**NT POLICE,
FIRE & EMERGENCY
SERVICES**

Communication Networks and Emergency Warning Systems to deal with natural disasters

NT Police, Fire and Emergency Services contribution

(a) the effectiveness of communication networks, including radio, telephone, Internet and other alert systems (in particular drawing on the spate of emergencies and natural disasters of the 2010/2011 Australian summer):

(i)   in warning of the imminent threat of an impending emergency

WebEOC

The Northern Territory has introduced a web-based incident management system (WebEOC). This system provides the capacity for all response and recovery agencies to use the system regardless of their individual agency operating system. As a result of the design within the system agencies can access a notification board that immediately advises all agencies of an impending emergency, such as severe weather, cyclones, bushfires and flood warnings.

Media based alerts

- Standard Emergency Warning System (SEWS) played via radio and television media – effective.
- Tropical Cyclone Advice from Bureau of Meteorology – effective.
- Flood Warnings from Department of Natural Resources, Environment, the Arts and Sport – effective.
- Landline and SMS to billing address through Emergency Alert – limited.
- Telephone (Landline and Mobile) to local/regional counter disaster controllers.
- Radio Phone (HF) – effective.
- UHF if within range – effective.

Bushfire Emergency Warning System

- the adoption of a new national framework for **fire warnings** which includes a redesigned **fire danger ratings** system that incorporates a new category of 'Catastrophic';
- Northern Territory Fire and Rescue Service (NTFRS) and Bushfires NT working collaboratively to develop strategic hazard abatement programs for greater protection of property from bushfire in urban and the urban/rural interface;

- introduction of an improved bushfire emergency warning system designed to provide information to Communities in the path of uncontrolled bushfires with the potential to impact on life and property, to enable residents to make potentially life saving decisions quickly;
- an enhanced arrangement with the national emergency broadcaster ABC, and other media, for disseminating **'Bushfire Emergency Warning'** messages and **'Bushfire Watch and Act'** messages;

The trialling of a telephone based text and voice emergency messaging system for landline and mobile telephone subscribers in areas with the potential to be impacted by an uncontrolled fire.

The **Fire Danger Rating** is derived as a scale of **Fire Danger Index** likely to be experienced for the following day and provided to the fire authorities by the BoM late each afternoon. The BoM forecasters calculate **Fire Danger Index (FDI)** by combining variables such as forecast temperature, relative humidity, wind speed and direction, vegetation type and available fuel volume, days since rain, level of 'curing' or dryness of vegetation fuel and other related factors. The figure resulting from the combination of these factors is based on bushfire science research and assists as an indicator of potential difficulty in controlling a fire should a bushfire start on that particular day.

- Note that the Fire Danger Index, which is used as the basis for Fire Weather Warnings and Fire Ban Days has not changed. Fire Bans will still be declared when the FDI reaches 45 – which is the level at which it becomes nearly impossible to control a bushfire.

The signboards as depicted below of a graded scale from Low to Extreme, with the arrow pointed at the present level of risk. Each colour represents a range/scale of FDI. What is new as a result of these national discussions is the incorporation of a new state of alert "Catastrophic" which takes effect when the FDI reaches and exceeds a figure of 100. One of the impacts of this change will be that dangerous fire weather will start with the needle pointing up, rather than to the right of the sign.
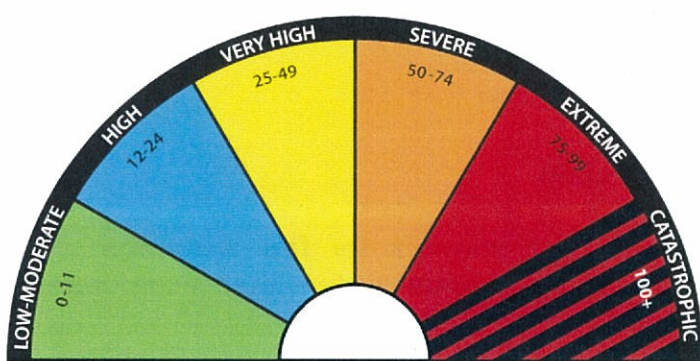
Under our new arrangements, when the NTFRS disseminates bushfire information, the message will be one of the following three categories:

Bushfire Advice message

Under this category a fire has started but there is no immediate danger and the message is for information only. It alerts individuals to the existence of a fire and allows them to keep up to date with developments. This type of message generally relates to a small fire which is controllable, or a prescribed burn under the hazard abatement program, or a fire burning a long distance from homes or structures.

The information message may be delivered through the NTFRS website, or passed on to the media for dissemination at a convenient time. There is no urgency attached.

Bushfire Watch and Act message

This message alerts you to a fire that is approaching your community, conditions are changing and the fire may threaten your property and possibly your life if not controlled. The fire is most likely to be burning in severe, extreme or catastrophic fire danger conditions and fire authorities' resources are stretched in attempting to control the fire.

Under this level of alert, community members are advised to protect themselves and their families and properties by initiating their Bushfire Survival Plan. Bushfire Survival Plans may be a prepared written document or a set of procedures developed and practiced with all family members detailing how an approaching fire will be dealt with.

Information will most likely be delivered by local radio, in particular the local ABC station. There is a degree of urgency in the dissemination of this message because the earlier you become aware of the situation, the better prepared you will be to act appropriately.

Bushfire Emergency Warning message

This message is the highest level of warning. It tells you that a bushfire is about to affect you and you need to take action to save your life immediately. The information in this message will always identify where the fire currently is, its severity, time due to impact on your community and what you should do immediately. More information may be included if there is time to do so.

This information will be disseminated most often by local ABC radio and will have a sense of extreme urgency which will require the ABC or other media to break into their programming immediately to broadcast the warning.

In some circumstances, particularly if the fire is burning on a day of Catastrophic fire danger, the message may be preceded by the Standard Emergency Warning Signal, which is the same as the signal that accompanies a Cyclone Warning message.

Bushfire Emergency Warning messages may also be distributed by telephone as SMS messages to mobile handsets and voice recording to landlines in a specific area. The information will also be posted onto the NTFRS website.

(ii)   to function in a coordinated manner during an emergency

Australasian Inter-Service Incident Management System (AIIMS)

The Australasian Inter-Service Incident Management System (AIIMS) was developed during the mid 1980's. It was based on a United States System, National Fire Service Incident Management System (NIIMS). AIIMS promotes effective joint operations through the use of common terminology and a structure that provides for appropriate communication between organisations at all levels of an incident.

It will operate effectively for any type of emergency incident, including floods, cyclones, rescue, earthquakes, fires, wind storms, aircraft accidents, train accidents, hazardous materials spillages, tunnel collapse, outbreaks of disease, road crashes, boating accidents, searches and the many other situations in which emergency service personnel will be involved.

AIIMS can be applied to organising and managing any event, large or small, where co-ordination and integration of various activities is essential.

AIIMS integrates personnel, procedures, facilities, equipment and communications into a common organisational structure, providing clear delegation of responsibilities to effectively accomplish stated Objectives.

In essence, AIIMS is a management system which:

- can be applied in a flexible manner to help deal with an incident of any size or type;

- applies a simple structure to help all personnel work co-operatively at an incident;

- operates through deliberate planning called 'Management by Objectives';

- outlines a process of decision-making; and

- one person, a group or a team at an incident can use.

How AIIMS is used in the Northern Territory

AIIMS is used to manage all fire and emergency situations throughout the Northern Territory (NT) (i.e. Bushfires, Structure fires, Road Crash Rescues or Hazardous Materials (Hazmat) incidents), size, or complexity. AIIMS also provides a structure for the management of large "non-emergency" incidents such as major events and training field days.

NTPFES WebEOC

The incident management system provides the capacity for all agencies to add information, task other agencies, provide sit-reps and Geographic Information System mapping capability. The use of the internet to access this system enables agencies to add and view information from any location. Benefits of this approach allow agencies to operate from within their own operation centre whilst still having access to the same information as the main Emergency Operations Centre. The system provides the capability of updating information from the field direct into the system for all agencies to view and provides immediate situational awareness. This level of agency communication within one system allows the Incident Controller to coordinate an effective emergency service response. The system is capable of coordinating multiple incidents simultaneously.

Electronic Incident Action Plan (eIAP)

Emergency Incident Action Plan – Fire Service frontline incident command

eIAP was upgraded this year to enable multiple users to access the system simultaneously. This eIAP software gives Command staff the ability to develop a comprehensive action plan from information obtained on the fire ground (scene of an incident). It provides a process for the Incident Controller to maintain high standards of record keeping for complex emergency incidents.

(iii)   to assist in recovery after an emergency

NTPFES WebEOC

The incident management system provides boards for response and recovery. As a result, information and tasks are able to be shared between the relevant agencies through the response and recovery operational periods.

(b)   the impact of extended power blackouts on warning systems for state emergency services, including country fire brigades and landholders or home owners

- any warning system is dependant on the ability to effectively communicate the correct messages. Any and all systems are dependant on the availability of power. The ability of these systems to continue to operate whilst mains power is missing is vital, however, any power outages will also affect the public, home phones, computers, recharging of mobiles etc. In time of disaster, eg the floods in the Brisbane Central Business District (CBD), the power was shut down to counter any flooding effects and damage to the power infrastructure, again impacting upon the ability to send or relay messages to the public;

- the NT Digital radio system has a battery time of 18 hours and, steps to have generators located at those sites which do not have

genset ability, is part of the normal planning for Cyclone and incidents. Over the last year the impacts of Cyclone Yasi and Carlos has not impacted upon the availability of this radio network for the Law Enforcement /Emergency Service Organisations (LE/ESO) agencies on this system;

- during the significant power outages experienced by the utilities company, the NTPFES digital radio system was the prime communications system for command and control, whilst the power outages (rolling) impacted upon the cellular networks, access, battery   capacity.
  power outages will affect all of (a) above depending on the extent of the outage;

- carriers, their exchanges and mobile towers;

- home owners will have no power (large demand for batteries for torches and radios);

- large demand for LPG for barbeques and gas fridges;

- use of YellowBird to get the message out (assuming radio stations are still running); and

- radio Stations provide a suitable method to get messages to the general public.

Incident management system (WebEOC) – relies on both NTPFES and Telstra infrastructure for back-up power and access to the internet for communication. Whilst the system can operate as a stand-alone incident management system pending other systems coming back on line, the strength of the system is on its accessibility through the internet. As this system continues development in incident management, GIS integration and warning update capacity for the public, the need for the system to operate through power outages is extremely important.

Northern Territory Fire Alarm System Transmission (NTFAST) State-wide automatic building fire alarm monitoring application.

The NTFRS has a wide area network of fire monitoring systems for approximately 850 buildings in Darwin, Jabiru, Nhulunbuy, Katherine, Tennant Creek, Yulara and Alice Springs.

The NTFAST system is a distributed alarm acquisition, monitoring and reporting system. It consists of a collection of radio telemetry devices based on the AD2000 RTU modules connected to local Fire Indicator Panels (FIP's) transmitting FIP status to a Master Base Station, telemetry device. The Master Base Station is connected to a PC based NTFAST Alarm Server. The function of the NTFAST Alarm Server is to scan the information collected from the local RTUs and to report the relevant alarm information.

The NTFAST system is distributed throughout the NT in a hierarchical structure. Each local centre operates independent of other centres throughout the NT. As the system is connected to the NTPFES WAN, the local NTFAST

Alarm Servers are monitored by the communications centre NTFAST global client workstation in the Peter McAulay Centre located at Berrimah, Darwin.

During the course of monitoring and reporting events the NTFAST Alarm Server interfaces with various databases, mobile data terminals, PA systems, radio system and printers. The system is a real time mission critical application developed specifically for the NTFRS and serves to ensure protected buildings are monitored on a 24 hour a day basis.

Radio technologies employed:

Several isolated 450/460MHz frequency PTMP systems using AD2000 RTU and base station repeater.

Typically, Fire Indicator Panels in buildings are required under Australian Standards to have a battery back-up of 24 hours NTFAST repeaters have UPS and 24 hour battery back-up and NTFAST Alarm Servers have UPS, battery back-up and generator support.

(c) *the impact of emergencies and natural disasters on, and implications for, future communication technologies such as the National Broadband Network*

- The National Broadband Network (NBN), is being built for domestic or consumer use. It is doubtful that the scope of works have stated a hardened and resilient system for use by LE/ESO. It would require the same 99.99% availability / accessibility as the Government Radio Network's to ensure users have access through times of high demand and during man-made and natural incidents.

- The NBN network will use fibre and therefore the active equipment will need power (to send light pulses down the fibre).

(d) *the scope for better educating people in high-risk regions about the use of communications equipment to prepare for and respond to a potential emergency or natural disaster*

- Education and preparedness of the public is the key to success. If they do not know their responsibility for planning and to ensure that they have the necessities to sustain life during time of disaster, then no amount of technology will counter this lack of planning.

- Planning is critical and the education and awareness of the public of their role and responsibility is paramount. An example is the Japanese exercises for earthquakes, where they set aside times for the public to practice their diaster preparedness.

(e) *new and emerging technologies including digital spectrum that could improve preparations for, responses to and recovery from, an emergency or natural disaster*

- Long Term Evolution (LTE) technologies will allow for numerous methods to be used to relay, access or deliver information in whatever form (web, internet, e-mail, SMS, video etc). These types of technologies can use many parts of the spectrum. The current debate over the 700Mhz Digital Dividend will allow for this spectrum to be used for LTE devices. Again, for use in time of disaster or incident, it must be a resilient and hardened system capable of allowing LE/ESO access during peak demand times, whilst still allowing the public access to information.

- Again, only systems built and the scope of the GRN's will allow and ensure access at times of high dependency.

- All electronic equipment requires power.

- Technology is not the saviour so planning for the absence of technology is a good idea.

(f)   any other relevant matters

- No matter what method is used, or by what means or what spectrum, the capacity of this agency to establish, fund or operate these systems is financially dependant.

- Issues to be discussed in relation to the above technologies include Interoperability, Usage, Coordinated Usage (one source – multiple channels of delivery), fail-over systems and self-healing (redundant links) etc.

- What critical infrastructures keep all of the above operational?

- All of the above rely on power to run the electronic equipment. While some have battery back-ups (all will vary) and may be a generator, eventually the batteries will run dry or the generator fuel tank(s) will need refilling. Either portable generators are needed or fuel will be required depending on the site.

- The capacity of communication networks and warning systems to deal with emergencies and natural disasters depends upon the type and extent of such emergencies and natural disasters.

The NT Government (and NTPFES) and many service providers (e.g. Telstra) have limited or no disaster recovery facilities.

Technology	Used by the NTPFES	Comments
Websites	Yes	
E-Mail	Yes	
Web-Mail	Yes	
SMS	No	
MMS	No	
GPS	No	
Satellite Phone	Yes	Iridim, and Thuraya systems, handheld only
Satellite Dish	Yes/No	Rely on whole of NT Government system.
Satellite Ground Station		Rely on whole of NT Government system.
Private Radio Networks (e.g. NTPFES)	Yes	• P25 Digital trunking in Greater Darwin, Katherine and Alice Springs. • Convential analogue in remote and rural areas • All above used by NT police, Fire, Emergency Service, and St John. Limited access to Bush Fire Council
Push to Talk (Carrier)	No	
Mobile Towers (Carriers)	Yes	Site sharing with Telstra (West Gap) Alice Springs
Fibre Links	Yes	
SCADA Systems	Yes	NTFAST Fire alarm monitoring system, NT wide
NEWS	Yes	National Emergency Warning Systems uses the Carrier terrestrial and mobile links
YellowBird	No	Can be used to interrupt radio programs irrelevant of the radio station being listened to by someone.
WebEOC	Yes	
Public Digital Radio Network (Motorola System down the South East Coast)	No	NTPFES owned, operated and maintained by NT police.
NBN	Started	
Carrier Exchanges	Yes	
Internet	Yes	
ISP's	Yes	
Internet Domain Servers	No	
Copper cabling	Limited	Only where Telstra still support this, but 99% of services migrated to fibre.
Microwave Links	Yes	NTPFES owned, operated and maintained by NT police, for P25 system
Mesh Networks	No	
Facebook	No	
Twitter	Limited	
Private SMS (e.g. NTPFES)	Some	SMS via NTFAST, for fire alarm, Paging used NT wide for NT police, Fire and ST John, owned, operated and maintained by NT police
WiFi	No	
Wi-Max	No	
CCTV	Yes	Preventing and monitoring crime and anti-social activities