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19.0 Communications

Introduction

Regular communications play an extremely important role in safe and effective exploration work. Good communication promotes safe work, builds morale, and encourages the efficient use of time, equipment and personnel. Established and tested communications routines are essential during emergency situations. The term “communication” covers all contacts between offices, projects, base camps, fly camps, fixed wing aircraft, helicopters, crews on traverses, parties travelling in vehicles (including all-terrain vehicles and snowmobiles) and boats. Company communications routines should also include check-in systems for personnel who are working out of a hotel etc., and for those travelling outside their home country.
Because no single communications system or check-in schedule will suffice, it is usually the responsibility of each project manager to develop and maintain standard operating procedures (SOPs) for routine and emergency communications. Each project or camp manager should assess the requirements of their work site(s) and take into account such factors as isolation, terrain, time of year, weather, means of transportation and other pertinent risks.

Acronyms

BGAN – Broadband Global Area Network

Cospas-Sarsat – “Cospas” is the Russian transliteration meaning “space system for the detection of vessels in distress” – Search And Rescue Satellite Aided Tracking

ELT – Emergency Locator Transmitter

EPIRB – Emergency Position Indicating Radio Beacon

ERP – Emergency Response Plan

GPS – Global Positioning System

HF – High Frequency

LEO – Low Earth Orbit

OHS – Occupational Health and Safety

PLB – Personal Locator Beacon

RCMP – Royal Canadian Mounted Police

SAR – Search And Rescue

SOP – Safe Operating Procedure

SSB – Single Side Band

UHF – Ultra High Frequency

UTM – Universal Transverse Mercator

VOIP – Voice Over Internet Protocol

VHF – Very High Frequency

19.1 Risks and Hazards

Lack of preparation and knowledge regarding communication equipment and procedures can have serious consequences. Risks and hazards include:

- Inability to communicate during normal daily operations due to:
  - Loss of battery power
  - Poorly trained employees
  - Inappropriate communication equipment for the region (e.g., Arctic) or the terrain (e.g., mountainous)
  - Service plan lapses
  - Incompatible radio frequencies, wrong radio antenna
  - Lack of repeaters
  - Dropped mobile/cell phone calls
  - Equipment breakage due to poor quality equipment
- Lack of or inadequate communications during emergency situations due to:
  - Poorly trained employees
  - Missing instructions to operate the satellite telephone
  - Equipment malfunctions
- Delay in implementing emergency response plans due to:
  - Lack of emergency response planning regarding communications within the company or between the company and contractors
  - Wrong or inadequate equipment (communications, first aid, transportation)
  - Lack of training
  - ELT failure in the event of an air crash
- Stranding and/or missed transportation pick up due to:
  - Loss of battery power
  - Poor quality equipment
  - Wrong communication equipment
- Miscommunications leading to:
  - Slinging incidents
  - Stranding
- Lack of response to emergency EPIRB or ELT alarm due to:
  - Out-of-date EPIRB or ELT equipment
  - Lack of training to manually turn on emergency equipment

19.2 Responsibilities (Due Diligence) Regarding Communications

Exploration Companies

- Comply with occupational health and safety (OHS) regulations regarding required communications for employees working in isolated locations, working alone etc.
- Comply with government requirements by obtaining all necessary and appropriate licenses to operate communication equipment. Some countries have regulations regarding importing of communication and electronic equipment.
- Carry out a risk assessment to determine the most appropriate types of communication equipment for a project site. Refer to section 2.1.5 Risk Assessments.
- Supply projects with sufficient, appropriate and functioning communication equipment.
- Make sure there is a fully functioning communications backup system for each project.

Project Supervisors

- Develop communications standard operating procedures (SOPs) for the project and communications procedures for site specific emergency response plans (ERPs).
- Provide adequate training for employees regarding the communication SOPs and communication procedures in the ERPs. Make sure all employees are trained to use each type of communication equipment they may have to use. See section 19.4 below.
- Post operating instructions for all communication equipment in central and visible places and/or at each communication station. Operating instructions should accompany complicated portable equipment and communication equipment in vehicles, boats and aircraft etc.
- Post ERP communication procedures in central and visible places and at each communication station. Emergency communication information should accompany all portable communication equipment and all vehicles, boats, aircraft etc.
- Create and implement employee check-in schedules and a tracking system that complies with OHS regulations for various work situations and conditions at the project (e.g., working alone, stranded by weather). The system should include a communications log.
- Understand the idiosyncrasies of the service plan for the satellite telephone system so that an individual using a handheld phone or the project is not suddenly left without service.

Employees

- Be trained to use all communication equipment at the project. This is essential during an emergency when anyone may be required to use the equipment due to unusual or crisis circumstances.
- When working on or off site, take all communication equipment, contact numbers and frequencies that may be required. Verify that equipment is working and fully charged before departure and after being dropped off (e.g., traverse, work site, drill site etc.).
- Adhere to check-in schedules, especially if you are working alone or change plans. Failing to check in may result in a needless search if you do not make contact at the scheduled time.

19.3 Equipment Selection

Proper planning and selection of communication equipment is essential. Some countries restrict the importation of communication equipment and parts so take this into account during the selection process.

19.3.1 Equipment Considerations

Select communication equipment that meets the requirements of the project size, location and situation.

- Local knowledge may be the best source of information to determine the most appropriate equipment to use, especially when starting a project in a new area. Other sources of information include equipment and communications service suppliers, government agencies, charter aircraft and expediting service companies, and the RCMP or local search and rescue organizations.
- Carry out a cost benefit analysis of various types of equipment that takes employee safety into account; do a cost benefit analysis of purchasing versus renting equipment. Carefully analyse the cost of the service plans; some plans are complicated and an administrative error can leave employees without communication.

Consider the following factors that affect communications. They include but are not limited to:

- Isolation
- Terrain
- Latitude
- Transmission distance requirements
- General and specific atmospheric conditions in the project area
- Means of transportation (aircraft, vehicles, boats)
- Local risks (e.g., weather, working on ice, presence of dust/sand)
- Requirements for a communications system in a fixed location (camp, drill site, mine site) and/or a mobile system (on a person, vehicle, boat etc.)

Assess what the communication equipment will be used for. Determine which types of equipment are required for communications between various parties.

- Project and head office, world contacts
- Project and expediter
- Project and aviation services
- Project on site and off site work locations (e.g., drill sites)
- Project and transportation (vehicles, aircraft, boats)
- Ground personnel and helicopter for pick up and during slinging operations
- Members of the same or different work parties (traversing, on or off site)
- Traversing personnel and air support or ground vehicles

- Project on site and off site employees and emergency support (e.g., medevac, first aid, security, fire)

Consider the following factors:

- Backup communications system requirements in case the main system fails. Consider which is better, a duplicate system or different systems that compliment each other.
- Equipment performance in very cold weather, very rainy weather, dusty conditions
- Equipment performance in very rugged terrain
- Privacy of conversations – essential or not
- Importing and licensing restrictions
- Potential maintenance issues – durability, life expectancy of equipment, availability of replacement parts

Consider if the project requires:

- Bandwidth for internet access
- Fax capabilities
- Satellite dish (depends on phone/data system)
- Wireless router
- Employee internet access and personal communications
- Two stations – one for company use and one for general use
- VOIP (Voice Over Internet Protocol), Skype (a software that allows users to make telephone calls over the internet at low cost)

19.3.2 Satellite Telephones

Satellite telephone equipment is reliable. It is usually the preferred equipment to use at remote sites. They range in size from stationary units to handheld units. Satellite telephones transmit to orbiting satellites rather than to terrestrial mobile phone systems (some use both). The coverage depends on the satellite orbit configuration – geosynchronous or Low Earth Orbit (LEO). Geosynchronous satellites are stationary relative to the earth surface; consequently high topography, buildings or trees may interfere with direct transmission. One may have to move to a higher or unobstructed location to secure reception. LEO satellites provide continuous access as they orbit the earth. If you cannot make contact, wait a while and another satellite will come into range. However, LEO satellite coverage in the high Arctic or Antarctica is lacking because LEO satellites do not orbit in these regions.

Technology changes rapidly and costs are generally decreasing, but stationary and portable satellite telephones can be expensive to operate. As suggested in sections 19.2 and 19.3.1, a company should carry out a risk assessment and a cost benefit analysis to determine the most suitable communication equipment for a project, and this is particularly true regarding satellite telephones. It can be dangerous if communications do not work as this will jeopardize employee safety. It is not advisable to cut costs and be dependent on a communication system with inadequate coverage (the saying “penny wise and pound foolish” may apply). It may be advisable to check with knowledgeable local sources to help determine the requirements.

- Satellite telephones can be portable but some systems require a 12-volt battery or a generator for power.
- Satphones usually provide private conversations but they can be intercepted.
- Satellite internet in conjunction with VOIP can be an economical option for voice communication. However, it is only as reliable as the internet connection in use and there are often significant delays. This technology is evolving rapidly.

Safety regarding satellite telephones:

- Everyone needs training if satellite phones are used at a project. Depending on the type and model, there may be difficulties if the users are not well trained in the required operation procedures (e.g., switching on the phone, dialling). In addition, the project manager should be very familiar with the service plan or service may suddenly be interrupted. Satellite phones should be compatible with other satphones used at the project and by the company at other projects.
- User instructions should (1) be posted at the central location with a stationary satphone and (2) accompany every portable satellite phone at all times.
- Emergency situations are not the time to learn to use a satellite phone. Every person who may possibly be in the position to use a satphone in an emergency should be trained to use them.
- Keep satellite phones in a waterproof and shockproof case.
- Charge satellite phones each night or at the manufacturer's specified interval while in regular use and test them routinely when they are not in use.
- For best transmission, set up the portable equipment in a location with wide access to the sky, as you will not know the precise location of the satellite that picks up and transmits a call. A hilltop location will provide better transmission than a clearing in a forest of tall trees, a ravine or a valley.
- At high latitudes satellite dishes should face toward the equator to increase reception; usually the orientation is specified by the service provider.
- When using a satellite communications system, locate the satellite dish so people do not come within 3.5 metres during transmission. The presence of a person or object in front of a dish may block the transmission.

Safety regarding satellite dishes:

- While a properly installed satellite dish is grounded, everyone should stay away from the dish during a thunderstorm. The base is metal and may attract lightning, depending on the location.
- No one should stand in front of the antenna; satellite dishes emit radio waves.
- Protect satellite communication dishes (phones, internet) from impact by ATVs and snowmobiles etc. Collisions may damage the dish and/or affect the orientation, which can interrupt communications.

Types of satellite telephones

- Iridium satellite telephones "Iridiums" use LEO technology, are portable, and provide dependable voice and data communications service worldwide. In 2009, Iridiums are the

best handheld option for the Arctic. There is 99% availability so the phone system can be relied upon for emergency use. http://www.iridium.com/

- MSAT (geosynchronous) has reliable satellite telephones and internet coverage for most of North America, Central America and some of South America. There is 99% availability so the phone system can be relied upon for emergency use. http://www.skyterra.com/index.cfm
- Globalstar (LEO) satellite phones and handheld are also portable but have less coverage than Iridium (in 2009) and at the time of publication they lack sufficient satellite coverage in the high Arctic. The voice service is intermittent with periods of one hour or greater when there is no service. It should not be depended upon for emergency use. http://www.globalstar.ca/en/
- BGAN (Broadband Global Area Network) offers internet access and voice communications from a portable mobile device through Inmarsat (geosynchronous). At the time of publication the cost is very high but it offers great flexibility. http://www.inmarsat.com/Services/Land/BGAN/default.aspx
- Rentals can be arranged through numerous communications companies.

19.3.3 Two-Way Radios

The use of radio equipment in mineral exploration has changed with the introduction and development of satellite telephone technology. Presently two-way radios are mostly used for communications between (1) aircraft and ground personnel, (2) employees at project work sites and the communications base, and (3) employees on traverse. As traverse routes usually take field crews out of radio range (if there are no repeaters), it may be necessary to rely on handheld satellite phones to contact the project communications base. Check with knowledgeable sources to help determine the requirements for a project.

Tips regarding two-way radios

- Make certain there are sufficient numbers of two-way radios (including batteries and rechargers) and other portable equipment for all operations. Allow for loss and breakage. In very remote areas, be sure to take enough equipment to include supplies for emergency caches.
- Professional quality radios are required for work in very cold temperatures.
- Some two-way radios include a GPS unit. It is strongly recommended that any person working alone be equipped with a combination GPS/radio unit. A person can be located immediately when they engage the radio “send” button.
- Digital technology is replacing analog technology, but consider if analog radio equipment will suffice or if the project requires digital equipment.
- Verify that you have the proper radio setup to communicate with aircraft, if applicable.
- Repeater stations can be installed to increase the range.
- In some locations two-way radios (walkie-talkies) that can accommodate several types of antennas are more versatile.
- Frequencies:
    - The length of dipole antennas should match the frequencies the radio uses.

  - Check that the project uses radios with the same frequencies as the contractor's radios. Program the frequencies into each radio – base station and handhelds.
  - Predetermine which frequency to use for ground personnel to communicate with an aircraft pilot (e.g., traverse support, slinging). This may vary with individual aircraft.
  - Radio frequencies used should allow communications with outside camps and other contacts. In some areas there may be a common frequency used by industry over which help can be readily obtained.

- Antennas should be set up at the appropriate height and face the proper direction. Try to place the antenna as high as possible and set it up at 90 degrees to the target location. The higher the antenna, the better the transmission and reception.
- Carry and know how to set up an emergency antenna and how to repair a broken one.
- All dipole antennas should be flagged so they are visible. Antennas can get caught in helicopter rotors and may even decapitate an ATV or snowmobile rider who is unaware of its location.

Types of radio transmissions

- Two-way radio systems normally use Very High Frequency (VHF) or Ultra High Frequency (UHF). Both transmit by "line-of-sight". Under ideal conditions VHF transmits farther than UHF. The transmission of both VHF and UHF are affected by rugged or mountainous terrain and vegetation cover.
- UHF is less susceptible to interference than VHF systems.
- Repeaters are required to increase transmission distance in mountainous and rugged terrain.
- Sometimes VHF/UHF antennas can be placed in an elevated position (hilltop or above foliage) to increase transmission distance.
- Factors to consider regarding High Frequency (HF) include:
  - HF systems will transmit over much longer distances than VHF/UHF systems but communications may be adversely affected by interference, especially from electronic devices. Transmission and reception quality may vary greatly depending on factors such as diurnal or seasonal atmospheric conditions, solar activity and the aurora borealis.
  - An HF system requires a large antenna, which should be placed where it will not interfere with aircraft flight paths. Flag antennas and make sure they are visible from the air and by ground vehicles.
  - HF radios are being superseded by satellite phones.

19.3.4 Mobile or Cellular Telephones

- Mobile or cellular telephones only function near civilization or where there are repeaters. Mobile/cell phones may not be compatible with systems operating in different parts of a country. Therefore, they are of limited use in many field areas. When considering mobile phones, test them to be sure there is adequate coverage of the field area. Reception is usually better on a hilltop.

- Small mobile/cell phones have limited power and range. More powerful 3-watt models should be installed in vehicles to increase the communication range where coverage is adequate.
- Calls may be cut off or "dropped" for no apparent reason even in urban areas. In addition, mobile/cell phone communications are not private.
- Some mobile/cell phones have two-way radio options, which may be useful on some job sites. Some mobile/cell phones are equipped with a GPS feature, which is an additional safety factor.
- When travelling outside North America it may be advisable to rent a mobile/cell phone (or satphone) for use in a specific country. Information is available at the following website: http://www.roadpost.ca/sitemap.aspx

Follow these guidelines for the safe use of mobile phones in hazardous site locations.

- Radio frequency (RF) energy is potentially hazardous near combustible or explosive materials, especially at sites where blasting occurs. Mobile/cell phones must be completely switched off, as incoming calls and automatic processes in this type of phone may still activate the phone's transmitter even if you are not making a call.
- Do not operate a mobile phone in an aircraft under any normal circumstances, as the phone may interfere with aircraft navigation/communications and/or electronic control systems. The phone must be completely switched off.

19.3.5 Emergency Locator Devices (ELTs, PLBs, EPIRBs)

Various emergency distress radio beacons are available designed for use with the Cospas-Sarsat international search and rescue satellite system. If an emergency locator device is activated, it transmits on 406 MHz, the frequency of the receiving Cospas-Sarsat satellite system, and initiates search and rescue procedures. Information regarding how the system works is available on the following website: http://www.sarsat.noaa.gov

Three types of emergency beacons are currently in use with the Cospas-Sarsat system.

Personal Locator Beacons (PLBs) for individual use

Emergency Position Indicating Radio Beacons (EPIRBs) for maritime use

Emergency Locator Transmitters (ELTs) for aircraft

Personal Locator Beacons (PLBs)

A Personal Locator Beacon, a device containing a small radio frequency transmitter and a GPS unit, is designed to be carried by an individual in remote areas away from normal emergency response services. PLBs are intended for emergency use, not as navigational tools. They may be purchased or rented.

- In very remote areas it may be advisable to equip employees with PLBs that tie in with the Cospas-Sarsat system. When a project uses them, a protocol system must be set up to avoid launching a full scale search when a charter aircraft can reach the person in distress. Make sure employees know how to cancel a false alarm or the company may be required to pay a large false alarm charge.

- A PLB must only be activated in a distress emergency situation where there is serious danger to human life and only in areas where cell phone coverage or other communications methods such as two-way radios or satphones are not available. Employees should have other means of notifying their project or camp of an emergency situation.
- 406 MHz PLB units provide global coverage but they need to be coded for the specific country where they will be used. If you plan to use the PLB in another country, take it to an authorized dealer to be re-coded for that country. PLBs must be registered with the appropriate authorities in the country of intended use. In Canada, a PLB can be registered directly with Cospas-Sarsat or online at:

  http://beacons.nss.gc.ca/
  https://www.406registration.com/
- Note: Older analogue PLB units that operate exclusively on the 121.5 MHz frequency should not be used. As of February 1, 2009, the Cospas-Sarsat system only processes signals from the newer 406 MHz emergency beacons.
- Anyone using a PLB should be familiar with the operator's manual. Use the correct batteries and make sure they are fully charged before departing on a long trip. Replace batteries according to the manufacturer's directions.
- The "SPOT": The "Spot Satellite Messenger" is a type of PLB that can send messages using the Globalsat network. A "check in" message can be sent to a designated receiver (office, family) and an emergency message – a "911" signal – can be sent to a GEOS International Emergency Response Centre. The Centre then notifies the contacts of the emergency situation. It is rugged and has a long lasting battery, but there are drawbacks. There is no way for the user to tell if the signal has been sent or received successfully. While it works well in most of North America, it does not function well in the Arctic and southern Africa. It is not intended as – nor is it usable as – a navigational tool. The device is inexpensive; the cost in 2009 is around $150 plus $99 per year subscription (US dollars). Information about the "Spot" is available on the following website: http://international.findmespot.com

Emergency Position Indicating Radio Beacon (EPIRBs)

EPIRBs are designed for use on boats.

- Each EPIRB has an identification number kept on file by the National Search and Rescue Secretariat (NSS) in Canada and the National Oceanic and Atmospheric Association (NOAA) in the USA. The registration should be kept up-to-date (see the previous section on PLBs to register them in Canada).
- In some areas, employees using boats should carry a regular 406 EPIRB unit that floats and will activate at a specified depth when it contacts water.
- The following Transport Canada website has additional information regarding EPIRBs for marine use: http://www.tc.gc.ca/marinesafety/tp/tp10038/70-lse-EPIRB.htm

Emergency Locator Transmitters (ELTs)

Emergency Locator Transmitters are specifically for use in aircraft and are designed to activate automatically upon impact; they can also be activated manually.

- The newer digital ELTs operate at 406 MHz and effective February 1, 2009 only signals at this frequency will be processed by the Cospas-Sarsat system. Frequencies of 121.5 and 243 MHz will no longer alert Search and Rescue (SAR). Exploration companies

should inquire whether all aircraft they intend to charter are equipped with up-to-date ELTs.

- Pilots of charter aircraft should indicate the location of the ELT in the aircraft to passengers and describe how to remove and manually activate the unit in the event of emergency.

Figure 19.1: Emergency Locator Transmitter © Great Slave Helicopters

Batteries

Various types of batteries are used at project sites. Follow the manufacturer's instructions regarding the correct use of rechargeable batteries and rechargers. Replace batteries as directed.

- Workers should start each day with fully charged batteries and carry sufficient fully charged spare batteries for their communication (and navigation) equipment.
- For additional information regarding batteries, refer to sections 7.7 Batteries and 18.4.6.3 Batteries.

19.4 Training

Proper training in the use of up-to-date equipment, radio protocols and radio techniques simplifies both regular and emergency communications routines. The project/camp manager is responsible for seeing that employees are trained to use communication equipment correctly.

- Train employees to correctly set up and operate the communication equipment they will use when working both on and off the site.
- When a project uses satphones, it is essential to train everyone how to operate them properly. Different models have different methods to switch them on; they require dialling international access codes to place a call. They are not intuitive to use. During an emergency is *not* the time to learn to use a satphone – or any other piece of equipment.
- When a project or camp uses a satellite communications system, make sure there is a backup system. Make sure people are trained to operate both systems. Post concise

operating instructions for both systems at the stations (including the muster station, which should have backup communication equipment).

- For emergency purposes the pilot should train all employees who use air support regarding the location, removal, and positioning the ELT so it transmits the maximum signal. Refer to section 16.10.2 Regular Pre-Flight Safety Briefings.
- Train and check out employees who use radio equipped vehicles. Store clear, concise operating instructions for radio use, emergency frequencies and emergency procedures in the glove box of all vehicles. Vehicles should be stopped in a safe place when communication equipment is used.
- Employees who do intermittent field work should update their training so they are knowledgeable about current communication equipment. Employees visiting a project could hinder safety during an emergency if they cannot use the equipment properly.

19.5 Communications Routines, Schedules and Protocols

19.5.1 Routines and Schedules

- Before the field season commences, check all company owned communication equipment and test each item prior to use. If possible, test the equipment with all potential contacts to assess transmission quality. This may include emergency contacts such as the charter aircraft companies and contractors.
- Test rental equipment to make sure it functions according to the rental agreement.
- Obtain frequencies from contractors (e.g., air support and drilling companies) and program the radios with these frequencies. All employees should know which frequencies provide weather and emergency information.
- When mobilizing a new project or camp, set up the communications station immediately and try to make sure it works properly before the air support departs. When demobilizing a camp the radio should be the last item dismantled, especially if everyone is being flown out.
- The camp should be on radio standby whenever aircraft are flying in, especially if weather is changing, or there are low clouds or fog in the area.
- Minimize non-essential radio messages by scheduling additional or personal orders to expediters when everyone is in camp. Then, one message can be sent.
- The communications system should include a communications log that records each transmission.
- When a lightning storm approaches a field project or camp, immediately disconnect the antenna and ground it away from the radio, as appropriate. This may prevent possible equipment damage and/or a fire.

Daily Checks

Employees working off site should follow communications routines and checks before departing each day:

- Each day verify that your communication equipment functions properly before leaving the project, camp or office.

- Make sure all the contact numbers you may possibly need are programmed into satellite phones or cell phones and that you are carrying the operation instructions for the equipment.
- If using two-way radios, confirm which channel everyone is using.
- The planned drop off point may have to be changed due to conditions. Make sure that any changes are communicated to the project/camp and not just to the particular pilot or driver who drops you off.
- Carry extra appropriate signalling devices (smoke flares, mirror, whistle, and fluorescent orange helicopter cloth) in addition to electronic devices and extra batteries.

Regular Scheduled Checks

Regular scheduled check-in reporting procedures contribute to a well run field operation and increase morale and security.

- Employee tracking system: Maintain a “white board” or other clear method for a “check out – check-in” system in a central location available to everyone. Post a map that shows all work locations (off site work locations, drill sites) and detailed daily traverse routes with clearly marked drop off and pick up points. Designate someone to keep track of employees throughout the day.
    - Employees should check in with the pilot, driver, base camp or office as soon as they are dropped off to verify their radios function properly. If a radio fails to function, the aircraft or vehicle should not leave them and employee should not proceed.
    - Before disembarking, make sure to confirm the time and pick up site with the pilot or driver in case the radio fails to function later.
    - When more than one field crew is working in the same area, they should be able to communicate with each other.
- Employee check-in schedules: Set up appropriate check-in schedules for contact between field parties, drill sites, work sites and the base camp or project base. Someone should monitor the base camp radio while personnel are in the field. It should be a requirement for each person in charge (including the traverse crew chief and the drill supervisor) to account for all their employees working on site, in the field or at a drill site at check-in times.
    - Set up a prescribed length of time after which a search will begin for an overdue field employee, field party, vehicle, boat or aircraft.
    - The frequency of check-in times may vary according to working conditions and OHS regulations (e.g., when employees works alone or in hot or cold conditions). The check-in time intervals are subject to change; when working conditions deteriorate, employees should check in more frequently.
    - Employees should always notify the project or base camp when they change plans while on traverse. Notify camp of any potential problem (e.g., impending bad weather, unexpected obstacles, change of pick up location, vehicle breakdown, a bear sighting).
    - Stay in communication with your field partner and/or other crews. Then you may learn if there has been a change in plans for your pick up vehicle, boat, or aircraft.
    - The check-in schedule and search criteria applies to all employees. Everyone should use the system, including visitors.

- Keep check-in conversations to a minimum to conserve battery power, but do not hesitate to break a routine check-in schedule to relay important information.

Additional check-in routines

- At minimum, a base camp should keep an hourly radio contact schedule with helicopters working in the field. The PDAC Health and Safety Guidelines recommend a contact interval of 30 minutes.
- All projects and base camps should contact the company office at established intervals.
- Employees working out of a hotel or motel should arrange a check-in schedule to contact the office. Then the company will know if you fail to return and can initiate a search.
- Individuals travelling abroad from the office should also have established check-in schedules with communications protocols. This can be by email.
- In some areas it may be advisable to check in with local landowners, local police or even local villagers to inform them of your daily routes and estimated time of return. If you fail to return, they will be able to initiate a search.

19.5.2 Radio Use Protocols

Users commonly share radio frequencies so it is important to keep traffic to a minimum and respect other users' time.

- Use the correct language so that everyone understands your responses:

  "**Affirmative**" to confirm a message ("**yes**")
  "**Negative**" to deny a message ("**no**")
  "**Roger**" to acknowledge a message ("**OK**")
- Say "**over**" at the end of each piece of traffic you transmit so the receiver knows you have finished and he or she may proceed.
- See section 19.7 Communications Tips Regarding Transportation (Boats) for information regarding the use of "PAN-PAN-PAN" and "MAYDAY-MAYDAY-MAYDAY" for urgent or emergency communications.
- Speak clearly and slowly if transmission or reception is poor. Sometimes it is necessary to spell words out to make sure your message is received correctly and understood. Learn and use the International Phonetic Alphabet.

Table 19.1: International Phonetic Alphabet

A	**Alpha**	**N**	**November**
B	**Bravo**	**O**	**Oscar**
C	**Charlie**	**P**	**Papa**
D	**Delta**	**Q**	**Quebec**
E	**Echo**	**R**	**Romeo**
F	**Fox-trot**	**S**	**Sierra**
G	**Golf**	**T**	**Tango**
H	**Hotel**	**U**	**Uniform**
I	**India**	**V**	**Victor**
J	**Juliet**	**W**	**Whiskey**
K	**Kilo**	**X**	**X-ray**
L	**Lima**	**Y**	**Yankee**
M	**Mike**	**Z**	**Zulu**

19.6 Emergency Communications

Most emergency response plans (ERPs) rely on good communications. A project should have several systems for communications, if possible. Unfortunately, communication problems often occur during emergencies and sometimes people often forget how to do the simplest things at that time.

- Post all emergency communications procedures, equipment operating instructions, emergency telephone numbers and radio frequencies at each communication station and the muster station. Store a copy in the glove box of each vehicle (and ATVs, snowmobiles, boats) and in support aircraft.
- Traversing employees should carry all emergency contact numbers, ERP information and operating instructions they may potentially require plus extra signalling devices to communicate with a pilot should there is an equipment failure (see section 19.5.1).
- Develop some worst-case emergency scenarios for the project/camp and work areas and determine emergency communications requirements.
- Determine how long it will take to contact emergency services and evacuate an injured employee from each work site, including the most remote place where traversing employees might experience an emergency.
- Test emergency communications plans to see if they work.
- Refer to Chapter 3. Emergency Response for additional information.

19.6.1 Project Emergency Call List

Post a project emergency call list at each communication station. The most important numbers should be at the top of the list. It should list, as appropriate:

- Telephone numbers or radio frequencies for medical help
    - On site first aid attendant

  - Hospital, health centre, nursing station, poison control (include map with directions)
  - Aviation services
- Telephone numbers or radio frequencies for other emergencies
  - Local SAR organization(s)
  - Local police, RCMP, security services
  - Expediter
  - Fire fighting services (government: province, territory, state)
  - Forest Fire report number
  - Other nearby projects, especially if they have air support and your project does not, or they have better medical aid
  - Spill report number
- Location: list both latitude and longitude and UTM units

Additional considerations

- Post a separate list with company personnel and contact telephone numbers.
- Regarding medical facilities: Know (list, if necessary) which facilities treat specific injuries so a patient is not evacuated to the wrong facility. This may be especially important for injuries such as snakebite. Include maps to each hospital/clinic etc.
- The expediter may be able to arrange emergency assistance more quickly than someone in camp.
- Know the location and number of the nearest helicopter or fixed wing aircraft. Know how to contact them quickly. This may be at a different company's project.
- Any necessary government numbers (Workers Compensation Board, Mines Inspector, Environmental Spill Report etc.)
- Procedures for search and rescue if a PLB signal is set off and instructions to cancel the alert, if necessary.

When calling in an emergency from the field, state:

1. Your name – that your call is an emergency
2. Your location – both latitude and longitude and UTM units
3. Nature of the emergency
4. Type of assistance required

NOTE: Be ready to relay messages for other parties in need of assistance.

19.6.2 Company Hotlines

Depending on the size of the company and the type or location of project work, it may be advisable to establish a hotline to assist employees in the event of emergencies that threaten their safety, health or liberty. The service should be designed to address major emergencies experienced by employees who are travelling or working outside of their normal operations base

or out of reach of management at a local exploration office. Field personnel should always carry appropriate telephone numbers or telephone cards to access the hotline. It should be possible to call “collect” from any country. The hotline telephone number must be tested periodically to verify that it works.

A hotline must be manned 24-hours a day by a service that will immediately place the employee in contact with a designated company officer. The hotline should have numbers to use when calling from:

Canada and USA
Elsewhere in the world

19.7 Communications Tips Regarding Transportation

Vehicles

- Before departure each day, check the radio to make sure it functions correctly. Carry extra fuses if the system requires them.
- Stow whip antennas correctly. Know how to rig an emergency antenna to replace a broken one. Carry a dipole antenna as a spare; it may work when laid out on the ground.
- Verify emergency procedures and operating instructions for the radio (or satphone) are in the glove box.
- When more than one party uses a vehicle, each party must return the vehicle with all radio equipment in good working condition, including antennas. Inform the supervisor of any broken equipment.
- Refer to Chapter 13. Vehicles for additional information.

Aircraft

Communications between employees and the pilot:

- Several methods of communications may be necessary (two-way radios, HF radio, satphone).
- If using a two-way HF radio to communicate with a pilot, make sure that your two-way radio has the correct aircraft radio frequency.
- Refer to Chapter 16. Aircraft for additional information.

Slinging operations:

Radio communication between the pilot and the ground man is essential for safe slinging operations. However, employees must also be competent using hand signals for communicating with the pilot, as radios and headsets may be ineffective while the ground man is under the helicopter. The ground crew should be equipped with handheld FM radios that are fitted with headsets or speaker microphones. Only one person may relay information to the pilot.

- Headsets are preferred as they provide the following features:
    - Hearing protection
    - Noise reduction
    - Boom microphone at the mouth position so there is no need to avert your eyes from the task

- Radios should be holstered in such a way to provide:
    - Protection from entanglement
    - Relatively hands-free operation
    - Unencumbered movement of the wearer
    - Protection for the radio from inclement weather, dirt, dust

Boats

- Depending on the area, employees using boats should consider carrying a regular 406 EPIRB unit that floats and will activate when it comes in contact with water.
- Test EPIRBs strictly according to the manufacturer's instructions to prevent triggering a false alarm. For further information, see the following website and follow the links to the testing and inspection information: http://www.sarsat.noaa.gov/
- Information about Canadian requirements regarding marine radios, radio licenses, operator's licenses and much more can be found on the following website: http://boating.ncf.ca/vhf.html
- The following phrases are used routinely in marine alert and emergency communications. They may not be familiar to many employees but are useful to know:
    - When a situation requires urgent action (but is not actual distress) you may interrupt radio transmissions to gain access as soon as possible by announcing "**PAN-PAN-PAN**" or **"BREAK-BREAK**". Proceed with your transmission when traffic clears. An urgent message has priority over all other messages except distress.
    - When you are threatened by serious and life-threatening danger requiring immediate assistance use "**MAYDAY-MAYDAY-MAYDAY**". Never use "MAYDAY" unless the emergency is imminently life-threatening (e.g., a downed aircraft, a sinking boat, cardiac arrest, bear attack).
- Refer to Chapter 17. Boats, Canoes and Inflatables for additional information.

19.8 Resources

Internet Resources

International Satellite System Search and Rescue. *International 406MHz Beacon Registration Database.* https://www.406registration.com/. Accessed December 6, 2009.

National Oceanic and Atmospheric Administration. Satellite and Information Service. http://www.sarsat.noaa.gov. Accessed December 6, 2009.

National Search and Rescue Secretariat. *Beacon Registration.* http://beacons.nss.gc.ca. Accessed December 6, 2009.

Pat's Boating in Canada. *Marine Radio in Canada.* http://boating.ncf.ca/vhf.html. Accessed December 6, 2009.

Transport Canada. Marine Transportation. *EPIRB*. http://www.tc.gc.ca/marinesafety/tp/tp10038/70-lse-EPIRB.htm. Accessed December 6, 2009.

Products

The Prospectors & Developers Association of Canada does not endorse the use of these products. They are referred to only as examples of potentially useful communications tools.

BGAN. http://www.inmarsat.com/Services/Land/BGAN/default.aspx

Globalstar. http://www.globalstar.ca/en

Infosat Communications. http://www.infosat.com

Iridium. http://www.iridium.com

Roadpost. http://www.roadpost.ca/sitemap.aspx

Skyterra Communications. http://www.skyterra.com/index.cfm

Spot International. http://international.findmespot.com