International Airborne Geophysics Safety Association

"SAFETY IN THE AIR BEGINS ON THE GROUND."

# IAGSA Member Self-Assessment Questionnaire

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| **Company Name: SANDER GEOPHYSICS LIMITED** | |
| **Location: OTTAWA ONTARIO CANADA** | |
| **Date of Assessment:** | |
| **Assessment Questionnaire completed by: STEVEN HYDE** | |
| **Key Management Personnel** | **Position** |
| **Luise Sander** | **Co-President** |
| **Stephan Sander** | **Co-President** |
| **Katherine Svarckopf** | **Flight Operations Manager** |
| **Todd Svarckopf** | **Chief Pilot** |
| **Total # Employees:** | **130** |

## Contents

| Planning – All Operations | | | |
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| **Title** | **IAGSA Recommendation** | **Compliance Level** | **Explanation of Compliance** |
| **Survey Planning** | The following is a list of IAGSA Recommended Practices which all members should take into account when planning airborne survey operations regardless of type of survey or terrain. | | |
| | Prior to commencing a survey, do you conduct a detailed risk assessment which identifies the safe survey height? | ☒ Always<br>☐ Sometimes<br>☐ Never | As per Section 2.1.2 of the Flight Department's Polices, Procedures and Reference Manual (PPRM) and Section 8.10 of the Flight Operations Manual (FOM), an Aerial Survey Plan and Risk Assessment is submitted prior to commencing a survey project. Section 1.7 of the Assessment indicates the safe survey height. |
| | Prior to conducting a survey do you establish a crew rotation schedule which considers factors such as remoteness of site, severity of climate, quality of accommodation, food and personal considerations? | ☒ Always<br>☐ Sometimes<br>☐ Never | Section 2 of the Aerial Survey Plan and Risk Assessment |
| | Do you have a minimum temperature limit for cold weather operations? | ☒ Always<br>☐ Sometimes | Sections 5.16 and 5.17 of the FOM |

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| | | ☐ Never<br>☐ N/A | |
| | Do you limit the use of aircraft heaters or air-conditioning in the interest of "clean" data? | ☐ Always<br>☐ Sometimes<br>☒ Never | The effects of having the air-conditioning or heaters turned on are compensated during data processing. Crews always have the option of using heaters or (when installed) air-conditioning. See Standard Operating Procedures (SOPs) 4.3 |
| | Do you require the use of oxygen for all aircrew for survey flights or portions thereof conducted above 10,000 feet ASL? | ☒ Always<br>☐ Sometimes<br>☐ Never | Section 5.11 of the FOM |
| | Do you have a drug and alcohol policy? | ☒ Yes<br>☐ No | Section 3.11.5 of the FOM and Section 4.1 of the Code of Conduct Manual |
| | Are aircrew members required to wear long trousers or a flight suit, closed shoes, have gloves available and clothing appropriate for the environmental conditions? | ☐ Always<br>☒ Sometimes<br>☐ Never | Section 3.10.3 of the FOM outlines the company's pilot dress code. Although specific guidelines are provided for certain activities (ferry flights and formal meetings with officials), pilots use their own discretion when dressing for regular survey flights. In doing so their dress is more-less always in line with the |

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| | | | IAGSA recommendations. Note that on occasion and at a client's request, pilots are required to wear the specific items recommended by IAGSA . |
| | For fixed wing surveys, is a risk assessment conducted to determine whether or not helmets should be worn by the flight crew members? | ☒ Always<br>☐ Sometimes<br>☐ Never<br>☐ N/A | Aerial Survey Plan and Risk Assessment Section 7 (Helmet Use Risk Analysis) and PPRM Section 10 (Helmet Policy) |
| | For helicopter surveys, are the flight crew members required to wear a flight helmet? | ☐ Always<br>☐ Sometimes<br>☐ Never | To be completed by Ed. |
| | Are flight crew members paid or given an incentive based upon hours or kilometers flown? | ☐ Always<br>☐ Sometimes<br>☒ Never | PPRM (Pilot Remuneration) Section 1.2 |
| **Emergency Response Planning** | Do you develop project specific emergency response plans for each project? | ☒ Always<br>☐ Sometimes | FOM 8.11 and PPRM (Flight Preparation Procedures) 2.1.2. See Emergency Response Plan (ERP) Form – Field (Revision F) |

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| | | ☐ Never | |
| | Does your company have an overall crisis management plan? | ☒ Yes<br>☐ No | Sander Geophysics Emergency Response Plan and Crisis Management Plan (Revision I) |
| **Flight Following** | Do you operate a satellite tracking system on all aircraft? | ☒ Always<br>☐ Sometimes<br>☐ Never | Aerial Survey Plan and Risk Assessment Section 4.7 |
| | Is the position reporting frequency of the tracking system set to 2 minute intervals as a minimum? | ☒ Yes<br>☐ No | Aerial Survey Plan and Risk Assessment Section 4.7 |
| **Single Pilot Only Surveys** | Do you conduct single Pilot Only Surveys (no equipment operator)? | ☐ Always<br>☒ Sometimes<br>☐ Never | FOM Fixed Wing 4.3.2 and FOM Rotary Wing 3.6. Such flights are rare and require special authorization from the Chief Pilot or Flight Operations Manager. |
| | If so, does the Pilot have equipment operation duties in addition to those normally associated with flying the aircraft? | ☒ Always<br>☐ Sometimes<br>☐ Never | FOM Fixed Wing 4.3.2 and FOM Rotary Wing 3.6. As sole occupant of the aircraft the pilot would be responsible for some equipment operation duties (essentially limited to |

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| | | ☐ N/A | selecting survey lines in the navigation system, although this task can be automated). |
| | Are additional risks associated with single pilot only operations detailed in the risk assessment? | ☒ Always<br>☐ Sometimes<br>☐ Never<br>☐ N/A | FOM 3.12.6 (Single Pilot Operations) – reduced duty hours. Aerial Survey Plan and Risk Assessment 4.12 (requirement for Flight Operations Manager or Chief Pilot approval for single pilot operations) |
| Operating Standards | | | |
| **Minimum safe survey speeds** | Are minimum safe survey speeds for single engine aircraft calculated at 130% of clean stall speed (Vs)? | ☒ Always<br>☐ Sometimes<br>☐ Never | Aerial Survey Plan and Risk Assessment (Fixed Wing) 1.8.3 and SOPs 4.5. |
| | Are minimum safe survey speeds for Multi-engine aircraft: 110% of best single engine rate of climb speed (Vyse), or minimum safe single engine speed (Vsse, if published)? | ☒ Always<br>☐ Sometimes<br>☐ Never<br>☐ N/A | Aerial Survey Plan and Risk Assessment (Fixed Wing) 1.8.3 and SOPs 4.5 |
| **Minimum Fuel Standard** | Is fuel planning for survey flights based upon 110% of planned consumption? | ☐ Always | See Notice of Difference Form – Fuel Planning |

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| | | ☒ Sometimes<br>☐ Never | |
| | Is minimum reserve fuel calculated as 30 minutes for fixed wing and 20 minutes for helicopter at normal cruise consumption rates? | ☐ Always<br>☐ Sometimes<br>☒ Never | See Notice of Difference Form – Minimum Fuel Reserve |
| | Do planned minimum fuel reserves consider site specific contingencies? | ☒ Always<br>☐ Sometimes<br>☐ Never | Aerial Survey Plan and Risk Assessment Section 5.14 (Fuel Exhaustion) |
| **Flight and Duty Times** | Are the following Flight & Duty Times adhered to? | | |
| Single Pilot Operation Maximum Flight Times | A maximum of 8 hours flight time per day. | ☐ Always<br>☐ Sometimes<br>☒ Never | See Notice of Difference Form – Single Pilot Operations |
| | A maximum of 5 hours flight time on survey per day (excluding transit time) | ☐ Always<br>☒ Sometimes<br>☐ Never | See Notice of Difference Form – Single Pilot Operations |

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| | A maximum of 40 hours flight time in any 7 consecutive-day period | ☐ Always<br>☒ Sometimes<br>☐ Never | When operating in a county with more restrictive limits those limits are followed. |
| | A maximum of 100 hours flight time in any consecutive 28 day period. | ☐ Always<br>☒ Sometimes<br>☐ Never | When operating in a county with more restrictive limits those limits are followed. |
| | A maximum of 1000 hours in any consecutive 365 day period. | ☒ Always<br>☐ Sometimes<br>☐ Never | Given that single pilot operations only occur under exceptional circumstances at SGL, this limit cannot not be exceeded. That being said, SGL does not have a specific written policy stating that single pilot flight time will not exceed 1000 hours in a consecutive 365 day period. |
| | If extensions to the single pilot flight times are used has the extension criteria recommended by IAGSA been met? | ☐ Always<br>☐ Sometimes<br>☐ Never<br>☒ N/A | SGL does not extend single pilot duty times. |

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| Dual Pilot Operations Maximum Flight times | A maximum of 10 hours flight time per day. | ☐ Always<br>☒ Sometimes<br>☐ Never | SGL does not have a prohibition against flights exceeding 10 hours. However, given the fuel capacity of our aircraft combined with our ban on nighttime survey flights, it would be extremely unlikely for a crew to exceed 10 hours of flight time in a single day. Additionally, as per the Aerial Survey Plan and Risk Assessment 4.14 and FOM 3.12, when operating in a foreign country with more restrictive duty limits, those limits are followed and, in most cases, would not permit more than 10 hours of flying in one day. |
| | A maximum of 8 hours flight time on survey (excluding transit time). | ☐ Always<br>☒ Sometimes<br>☐ Never | Although SGL does not specific a limit for 'time on survey', the fuel capacity of our aircraft usually limits time on survey to well below 8 hours. |
| | A maximum of 45 hours flight time in any consecutive 7 day period. | ☐ Always<br>☒ Sometimes<br>☐ Never | Except when operating in a country that specifies a flight time limit for 7 consecutive days, SGL's policies do not list a maximum number of flight hours for a 7 day period. |
| | A maximum of 120 hours flight time in any consecutive 28 day period. | ☐ Always<br>☒ Sometimes<br>☐ Never | Aerial Survey Plan and Risk Assessment 4.14 and FOM 3.12. As per the FOM, when operating in a foreign country with more restrictive duty limits, those limits are followed. Note that FOM 3.12.3 specifies that flight time shall not exceed 120 hours in a 30 day period (but this may be extended in accordance with the Canadian Air Regulations). |

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| | A maximum of 1200 hours flight time in any consecutive 365 day period. | ☐ Always<br>☒ Sometimes<br>☐ Never | As per FOM 3.12.3, the maximum number of hours a flight crew member can log in one year is 1200. When operating in a foreign country with more restrictive duty limits, those limits are followed. |
| Maximum Duty Times | The maximum duty time in any one day shall not exceed 14 hours | ☒ Always<br>☐ Sometimes<br>☐ Never | Aerial Survey Plan and Risk Assessment 4.14 and FOM 3.12.5. As per the FOM, when operating in a foreign country with more restrictive duty limits, those limits are followed. |
| | The pilot shall have a minimum of 2 days rest within a 14 day period. These may be taken separately or together. If taken separately, one day rest shall be defined as 30 consecutive hours free from duty. | ☐ Always<br>☐ Sometimes<br>☒ Never | FOM 3.12.8 (See Notice of Difference Form – Rest Periods) |
| **Emergency Beacon / Radio** | Is each aircrew member required to carry on their person essential survival items including: a personal locator beacon means to start a fire, knife and a signal mirror? | ☐ Always<br>☐ Sometimes<br>☒ Never | See Notice of Difference Form – Emergency Survival Gear |
| **Fuel Quality Control – Storage Tanks** | The quality control of the fuel varies considerably at smaller centres. The crew must determine the adequacy of this quality control and take all available means to ensure against boarding contaminated fuel. | | |

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| | Is there a procedure in place to ensure that the following checks are required anytime a fuel source is unknown or questionable: | | |
| | Check that Fuel Quality Control Check and Delivery documents are current and available. | ☒ Always<br>☐ Sometimes<br>☐ Never | Aerial Survey Plan and Risk Analysis 4.24 (Fuel) and Section 5 (Fuel Quality Audits) Maintenance Training Manual Appendix 8 (Fuelling) |
| | Check that the fuel servicing vehicle / facility is identified with the fuel type handled. | ☒ Always<br>☐ Sometimes<br>☐ Never | Aerial Survey Plan and Risk Analysis 4.24 (Fuel) and Section 5 (Fuel Quality Audits) Maintenance Training Manual Appendix 8 (Fuelling) |
| | Check that the facility is clean and maintained. | ☒ Always<br>☐ Sometimes<br>☐ Never | Aerial Survey Plan and Risk Analysis 4.24 (Fuel) and Section 5 (Fuel Quality Audits) Maintenance Training Manual Appendix 8 (Fuelling) |
| | Check that bonding wires and connections are in good condition. | ☒ Always<br>☐ Sometimes<br>☐ Never | Aerial Survey Plan and Risk Analysis 4.24 (Fuel) and Section 5 (Fuel Quality Audits) Maintenance Training Manual Appendix 8 (Fuelling) |
| | Check that filter systems are in place and date of last element replacement. | ☒ Always | Aerial Survey Plan and Risk Analysis 4.24 (Fuel) and Section 5 (Fuel Quality Audits) |

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| | | ☐ Sometimes<br>☐ Never | Maintenance Training Manual Appendix 8 (Fuelling) |
| | Check that a sample is clear and bright downstream of the filter. | ☒ Always<br>☐ Sometimes<br>☐ Never | Aerial Survey Plan and Risk Analysis 4.24 (Fuel) and Section 5 (Fuel Quality Audits)<br>Maintenance Training Manual Appendix 8 (Fuelling) |
| | Request or conduct a water test with paste or syringe and capsules. | ☒ Always<br>☐ Sometimes<br>☐ Never | Aerial Survey Plan and Risk Analysis 4.24 (Fuel) and Section 5 (Fuel Quality Audits)<br>Maintenance Training Manual Appendix 8 (Fuelling) |
| | Check that a sample from the low point of the tank is clear bright and free of water. If there is no low point water drain, do a dip of the tank using water paste. | ☒ Always<br>☐ Sometimes<br>☐ Never | Aerial Survey Plan and Risk Analysis 4.24 (Fuel) and Section 5 (Fuel Quality Audits)<br>Maintenance Training Manual Appendix 8 (Fuelling) |
| **Fuel Quality Control - Drums** | When using drummed fuel are there procedures in place to ensure the following requirements? | | |
| | Verify the expiry date of the drums. | ☒ Always<br>☐ Sometimes | Maintenance Training Manual Appendix 8 (Fuelling) |

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| | | ☐ Never | |
| | A "go no-go" filter be used for all refueling from drums. | ☐ Always<br>☒ Sometimes<br>☐ Never | Maintenance Training Manual Appendix 8 (Fuelling) indicates that the use of water detecting capsules is a permissible alternative to a go no-go filter. |
| | All drum fuel is visually checked for clarity and color and water tested with paste or fuel syringe and capsules before use. | ☒ Always<br>☐ Sometimes<br>☐ Never | Maintenance Training Manual Appendix 8 (Fuelling) |
| | Only clearly branded drums with both seals intact are be used unless the pilot knows the "history" of the drum since the seals were broken and retests the fuel for contamination before use. | ☒ Always<br>☐ Sometimes<br>☐ Never | PD-0043 SGL Supplied Fuel Assurance Procedure Page 3 |
| | Aircraft sump drains be checked before the first flight of the day and after each refueling. | ☒ Always<br>☐ Sometimes<br>☐ Never | Standard Operating Procedures (SOPs) Fixed Wing 3.3 |
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| | Drums are stored on their sides, clear of the ground with bungs horizontal in an area not subject to flooding. Under-cover storage should be considered if drum stock are to be kept for a long time. | ☐ Always<br>☒ Sometimes<br>☐ Never | Maintenance Training Manual Appendix 8 (Fuelling) permits the storage of drums upright but at an angle that water does not collect over the bungs and seep into the drum. |
| | When not in use, fuel pumps are protected from water and other contamination. | ☒ Always<br>☐ Sometimes<br>☐ Never | Maintenance Training Manual Appendix 8 (Fuelling) |
| | Bungs should be sealed and the drum placed on its side for short term storage (i.e. overnight) of a partially filled drum. | ☐ Always<br>☒ Sometimes<br>☐ Never | Maintenance Training Manual Appendix 8 (Fuelling) permits the storage of drums upright but at an angle that water does not collect over the bungs and seep into the drum. |
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| **Night Surveys** | Typically, survey flights are conducted at low heights in day VMC, but if the low height is removed coupled with a smooth air requirement, such as for gravity surveys, it may be desirable to conduct night flights. Such flights can be conducted safely as long as there are adequate procedures to prevent a "controlled flight into terrain" CFIT accident.<br><br>Are procedures in place to ensure the following requirements: | | |
| | Are night surveys flown at least 1000 feet above all | | |

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| | obstacles within the operational area and a 10 nautical mile buffer around the operational area? Does the operational area include the maneuvering area for line turns and lead-ins? | ☐ Always<br>☐ Sometimes<br>☐ Never<br>☒ N/A | SGL does not survey at night (FOM 7.1.1/PPRM 11.4) |
| | Is a VMC reconnaissance flight performed in each block? | ☐ Always<br>☐ Sometimes<br>☐ Never<br>☒ N/A | SGL does not survey at night (FOM 7.1.1/PPRM 11.4) |
| **Monitoring of radios** | During survey flights, are radios and transponders turned on and selected to the appropriate ATC or flight service frequencies. Additionally, equipment permitting, common air to air and emergency frequencies (121.5MHz) should also be monitored. | ☒ Always<br>☐ Sometimes<br>☐ Never | SOPs (Fixed Wing) 3.13 and 3.14. Note: we are unable to use High Frequency (HF) radios during survey. However, in essentially all cases the relevant frequencies are VHF hence the selection of 'always'. |
| **Turning Radius** | During straight and level flight there may be a significant margin above the stall speed, however in a steep turn the stall speed may be reached quickly with little warning and a stall in the turn at low level will likely result in a fatal accident. | | |

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| | Are all turns at low level limited to a maximum angle of bank of 30 degrees and be done at a constant altitude. Are climbs or descents allowed to be carried out during the turn? | ☒ Always<br>☐ Sometimes<br>☐ Never | SOPs (Fixed Wing) 4.4 |
| Towed Geophysical Arrays | | | |
| **Towed Geophysical Arrays – All aircraft types** | This section applies to all airborne surveys utilizing geophysical arrays suspended below and/or towed by rotary or fixed wing aircraft. | | |
| | Do you operate towed geophysical arrays? | ☒ Yes<br>☐ No | Rotary wing only |
| | Does the towed array have an STC/LSTC, engineering order or other similar certificate or statement describing array specifications and flight test data? | ☐ Yes<br>☐ No<br>☐ N/A | |
| | Is there an Operating Manual for each array? | ☐ Yes<br>☐ No<br>☐ N/A | |

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| | Does the Operating manual identify the maximum safe operating airspeed for the array? | ☐ Yes<br>☐ No<br>☐ N/A | |
| | Does the Operating Manual contain a parts list and maintenance manual containing the critical design specification for all parts and elements of the array? | ☐ Yes<br>☐ No<br>☐ N/A | |
| | Does the Operations Manual contain a pre-flight checklist? | ☐ Yes<br>☐ No<br>☐ N/A | |
| | Does the Operations Manual contain a schedule for routine preventative maintenance, recorded inspections and testing? | ☐ Yes<br>☐ No<br>☐ N/A | |

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| | Is there a procedure in place to ensure that all required maintenance, inspections and testing are up to date prior to job start? | ☐ Yes<br>☐ No<br>☐ N/A | |
| | Is all maintenance performed by a qualified person endorsed by the manufacturer or operator? | ☐ Yes<br>☐ No<br>☐ N/A | |
| **Towed Geophysical Arrays – Rotary Wing Aircraft** | Has the cable weight and length been determined by an aeronautical engineer as to minimize the potential for cable recoil into main and tail rotors following the loss of load? | ☐ Yes<br>☐ No<br>☐ N/A | |
| | Is there a weak link incorporated into the load bearing cable? | ☐ Yes<br>☐ No<br>☐ N/A | |
| | Is the weak link located as close as possible to the | ☐ Yes<br>☐ No | |

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| | attachment hook of the helicopter? | ☐ N/A | |
| | Has the breaking strain of the weak link been specified by an aeronautical engineer? | ☐ Yes<br>☐ No<br>☐ N/A | |
| | Is the maximum towed array airspeed and VNE (Velocity Never Exceed) placard placed on the aircraft instrument panel in the Pilot's view? | ☐ Yes<br>☐ No<br>☐ N/A | |
| | Does the cargo hook arrangement allow the pilot to jettison the load without removing his/her hands from the flight controls? Do procedures include the requirement to test the helicopter cargo hook release mechanism? | ☐ Yes<br>☐ No<br>☐ N/A | |
| **Towed Geophysical Arrays – Fixed Wing** | Is the aircraft fitted with a shearing mechanism which can cut the tow cable when the array needs to be jettisoned? | ☐ Yes<br>☐ No | SGL does not utilize towed arrays with fixed wing aircraft. |

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| | | ☒ N/A | |
| | Does the tow cable have a breaking strain which minimizes damage to the aircraft in the event the array snagged with ground objects? | ☐ Yes<br>☐ No<br>☒ N/A | SGL does not utilize towed arrays with fixed wing aircraft. |
| Geophysical Survey Flight Training | | | |
| **Training and Experience – All Operations** | Does your training program contain a syllabus for low level geophysical flight training? | ☒ Yes<br>☐ No | Training Manual (Fixed Wing) 3.1.1 (6)(a), 3.1.2 (6)(a), 4.6 and 5.4 |
| | Does the Pilot training syllabus reflect the IAGSA training guidelines? | ☒ Yes*<br>☐ No | Our overall training syllabus is generally consistent with the IAGSA training guidelines In fact SGL uses many of the same providers listed in the 'Training Resources' section of the IAGSA website (Cessna, FlightSafety, etc). *However one point of divergence is our Survey Crew Resource Management (SCRM) Training: The IAGSA recommendation is for a classroom session involving 15-20 participants from all departments. Apart from some training offered during the initial pilot ground school (which involves an instructor and a small group of pilot-applicants) we utilize computer based training for our SCRM course. Moreover, the pilot SCRM training is more |

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| | | | focused on traditional aviation 'CRM' content as opposed to survey-specific CRM. |
| | Are there documented criteria to assess Pilot competency? | ☒ Yes<br>☐ No | Training Manual – Fixed Wing Section 5 (Flight Training Program). |
| **Simulator Training** | In addition to the training in the actual aircraft, do pilots, where practical, undergo simulator training in a type specific simulator representing the aircraft being flown on survey? If so, at what frequency? | ☐ Always<br>☒ Sometimes<br>☐ Never<br>☐ N/A | SGL's process for training captains on the C-208 Caravan, C-404 Titan and DHC-6 Twin Otter includes attendance at FlightSafety, Simcom or Pan Am (Initial Pilot Training Course). Recurrent simulator training is occasionally (but not routinely) carried out. Co-pilots do not attend company-mandated simulator training courses. See Notice of Difference Form – Simulator Training |
| Overwater and Offshore Surveys | | | |
| **Minimum requirements for Over water and Off Shore Surveys** | The following recommendations apply to all overwater and off shore surveys flown in both fixed wing and rotary wing aircraft. | | |
| **Training – Overwater & Offshore Surveys** | Is Underwater Escape Training completed within the preceding three years before undertaking the over water or offshore survey. | ☒ Always<br>☐ Sometimes<br>☐ Never | Pilot Training Manual 3.0 (Training Program Overview (13)(c)(d) |
| | Are Ditching & Emergency Evacuation Procedures | | See SOPs 3.3 (Pre-Flight Duties) for a discussion of the requirements of a pre-flight |

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| | reviewed, crew members thoroughly briefed and simulated training to be conducted at the work site prior to the start of all over water or offshore work. This review should include a review of general emergency procedures that could potentially lead to a ditching and a discussion on the significance of sea state/wave height on ditching. | ☐ Always<br>☒ Sometimes<br>☐ Never | briefing (which include a discussion of emergency equipment and procedures. However, as there is no requirement for simulated egress training at the start of an offshore project see Notice of Difference Form – Pre Survey Training – Ditching and Emergency Egress |
| **Training - Off Shore Surveys** | In addition to the above items, the following are to be included in offshore training: | | |
| | Does Initial Training consist of a minimum of 10 hours training conducted by a pilot who has a minimum of 100 hours Offshore experience? | ☐ Yes<br>☒ No | See Notice of Difference Form – Ditching and Emergency Evacuation Procedures Training |
| | Does Recurrent Training consist of a minimum of 5 hours training conducted annually by a pilot with the same qualifications as for the initial training: or prior to the start of an Offshore survey if pilot has completed the initial training but has not flown | ☐ Yes<br>☒ No | See Notice of Difference Form – Ditching and Emergency Egress Training |

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| | Offshore for more than 90 days? | | |
| | Alternatively, the above experience requirements may be waived if the Operator has in place a competency based training program which includes Offshore operations. | | |
| **Type of Aircraft – Over water / Offshore Operations** | For an over water/offshore survey in an area with harsh conditions where the odds of surviving a ditching or the exposure that would follow are low then the emphasis must be placed on choosing an aircraft that reduces the probability of a ditching. Whereas, the aircraft criteria may be somewhat less stringent in less harsh conditions where the odds of a successful ditching and rescue are good. | | |
| | For any survey that is over water or offshore in an area where rescue is not likely to occur within an anticipated acceptable exposure time and/or where anticipated sea states would make a successful ditching unlikely, is the use of a multi engine aircraft with performance characteristics such that in the event of an engine failure during an over water survey it can climb from survey height to 500 feet and return to shore or during an offshore survey it | ☐ Always<br>☒ Sometimes<br>☐ Never | See Notice of Difference Form – Single Engine Over-Water Ops |

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| | can climb from survey height and maintain prolonged flight on the remaining engine(s) to return to a suitable airport at the minimum IFR altitude utilized? | | |
| | Are single engine piston aircraft used for over water/offshore surveys? | ☐ Always<br>☐ Sometimes<br>☒ Never | Not applicable – SGL does not operate single engine piston aircraft. |
| **Aircraft equipment – Offshore** | Are aircraft equipped with at least the following gyroscopic instruments, each of which must be independent of the others:<br>2 x attitude indicator; 2 x heading indicator; 2 x turn and slip indicator or turn coordinator? | ☒ Yes<br>☐ No | See applicable Aircraft Flight Manual (C-208, C-404, DHC-6) |
| | If a second pilot is to be part of the crew, is there a complete second set of basic flight instruments (attitude indicator, gyroscopic heading indicator, turn and slip or turn coordinator airspeed, | ☒ Yes<br>☐ No | See applicable Aircraft Flight Manual (C-208, C-404, DHC-6) |

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| | altimeter, vertical speed) installed at the co-pilot's seating position? | | |
| | Are there at least two (2) independent power sources to drive the gyroscopic instruments?<br>- this may mean two vacuum pumps with all air driven gyroscopes or a mixture of air driven and electric gyroscopes provided loss of one power source leaves operational one set of three gyroscopic instruments (attitude, heading and turn rate indicators) | ☒ Yes<br>☐ No | See applicable Aircraft Flight Manual (C-208, C-404, DHC-6) |
| | Is there a radio or radar altimeter with a means of alerting the crew when height above the water falls below a minimum safety height selected by the crew? Is there a means of testing the alerting device prior to flight? | ☒ Yes<br>☐ No | See applicable Aircraft Flight Manual (C-208, C-404, DHC-6) |

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| | Is there a minimum of one instantaneous vertical speed indicator (IVSI) to provide an instant alert of descent | ☐ Yes<br>☒ No | See Notice of Difference Form – Aircraft Equipment – Offshore IVSI |
| | Do you require the use of weather radar where thunderstorms are present or could be expected? | ☒ Always<br>☐ Sometimes<br>☐ Never | FOM 5.14.2 |
| | Are Rotary wing aircraft equipped with floatation aids such as "pop-outs floats"? | ☐ Always<br>☐ Sometimes<br>☐ Never | |
| **Emergency Equipment – Offshore Surveys** | An upper torso restraint system, with a preference for a four point harness, for each crew member | ☒ Yes<br>☐ No | See Aircraft Flight Manual (C-208, C-404, DHC-6) and FOM 5.10 |
| | Are aircraft equipped with a 406 MHZ ELT? | ☒ Yes<br>☐ No | All aircraft are equipped with 406 MHZ ELTs in accordance with the Canadian Aviation Regulations for commercial aircraft |
| | Is the crew provided a covered life raft with a self erecting canopy that is equipped with a | | See Notice of Difference Form – Life Rafts |

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| | 406 MHZ ELT and normal emergency survival equipment? Does raft should include an inflatable floor for cold water operations? | ☐ Yes<br>☒ No | |
| | Are constant wear dual chamber life vests that contain an ELT aELT/EPIRB, flares and a signal mirror, worn by each crew member? | ☒ Yes<br>☐ No | Yes (when operating over water) |
| | Are immersion/exposure suits worn if water and air temperatures warrant? | ☒ Yes<br>☐ No | |
| | Are all helmets and headsets fitted with double disconnect cords? | ☐ Yes<br>☐ No | Fixed wing pilots do not wear helmets. |
| **Weather – Offshore Surveys** | Are Offshore survey flights conducted under VMC with minimums of 5 miles visibility and 1000 foot ceiling in the survey area? | ☒ Yes<br>☐ No | FOM 5.12 |
| | Is a thorough weather briefing solicited (if available) and does it should include sea | ☒ Yes | SOPs 3.3 (note: specific mention is not made of wave height but this would be included in a |

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| | state/wave height and wind maximums in the survey area? | ☐ No | normal weather briefing whenever appropriate). |
| **Additional Training Requirements** | | | |
| Fire Extinguisher Training | Do all crew members on survey flights, including equipment operators, receive annual training in the use of fire extinguishers in fighting in flight fires? | ☐ Yes<br>☒ No | Training Manual – Fixed Wing 3.1.4 (Triennial) |
| Survey Crew Resource Management Training | Is Survey Crew Resource Management training provided to all crew members assigned to survey operations including: geophysicists; pilots; equipment operators; maintenance engineers; field technicians and field support staff at intervals not exceeding three years? | ☐ Yes<br>☒ No | See company article titled 'Field Crew Team Work' for a general statement of the company's CRM philosophy but there is no stated requirement for recurrent training for all crew members. See Notice of Difference Form – Survey CRM Training |
| **Flight Performance Monitoring** | | | |
| Performance Monitoring | Is performance parameters, including aircraft speed, height above terrain and drape, periodically reviewed using data collected during surveys? | ☒ Always<br>☐ Sometimes<br>☐ Never | See 'Daily Data Quality Control Checklist (Rev 4.1) |

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| | Is the frequency of review such that any discrepancies on a particular survey or by a particular pilot can be identified as early as possible? | ☒ Always<br>☐ Sometimes<br>☐ Never | See 'Daily Data Quality Control Checklist (Rev 4.1) |