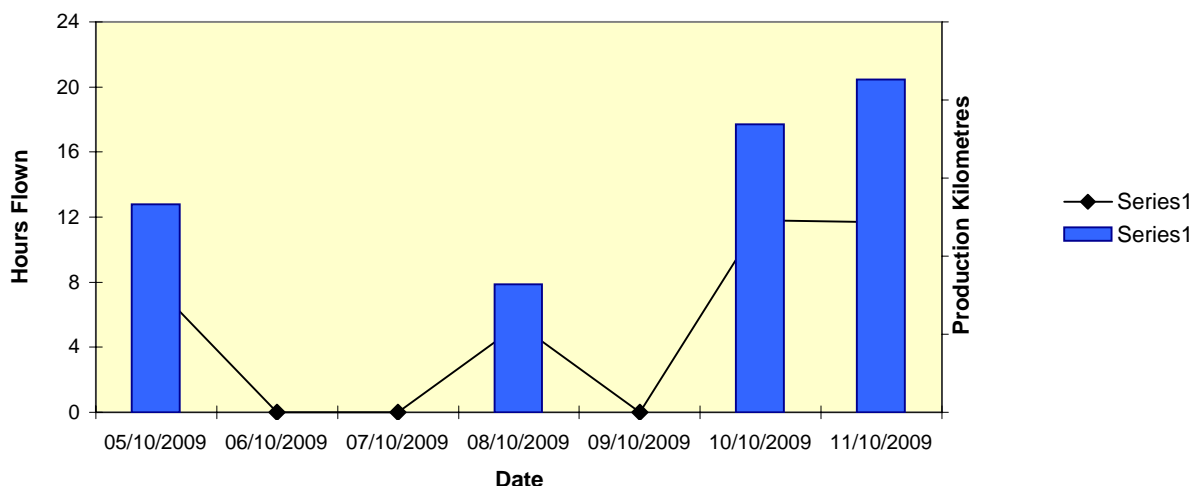
PERSONNEL ON SITE THIS WEEK					
Name	Arrival	Departure	On Site?	# of Days on Site this week	# of Days on Site to date
Alison McCleary			ON SITE	7	50
Sol Meyer			ON SITE	7	50
Steve Gebhardt			ON SITE	7	50
Galen Smith			ON SITE	7	50
John Sevenhuysen			ON SITE	7	43
Andre Lafontaine				0	18
Luise Sander				0	6
France Belley			ON SITE	7	29
Kim Steingass			ON SITE	7	27
Johnathan Drolet				0	13
Randall Forwell			ON SITE	7	17
Jean-Vincent Duchesne				0	0
Harley Melnick				0	0
Adam Dalziel				0	0

HSE Statistics	This Week	Project Totals
SGL Person Hours	420.0	2647.5
Inductions	0	11
Near Miss	0	1
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case	0	0
Lost Time Injuries (LTI)	0	0

TOTALS FOR PLOT	Total Flight Time (hrs)	Total Production (km)
Monday	7.7	1064.9
Tuesday	0.0	0.0
Wednesday	0.0	0.0
Thursday	5.4	656.9
Friday	0.0	0.0
Saturday	11.8	1474.7
Sunday	11.7	1706.2

* This table adds together values for both planes

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN





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Week 9

Week 9

SURVEY DETAILS													
Survey Name		QUEST - South BC				Client Name				Geoscience BC Society			
Survey Location		BC, Canada				Contact Name				'Lyn Anglin			
Project Code		Geosci09.BC				Contact Phone				+1 (604) 662-4147			
Total Size		25,010.3 km				Client Address				440 - 890 W. Pender St			
Line Spacing		2 km by 20 km				Vancouver, BC							
Type		GRAVITY				V6C 1J9 Canada							
Aircraft 1	C-GSGJ	Aircraft 2		C-FSDK		Email		anglin@geosciencebc.com					
SURVEY PRODUCTION SUMMARY													
Production km this Week		1461.3		km		Total km Flown to Date				21731.8		km	
Total Remaining		3278.5		km		Total km Reflown this Week				0.0		km	
% Complete		86.9		%		Total Flight Time this Week				10.7		hrs	
Average km/Day this Week		208.8		km/day		Average km/Flt. Time this Week				136.6		km/hr	
WEEKLY PRODUCTION													
Date	Day	Flight No.		Flight Time		No. of Lines Flown		No. Reflight Lines Flown		Production km		Reflown km	
TOTALS		Aircraft 1	Aircraft 2	10.7		13.5		0.0		1,461.3		0.0	
12-Oct	Monday	123	211	6.8	3.9	9.0	4.5	0.0	0.0	839.9	621.4	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny, strong winds in afternoon												
Remarks:	C-FSDK, full production flight. C-GSGJ, aborted due to weather.												
13-Oct	Tuesday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast, winter weather conditions in mountains												
Remarks:	No flights due to weather.												
14-Oct	Wednesday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast, rain all day												
Remarks:	No flights due to weather.												
15-Oct	Thursday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast, strong winds in afternoon												
Remarks:	No flights due to weather. Kim Steingass returns to Ottawa. Jean-Vincent Duchesne, pilot, arrives in Kelowna.												
16-Oct	Friday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast, rain all day												
Remarks:	No flights due to weather.												
17-Oct	Saturday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast with fog in valley, heavy rain all day												
Remarks:	No flights due to weather.												
18-Oct	Sunday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast with fog in valley, rain all day												
Remarks:	No flights due to weather.												
Comments:	Rain and winter weather conditions in mountains halts production.												

Signed: Alison McCleary

Week Complete?

1

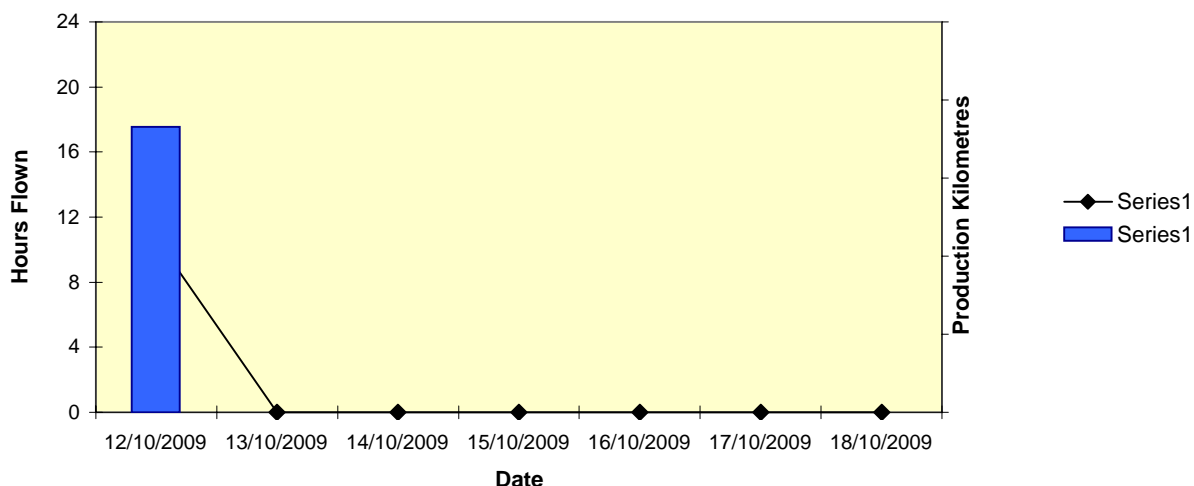
PERSONNEL ON SITE THIS WEEK					
Name	Arrival	Departure	On Site?	# of Days on Site this week	# of Days on Site to date
Alison McCleary			ON SITE	7	57
Sol Meyer			ON SITE	7	57
Steve Gebhardt			ON SITE	7	57
Galen Smith			ON SITE	7	57
John Sevenhuysen			ON SITE	7	50
Andre Lafontaine				0	18
Luise Sander				0	6
France Belley			ON SITE	7	36
Kim Steingass		15-Oct	ON SITE	4	31
Johnathan Drolet				0	13
Randall Forwell			ON SITE	7	24
Jean-Vincent Duchesne	15-Oct		ON SITE	4	4
Harley Melnick				0	0
Adam Dalziel				0	0

HSE Statistics	This Week	Project Totals
SGL Person Hours	427.5	3075.0
Inductions	1	12
Near Miss	0	1
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case	0	0
Lost Time Injuries (LTI)	0	0

TOTALS FOR PLOT	Total Flight Time (hrs)	Total Production (km)
Monday	10.7	1461.3
Tuesday	0.0	0.0
Wednesday	0.0	0.0
Thursday	0.0	0.0
Friday	0.0	0.0
Saturday	0.0	0.0
Sunday	0.0	0.0

* This table adds together values for both planes

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN





SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

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Week 10

SURVEY DETAILS													
Survey Name		QUEST - South BC				Client Name				Geoscience BC Society			
Survey Location		BC, Canada				Contact Name				'Lyn Anglin			
Project Code		Geosci09.BC				Contact Phone				+1 (604) 662-4147			
Total Size		25,010.3 km				Client Address				440 - 890 W. Pender St			
Line Spacing		2 km by 20 km				Vancouver, BC							
Type		GRAVITY				V6C 1J9 Canada							
Aircraft 1	C-GSGJ	Aircraft 2		C-FSDK		Email		anglin@geosciencebc.com					
SURVEY PRODUCTION SUMMARY													
Production km this Week		1488.5		km		Total km Flown to Date		23220.3		km			
Total Remaining		1790.0		km		Total km Reflown this Week		228.5		km			
% Complete		92.8		%		Total Flight Time this Week		13.6		hrs			
Average km/Day this Week		212.6		km/day		Average km/Flt. Time this Week		109.4		km/hr			
WEEKLY PRODUCTION													
Date	Day	Flight No.		Flight Time		No. of Lines Flown		No. Reflight Lines Flown		Production km		Reflown km	
TOTALS		Aircraft 1	Aircraft 2	13.6		9.6		1.1		1,488.5		228.5	
19-Oct	Monday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast with fog in valley, clearing late afternoon												
Remarks:	No flights due to weather.												
20-Oct	Tuesday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast with fog in valley, clearing late afternoon												
Remarks:	No flights due to weather. Harley Melnick, AME, arrives in Kelowna.												
21-Oct	Wednesday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast, rain all day												
Remarks:	No flights due to weather. Aircraft maintenance.												
22-Oct	Thursday	124	0	7.2	0.0	8.0	0.0	0.0	0.0	1,227.1	0.0	0.0	0.0
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Full production flight. Aircraft maintenance. Adam Dalziel, pilot, arrives in Kelowna.												
23-Oct	Friday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast, rain all day												
Remarks:	No flights due to weather. Aircraft maintenance complete. John Sevenhuysen and Galen Smith return to Ottawa												
24-Oct	Saturday	125	0	6.4	0.0	1.6	0.0	1.1	0.0	261.4	0.0	228.5	0.0
Geomag:	n/a												
Weather:	overcast with clear periods, strong winds all day												
Remarks:	Flight aborted due to weather, includes radar test. C-FSDK completes pilot training flight, no production due to weather.												
25-Oct	Sunday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast, rain all day												
Remarks:	No flights due to weather.												
Comments:	Weather slows production. Only 2 flight days remain. Maintenance on C-FSDK completed.												

Signed: Alison McCleary

Week Complete?

1

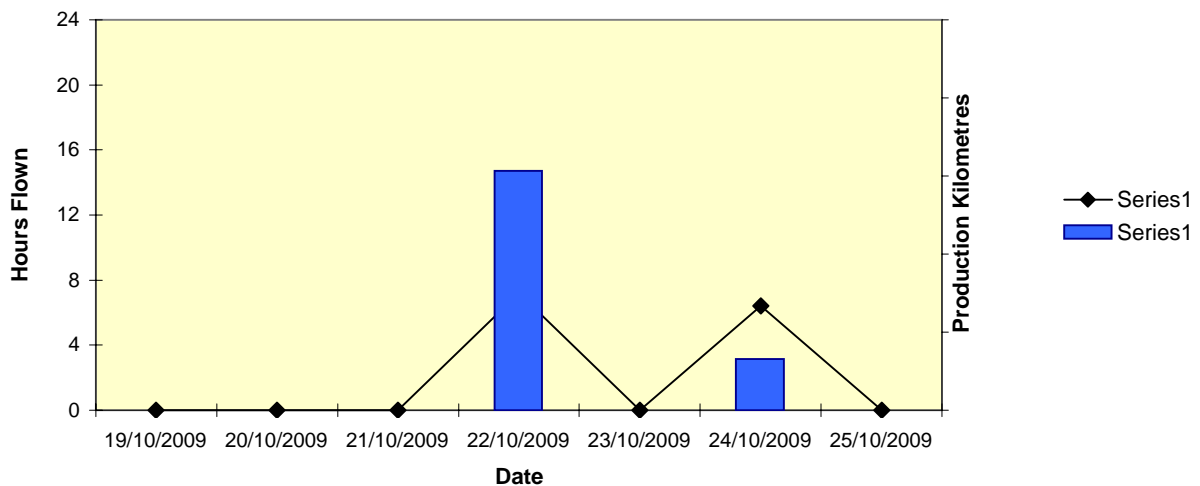
PERSONNEL ON SITE THIS WEEK					
Name	Arrival	Departure	On Site?	# of Days on Site this week	# of Days on Site to date
Alison McCleary			ON SITE	7	64
Sol Meyer			ON SITE	7	64
Steve Gebhardt			ON SITE	7	64
Galen Smith		23-Oct	ON SITE	5	62
John Sevenhuysen		23-Oct	ON SITE	5	55
Andre Lafontaine				0	18
Luise Sander				0	6
France Belley			ON SITE	7	43
Kim Steingass				0	31
Johnathan Drolet				0	13
Randall Forwell			ON SITE	7	31
Jean-Vincent Duchesne			ON SITE	7	11
Harley Melnick	20-Oct		ON SITE	6	6
Adam Dalziel	22-Oct		ON SITE	4	4

HSE Statistics	This Week	Project Totals
SGL Person Hours	465.0	3540.0
Inductions	2	14
Near Miss	0	1
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case	0	0
Lost Time Injuries (LTI)	0	0

TOTALS FOR PLOT	Total Flight Time (hrs)	Total Production (km)
Monday	0.0	0.0
Tuesday	0.0	0.0
Wednesday	0.0	0.0
Thursday	7.2	1227.1
Friday	0.0	0.0
Saturday	6.4	261.4
Sunday	0.0	0.0

* This table adds together values for both planes

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN





SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

260 Hunt Club Road, Ottawa, ON K1V 1C1 Canada Tel: +1 (613) 521-9626 Fax: +1 (613) 521-0215 Web Page: www.sgl.com

Week 11

SURVEY DETAILS													
Survey Name		QUEST - South BC				Client Name				Geoscience BC Society			
Survey Location		BC, Canada				Contact Name				'Lyn Anglin			
Project Code		Geosci09.BC				Contact Phone				+1 (604) 662-4147			
Total Size		25,010.3 km				Client Address				440 - 890 W. Pender St			
Line Spacing		2 km by 20 km				Vancouver, BC							
Type		GRAVITY				V6C 1J9 Canada							
Aircraft 1	C-GSGJ	Aircraft 2	C-FSDK			Email		anglin@geosciencebc.com					
SURVEY PRODUCTION SUMMARY													
Production km this Week		1790.0		km		Total km Flown to Date				25010.3		km	
Total Remaining		0.0		km		Total km Reflown this Week				654.2		km	
% Complete		100.0		%		Total Flight Time this Week				21.6		hrs	
Average km/Day this Week		255.7		km/day		Average km/Flt. Time this Week				82.9		km/hr	
WEEKLY PRODUCTION													
Date	Day	Flight No.		Flight Time		No. of Lines Flown		No. Reflight Lines Flown		Production km		Reflown km	
TOTALS		Aircraft 1	Aircraft 2	21.6		20.7		5.5		1,790.0		654.2	
26-Oct	Monday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast, rain all day												
Remarks:	No flights due to weather.												
27-Oct	Tuesday	126	0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast												
Remarks:	Flight aborted due to weather, no production. C-FSDK completes pilot training flight, no production due to weather.												
28-Oct	Wednesday	127	212	7.6	2.3	5.1	0.8	2.1	0.3	750.7	112.3	339.7	39.6
Geomag:	n/a												
Weather:	overcast												
Remarks:	Full production flight. C-FSDK flight aborted due to technical difficulties. Sol Meyer returns to Ottawa.												
29-Oct	Thursday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast, rain and snow all day												
Remarks:	No flights due to weather.												
30-Oct	Friday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast, rain all day												
Remarks:	No flights due to weather.												
31-Oct	Saturday	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a												
Weather:	overcast with clear periods, strong winds all day												
Remarks:	No flights due to weather.												
01-Nov	Sunday	128	313	7.4	3.6	12.0	2.8	2.2	0.9	508.4	418.6	146.8	128.1
Geomag:	n/a												
Weather:	clear and sunny												
Remarks:	Full production flights.												
Comments:	Production completed.												

Signed: Alison McCleary

Week Complete?

1

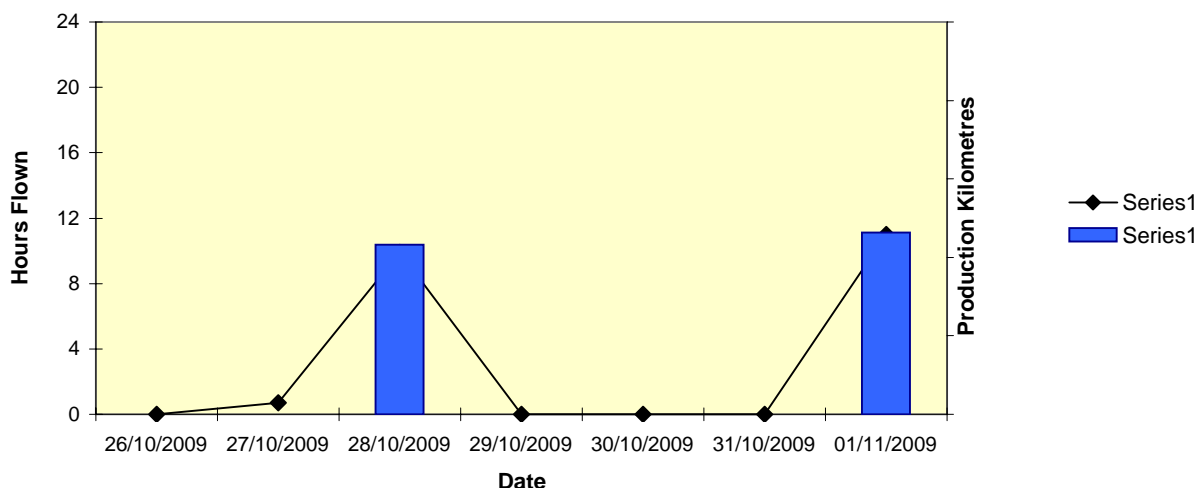
PERSONNEL ON SITE THIS WEEK					
Name	Arrival	Departure	On Site?	# of Days on Site this week	# of Days on Site to date
Alison McCleary			ON SITE	7	71
Sol Meyer		28-Oct	ON SITE	3	67
Steve Gebhardt			ON SITE	7	71
Galen Smith				0	62
John Sevenhuysen				0	55
Andre Lafontaine				0	18
Luise Sander				0	6
France Belley			ON SITE	7	50
Kim Steingass				0	31
Johnathan Drolet				0	13
Randall Forwell			ON SITE	7	38
Jean-Vincent Duchesne			ON SITE	7	18
Harley Melnick			ON SITE	7	13
Adam Dalziel			ON SITE	7	11

HSE Statistics	This Week	Project Totals
SGL Person Hours	390.0	3930.0
Inductions	0	14
Near Miss	0	1
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case	0	0
Lost Time Injuries (LTI)	0	0

TOTALS FOR PLOT	Total Flight Time (hrs)	Total Production (km)
Monday	0.0	0.0
Tuesday	0.7	0.0
Wednesday	9.9	863.0
Thursday	0.0	0.0
Friday	0.0	0.0
Saturday	0.0	0.0
Sunday	11.0	927.0

* This table adds together values for both planes

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN

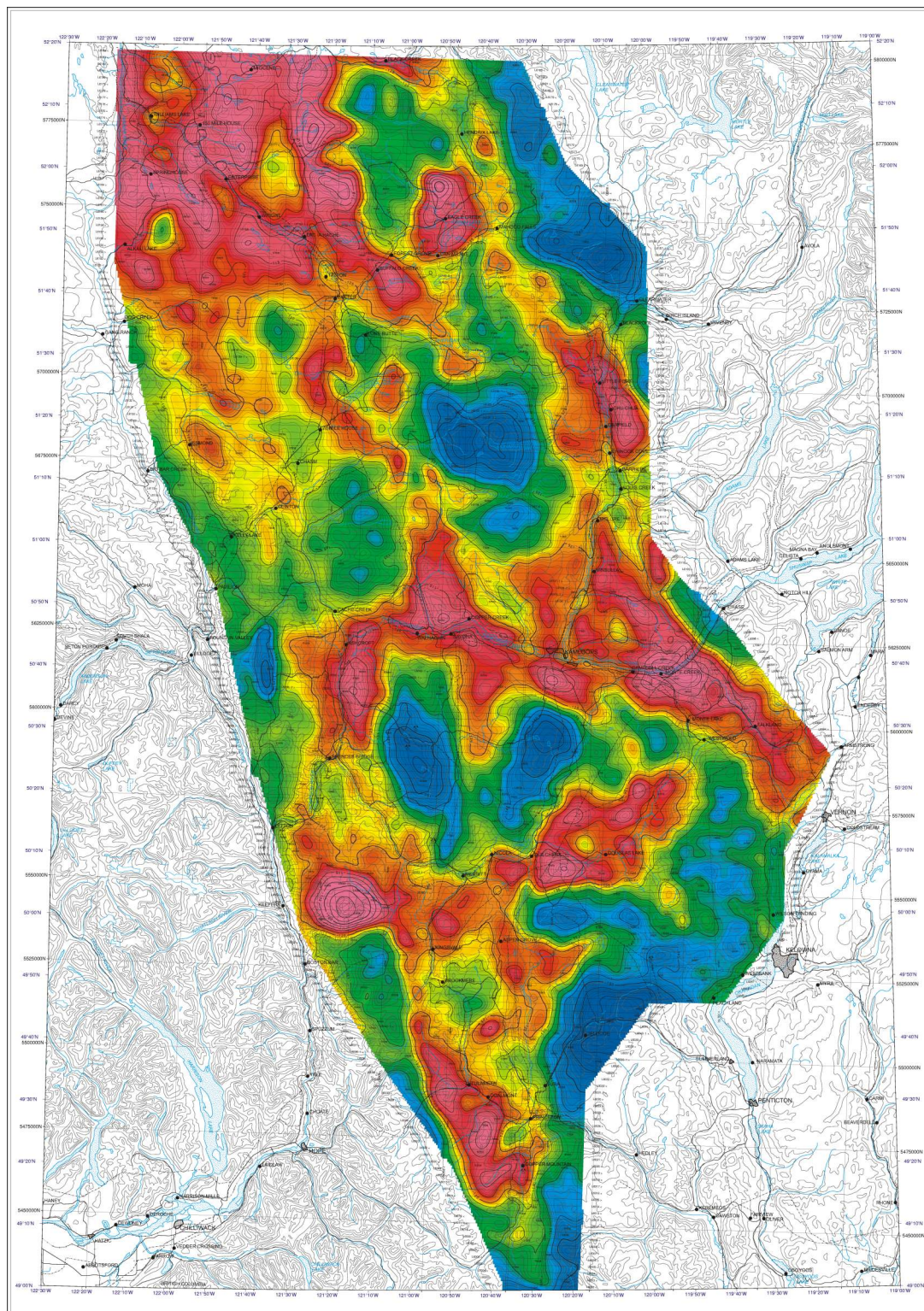




APPENDIX VII

MAPS

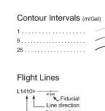




High Resolution Airborne Gravity Survey

Quest South Project Area, British Columbia - 2009

Terrain Corrected Bouguer Gravity (mGal)



Survey and Processing Specifications

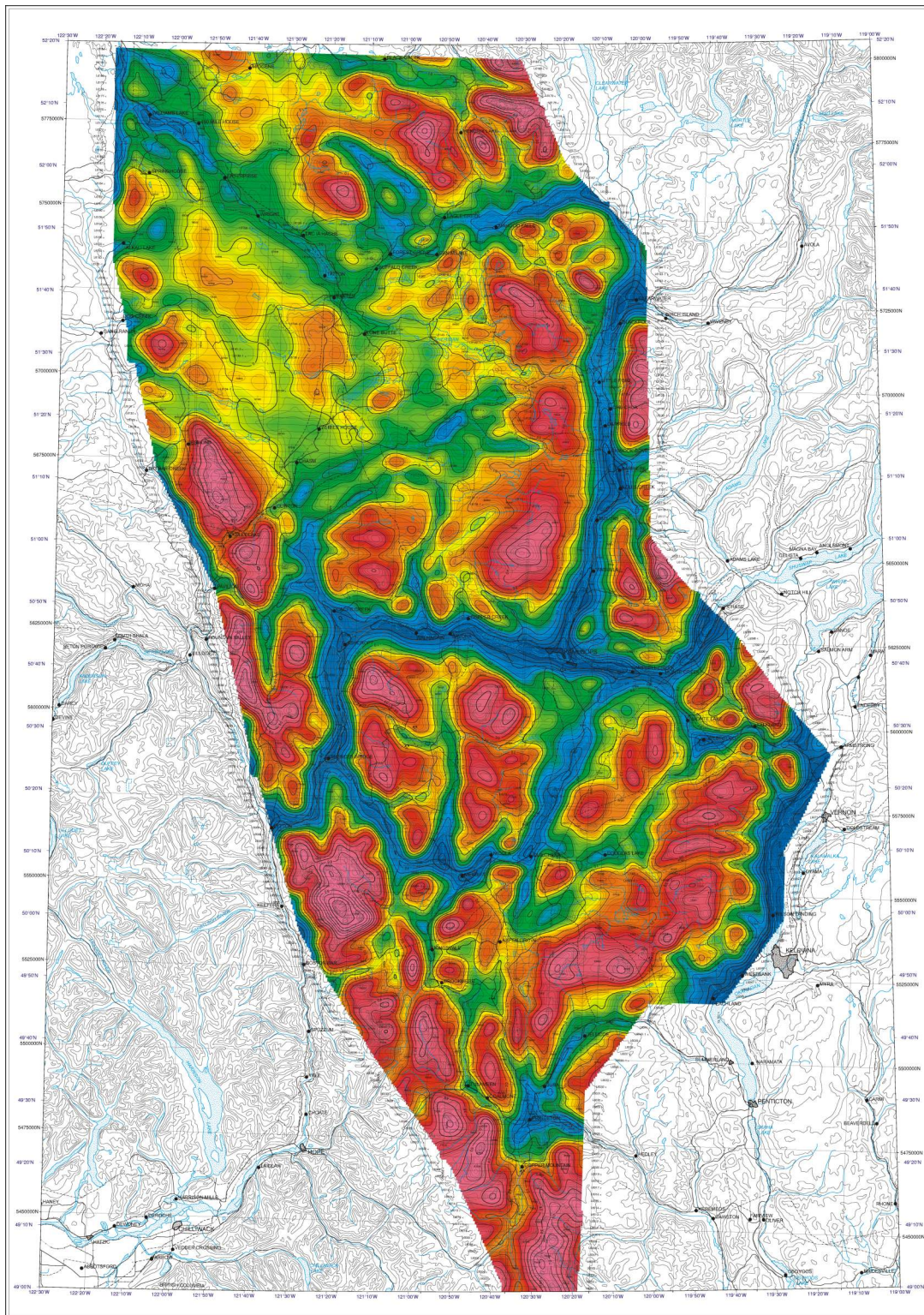
Traverse Line Spacing	2000 m
Traverse Line Direction	along bearing 90°/270°
Control Line Spacing	2000 m
Control Line Direction	along bearing 0°/180°
Aircraft Altitude	200 m above target
Flare Speed	50 m/s
Gravimeter Sensor	Sander Geophysics AIRGrav
Gravimeter Bandwidth	0.1 mHz
Gravimeter Sample Rate	128 Hz
GPS Receiver	Trimble NetStar 5600
Antenna	Trimble NetStar 5600
Density used for Bouguer and Terrain Corrections	2.67 g/cm ³
Gravity Data Spatial Resolution	0.5 m
GPS Ground Station 1 (NAO-83)	51°48'33.2527N, 121°22'17.1614W, 946.19 m
GPS Ground Station 2 (NAO-83)	51°48'33.1582N, 121°22'17.1708W, 946.26 m
GPS Ground Station 3 (NAO-83)	49°52'1.8617N, 119°25'04.1227W, 275.46 m
GPS Ground Station 4 (NAO-83)	49°52'1.8977N, 119°25'04.1467W, 275.20 m
Survey Period	September - November 2009
Cell Cell Size	500 m
UTM Zone	10N



Terrain Corrected Bouguer Gravity (mGal)

High Resolution Airborne Gravity Survey
Quest South Project Area, British Columbia - 2009





High Resolution Airborne Gravity Survey

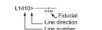
Quest South Project Area, British Columbia - 2009

**Free Air
Corrected Gravity (mGal)**

Contour Intervals (mGal)



Flight Lines



Survey and Processing Specifications

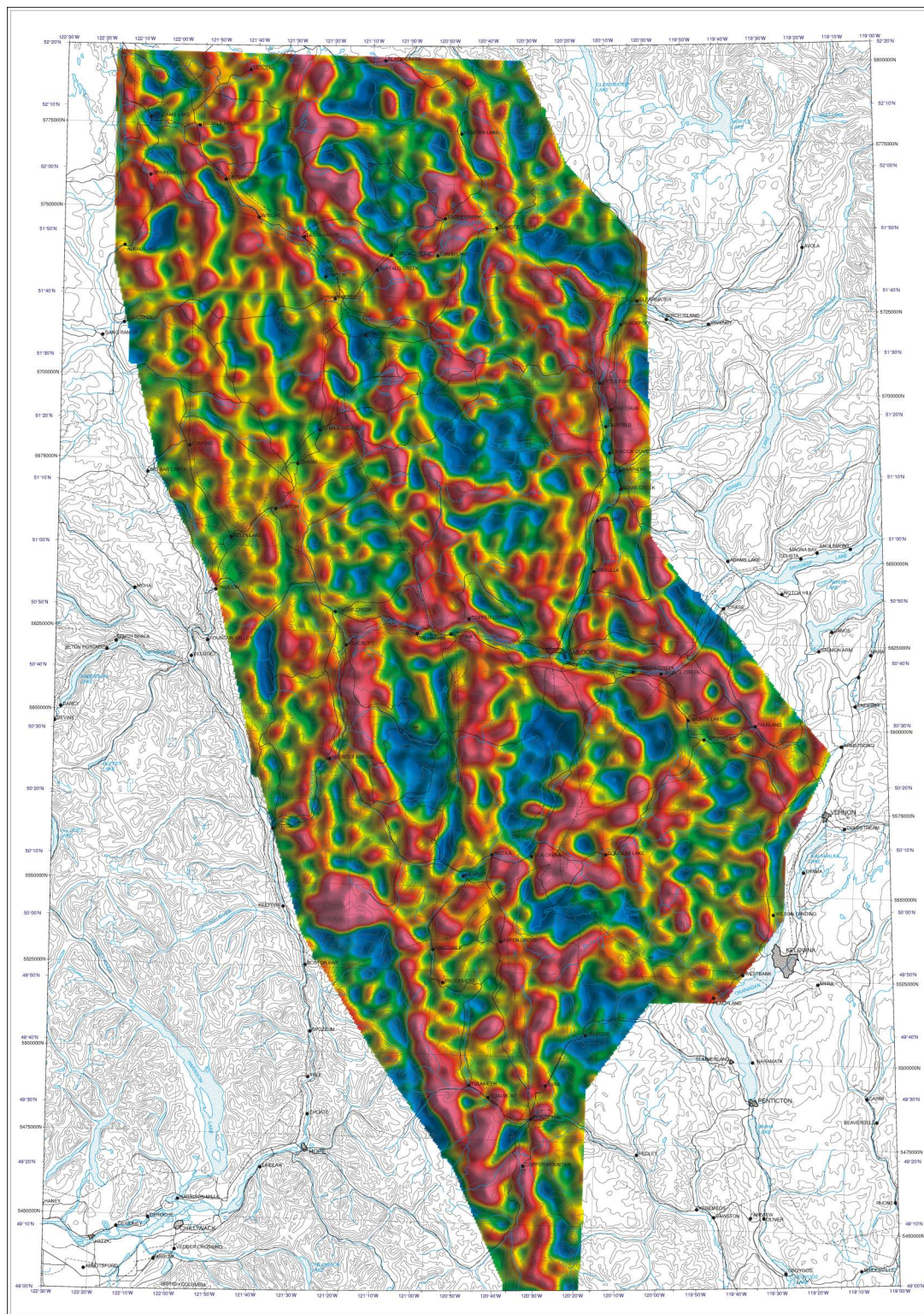
Traverse Line Spacing	2000 m
Traverse Line Direction	along bearing 30° 27'
Control Line Spacing	2000 m
Control Line Direction	along bearing 0° 15'
Aircraft Altitude	200 m above stage
Flight Speed	95 kts
Gravimeter Sensor	Sander Geophysics AIRGrav
Gravimeter Sensitivity	0.1 mGal
Gravimeter Sample Rate	12 Hz
GPS Receiver	Trimble 5600XT
Antenna	Trimble 5600XT
Density used for Bouguer and Terrain Corrections	2.67 g/cm ³
Density Data Spatial Resolution	0.5 m
GPS Ground Station 1 (NAVD83)	51°48'33.2527N, 121°22'17.1614W, 946.18 m
GPS Ground Station 2 (NAVD83)	51°48'33.1582N, 121°22'17.1708W, 946.26 m
GPS Ground Station 3 (NAVD83)	49°52'1.8677N, 119°25'04.1027W, 275.46 m
GPS Ground Station 4 (NAVD83)	49°52'1.8677N, 119°25'04.1027W, 275.20 m
Survey Period	September - November 2009
Grid Cell Size	500 m
Datum	NAVD83
UTM Zone	10N



Free Air
Corrected Gravity (mGal)

High Resolution Airborne Gravity Survey
Quest South Project Area, British Columbia - 2009





High Resolution Airborne Gravity Survey

Quest South Project Area, British Columbia - 2009

First Vertical Derivative of the Terrain Corrected Bouguer Gravity with Shadow (Elev-6)

Illumination: Inclination 70°, Declination 70°



Survey and Processing Specifications

Traverse Line Spacing	2000 m
Traverse Line Direction	along bearing 50° 27' 00"
Control Line Spacing	2000 m
Control Line Direction	along bearing 0° 15' 00"
Aircraft Altitude	200 m above target
Flighting Speed	95 knots
Gravimeter Sensor	Sander Geophysics AIRGrav
Gravimeter Sensitivity	0.1 mGal
Gravimeter Sample Rate	12 Hz
GPS Receiver	Trimble NetR9
Antenna	Trimble NetR9
Density used for Bouguer and Terrain Corrections	2.67 g/cm ³
Density Data Spatial Resolution	0.5 m
GPS Ground Station 1 (NAVD83)	51°48'33.2527N, 121°22'17.1614W, 946.19 m
GPS Ground Station 2 (NAVD83)	51°48'33.1584N, 121°22'17.1704W, 946.26 m
GPS Ground Station 3 (NAVD83)	49°52'17.8617N, 118°25'04.1027W, 275.46 m
GPS Ground Station 4 (NAVD83)	49°52'17.8617N, 118°25'04.1027W, 275.20 m
Survey Period	September - November 2009
Cell Cell Size	500 m
Datum	NAVD83
UTM Zone	10N



First Vertical Derivative of the Terrain Corrected Bouguer Gravity with Shadow (Elev-6)

High Resolution Airborne Gravity Survey
Quest South Project Area, British Columbia - 2009

