

U.S. ARMY CORPS OF ENGINEERS REQUIREMENTS FOR TRANSPORTING MATERIALS OFF-SITE FROM FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM (FUSRAP) SITES

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ABSTRACT

Execution of the Formerly Utilized Sites Remedial Action Program (FUSRAP) by the U.S. Army Corps of Engineers (USACE) requires large volumes of material containing residual radioactivity to be transported off-site for recycling, treatment and/or disposal. To ensure that FUSRAP materials are transported to the appropriate receiving facility in a compliant, timely and cost-effective manner, USACE has implemented supplemental requirements and procedures for transporting FUSRAP materials. The supplemental requirements may exceed Federal and state transportation regulations in some cases. This paper will identify the variety of FUSRAP materials that may be destined for off-site transportation by rail and truck. The characterization of the different types of materials is essential in determining the applicability of the various transportation regulations. FUSRAP material meeting the Department of Transportation (DOT) definition of a Class 7 (radioactive) material (>70 becquerels per gram or 0.002 microcurie per gram) or a Class 9 miscellaneous hazardous material is regulated by DOT when transported in commerce. Depending on the type of FUSRAP material being transported, the materials may also be regulated by other Federal agencies (e.g. U.S. Nuclear Regulatory Commission (NRC), U.S. Environmental Protection Agency (EPA)) in addition to DOT. This paper identifies and explains the USACE requirements that augment mandatory Federal and state requirements for transporting hazardous materials. The paper also identifies the procedures USACE and their contractors must follow when transporting FUSRAP material that is not regulated by Federal or state agencies.

INTRODUCTION

The U.S. Army Corps of Engineers (USACE) is responsible for continuing the work began by the Department of Energy (DOE) in cleaning up sites with radioactive contamination that occurred from the early atomic weapons program. The Formerly Utilized Sites Remedial Action Program (FUSRAP) was created to identify, investigate and take appropriate action at sites where radioactive contamination may present an unacceptable risk to human health and the environment. The execution of FUSRAP cleanups routinely requires large volumes of soil and debris, containing residual radioactivity, to be transported off-site for recycling, treatment and/or disposal. USACE recognizes the importance of proper management of FUSRAP materials during transportation to the receiving facility. This paper summarizes the supplemental requirements that USACE has implemented to ensure FUSRAP materials are transported in compliance with all applicable laws and regulations. The supplemental requirements for FUSRAP shipments, in some cases, exceed Federal or state transportation requirements. The paper includes references to additional USACE information on the specific requirements for transporting FUSRAP materials.

BACKGROUND

Large volumes of materials containing residual radioactivity are transported off-site by rail and truck for recycling, treatment and/or disposal in the execution of FUSRAP by the USACE. There are a variety of different types of materials (primarily soil and/or debris, scrap steel,) shipped off-site from the various FUSRAP sites. Figure 1 shows the location of the 46 FUSRAP sites that were identified by the DOE as requiring further investigation and remediation. In 1997, when FUSRAP was transferred to USACE for execution, DOE had completed remediation at 25 of the FUSRAP sites. From the fall of 1997 through the summer of 2000, over 268,000 cubic meters (350,000 cu yd) of soil with residual radioactivity were transported from various FUSRAP sites to designated recycling/treatment and/or disposal facilities. During this same time period, approximately 4100 metric tons (4500 tons) of scrap metal, structural steel and debris were transported for recycling/treatment and/or disposal. Figure 1 shows the location of the facilities that have received FUSRAP material for disposal.

In the fall of 1998, USACE had a rail car of FUSRAP material (containing low-activity radioactive residuals), get misdirected en route to the designated disposal facility. The FUSRAP material was mistakenly placed in an Ohio municipal landfill that was not permitted to receive this material. The regulators were notified of the improper disposal upon discovery of the situation. The rail carrier was directed by the State of Ohio regulators to remove the material from the municipal landfill. The FUSRAP material had been commingled with other solid waste when it was placed in the landfill. The original 78 metric tons (86 tons) of FUSRAP material required approximately 272 metric tons (300 tons) of additional material be excavated and removed from the landfill. USACE implemented several supplemental requirements to reduce the likelihood of this type of improper disposal from reoccurring.

In general, the FUSRAP materials fall into the following categories of radioactive residuals or materials:

- Materials regulated under the Atomic Energy Act (AEA);
- Materials not regulated under AEA;
- Materials that are strictly hazardous waste regulated under the Resource Conservation and Recovery Act (RCRA);
- Materials that are hazardous waste and commingled with AEA regulated materials (mixed waste);
- Materials that are hazardous waste and commingled with non-AEA regulated radioactive residuals;
- Materials that must be sent off-site for disposal that are not regulated as radioactive waste or hazardous waste;
- Materials only regulated by the Department of Transportation (DOT).

The FUSRAP material characterization must be established to determine the applicability of the DOT, U.S. Environmental Protection Agency (EPA) and U.S. Nuclear Regulatory Commission (NRC) transportation regulations. The material characterization

is also important for the formalized process USACE follows in obtaining the approval from the facility regulator that the FUSRAP material may be sent to the facility.

FUSRAP – 46 Sites In 14 States

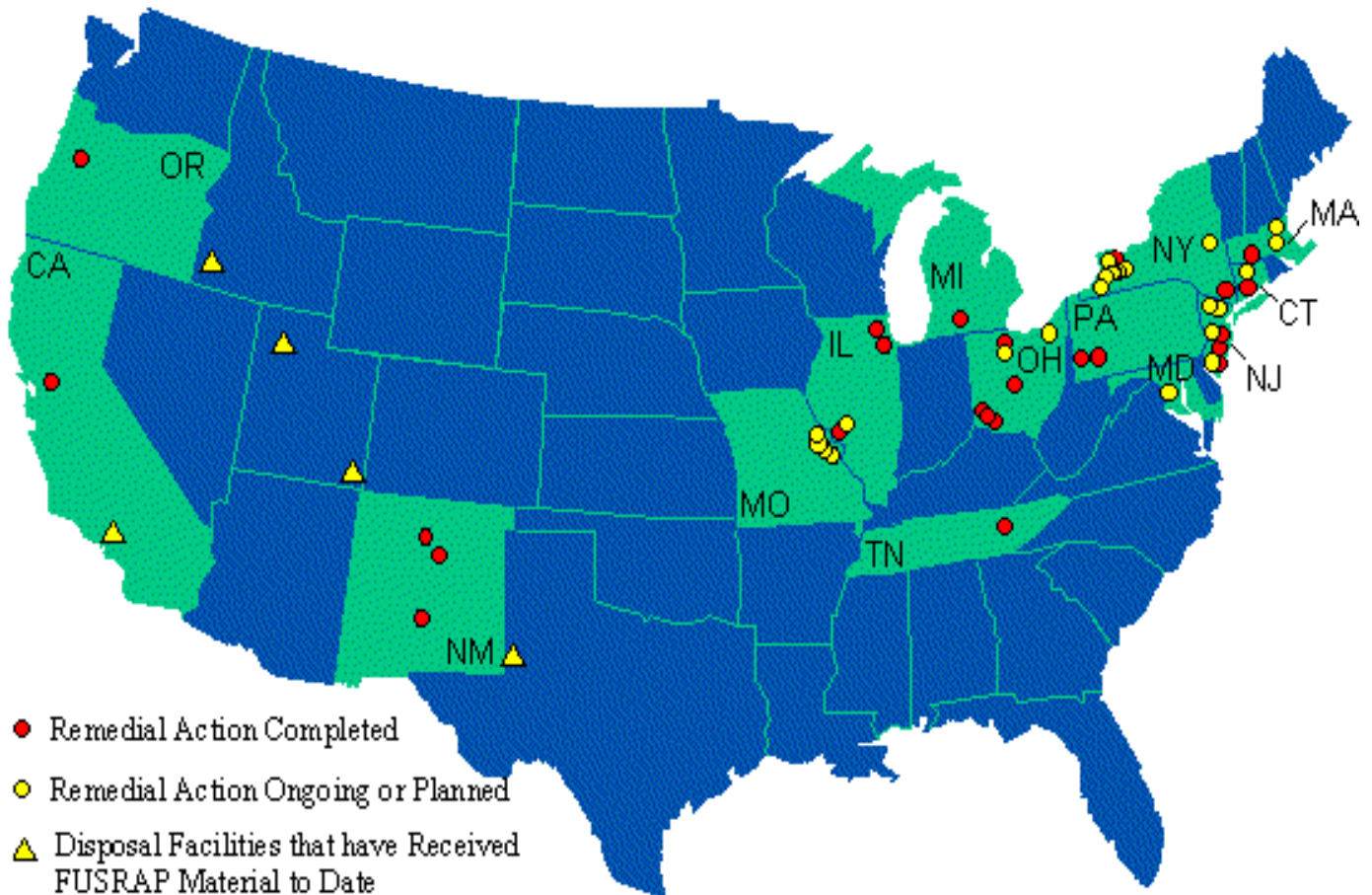


Fig. 1. Location of FUSRAP Sites and disposal facilities that have received FUSRAP material

DISCUSSION

The transportation of hazardous materials is strictly regulated by DOT under Title 49 of the Code of Federal Regulations (CFR) parts 171 through 180. EPA or a Resource Conservation and Recovery Act (RCRA) Authorized State may also regulate a DOT hazardous material if it is hazardous waste (40 CFR 260 through 280). If the hazardous material contains a radioactive material regulated under the AEA (licensed material), it will also be regulated by the NRC or an Agreement State.

The USACE project team (e.g. project manager, construction representative, health physicist and transportation specialist) in consultation with their contractor and the receiving facility, determine the necessary information and forms required for execution of each project. The site specific work plans, developed by the remedial action contractor and approved by the USACE District personnel, establish the procedures that will be followed when FUSRAP material is sent off-site. The work plans must be in compliance with USACE policies and all Federal, state and local regulations. USACE has identified the policies that must be followed in USACE guidance documents (e.g. Engineering Circulars and Engineering Pamphlets). The scope of this paper is limited to the policies associated with the off-site transportation of FUSRAP material after the determination has been made that the FUSRAP material meets the facilities waste acceptance criteria.

USACE established an Off-Site Disposal Policy for FUSRAP materials in Engineering Circular (EC), EC 200-1-3 "[Off-Site Disposal of Materials from the Formerly Utilized Sites Remedial Action Program](#)". The EC states that shipments of FUSRAP materials will comply with all applicable DOT and NRC requirements. The EC also includes several additional requirements that are not required by the DOT, NRC or EPA. Some of the supplemental requirements presented in this paper are unique to FUSRAP and are not required on other USACE remediation programs. The Hazardous, Toxic and Radioactive Waste Center of Expertise (HTRW CX) revised two USACE Engineering Pamphlets (EP) that establish guidance to the field, to explain the transportation and manifesting requirements for FUSRAP materials. The pamphlets identify the applicable DOT, NRC and EPA requirements when transporting most of the hazardous materials USACE offices encounter in executing their different projects. The EP's are identified below and are linked to the USACE Huntsville Engineering and Support Center web site where the complete documents may be viewed or downloaded:

- EP 415-1-266, "[Resident Engineering Management Guide for Hazardous, Toxic, and Radioactive Waste \(HTRW\) Projects](#)";
- EP 200-1-2, "[Process and Procedures for RCRA Manifesting](#)".

Manifesting and transportation checklists are included in [EP 200-1-2](#) (beginning on page A-68) to assist USACE personnel and their contractors in preparing FUSRAP materials for shipment in accordance with DOT and EPA regulations. The checklists identify important steps and requirements in preparing shipping papers, packaging, marking, and labeling containers and placarding the transport vehicle in accordance with DOT regulations. For example, if the FUSRAP material is being shipped as Radioactive material, low specific activity (LSA)-"Exclusive Use", checklist 9 will assist in reviewing the regulatory requirements for packaging, shipping papers, marking, labeling and placarding the shipment in accordance with DOT regulations.

The type of shipping paper needed for transporting FUSRAP material will depend on the history and characterization of the material and the regulatory status of the material. If the material is determined to be NRC regulated, a *Uniform Low-Level Radioactive Waste Manifest* ([Forms 540 & 541](#)) must be used. If the radioactive material is also a hazardous waste, the appropriate state or EPA *Uniform Hazardous Waste Manifest* must

be used in addition to the NRC manifest. A DOT bill of lading may be used if the material is a DOT hazardous material (e.g. Class 7 Radioactive Material or Class 9) but not NRC regulated or a hazardous waste. It is important to note that recycling/treatment/disposal facilities may require specific shipping papers (e.g. NRC manifest) even if the material is not regulated by DOT, EPA or the NRC. In that situation, the shipping paper should include a notation that the material is not DOT, EPA or NRC regulated as appropriate. Additional information on determining the manifesting requirements may be found in [EP 200-1-2](#), page A-51.

FUSRAP SPECIFIC TRANSPORTATION REQUIREMENTS

HTRW CX Notification Requirements

All USACE Districts and field offices are required to coordinate disposal of all radioactive waste, to include FUSRAP radioactive materials, internally with the HTRW CX prior to shipment ([ER 385-1-80, paragraph 17.a.](#)). The HTRW CX maintains a database that compiles the USACE District notifications for upward reporting to HQ USACE on the quantities and types of radioactive wastes and materials that are disposed by all the USACE Districts and their contractors. The notification form may be found in [EP 200-1-2](#), on page A-52. The initial notification, prior to shipment, may be an estimate of the disposal cost, volumes and activity of the radioactive materials. Final shipment quantities shall be provided to the HTRW CX upon completion of the work to reconcile the estimated volume with the actual volume of radioactive material shipped.

Chain-of-custody

As previously stated, FUSRAP materials may not always be regulated during the course of transportation by DOT, EPA or NRC. In these instances of unregulated shipments, USACE has an agency requirement that a chain-of-custody form shall be used for each shipment of material to track the material from the point of generation to the ultimate placement or disposal location. The chain-of-custody form requires information very similar to a DOT bill of lading. The form shall describe the material being shipped and includes a certification that the material being shipped is not NRC regulated; or EPA regulated as a hazardous waste; is not DOT regulated as a radioactive material; and the shipping container does not contain a reportable quantity of a radionuclide. An example chain-of-custody form is included in [EP 200-1-2](#) on pages A-81 and A-82.

Marking Sticker

All shipments of FUSRAP materials must comply with the applicable DOT, NRC and EPA marking and labeling regulations. In addition, USACE requires the use of a secondary, non-DOT communication "marking sticker" (Federal Railroad Administration (FRA) designation) on all bulk containers of FUSRAP material regardless of whether the material is a DOT hazardous material or not. The label indicates the destination of the shipment and a telephone number of a USACE point of contact with knowledge of the shipment. This additional marking sticker duplicates existing information that is required

on shipping papers when the shipment is a DOT hazardous material. The FRA has reviewed and approved the marking sticker with the understanding that the marking sticker's unique color (purple, pink or chartreuse) will not create any confusion or violate any DOT requirements. Marking stickers shall be placed in visible locations on the exterior sides of bulk containers (truck or rail car). If the transport container is open on top (e.g. gondola), several marking stickers are recommend to be placed on top of the closed container liner (e.g. burrito bag in rail car gondola) to ensure the workers observe the information prior to emptying the container or rail car (intermodal or gondola). Bulk containers that are transported by truck to a transload facility and emptied into a gondola rail car would require new marking stickers when the material is consolidated into the new transport container. However, if the containers are placed on rail cars intact, the marking stickers placed on the containers at the FUSRAP site should already reflect the final destination. One USACE District field office requires their contractor to place a single marking sticker by the end-gate latching device for the intermodal since the container contents can not be emptied without opening the end-gate. An example of the marking sticker may be found on page A-65 of [EP 200-1-2](#). The HTRW CX may be contacted for potential suppliers of the marking stickers.

Certificate of Disposal

A Certificate of Disposal/Destruction or Placement is required by USACE for all off-site shipments of FUSRAP materials. The comeback copy of shipping papers (Uniform Hazardous Waste Manifest, Uniform Low-Level Radioactive Waste Manifest) does not satisfy the requirement for a Certificate of Disposal/Destruction or Placement. The comeback copy of the shipping papers typically acknowledges receipt of the material by the facility but does not state that the material has been properly disposed of. The Certificate must provide the following essential information:

- Correlate each shipment of material to the facility and the corresponding shipping papers.
- Provide a direct correlation to the specific shipping container and quantity of material identified on the shipping paper. Adjustments to the final disposal volume/mass must be explained and justified if impacted by treatment.
- Identify what treatment (if required) was performed on the material prior to recycling/disposal. Treatment residues must be accounted for if material undergoes treatment prior to recycling/disposal.
- Date of placement of the material in the permanent disposal cell.

This USACE policy may be found in [EP 415-1-266](#) in Section 7, page 12.

Spill Reporting Procedures

USACE policy on spill reporting procedures for USACE personnel involved with HTRW and FUSRAP projects may be found in [EP 415-1-266](#) on page 12 of Section 7. The pamphlet directs the reader to spill reporting procedures at: <http://www.environmental.usace.army.mil/info/technical/comply/complys/complys.html#>

[guidance](#). The Internet site includes a useful flowchart that explains reporting responsibilities for three common types of spill scenarios. The USACE spill policy memorandum outlines the major reporting requirements and delineates reporting responsibilities. The contractors develop emergency response plans or work plans (approved by the USACE District) that assign the reporting responsibilities to the appropriate Federal, state and local officials in the event of a reportable spill. USACE ER 500-1-1, chapter 11, requires all USACE Districts to have a designated Emergency Operations Center or an Emergency Management Office (EOC/EMO) and have a plan outlining the upward reporting requirements should a natural disaster or hazardous material spill occur. Each District responsible for remediating FUSRAP sites, should build upon the existing emergency response structure by including any additional FUSRAP reporting requirements within their existing plans. Some basic steps should be taken to ensure the District emergency response plan adequately addresses FUSRAP spills at the project site or while the material is in transportation. Recommendations are as follows:

- District FUSRAP team or representative should meet with District EOC/EMO staff and review the District emergency response plan and identify unique FUSRAP transportation and reporting issues.
- The existing emergency response plans should be reviewed for conformance with USACE spill reporting procedures. Standard procedures should be developed with Call-Down lists for District, Division and HQUSACE points of contact for FUSRAP incidents. Each District should have an internal 24-hour emergency telephone number for reporting DOT incidents or spills of FUSRAP material. This telephone number is not to be confused with the DOT requirement for a 24-hour emergency telephone number that is monitored at all times by a person delegated to accept responsibility and make decisions (49 CFR 172.604) when a hazardous material is offered for transportation.
- The contractor reporting requirements should be identified on all FUSRAP projects. The contractor shall report all DOT incidents and spills to the designated District point of contact even if the contractor is responsible for notifying all appropriate Federal, state and local officials. The contractor should be required to immediately notify the District EOC/EMO (within 1 hour) of spill or incident. Refer to [Table 1](#) of the spill policy memorandum for notification requirements.
- The appropriate District personnel (including onsite construction representatives) shall be informed of proper reporting procedures. All reporting should go through the EOC/EMO to activate the emergency response procedures.
- Each District shall ensure that all appropriate persons within the District and field offices have the required emergency response training.
- All FUSRAP contracts involving off-site transportation or management should include language as per Corps of Engineers guide specification 02120, *Transportation and Disposal of Hazardous Materials*, paragraph 3.8.
“The Contractor shall respond to any spill of hazardous materials or hazardous waste which are in the custody or care of the Contractor pursuant to this contract. Any direction from the Contracting Officer

concerning a spill or release shall not be considered a change under the contract. The Contractor shall comply with all applicable requirements of Federal, state, or local laws or regulations regarding any spill incident.”

Training Requirements

FUSRAP manifests and shipping documents will be signed by USACE personnel that have been appropriately trained (see Table I.) and authorized by the District Commander or delegated representative to sign “On behalf of the U.S. Army Corps of Engineers.” The USACE personnel must be trained in accordance with DOT regulations (49 CFR 172, Subpart H), DOD regulation ([DOD 4500.9-R](#) , dated October 1999) and USACE ([EP 415-1-266](#) , [EP 200-1-2](#) & [EC 200-1-3](#)) policies. The USACE personnel that perform functions associated with transporting DOT hazardous materials, such as developing shipping papers or manifests, marking, labeling, placarding or packaging of materials or wastes are considered hazmat employees by DOT and USACE. Hazmat employees, by DOT and DOD regulation and USACE policy must receive the following training:

- General awareness/familiarization training designed to provide the employee with an understanding of DOT requirements, and to enable the person to recognize and identify hazardous materials in accordance with the applicable regulations.
- Function-specific training, which is specifically applicable to the functions the employee performs (e.g. FUSRAP- DOT & NRC radioactive material regulations and EPA if hazardous waste).
- Safety training that covers emergency response, worker protection, accident prevention and meets the requirements established by the Occupational Safety and Health Administration (OSHA) of the Department of Labor as applicable.
- Recurrent training every two years as required by DOD 4500.9-R instead of every three years as required by DOT. USACE is responsible for maintaining a current record of the USACE employees’ training and certification.

Table I. DOT Training Summary Chart for USACE HAZMAT Employees

Course Name	Course Needed for General Awareness and Function-Specific Training	Course Needed for Recurrent (Refresher) Training
OSHA/DOT Safety Training	HAZWOPER (29 CFR 1910.120)	HAZWOPER Refresher
Hazardous Waste (HW) Certification Only	PROSPECT 223 or DOD approved equivalent	PROSPECT 429 –12 Hours
DOT Class 7 Certification	PROSPECT 441 (excludes HW)	PROSPECT 429 –16 Hours (with Radioactive Module option)
DOT Class 9 (for Radionuclides only, includes HW)	PROSPECT 223 (with Radioactive Module option)	PROSPECT 429 – 16 Hours (with Radioactive Module option)
Ordnance and Explosives (Does not include HW)	See list in DOD 4500.9-R, dated Oct 1999	See list in DOD 4500.9-R, dated Oct 1999

PROSPECT Course #223: "Hazardous Waste Management, Manifesting & DOT Initial Certification Course" is a USACE training course (USACE instructors).

PROSPECT Course #429: "Hazardous Waste Manifesting 12-hour DOT Recertification" is a USACE training course (USACE instructors).

PROSPECT Course #441: "Radioactive Waste Packaging, Transportation and Disposal Initial DOT Certification Workshop" is a USACE training course (Contractor instructed).

Off-Site Rule Requirements

FUSRAP materials, including radionuclides, sent off-site for recycling/disposal must meet the notification requirements of the "Off-Site Rule," found in the *National Contingency Plan* (NCP), at 40 CFR 300.440. Since FUSRAP response actions are being performed under Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) authority, the "Off-Site Rule" must be satisfied. Prior to shipping any FUSRAP material off-site, USACE or their contractor must notify the EPA Regional Off-Site Coordinator (ROC), in the region where the selected facility is located, of the intent to send CERCLA waste to that facility. The regulation requires that the facility receiving the CERCLA waste must be in compliance with their permit and not releasing hazardous waste, hazardous constituents, or hazardous substances into the environment. The EPA ROC will provide USACE or their contractor with the facility status. [EC 200-1-3](#) requires that this notification occur prior to shipment of FUSRAP materials and if shipments are delayed for 60 days that the facility current status be re-verified with EPA. Shipments may only be made after the EPA ROC has provided a determination that the facility meets the compliance and release criteria of 40 CFR 300.440. The EPA ROC telephone number for the selected facility may be obtained by calling the EPA Hotline (1-800-424-9346). A record of the telephone conversation with the EPA ROC shall be placed in the project files.

Tracking FUSRAP Shipments

The majority of FUSRAP materials that are transported off-site for recycling/disposal are shipped by rail. The responsibility of tracking the railcars from the FUSRAP site to the recycling/disposal facility and back to the site is assigned to the contractor's transportation manager. All USACE Districts performing FUSRAP cleanups require their contractors to perform this tracking function. Numerous tracking programs are available from the different rail carriers and the American Association of Railroads (NetREDI system). The tracking systems are generally free or minimal cost for customers or their representatives. The tracking systems operate by using the rail industry's standard electronic tracing system called Car Location Message (CLM). There are a fixed number of bar code readers spread across the United States, which are used to provide a general location of the rail car by reading a unique bar code that is placed on each rail car. The contractor's transportation manager is able to access the rail carrier's tracking system and ensures that rail cars are moving in the correct direction within normal time periods. USACE and their contractors have had great success in tracking

their rail shipments of FUSRAP materials on a daily basis and have corrected misdirected shipments and investigated shipments that were not moving.

One USACE District did implement global positioning satellite (GPS) tracking on a portion of their FUSRAP rail shipments. The GPS tracking provided an instantaneous location of their rail cars, which is not possible with the rail industry's CLM system. However, there are significant costs associated with renting/purchasing the necessary equipment to monitor all rail shipments from a single FUSRAP site. Furthermore, there is a durability concern with the equipment since the rail cars are bumped and jostled during shipment. Due to cost concerns, the empty rail cars did not have GPS tracking capability. The GPS equipment was returned to the FUSRAP site from the disposal facility by air cargo to maximize the number of loaded rail cars with GPS tracking capability. This USACE District has experience with both tracking methods and has not required the use of GPS tracking on a subsequent FUSRAP site remediation. The separate project will require a transportation manager that monitors the railroad's CLM tracing system with one of the available tracking systems.

SUMMARY

This paper summarizes the USACE supplemental transportation requirements for off-site shipment of FUSRAP materials and highlights some important Federal requirements. USACE transportation requirements may exceed Federal or state transportation requirements. As discussed in the paper, USACE policy requires non-regulated shipments of FUSRAP material, at a minimum, to have a chain-of-custody form when no other type of shipping paper is required by regulation. All bulk shipments of FUSRAP material, even if non-regulated, must include the USACE unique communication "marking stickers" in addition to any other DOT, EPA, or NRC marking, labeling and placarding requirements. Proper disposal and placement of FUSRAP material is verified by USACE with a requirement for the final destination facility to provide a certificate of disposal/destruction or placement for all off-site shipments of FUSRAP materials. USACE specific spill reporting requirements exceed Federal, state and local regulations by requiring that in addition to the notifications required by regulations, the USACE chain of command must also be informed of any incidents or spills of FUSRAP material. USACE personnel involved in any phase of hazardous material transportation must be trained in accordance with DOT regulations and USACE requirements. USACE personnel must be formally designated by the District Commander or authorized representative to sign shipping papers "on behalf of the U.S. Army Corps of Engineers." In addition, USACE requires that off-site transportation of radioactive material be coordinated with the HTRW CX prior to shipment. Finally, USACE requires that all shipments of FUSRAP materials comply with the NCP "Off-Site Rule" notification requirements to ensure the disposal facility is in compliance and able to accept the material for disposal. In summary, the US Army Corps of Engineers is committed to complying with all applicable laws and regulations governing the transportation of FUSRAP materials in order to ensure safe passage of these materials to their final destination.