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Do Volcanic Eruptions Affect ALMR



Although Mount Redoubt has erupted many times since March 23 without affecting the Alaska Land Mobile Radio (ALMR) Communications System, the potential for future eruptions to detrimentally affect ALMR will continue to be of concern. Given the location of Mt. Redoubt, and other periodically active volcanoes, the ALMR sites on the Kenai Peninsula were of the most concern prior to the recent eruptions. The prevailing winds, at the time of several of the eruptions, caused ash to be dropped near sites in the upper Matanuska-Susitna Valley and also across the Kenai Peninsula. Obviously, depending on future eruptions and wind direction, the potential exists that other sites may be affected.

Eruptions have the ability to affect ALMR in at least two ways. The first potential impact to the System is that a substantial amount of volcanic ash in the air could affect the microwave connectivity that ALMR depends on for wide-area communications. Secondly, sites could lose commercial power and revert to backup power sources (e.g. generator or batteries), which are of limited duration. A severe ash fall might preclude operation of on-site generators.

Sites that remain operational using either commercial or backup power, but lose microwave connectivity, will default to site trunking, as occasionally occurs on the System due to severe weather and/or power issues.

Following an eruption and any ash fall, all sites in the impacted area need to be in-

spected and cleaned to prevent potential damage and ensure continued operation. The Operations Management Office and the System Management Office, in coordination with the State of Alaska Enterprise Technology Services, assess the potential impact to each site and determine the appropriate actions.

If ALMR sites go off the air during an event, or are shut down to protect them from damage, user agencies in the vicinity of those sites will only be able to communicate in the affected areas using simplex frequencies, or the agency's back-up system (if applicable). As required by the User Council, OP Zone conventional frequencies (located at <http://www.akprepared.com/almr/pdf/IC%20Zone%20verbiage.pdf>) are to be programmed in all ALMR radios. These frequencies are available for use as the primary means of response communications until any downed ALMR sites are brought back on line.

If any sites are completely shut down, or go off the air during an ash fall, the site will not be brought back online until personnel can be dispatched to assess the site status and conduct clean-up operations, as necessary. Obviously, the availability of helicopters after an ash fall will impact the ability to immediately inspect some remote/mountain sites. High sites will be given priority for inspection and clean-up efforts due to their broader coverage area, as compared to lower sites.

Although the Mt. Redoubt eruptions are currently of concern, the challenges presented to the ALMR System by other catastrophic natural events (CNE) such as earthquakes, floods, wild land fires are addressed in the CNE Plan being finalized by the Operations and System Management staffs. Once approved by the User Council, the plan will guide recovery/restoration efforts for ALMR when an event occurs that has the potential to disrupt service to the System users. For questions or concerns regarding ALMR, please contact the Help Desk at almr-helpdesk@inuitservices.com, or 888-334-2567.

ALMR Help Desk

In Anchorage:
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Quality Assurance Oversight of Site Periodic Maintenance Inspections

ALMR currently consists of 80 sites stretching from Fairbanks in the North to Juneau in the South, and from near the Canadian border in the East to Kodiak in the West. The System currently serves 77 agencies utilizing over 13,000 subscriber units. An enterprise this large and geographically diverse requires constant attention to meet user needs and provide oversight of operations and maintenance of the infrastructure equipment. The Operations Management Office (OMO) is responsible for providing that attention to meet the needs of users, as well as maintenance oversight.

Among the numerous OMO tasks is ensuring the System performs at the highest possible level. Staff members accompany ALMR maintenance contractors as they perform annual Preventative Maintenance Inspections (PMI) at scheduled sites. During the February through September PMI season each year, OMO staff members monitor two randomly selected PMIs each month to provide quality

assurance oversight of the work being done. A report is provided to the User Council (UC) on whether or not the contractor's performance meets the standards set out in the Service Level Agreement (SLA). The report is also forwarded to the organization that owns the site with regard to any specific host site issues that require attention to ensure optimal operation of the System.

In addition to the reports provided to the UC on compliance with the SLA, the OMO also provides monthly (or as requested) reports to the UC on System use (i.e. total calls, busies, talk groups use, scheduled and unscheduled maintenance and ad hoc reports, as necessary) to keep the UC informed regarding System operation.

A full listing with detailed information regarding OMO functions, and services available to ALMR member agencies can be viewed in the OMO Customer Support Plan at www.ak-prepared.com/almr_documents.

In-Building Coverage

Man-made objects tend to affect radio signals in ways similar to mountainous terrain and foliage. Therefore, radio coverage inside buildings is much more complicated than coverage in open space. The loss of radio coverage affects the safety and well-being of public safety first responders who have to respond to situations within structures.

A number of factors affect radio coverage in a building. Relative location within an agency's coverage footprint may determine a major part of the building's internal communications capabilities. Each of the frequency bands (VHF, UHF, 700 MHz, 800 MHz) has its own penetration qualities. Building size, layout, and construction materials also contribute heavily to lack of the radio coverage within.

In-building communications can be defined in two ways:

- Internal unit-to-unit (ability of radio units to communicate with each other within the confines of the building)
- Subscriber unit-to-external infrastructure (ability of a radio unit to communicate with infrastructure located outside of the building)

There are three primary approaches to achieving in-building coverage: 1) increasing the signal level through deployment of additional antenna sites within the jurisdiction; 2) supplementing coverage in a specific building with a permanent system that boosts the signal level received from, and transmitted to, the outside; and 3) using deployable systems which can boost coverage in a building for a specific incident scene on a temporary basis. There are tradeoffs across each of these approaches, and it is likely that a combination of all three will be used in any given jurisdiction.

There are several solutions that can be utilized to improve in-building coverage:

- Active – bi-directional amplifiers
- Passive – splitters, couplers, or radiating coaxial cable (leaky coax)
- Hybrid – combination of active and passive components

During the Alaska Land Mobile Radio (ALMR) Communications System project design and installation phase, federal agencies were requested to survey buildings within their agency's territory to determine if bi-directional amplifiers were required. Most of those reported have been addressed. However, state and local buildings weren't surveyed and some require corrective action to improve coverage deficiencies.

If you are aware of Federal, State, or local buildings which lack in-building radio coverage, please provide that information to the Operations Management Office, who will direct them to the appropriate funding agency for consideration.

National Interoperability Field Operations Guide (NIFOG)

The Department of Homeland Security NIFOG is a collection of technical reference materials for radio technicians and communications supervisors who are responsible for radios/communications used in disaster response applications. It includes information on national interoperable frequencies and is an easy to carry pocket-sized guide. The Operations Management Office has a limited supply of these guides available, without charge, to user agencies. Please contact Sherry Shafer (sherryshafer@5starteam.net) if you are interested.



State of Alaska: Alternate Power Solutions



Reliable power is a critical component of services. In areas served by commercial power, this is managed by a traditional mix of battery plants and backup generators. If commercial power is interrupted, we can rely on our backup to keep the lights on until power is restored.

Usually 72 hours would be enough time to weather a commercial power outage, but in Alaska, it could take weeks. Because of this fact, the State is revisiting back-up power requirements in high-risk/long-recovery time sites.

In locations not served by commercial power, all power (primary and backup) is generated on site. The design of these off-grid sites is the real challenge. Options usually include some combination of generator, battery, solar, and wind. The challenge is finding the right combination to get the most reliable power possible. Solar is expensive to implement, inexpensive and reliable to operate, but seasonal when days get short. It is usually not enough

to provide all the power, but can help at certain times of the year. Wind is inexpensive to operate but works better in some locations than others, and is usually not sufficient. The traditional generator is a well known and reliable technology. The question then is how many, how big, and constant or cycle service. Getting a generator to remote start on a mountain top in the dead of winter can be a challenge. Reliability and efficiency are key decision points.

After trial and testing, the current preferred solution is to use pairs of smaller constant-run generators supplemented by solar and wind, whenever possible. The choice of constant run is to reduce the risk of a no-start that would require an on-site visit. A smaller generator works well as the constant run generator and provides a manageable fuel burn. The lower burn rate, and fuel tanks up to 1,000 gallons, provide for fewer visits. The paired sets provide a backup generator, as well as a way to balance the

run time on the generators. If the hour limit on the oil change comes up, we can switch to the second generator and the first becomes the backup. This has proven more reliable and economical than other solutions, with wind and solar adding economy of operation and reliability in the form of alternate power sources. For example, if the sun is right and the wind blows, Independent Ridge can get by on very little generator power.

When a failure in power can cause an interruption in service, and cost \$5,000 to correct, reliability is critical. At the same time, when a helicopter re-fuel trip can cost \$10,000, efficiency and economy of operation are equally important. This is an on-going challenge. As technology continues to evolve, so will our solutions for off-grid power.

Submitted by:
SATS Manager,
Carl Hereford



Anchorage Wide Area Radio Network (AWARN): 700 MHz Update



On March 26, the Municipal Assembly approved the purchase of radios using most of our grants from the Public Safety Interoperable Communications program and many of our awards from the 2007 and 2008 State Homeland Security Program. More than 800 P25 trunked SmartZone subscriber units are now on order. These will be added to the hundreds of AWARN/ALMR radios Anchorage has purchased over the past several years. It represents another milestone in our path to bring all Municipal radio users onto AWARN.

The Anchorage Bowl simulcast portion of the system is complete and several agencies are using it. All reports have been very favorable concerning coverage and voice quality. One law enforcement user described AWARN coverage with a portable (on the belt/

inside a vehicle) as superior to the coverage achieved with the legacy Project 16 trunked system mobile.

As we continue site build-out, a pressing issue for Anchorage radio users is how best to effect interoperability among our agencies. As we discuss this, we use the terms "talkgroup" and "channel" interchangeably. The simplest solution is to program radios with talkgroups from the other agencies. The negative of that is radios may have an unwieldy number of zones and talkgroups and dispatch may be unable to contact a unit while it is on another agency's channel. A second choice would be to have field units contact a dispatcher and request connection to another agency. The dispatcher then directs all

units who are to interoperate to a talkgroup that has been set aside or merges them with the target talkgroup. The potential problem with this is it requires dispatch to monitor at least one extra talkgroup and it slows down the establishment of the link between various agencies/responders. Our goal is for procedures to be consistent between our own agencies and surrounding departments.

I, along with Director of the Office of Emergency Management Mr. Kevin Spillers welcome input from those with experience in making these decisions. Contact us at ericksontj@muni.org and spillerskp@muni.org.

Submitted by:
Wireless Communications Director,
Trygve Erickson

Operations Management Office - What Do They Do?

The Alaska Land Mobile Radio (ALMR) Communications System serves over 75 federal, state, and local government agencies and volunteer organizations with approximately 13,000 subscriber units on 80 sites stretching from north of Fairbanks down to Juneau. It is a undoubtedly a technologically complicated system but it is also a very complex system from the perspective of governance and the sharing of accurate information among the members and prospective members.

One of the more important tasks that the Operations Management Office (OMO) can perform is the provision of accurate and timely information to ALMR members. Prior to the establishment of the OMO, the ALMR Project Management Office (PMO) was the only source for information on the various aspects of the System. The PMO was appropriately focused on implementation of the ALMR System and completing the project in a timely manner. Few resources were avail-

able to answer questions or proactively provide factual information to agencies trying to decide whether to participate as an ALMR member agency, what equipment to buy, membership advantages, other options, etc.

The ALMR Executive Council and User Council have designated the OMO to provide for not only the management of the System on a daily basis, but also the entity that current members, prospective members, or anyone interested in ALMR can contact to obtain current, factual information. For a complete listing of the available services, please review the OMO Customer Support Plan (CSP) on the ALMR website at www.ak-prepared.com/almr/documents.

If you have any questions about ALMR, please do not hesitate to contact the ALMR Help Desk at 888-334-2567 or almr-helpdesk@inuitservices.com.

Help Desk In Anchorage Bowl: 334-2567

Toll Free within Alaska: 888-334-2567

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Email: almr-helpdesk@inuitservices.com

Website: <http://www.ak-prepared.com/almr/>

ALMR Website

- Policies, procedures, and plans
- Executive Council/User Council members and meeting materials
- Subscriber radios authorized for use on the System and acceptance test procedures criteria used for validation
- Agencies currently operating on ALMR
- Training presentations
- Points of contact
- Frequently Asked Questions
- Insider newsletter

Find it at: www.ak-prepared.com/almr

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