

RADIOACTIVE WASTE TRANSPORTATION DRILLS

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ABSTRACT

The Tennessee Valley Authority's (TVA) radwaste transportation drills involve staged transportation accidents which precipitate communications and emergency responses that would result in the event of a real accident. These exercises allow TVA to test several areas of the radwaste shipping program and transportation incident response procedures. The exercise calls for emergency response by local law enforcement, civil defense, and other State emergency personnel. In the developmental stages of the exercise, meetings are held with all of these organizations in the host State. At these meetings, a presentation on the transportation drill is made by TVA which includes general information on TVA radwaste shipments, what radwaste is, why the drill is being held, and what the value of the exercise is to all involved. The drill, therefore, serves as a learning tool for TVA and all other participating organizations.

BACKGROUND

TVA now has in operation or under construction four nuclear power plants comprised of nine units in the 1,100- to 1,300-MWe range. The two plants (five units) currently in operation generate a total of approximately 130,000 cubic feet of low-level radioactive waste annually. This consists of materials such as mops, cleaning rags, coveralls, contaminated tools, and dewatered resin. Until very recently, TVA utilized only the Chem-Nuclear Systems, Inc., site in Barnwell, South Carolina, for disposal of this material. Because of reductions in volume allocation at Barnwell, TVA began making radwaste shipments (trash packaged in drums and boxes only) to the U.S. Ecology disposal site near Richland, Washington. TVA submitted license applications to NRC for temporary onsite storage in engineered concrete modules in July 1980 and November 1980 for its Browns Ferry and Sequoyah Nuclear Plants. On September 17, 1982, NRC granted a license for use of the onsite storage modules at Sequoyah Nuclear Plant. These storage modules will only be used to accommodate waste which cannot be shipped offsite within a reasonable length of time because of plant generation rates or circumstances at the commercial disposal sites. TVA's philosophy is to minimize waste generation while considering the economic, environmental, and political aspects of low-level waste management. Offsite shipment is more environmentally acceptable than lengthy periods of onsite storage, so immediate shipment of TVA's low-level waste is accomplished to the extent possible.

TRANSPORTATION OF TVA'S RADWASTE

The safe transportation of material which travels to commercial disposal sites is of the utmost importance to TVA. Our safety record has been excellent to date with nearly one million miles logged by commercial carriers hauling TVA's radwaste. While it is hoped that no accident will occur, the possibility exists and we must be prepared. TVA has taken several steps to enhance its preparedness in this area. An emergency kit and emergency instructions accompany each shipment. All drivers are trained in use of the equipment in the kit and emergency instructions which include notification procedures. A portion

of TVA's Radiological Emergency Plan (REP) is dedicated to incidents involving transportation of radioactive waste. TVA's Radwaste Management Group maintains updated shipment information and monitors a pager at all times to facilitate notification and quick transfer of information in case of an accident. TVA's transportation drills provide the opportunity for testing all of these measures.

TRANSPORTATION DRILLS

Planning the Exercise

TVA's transportation drills involve a simulated accident which assumes the wreck of a tractor-trailer carrying radioactive waste. These exercises are conducted somewhere along the usual route during an actual radwaste shipment. A drum of noncontaminated trash is used to simulate a breach of container integrity and release of radioactive material. These exercises require extensive planning and coordination on the part of TVA and have proven to be very worthwhile.

The first step in planning a transportation drill is development of a preliminary scenario outlining the basic exercise, the goals, and the expected response for each portion of the exercise. The scenario can then be used in the next step which involves choosing a host State for the exercise. Discussions are held with appropriate State officials to determine their willingness to be involved in the drill. Usually, State officials are receptive to the idea of a transportation drill and enthusiastically promote the concept among their local law enforcement and emergency response personnel.

Next, several possible site locations along the normal radwaste transportation route are evaluated using quadrangle maps and area descriptions from drivers. The drill site is then selected after physical inspection of these likely areas. Several factors must be considered when selecting a site. Some of these include the method by which the driver is to make required notifications (CB radio, telephone), whether the exercise can be executed without interrupting the

normal flow of traffic on the highway, and accommodation of emergency response personnel and news media.

Once a site is established, a date and time can be set for the exercise. All of this information is known only to TVA personnel. Prior to the exercise, a meeting with law enforcement and emergency response personnel from all counties along the transportation route is held. The meeting is best organized and coordinated by State officials. This is an information session for potential participants from the host State at which TVA conducts a presentation on the transportation drill. This program includes descriptions of each waste type, the packaging requirements, and a discussion on how the packages are shipped. A short comparative explanation of radiation doses is given along with examples of doses to be expected for each type of TVA waste. Details on the transportation drill are given including information on the drivers emergency procedures, what notifications will be made, TVA's part in the response, and what we hope to accomplish with the exercise. Most local law enforcement and Fire Department personnel have received training in transportation incident response involving radioactive material. They have been trained to use radiation survey instruments and designated individuals carry these in their vehicles. Most do not, however, have practical knowledge or experience in procedures to be followed at an actual accident scene. This meeting provides the opportunity for these people to ask any questions they may have. The representatives at the meeting are given a 30-day timeframe in which the exercise could occur. All other specific details are known only to TVA.

A press conference is usually held in cooperation with the host State to inform members of the media and the public about the transportation drill. Basic information on TVA's radwaste program including the drills and their purpose is given. Shortly before the drill, a press release is issued. The release explains the purpose of the exercise and gives general information about TVA's radioactive waste. The following is a press release which was issued by TVA on August 17, 1977 before a drill in the State of Alabama.

TVA to Assist Alabama Public Health Department in Radiological Drill

TVA is cooperating with the State of Alabama Department of Public Health in staging a simulated traffic accident involving the transportation of low-level radioactive materials to test the timely response of local, State, and Federal agencies which would be involved in the event of such an accident.

The simulated accident will be staged sometime before the end of August, and will take place somewhere in northern Alabama. The drill will assume the wreck of a flatbed tractor-trailer, transporting casks of low-level radioactive materials such as clothing, gloves, mops, and resins from TVA's Browns Ferry Nuclear Plant near Decatur, Alabama, to a low-level radioactive waste burial ground at Barnwell, South Carolina.

The casks containing the radioactive wastes are designed, tested, and certified to

withstand impacts which could result from actual transportation accidents, and it is highly unlikely that the contents could escape. Even if the casks were breached, it is unlikely that there would be any serious radiation exposures because of the relatively low level of the radioactive material that is shipped in solid form.

Any contamination resulting from this kind of accident would be confined to the immediate vicinity where the accident occurred. A general evacuation of the public near the accident site, which is a common procedure in some accidents involving hazardous materials such as noxious gases, would not be necessary.

The Exercise

As the date of the exercise nears, final preparations are made. Plant personnel are instructed to prepare a drum of noncontaminated trash. This drum is carried on the trailer along with a regular cask shipment containing resin. TVA's cask trailer has eggcrate structures mounted on the front and back so that drums can be carried along with a resin liner. The driver of the designated shipment is told by TVA's Radwaste Operations personnel that he will be participating in a drill exercise (written permission must be obtained in advance from the carrier). The driver is requested to pull his rig over at the chosen location. Upon his arrival, the drum of clean trash is opened and the material is spread over a small area near the trailer. Sealed sources provided by State civil defense personnel are placed in this material. This entire procedure creates a sense of realism for emergency response personnel and provides a radiation dose reading on detection equipment. The driver's emergency procedures (taped or placed in a conspicuous location in the cab of every shipment) instruct him to provide first aid to any injured persons and rope off the area. Each shipment is provided with an emergency kit containing first aid equipment, rope and stanchions, plastic bags, protective clothing, and a radiation survey instrument. The driver is to notify local law enforcement and then the TVA Operations Duty Specialist. He will probably also wish to contact his dispatcher at this time. If local law enforcement officers are contacted by CB radio, they will, upon arrival, provide transportation for the driver to a telephone. The driver is aware that certain information will be required of him when he notifies the TVA Duty Specialist. As he complies with the instructions outlined in this emergency procedure, the driver will ensure that he has the answers to these questions before the notification is made. The emergency procedures are outlined as follows.

Procedures to be Followed by Vehicle Operator in the Event of an Accident, Delay, or Detour

Accident Procedures

1. Remove injured persons from any possible contaminated areas and provide first aid.
2. After analyzing the situation, the driver shall rope off the area as follows:
 - (a) If there are no visible signs of leakage, a restricted area at least 20 feet from the transport vehicle on all sides shall be established.

- (b) If there is visible leakage, a restricted area at least 20 feet from visible contamination shall be established.

If a radiation survey instrument is provided, the driver or other individual at the scene trained in the use of such instrumentation can provide survey information, if requested, to State authorities or cleanup teams en route to the scene.

3. If a container(s) is visibly damaged or material is leaking from the container(s), establish the restricted area and obtain the help of the police in keeping people out of the restricted area and on the upwind side if possible. Do not allow the taking of souvenirs.
4. If there is a fire, keep everyone upwind and do not breathe any of the smoke and fumes coming from the fire. Notify the Fire Department of the fire, and inform them that the transport vehicle is carrying radioactive material.
5. Notify the State or local police as appropriate.
6. Notify the TVA Operations Duty Specialist, area code 615, telephone number 751-2495, of the accident, and give answers to the following questions:
 - (a) What is your name?
 - (b) What is your relationship to the accident (truck driver, State or local police, or passerby)?
 - (c) Where did the accident occur, and at what time did it occur?
 - (d) Where did the vehicle originate, and what is its destination?
 - (e) What authorities, such as State or local police, have been notified?
 - (f) Was anyone injured? What is the nature and extent of their injuries?
 - (g) Has medical assistance been summoned for injured persons?
 - (h) Is there a fire involved?
 - (i) What is the extent of damage to the vehicle and shipping container?
 - (j) Is there an obvious breach of the shipping container? Have the contents of the container spilled?
 - (k) What type of shipment is this (cask, van-type trailer or other vehicle)?
 - (l) Where are you calling from?
 - (m) How can you, State, or local police be contacted (area code and telephone numbers)?

7. Limit your discussion with the press and public to a statement that the shipment consists of radioactive material (as described in your shipping papers) contained in a package approved by DOT and NRC. Any additional information will be given to the public and press by a TVA information officer or representative of the State Health Department.
8. Get the names, addresses, and telephone numbers of the injured and any witnesses.

Delay or Detour

Any significant delays or detours encountered while radioactive material is being transported shall be reported to the Power Stores supervisor or his designate at _____ Nuclear Plant, telephone number _____.

After receiving information from the driver, the Operations Duty Specialist notifies the TVA Central Emergency Control Center (CECC) Director, the Division Director and others as required by the REP. The TVA REP is activated if a shipment from a TVA facility is involved in a transportation accident in which radioactive materials are released or may have been released to the environment. The Radwaste Management Group contact is notified immediately by the CECC Director so that information on the contents of the shipment can be passed along to the proper TVA and State authorities. Based on the contents of the shipment and information given by the driver, the CECC Director decides whether conditions warrant activation of the CECC Staff.

In all of TVA's transportation drills a breached container is simulated and, therefore, the REP and CECC Staff are activated. Under these conditions, TVA may dispatch a radiological monitoring team if requested by the Department of Public Health or if assistance is deemed necessary by TVA's Radiological Health personnel. The CECC Director may provide assistance for cleanup and recovery of radioactive materials as he deems necessary.

Having made contact with local law enforcement officials, the Operations Duty Specialist, and his dispatcher, the driver returns to the spill area. Law enforcement officials usually arrive first. They review the shipping papers and check the area with their radiation survey meter. They are prepared to seal off the area, provide crowd control, traffic control, and provide assistance as necessary. The Fire Department may participate in an exercise such as this. In a drill held near Conyers, Georgia, in November of 1979, the Rockdale County Fire Department responded suited in anticontamination clothing and surveyed the surrounding area.

The State Radiological Health office is contacted by the CECC Director shortly after notification of the accident by the driver. State personnel usually arrive after law enforcement and Fire Department personnel because of long distances which may have to be traveled to reach the site. Upon their arrival they may conduct surveys of potentially contaminated individuals and perform analyses of environmental samples of

air, soil, and water. The State is in contact with the CECC through police communications or through communication back to the State central command post.

TVA may decide to dispatch a monitoring team at any time in this scenario. This team would also be capable of assisting in cleanup efforts. The carrier is responsible for cleanup of any accident but TVA will lend assistance as necessary. In all drills conducted to date, TVA, in conjunction with the State Radiological Health response team has provided cleanup efforts. The cleanup crew dresses out in protective clothing and begins picking up the debris at the periphery of the roped-off area. The sealed sources are located and removed first. Moving toward the vehicle, the cleanup crew carefully puts the trash back into containers. The State Radiological Health personnel make a final survey of the area to ensure that all material has been recovered and that the area is sufficiently free from contamination above background. At that point the exercise is completed.

FOLLOW UP

At the conclusion of the exercise a critique is scheduled. The purpose of this meeting is to allow discussion of the drill among all involved organizations. Problems encountered during the exercise and possible solutions are examined. Often, other members of the collective group are able to offer constructive criticism and excellent suggestions for more effective programs.

MEDIA INTEREST

During the course of the exercise, news media personnel arrive and request information and interviews. TVA and State officials allow the media close access to the activities during drill. In the event of a real accident, this would not be permitted. A spokesperson would be assigned from TVA or State Radiological Health to keep the media updated at a location well away from the spill area. We believe a closeup view by the media of activities at the drill site is beneficial in educating the public. The general public should be aware that an accident involving low-level radioactive waste does not pose a threat to them and will not necessitate evacuation near the accident even in cases involving a breach of container integrity. This type of exercise ensures the public that TVA and State authorities are capable of handling transportation emergencies in a safe and timely manner.

CONCLUSIONS

The transportation drills conducted by TVA have proven to be very educational for policemen, Fire Department personnel, news media, and the general public. All participants in the drill and area residents have a better understanding of the types of material being transported through their county and the recovery procedures involved should an accident occur. State Radiological Health personnel have had an opportunity to test their emergency response procedures and equipment as well as their communication system with TVA Radiological Health personnel and the CECC. As a result, they have given TVA many suggestions which have improved information transfer and thus made emergency response more effective.

TVA has coordinated three transportation drills, one in Georgia and two in Alabama. All three exercises have pointed out problem areas and many improvements have been made as a result. Much of the information requested of the driver in his notification to the Operations Duty Specialist has been revised to provide the most important details. Minor discrepancies in the TVA REP have been corrected. Other changes in the REP have facilitated more accurate information transfer between TVA and State authorities. TVA's emergency kits have changed as a result of the drills to include necessary equipment such as stanchions for supporting the boundary rope.

The experience gained from these drills at all levels of participation has proven invaluable. The actions of the driver (Tri-State Motor Transit, Inc.), the CECC Staff, TVA emergency response team, State health officials, law enforcement officials, and Fire Department personnel have been professional and a credit to the safe transportation of low-level radioactive wastes.