

## STANDARD NEST BRIEFING

### VG 1 DOE LOGO:

I'm Stephen Ronshaugen, Director Emergency Management Division. One of the missions of the Nevada Operations Office of the Department of Energy is field management assistance provided in response to incidents which involve the potential for criminal misuse of nuclear materials.

### VG 2 NEST:

The Nuclear Emergency Search Team, commonly referred to by its acronym NEST, is one of several specialized nuclear emergency organizations in DOE. NEST is a capability that assists the Federal Bureau of Investigation and other government agencies by providing technical expertise and advice in response to a variety of potential incident threats involving nuclear materials. These threats or acts can be perpetrated by terrorists, criminals, psychotics, extortionists, or nationalist groups. Nuclear threats can, likewise, take many forms, the most common of which are improvised nuclear yield weapons, radioactivity dispersal devices, or misuse of stolen military weapons.

To assist in your understanding of NEST, I would like to address the background, capabilities, and some of the past deployments of NEST. The NEST capability is built around the Department of Energy's nuclear weapons capability and was established in 1975 in response to an increasing number of nuclear threats. Over the

years, the resources of NEST have been expanded and diversified to meet actual and potential misuses of nuclear materials. NEST draws on the resources of the Department of Energy national laboratories at Los Alamos, Lawrence Livermore, and Sandia. It also includes specialized contractors such as EG&G/EM, Reynolds Electrical and Engineering, Inc. and Raytheon Services of Nevada. NEST also obtains expertise and equipment from other government agencies.

To date, there have been in excess of 100 nuclear extortion threats and incidents in the United States. Only approximately a dozen of these resulted in deployment of NEST assets. All others were clearly determined to be hoaxes, not requiring further action.

### **VG 3 "Maintain deployable search, identification, and diagnostic capability"**

NEST has been assigned the responsibility to respond to:

- Lost or stolen nuclear weapons and special nuclear materials.

The special nuclear materials referenced here are those radiological isotopes that are capable of being used to construct nuclear yield devices.

- Nuclear explosive threats. In other words, a device that a perpetrator has built or modified and is purported to be capable of a nuclear yield.

- Radiological dispersal threats. These are threats to spread or disperse any of the numerous ionizing radiological substances available.

The NEST R&D capability is directed toward the nuclear explosive or dispersal threat.

We commonly refer to these devices as Improvised Nuclear Devices (IND) and the

Radiological Dispersal Devices (RDD). In the past decade, the IND problem has received the greatest attention but the possibility of proliferent third world nations and the potential loss of control of former Soviet Union weapons and material are considered as greater possibilities today that ever before.

**VG 4 Executive Order 12656:**

The primary authority for the DOE NEST Program is in the Atomic Energy Act of 1954, as amended, and in Executive Order 12656 which modifies the basic Emergency Preparedness Order 11490. As you can see on the viewgraph, the DOE is charged with:

- Coordination of search and recovery operations for nuclear materials, weapons, or devices.
- Assistance in identification and deactivation of INDs.
- Providing scientific and technical advice for radiation problems in the event of detonation of an IND.

**VG 5 NUCLEAR THREAT RESPONSIBILITIES IN THE UNITED STATES**

Within the U.S. three federal agencies share the federal responsibility in countering a nuclear terrorist incident. The lead agency is the Federal Bureau of Investigation (FBI). The malevolent use or threatened use of special nuclear material is a violation of the Atomic Energy Act, and it is the responsibility of the FBI to investigate such threats and to provide for the protection of the public health and safety.

The nuclear terrorist actions, discussed here result in the FBI assuming command over the incident and all federal resources devoted to resolving the incident. The DOE and selected elements of the Department of Defense (DoD) provide support to the FBI.

The DOE family has great deal of technical expertise in the design and construction of nuclear weapons, and therefore, is in a optimum position to provide technical assistance in a nuclear threat incident or accident. We are prepared to provide a wide range of responses as we will discuss in a few minutes.

DoD assistance, primarily through their Explosive Ordnance Disposal or EOD teams, will be provided to counter booby traps and to allow DOE diagnostics personnel and equipment access to the suspect object. They also provide the hands-on operation of the disablement equipment under the direction of DOE scientists.

The viewgraph depicts only some of the federal responsibilities during a nuclear criminal misuse incident; however, as you are well aware, the basic health and safety responsibility of the populace rests with local authorities, not federal. Control of civilian populace, traffic control, evacuation decisions and procedures, as well as other similar activities, are clearly within the realm of responsibility of the local and state authorities. Therefore, it is essential that police forces, fire departments, civil defense agencies, and local and state government authorities understand the NEST capability and functions such that we can all work together as a team during a nuclear incident.

## VG 6 CHANNELIZATION OF THREAT, NOTIFICATION, AND DEPLOYMENT

How does a nuclear threat activate the NEST system? As mentioned previously, a nuclear threat is a violation of federal law. A special unit within the FBI/HQ is assigned the responsibility for handling this type of violation. Once notification of a threat is received in the FBI, it is reported to this unit a FBI/HQ. FBI/HQ, in turn, notifies the DOE/HQ of the threat and requests the assistance that is required.

The first assistance provided is the assessment of the actual threat message that was received. DOE at Lawrence Livermore National Laboratory maintains a capability to analyze and evaluate a threat in three aspects: technical, operational, and behavioral. The behavioral assessments are performed by psychiatrists and psychologists dealing in the behavioral sciences. Valuable information is gleaned from the threat message and the words utilized. Results of the assessment are passed to the FBI, providing an indication of the credibility of the threat, including as much information as is available that would assist law enforcement officials in their efforts to identify and apprehend the perpetrators. If the threat appears to a be credible or a least can not be determined to be a hoax, NEST is deployed. Most threats terminate during the threat assessment phase since they are clearly determined to be a hoax and warrant no further action.

## **VG 7 DEPLOYMENT ACTIVITIES**

This viewgraph displays the sequence of operations in the event that the threat is determined to be credible and requires a full NEST deployment. As discussed before, the threat is passed to the FBI and then to the DOE requesting the threat credibility assessment. If the threat looks credible, the FBI may request a senior DOE/HQ management team direct a NEST deployment. A senior DOE Official, normally the Manager of the Nevada Operations Office, is appointed as the Energy Senior Official (ESO) and is responsible for the management of the NEST response to this event. The DOE ESO then selects a Senior Scientific Advisor (SSA) from one of the three nuclear design laboratories.

In some instances, a small advance party may be dispatched to the scene of the incident to work with the local authorities and to scope the full NEST involvement. Feedback from this advance party helps tailor the size and composition of the main party which is then deployed to the incident scene. The deployed NEST assets and personnel will be established as the on-scene NEST base of operations. It is likely that there may not be time available to use the advance party concept and portions of the NEST team will depart as soon as transportation is available.

## **VG 8 ON-SCENE ACTIVITIES**

Once on-scene, NEST performs a number of on-site activities as depicted in this viewgraph. As is seen, assessment activities continue from the receipt of

the threat message until demobilization. Over on the right hand side are several other prime activities that are initiated:

- Effects Prediction
- Damage Mitigation Planning
- Disablement Planning

As soon as NEST arrives on-scene, preliminary plans are developed. As more details of the suspect object are determined, these plans are refined accordingly. Also immediately upon arrival, the FBI will arrange on-site meetings with local authorities, conducted to learn more details of the incident. This will assist NEST in the initiation of a radiological search, if such activity is necessary, to locate the suspect object. DOE is prepared to mount airborne, surface vehicle, and hand-held radiological searches, as appropriate, to locate the object. Once the suspect object has been found, the access phase begins to identify and overcome any booby traps which may prevent close proximity to the suspect object.

Once access is gained, detailed diagnostics are undertaken to determine as much as possible about the suspect object. This information is needed to determine if the device is actually credible, and to develop render-safe plans.

Based upon the diagnostic information, a damage mitigation or containment plan is developed to localize and contain any radiological contaminant, which in turn minimizes the post-incident clean-up activities needed and the potential loss of property.

The disablement scheme is also finalized based upon the diagnostics information and implemented in conjunction with the containment system. NEST would contribute its assets to the operations of a Federal Radiological Monitoring and Assessment Center--also know as a FRMAC.

#### **VG 9 NEST FIELD ORGANIZATION**

As depicted on the previous two viewgraphs, there are a considerable number of on-scene activities to be undertaken by NEST during a nuclear incident. NEST has a basic command and control structure sufficient to address the wide variety of activities potentially needed to successfully resolve the nuclear incident. This viewgraph shows the NEST field organization that would be implemented for a major NEST deployment. I would like to stress that his organization, as shown, would only be implemented in its entirety for a major problem requiring the full range of responses and capabilities available with the NEST. To date, there have been no actual Improvised Nuclear Devices or Radiological Dispersal Device events. All deployments have been much smaller with a maximum of 45 people deployed to resolve each incident. If needed, NEST can deploy on the order of 600 people and approximately 150 tons of equipment to an incident site.

#### **VG 10 NEST TEAM MEMBERS**

Throughout this presentation, I have referred to the Nuclear Emergency Search Team. I would like to reiterate that the people filling the various



functions within the NEST organization are an integrated team, with members coming from a variety of organizations within the DOE and DoD. This team is in support of the FBI Special Agent in Charge of the incident. Shown here are the organizations from\*\* which personnel would deploy. It includes personnel from the DOE, the three DOE nuclear weapons design laboratories: Lawrence Livermore National Laboratory, Los Alamos National Laboratory, and Sandia National Laboratories, plus DOE/NV prime contractors EG&G/EM and Reynolds Electrical and Engineering Company. Additionally, Army Explosive Ordnance Disposal personnel would be actively involved.

#### **VG 11 NEST ELEMENTS**

There are a number of NEST elements that could be brought to bear on the incident, ranging from airborne detection systems to portable telephone systems, hand-held radiation detection systems, photographic capabilities, and a variety of other support activities.

NEST, when it deploys, goes to the field a wholly contained element with all the logistical, administrative support needed to field its scientific efforts. Services needed, such as housing, food, rental cars, etc., are also arranged by the NEST support personnel.

#### **VG 12 SPECIFIC NEST RESPONSE FOR EACH PROBLEM**

To successfully counter the wide variety of potential nuclear problems, a number of systems and capabilities are needed. However, each and every c

capability is not needed for every problem. If sufficient information is available prior to deployment, the NEST response is specifically tailored to address the given scenario at hand.

Most NEST personnel have NEST as a collateral duty to their full-time jobs within the DOE nuclear weapons program. In this manner, we not only reduce the costs of the program, but more importantly, we assure that experts are working daily in each technology needed in a NEST incident and are available for deployment as needed.

#### **VG 13 AERIAL PLATFORMS**

The equipment that is available within NEST is important to the success of the mission. This viewgraph depicts the DOE aircraft available to us. As shown, we have four helicopters equipped with on-board detection systems for radiological search, and three fixed-wing aircraft, each modified for remote sensing. These aircraft are owned by the DOE and are available to the NEST program, but have other day-to-day duties supporting DOE/NV in routine radiological, photo, and remote sensing missions.

#### **VG 14 GROUND AND VAN MOUNTED RADIATION SEARCH EQUIPMENT**

A variety of hand-held detector systems are maintained in the NEST inventory to meet the various needs and blend in for covert searches as necessary. Each is equipped with electronics for background suppression, which greatly enhances the

ability of the unit to detect a small source as an operator passes by. They are also capable of providing a signal to the operator using an inductively-coupled ear phone that allows only the operator to know that a source has been located.

**VG 15** In addition to hand-held or airborne searches, we can mount large, sensitive detectors in rented vans and do area sweeps along streets and roads. If the source is in an automobile or a building near the street, we should be able to get a positive signal even while the detector van is moving. It is our intention to have a local law enforcement officer with us in the vans to efficiently search areas unknown to the NEST personnel.

#### **VG 16 DIAGNOSTICS FUNCTION**

When sufficient access is achieved, the efforts to diagnose the device will increase. Initially, these will focus on passive measurements to determine what's in the device, the location and identification of the radioactive material and if it's yield-producing potential is credible. It is also desirable to develop a good physical description of the internal components to provide the necessary information to attempt disablement. Invariably, there will be a desire to use radiographic techniques to achieve better resolution of the size and location of the components. The use of active diagnostics also carries some degree of risk and may not be permitted in some instances. Efforts in the last few years have concentrated on means of getting improved radiographs at lower exposure doses.

## **VG 17 DISABLEMENT FUNCTION**

At some point in the process, it may become desirable to attempt to disable or render the device safe. This may not be possible without accepting a possibility that some nuclear yield will result, or, of much lessor consequence, that radioactive material will be scattered over the adjacent area. The decision-maker therefore must decide whether to accept the risk of the terrorist's device producing a nuclear yield or the risk of a lessened yield and/or radioactive material dispersal. A variety of disablement methods have been developed and tested. Each of them is highly effective against certain components and devices. Like the rest of the NEST equipment, there is no one solution that can cover all situations. The decision of which device to employ will be a strong function of the availability of diagnostics and intelligence information.

## **VG 18 CONTAINMENT EFFORTS**

If the disablement attempt initiates the explosive, the violent reaction may generate an aerosol which will be dispersed downwind by the buoyant plume which results from the detonation. Methods have been developed which can significantly mitigate this dispersal. The most prevalent uses aqueous foam. The water in the foam provides capture sources for radioactive material. As the foam flows rather freely, it is necessary to build constraining structures to hold the foam in the desired positions over the device.

## VG 19 EFFECTS ANALYSIS

By far the greatest consequence of such a terrorist event would be nuclear detonation. Both the prompt effects of the detonation and the longer-term dispersal effects would stretch to great distances. If a nuclear detonation can be precluded, these distances are greatly diminished, especially if an effective containment system can be emplaced.

As demonstrated during the briefing, NEST has a wide range of technical expertise and equipment assets to address a variety of problems.

The most extensive deployment of NEST was Operation Morning Light where the NEST capability was appropriate to provide assistance to the Canadian Government in search and retrieval of radiological debris from a Soviet Cosmos satellite that fell in northern Canada. This operation involved approximately 120 NEST personnel deployed over a three-month period and provided an opportunity for extensive evaluation of the NEST structure, personnel, and capabilities under extreme environmental conditions.

The Harvey's Casino bombing in 1981 was another type of response in which NEST gave assistance to the FBI. This was a sophisticated explosive device with a number of access denial devices. While NEST was not formally called out for this non-nuclear incident, advice of members of the community was solicited to help both with the access to the device and in recommending disablement schemes.

The Department of Energy is very seriously committed to its responsibility of assisting the FBI in any instance regarding the criminal misuse of

radioactive material. It has backed up this recognition of responsibility by spending from \$20M to \$30M per year since the late 1970's to devise methods of countering these threats and to develop a trained team to respond to those incidents. Their intent is to continue to provide this high level of support. While this cannot ensure success against nuclear terrorism or events of criminal misuse of nuclear materials, it will guarantee that the best resources available will be employed to minimize the potentially catastrophic consequences of such incidents.

Thank you for your attention. Do you have questions?