

APPLICATION OF UNITED STATES DEPARTMENT OF TRANSPORTATION REGULATIONS TO HAZARDOUS MATERIAL AND WASTE SHIPMENTS ON THE HANFORD SITE

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ABSTRACT

All hazardous material and waste transported over roadways open to the public must be in compliance with the U.S. Department of Transportation (DOT) regulations. The DOT states that the hazardous material regulations (HMR) also apply to government-owned, contractor-operated (GOCO) transportation operations over any U.S. Department of Energy (DOE) site roadway where the public has free and unrestricted access.

Hazardous material and waste in packages that do not meet DOT regulations must be transported on DOE site roadways in a manner that excludes the public and nonessential workers. At the DOE Richland Field Office (the Hanford Site), hazardous material and waste movements that do not meet DOT requirements are transported over public access roadways during off-peak hours with the roadways barricaded. These movements are accomplished using a transportation plan that involves the DOE, DOE contractors, and private utilities who operate on or near the Hanford Site.

This method, which is used at the Hanford Site to comply with DOT regulations onsite, can be communicated to other DOE sites to provide a basis for achieving consistency in similar transportation operations.

INTRODUCTION

Over the last 15 years the U.S. Department of Energy (DOE)-Headquarters has expressed concern over public access to DOE onsite hazardous material transfers that do not meet U.S. Department of Transportation (DOT) regulations and U.S. Nuclear Regulatory Commission (NRC) standards. These concerns addressed lack of contractor documentation demonstrating adequate levels of packaging safety, lack of onsite packaging standards, lack of adequate quality assurance requirements, continued use of obsolete packages, and, in some cases, lack of an onsite transportation program itself. These concerns have been expressed in onsite transportation safety audits and appraisals at several DOE sites. The DOE attempted to remedy these concerns beginning in 1985 with the attempted issue of a revised DOE Order 5480.3, "Safety Requirements for the Packaging and Transportation of Hazardous Material, Hazardous Substances, and Hazardous Waste" (1). Since then, several additional attempts have been made to revise this DOE order. In these attempts, DOE for the first time tried to impose DOT regulations on onsite transportation operations where hazardous material transfers are involved. This concept, however, was not popular with the DOE field elements for such reasons as programmatic impacts, cost, and site cleanup milestones that required the use of hazardous material packages approved only for onsite use. As a result, concerns raised in onsite transportation safety audits and appraisals were unresolved, leaving the current DOE Order 5480.3 to address offsite transportation requirements only (1).

The concept of mandating DOT requirements onsite was not popular because for many years DOE field elements were allowed to develop and administer their own onsite transportation programs. Packaging systems and associated administrative controls were developed and utilized to meet specific onsite programmatic needs during a time when production of nuclear material was given full attention. As a result, impacts associated with changing missions at several DOE sites, a new policy of openness by the DOE regarding onsite activities, and

stronger safety and environmental regulations governing storage and transportation of hazardous materials left onsite transportation programs potentially noncompliant with DOE orders, current DOT requirements, and other federal regulations.

RESEARCH

In March 1991, after years of deliberation, the DOE asked the DOT to provide a written interpretation on the issue of what constitutes a public road, and, consequently, when hazardous material shipments are subject to DOT regulations. On March 26, 1991, DOE issued interim guidance on this subject in a DOE memorandum until a formal interpretation could be provided by the DOT. The DOE memorandum, sent from DOE-Transportation Management Programs (EM-50.1) to field elements was entitled, "Interim Guidance for Onsite/Offsite Shipments" (2). The guidance stated the following:

All city, county, state, and interstate roads that traverse any portion of a Federal reservation shall be treated as public roads, and all shipments made across or along these roads shall comply with applicable Federal regulations. A knowing failure to be in compliance can entail civil and criminal penalties for both contractor and DOE personnel. Compliance can be achieved by (1) strict adherence to DOT regulations, (2) obtaining a DOT exemption, or (3) utilizing a DOE driver in a DOE vehicle.

The interim guidance went on to say:

....restricting public access on public roads while shipments are made does not preclude compliance with DOT regulations. While the road is blocked, the shipment is still required to be in conformance with DOT requirements or operated under a DOT exemption....

....Roads that are located on the Federal reservation, and are posted as being Government roads/official business only/no trespassing, etc., should be regarded as onsite roads, and not subject to the DOT regulations. However, it is a DOE policy, through DOE Orders 1540.1, 5480.3,

and 5480.4 that we protect our workers, as well as the public and the environment when we conduct our transportation operations. In view of this, the presence of our workers, as well as members of the public, should be considered when planning how and when onsite movements are made. Compliance with DOT packaging and communication standards is one way of doing this. For movements not utilizing DOT standards, restricting public access, as well as non-essential workers, would be appropriate in making these movements. In all cases, ALARA principles shall be employed....*

In summary, this interim guidance required compliance to DOT regulations on public access roadways on all Federal reservations. This causes a problem for most sites, because many onsite transportation operations are conducted using public access roadways. For example, the Hanford Site utilizes approximately 16 kilometers (10 miles) of public access roadways to conduct onsite transportation operations (Route 4 South, Route 10, and Route 40) south of a barricade (the Wye Barricade) through which the public is denied access (Fig. 1). Approximately 20 packages, approved only for onsite use via onsite safety analysis documentation, are transferred between areas south of the barricade or to and from areas north of the barricade. The area that includes Route 4 South is most often affected (Fig. 1). Another example, Idaho National Engineering Laboratory (INEL), has U.S. Highways 20 and 26 crossing the southern portion of the site, and Idaho State Highways 22, 28, and 33 crossing the northeastern part of the site. In some cases, packages approved only for onsite use must be transported along these highways from site to site to meet the needs of the laboratory.

Because of this problem, the Director of the DOE Office of Environmental Restoration and Waste Management requested that field elements determine impacts resulting from the DOT requirements outlined in the interim guidance. The impacts identified through this effort were intended to support the development of a comprehensive DOE plan for transportation operations that would meet programmatic requirements as well as applicable regulations. The Hanford Site, as well as other DOE sites that were affected, would benefit from this effort in the following manner.

- The DOE would be forced to address requirements for funding onsite package upgrades, to continue onsite operations that impact long-term programmatic needs as well as environmental concerns.
- The DOE would have to address funding needed for alternative methods of meeting DOT requirements in the near future.
- The DOE would increase emphasis on establishment of minimum packaging standards.
- Field elements within the DOE structure would have a heightened awareness of the need for developing an onsite hazardous material transportation plan at each affected site.

In the meantime, the Research and Special Programs Administration within DOT responded to the DOE request for a written interpretation of "public highway." The following

was stated in a memo dated April 23, 1991 (5), from Research and Special Programs Administration Chief Council (DOT) to the Transportation Management Program, Office of Technology Development (DOE):

....If a road is used by members of the public (including dependents of Government employees) without their having to gain access through a controlled access point, transportation on (across or along) that road is in commerce. On the other hand, if access to a road is controlled at all times through use of gates and guards, transportation on that road is not in commerce.

One other means of preventing hazardous materials transportation on Government property from being in commerce is to temporarily block access to the section of the road being crossed or used for that transportation. The road would have to be blocked by persons having legal authority to do so, and public access to the involved section of road would have to be effectively precluded....

Note that the term "in commerce" is intended to mean roads on DOE sites that are open to the public and are not blocked by a gate or are not blocked by guards with the authority to block the road.

In summary, transportation of hazardous material across or along a road within DOE site boundaries where the public has unrestricted access is subject to the hazardous material regulations mandated by the DOT. This is so unless the section of road intended for use is barricaded or effectively blocked in some manner by officials authorized to do so, to preclude public access.

HANFORD SITE IMPACTS AND THE DECISION TO BARRICADE

Onsite transportation and packaging operations at the Hanford Site are greatly affected by the DOT interpretation of what is considered onsite and what is considered in commerce. The final decision by DOE to comply with this interpretation, along with an evaluation of onsite packaging impacts prepared for DOE review, made road barricading the best short-term interim method available for the continuation of certain transportation operations on the Hanford Site where the public and nonessential workers have potential contact with onsite transfers not in compliance with DOT regulations. This method is also the most cost-effective near-term solution available for (1) continuance of transportation operations that present a major impact to programmatic milestones as well as (2) government interagency agreements for the environmental restoration of the Hanford Site.

The logic used in the decision to "barricade" at the Hanford Site was, in part, an effort to maintain cost effectiveness. At the Hanford Site, approximately 50 to 60 transfers per year are made over public access roadways in one of approximately 20 packages that do not meet the DOT requirements. The packages transport radioactive material in amounts up to and including highway route controlled quantities (HRCQ) [see definition in Title 49, Code of Federal Regulations, Part 173, Subpart I, "Radioactive Materials," 173.403 (6)]. The packages used are evaluated through a detailed safety analy-

* Referenced DOE Orders are (3), (1), and (4), respectively.

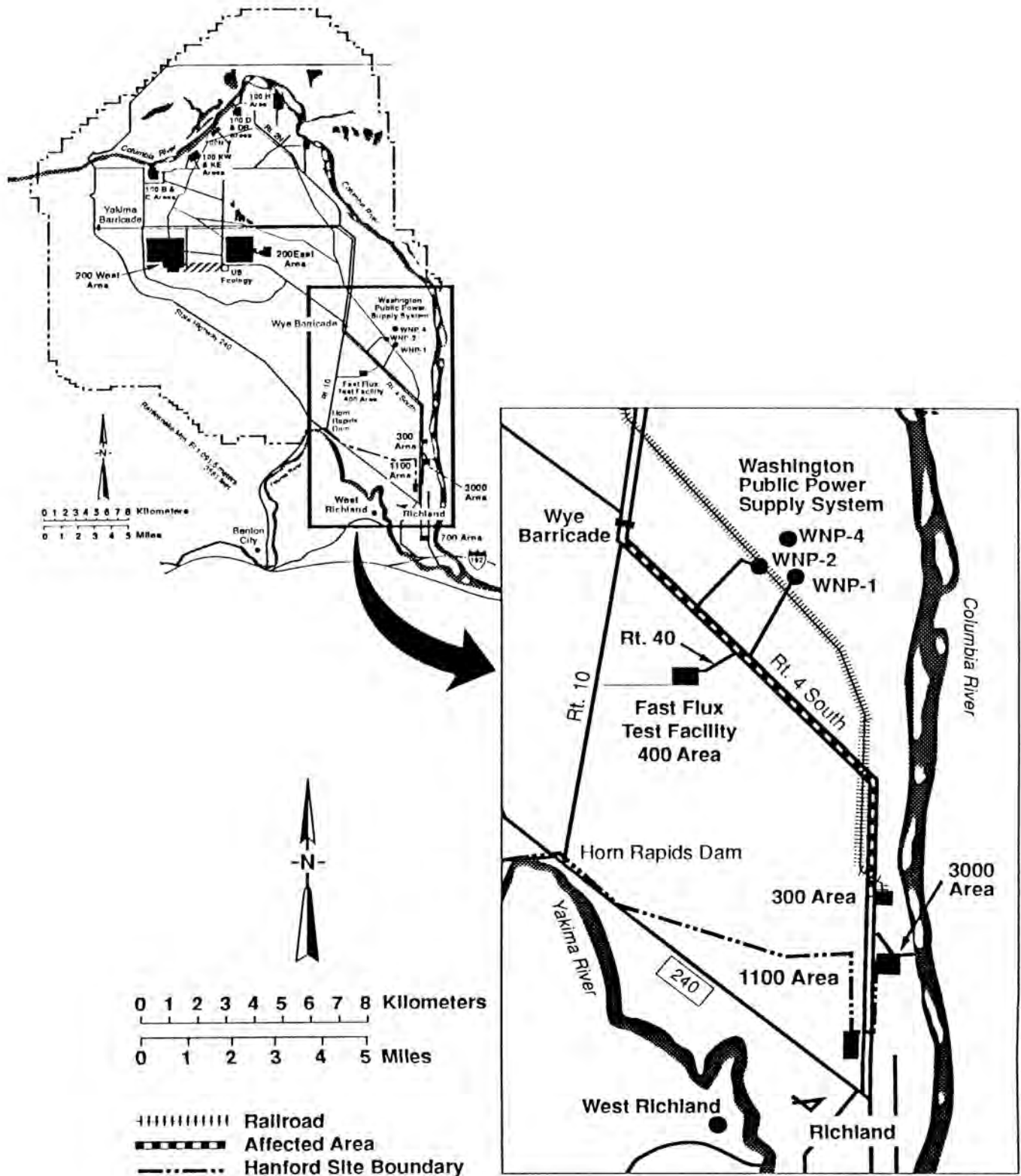


Fig. 1. Affected area of road barricading on the Hanford Site.

sis, approval, and documentation process or "assessment" as mandated in DOE-Richland Order 5480.1, Change I, Chapter III, "Safety Requirements for the Packaging of Fissile and Other Radioactive Material" (7). This order addresses Hanford on-Site transportation operations to ensure an equivalent degree of safety to DOT regulations. Equivalence to the DOT is measured through either safety in the package or minimum packaging standards combined with administrative controls (e.g., material packaging requirements and procedures, route and speed controls, escorts).

The process for upgrading a package to meet DOT regulations requires one to three years to complete, depending on the complexity of the package at a cost of between \$1 million to \$5 million per package. As an option, barricading the road at the Hanford Site using an equivalent degree of safety to DOT regulations is estimated at \$3,000 per transfer (\$180,000 per year), resulting in a major cost savings to the DOE for the near-term and an opportunity to continue transportation operations without affecting programmatic and environmental missions at the Site.

Some programmatic missions at the Hanford Site center around movement and storage of fissile material and nuclear fuel in an effort to close out production operations at various site facilities and to support the continued operation of the Fast Flux Test Facility (FFTF), a 400-megawatt thermal sodium-cooled test reactor. Fissile material and nuclear fuel transfers utilize a number of onsite packages specially designed for these payloads. Without these onsite packages, continued facility operations (like FFTF) in the near term would be significantly impacted. Barricading public access roadways to accommodate these onsite transfers is an attractive alternative to nonoperation until long-term packaging solutions are identified.

Of all the missions at the Hanford Site, the environmental restoration mission has the greatest impact on the future of the Site. Interagency agreements such as the Tri-Party Agreement between the DOE, the U.S. Environmental Protection Agency, and the Washington State Department of Ecology (8) mandate a clear and long-term mission for restoration of the Hanford Site. Milestones associated with the Tri-Party Agreement, other associated environmental and waste commitments, and the time frame and cost for upgrading to DOT approved packages, make barricading an attractive alternative to slowing down response to environmental restoration and waste disposal commitments in the near term. This logic also allows the use of packages already in existence that have a proven track record of safety during onsite use.

Some of the hazardous material transfers that require barricading include the following:

- Transfers of radioactive liquid waste tank characterization samples to onsite laboratories for analysis (e.g., core samples that include slurry and liquid)
- Transfers of radioactive material soil samples and associated hazardous constituents from *Resource Conservation and Recovery Act of 1976 (RCRA)* (9) and *Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)* (10) operable units near known plumes and cribs to onsite laboratories for analysis

- Transfers of bulk liquid radioactive waste over railroad tracks that cross onsite public access roadways (e.g., 20,000-gallon liquid waste tank cars)
- Transfers of low-level solid radioactive waste in onsite packages to solid waste burial (e.g., 5,000-pound wooden burial boxes, metal drums)
- Transfers of mixed waste (radioactive waste with other hazardous constituents) in onsite packages to mixed waste storage (e.g., transfers in metal drums containing different configurations of inner packaging)
- Transfers of transuranic (TRU) waste in onsite packages to storage (e.g., transfers of TRU waste in galvanized drums with 90-millimeter polyethylene inner liners).

THE BARRICADING PROCESS AT THE HANFORD SITE

The Westinghouse Hanford Company (Westinghouse Hanford), with the approval of the DOE Richland Field Office, prepared a transportation plan for moving packages that do not meet DOT requirements on public access roadways. The plan was conceived through a joint effort involving the DOE Richland Field Office, several Hanford Site contractors [e.g., Westinghouse Hanford, Pacific Northwest Laboratory (PNL), Kaiser Engineers Hanford Company], and other entities such as the Bonneville Power Administration and Washington Public Power Supply System. The plan is designed to implement temporary road barricading operations during predetermined off-peak hours when shift change of nonessential employees has little impact, and onsite traffic, including the public, is at a low level.

Westinghouse Hanford coordinates all road barricading operations. The Westinghouse Hanford Transportation and Packaging Function (T&P) is notified by Hanford Site facilities and contractors of a need for road barricading three days in advance of the anticipated transfer. Upon notification of a desired transfer date, Westinghouse Hanford T&P completes the following:

- Notifies the following entities of a pending road closure:
 - Westinghouse Hanford Patrol Operations Center (provides DOE Richland Field Office notification, coordinates opening of onsite gates, authority approved to post manned barricades on the Hanford Site)
 - Westinghouse Hanford Security (approves opening of onsite gates)
 - Westinghouse Hanford Health Physics (radiation monitoring support)
 - Westinghouse Hanford FFTF Facility Operations (because of FFTF location and shift change)
 - Kaiser Engineers Hanford Company Security (notifies affected Kaiser personnel)
 - Pacific Northwest Laboratory Security (notifies affected PNL and Battelle personnel)
 - The Washington Public Power Supply System (notifies affected Washington Public Power Supply System employees, and the Bonneville Power Administration via electronic mail)

- Coordinates necessary drivers and vehicles to make the transfer
- Inspects and authorizes all packages originating from Westinghouse Hanford facilities prior to the time of transfer. Other contractors inspect and authorize their own packages
- Coordinates a group of transfers together when possible to reduce cost.

Several transfer scenarios identified in the transportation plan can be followed to complete a transfer or group of transfers (e.g., 300 Area to the WYE Barricade; WYE Barricade to the 300 Area; 20,000-gallon rail tanker to and from 300 Area). These scenarios were established in the plan to ensure routine and appropriate responses by essential personnel during barricading. This also eliminates the need for transportation plan review meetings prior to routine transfers that pose little safety concern after they have been done repeatedly. Complex transfers, however, require transportation plan review prior to each transfer. These transfers require additional administrative controls as identified in the safety analysis documentation because of the type of radioactive material being transferred, dose rate considerations, or the need for additional response personnel. As new transfer scenarios are identified, they are incorporated into the transportation plan.

The goal of barricading is to exclude the public and nonessential personnel (employees) from the transfer. However, during normal onsite transfers that have little safety impact (e.g., minimum dose rate, little or no administrative controls), employees are allowed to travel to and from work destinations on the same road as an onsite transfer. Under these conditions, barricading only serves to exclude the public. Certain onsite transfers do, however, require administrative controls that exclude nonessential personnel as well as the public (i.e., classified transfers, transfers with dose rates above the limits for nonessential workers and the public).

Under routine conditions, when the barricades are first set up employees with badges experience some delay before being allowed to proceed onto the barricaded road. This delay also impacts Washington Public Power Supply System employees and Bonneville Power Administration employees. This is the time utilized by Westinghouse Hanford Patrol Operations personnel to clear the affected roadway of all traffic to ensure that employees without badges and members of the public are excluded.

Once the transfer has progressed onto the barricaded stretch of the road, employees with badges (including Washington Public Power Supply System and Bonneville Power Administration employees) are allowed to proceed to their destinations. Employees without badges and the general public are not allowed through the barricades until the transfer is completed and all barricades are removed.

Contingency planning is built into the transportation plan for emergency vehicles responding to onsite facility emergencies, including those of the Washington Public Power Supply System and the Bonneville Power Administration. The Westinghouse Hanford Patrol Operations Function monitors all emergency situations on the Hanford Site, including those of the Washington Public Power Supply System and the Bonneville Power Administration. Emergency response vehicles and/or personnel are allowed to pass through barricades at all times to respond to emergencies.

Security requirements for certain onsite transfers require barricading without prior notification. Westinghouse Hanford T&P coordinates these transfers under the conditions specified in the transportation plan.

Emergency transfers are authorized through the transportation plan on a case-by-case basis with the proper approval authority. Westinghouse Hanford T&P also coordinates these transfers under the conditions specified in the transportation plan.

SUMMARY

Temporary road barricading has caused minimum impact to Hanford Site operations since it was instituted in May 1991. Approximately 30 barricading operations have been conducted without incident from that time to the present. Many more onsite transfers are planned for the future that will require barricading of public access roadways at the Hanford Site until other options are made available.

Other options and alternatives to barricading are being evaluated. Upgrading and procurement of packaging systems that meet DOT and NRC requirements is still the long-term goal at the Hanford Site. Westinghouse Hanford T&P has developed a plan to address existing packages, based on user priority and frequency of packaging system use. The lengthy processes of package design, package construction, testing, documentation, and licensing all make this plan a long-term endeavor, along with personnel requirements and the hard dollar cost impact for completion of DOT/NRC-approved packaging systems.

For the near term, the transportation plan used at the Hanford Site clearly documents and implements compliance with transportation requirements mandated by the DOT and DOE for onsite transfers of hazardous materials on public access roadways. Communication of this method of compliance is important, because sharing of ideas among affected DOE field elements and contractors helps to define clear solutions to transportation compliance problems affecting the DOE as a whole. It also helps the DOE to establish directives and orders in a timely manner and helps communicate the DOE concern for safety of employees, the public, and the environment to institutional entities near DOE sites.

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 9. *Resource Conservation and Recovery Act of 1976*, 42 USC 6901 et seq.
 10. *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, 42 USC 9601 et seq.