

**The WIPP Transportation Program at 10 Years  
Making the Case for Above-Regulatory Procedures - 9396**

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**ABSTRACT**

This paper strongly endorses the above-regulatory procedures and protocols that the U.S. Department of Energy (DOE) uses for all of its shipments of transuranic waste to the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico. Those procedures and protocols were developed through a cooperative partnership between DOE and Western states, working through the Western Governors' Association (WGA). Both authors were greatly involved with development of the WIPP transportation program and draw upon this institutional knowledge and their direct involvement with WIPP shipments to assess the status of the WIPP transportation program as it approaches ten years of operations. The authors examine many of the above-regulatory elements of the transportation program – such as bad weather provisions, driver and carrier requirements, and inspection protocols – and demonstrate the value these requirements have added to the safety of these shipments. The paper also examines some of the disagreements, such as DOE's (and the railroad industry's) resistance to developing similar procedures and protocols for rail when it appeared that DOE was intending to initiate rail shipments to WIPP. In addition, the authors will examine whether complacency is a problem now or likely in the near future. Finally, the authors will make a case for similar above-regulatory protocols for DOE's future shipments of spent nuclear fuel and high-level waste to a national repository.

**INTRODUCTION**

For nearly a decade, trucks carrying transuranic waste have traveled through much of the United States en route to the WIPP, a federal geologic disposal site in southeast New Mexico. This program is the largest radioactive material shipping campaign to occur in the United States. Since the first shipment arrived at WIPP in March 1999, more than 7,000 shipments have occurred from nine DOE sites. Thousands more shipments will occur over the next decade.

Every WIPP shipment follows specific procedures and protocols that were developed cooperatively between DOE and Western states along the shipping corridors. States in other regions of the country have also endorsed this program. Developing the transportation program was a multi-year effort – spanning nearly the entire decade of the 1990s – and included opportunities to test various elements of the program on other DOE radioactive material shipping campaigns prior to the opening of WIPP. The result has been a sterling safety record – with only a handful of minor accidents and other incidents to date.

The WIPP transport safety program was based on a common-sense approach – taking reasonable steps to lessen the chance of an accident. It also recognizes that there likely will be some accidents, requiring emergency responders along the routes to be prepared. These common-sense elements greatly lessen the likelihood of an accident – having good quality trucking companies; well-trained, experienced drivers; routinely auditing both carriers and drivers to ensure they continue to meet the standards of the program;

rigorous inspections to ensure the trucks are in top working condition; provisions to ensure that trucks are kept off the road when conditions are hazardous; procedures in place to park the trucks safely if the need arises; and ensuring the trucks use the safest and most direct routes.

The accident prevention measures are then backed up by ensuring that emergency responders and hospital emergency room personnel are trained and equipped. Emergency response plans and procedures are reviewed and revised as appropriate. Communication capabilities are evaluated and notification lists and procedures are checked. Realistic emergency response training exercises test the training, plans, and the incident command structure; and allow responders to practice their newly learned skills. Because the exercise program was frequently the first opportunity that responders at the federal, state and local level had an opportunity to work together, the exercises provided the additional benefit of the responders getting to know one another. As a result, everyone knows their role in the event a response to an accident is necessary. In addition, key state response/dispatch centers have the ability to track the shipments and state and local emergency response officials are notified in advance that shipments are scheduled.

These common-sense measures, agreed to by DOE, go beyond federal and state transportation regulations. DOE recognized the importance of demonstrating that these shipments could be both safe and uneventful, and recognized the importance of having local emergency responders, state transportation officials, and state political leaders supportive of this program.

In 2003, DOE's Carlsbad Field Office (DOE-CBFO) and the Western Governors' renewed a Memorandum of Agreement, endorsing the above-regulatory standards and attributing the safety record, in part, to these procedures:

“DOE-CBFO, in a Cooperative Agreement with WGA, agreed that the WIPP transportation program will be conducted using the standards and procedures developed through the Western Regional Planning Process. This process recognizes that many of the procedures are above the minimum federal regulatory requirements, but were employed to achieve the high level of safety and shipment success since 1999...In part, it has been these safety procedures and the cooperative planning process which has produced the exemplary safety record of the WIPP program and its extraordinary acceptance by the public and elected officials”[1].

## **DEVELOPMENT OF THE WIPP TRANSPORT SAFETY PROGRAM**

In the late 1980s, Western Governors were committed to the cleanup of defense sites in the West. These sites included Hanford in Washington, the Idaho National Engineering Laboratory in Idaho, and Rocky Flats in Colorado. The Governors recognized that cleanup of these facilities depended in part on the ability to move transuranic (TRU) waste off of these sites and safely transport it through Western states to the then-proposed WIPP facility in New Mexico. The importance the Governors placed on transportation safety was reflected in 1988 when the Governors directed their staff to “...secure the commitments necessary to reach a high level of public confidence that nuclear waste can be transported in a safe and uneventful manner” [2].

Western states were already participating in a number of initiatives on transportation. The Western Interstate Energy Board, an affiliate organization of WGA, had formed the High-Level Waste Committee, which was dealing primarily with transportation issues for the proposed high-level waste deep geological disposal facility. The committee had completed some work related to WIPP, including evaluation of the proposed TRUPACT-I transportation cask. Their work, however, was mostly directed to researching issues related to transportation in general, and not to developing transportation programs.

States in the Northwest had formed the Pacific States Agreement, an interstate compact which included Washington, Oregon, Idaho and Wyoming. The need to transport waste successfully was emphasized in the policy statement of the Pacific States Agreement Compact as the protection of the health and safety “through economical transportation of radioactive materials,” which was to be accomplished through cooperation and coordination among neighboring states. The compact established a committee, consisting primarily of state legislators, which was directed to develop model regulatory standards and to coordinate decisions related to routing and inspection of shipments. Compact issues included mode and routes; carrier compliance with rules and regulations; uniform procedures for permitting; uniform safety standards; coordination of emergency response plans; parking; state inspections; arrangements and agreements to enhance safety; and emergency response training and drills.

Thus, states were actively working on transportation issues for the transport of waste to WIPP through a number of venues. Although the Pacific States Agreement was a coordinated effort it only involved four of the states affected by transportation to WIPP. At the same time, representatives from DOE were meeting with states individually, to inform states about their proposed transportation program and to solicit concerns that the states had with the proposed transportation.

Several states had also taken initial steps to address concerns within their state. Colorado, for example, enacted legislation establishing mandatory inspections for shipments of radioactive material originating in or passing through the state. Colorado also established routes within the state for shipments of TRU waste. Both Wyoming and Oregon had discussed bad weather issues with DOE on particular stretches of highway.

The Congressional delegation from Washington and Oregon recognized that the proposed transportation of TRU waste through the west would create significant demands on state resources. They successfully attached a provision to the 1989 Energy and Water Appropriation Bill providing funding to the seven states initially affected by WIPP transportation to assess the needs created by this transportation program, and to develop a report to Congress identifying these needs and the funds necessary to address them. The states included in this initial study were Oregon, Washington, Idaho, Utah, Wyoming, Colorado, and New Mexico. The language in the appropriation did not specify how the U.S. Department of Transportation was to distribute or allocate these funds to the designated states. The Western Governors recognized that the most efficient way to utilize these funds was through a coordinated effort. Since the results of such an assessment would have significant policy implications, they also felt it was appropriate to coordinate this effort through an advisory group to the WGA. Therefore, they created the Working Group on Nuclear Wastes, consisting of a representative from each of the states, and assigned a Policy Manager within WGA to assist the state representatives.

The first meeting of the Working Group was held in 1988 in Albuquerque, New Mexico. The importance the Governors placed on this effort is reflected in their initial appointment of their representatives to the WGA Working Group. Most committee members were members of their Governor’s staff. Those that weren’t had direct access to their Governor. These were people actively involved in setting policies for their states. The Governors were clearly interested in establishing policies which would direct the development of a safe and uneventful transportation program.

Working Group members recognized that there were three key elements to achieving the Governors’ objectives of safe and uneventful transportation and public acceptance of the program: accident prevention; effective emergency response if there were an accident; and a successful public information program. They also recognized that a cooperative effort by federal, tribal, state and local governments was necessary to achieve the objectives.

The Working Group developed a list of concerns and issues that should be addressed in a successful transportation program for each of the major program issues. Accident prevention involved eliminating, to the extent possible, the contributing factors to accidents, such as human error, mechanical failures, and dangerous highway conditions. Effective emergency response, by necessity, required that local emergency responders be willing and able to respond to an accident involving radiological materials. Public acceptance of the shipments would only be possible through an effective and honest public information campaign.

These elements of the program, to a large degree, reflected the ongoing work of the states, both individually and through the Pacific States Agreement. To develop the Report to Congress, individual states focused on those issues for which they had specific interest or expertise.

In June 1989, the Working Group submitted its *Report to Congress, Transport of Transuranic Wastes to the Waste Isolation Pilot Plant: State Concerns and Proposed Solutions*. The report noted that most citizens were afraid of nuclear waste transportation and did not trust the government to assure safe transport of the waste. The importance of winning, and maintaining, public confidence was stressed. The report indicated that the governors were concerned that DOE had not recognized the importance of state and local governments in assuring transport safety. The report also emphasized unique conditions in the western states, including long distances between population centers and mountain passes that can be treacherous in both summer and winter.

Although this initial report was submitted to Congress, Secretary of Energy James Watkins, at a meeting with the Governors, endorsed the conclusions of the report and agreed to provide funding to the states through the WGA to implement the proposed solutions.

A key element for the success of the program was Secretary Watkins' direction to DOE-CBFO to work cooperatively with the states in the development of the program outlined in the *Report to Congress*. DOE had also already committed to using a contract carrier to conduct these shipments. That gave DOE the ability to include specific contract requirements for the carrier to implement the safety program.

Working cooperatively with DOE, the states developed the comprehensive transportation safety program. However, permitting delays for the WIPP facility prevented shipments from occurring. DOE and the states used this delay to advantage by testing the program on DOE shipments of Cesium-137 from Colorado to the Hanford Site. This "test" of the safety program demonstrated not only the effectiveness of the program as a whole, as well as many of its specific components, but also that it could be used for other DOE shipping campaigns.

### **EXTRA-REGULATORY ELEMENTS AND THEIR VALUE**

Most of the program elements related to accident prevention required DOE to take steps beyond the minimum requirements of federal and state regulations. In their initial *Report to Congress*, the states outlined key steps to preventing accidents, including:

- High quality drivers were critical to avoiding accidents, since most truck accidents can be prevented by a prudent driver. The states outlined the standards they expected drivers to meet.
- Compliance by carriers with regulations and contract requirements would ensure that the safety elements were implemented on the road. This compliance would be monitored by both the states and DOE.
- Stringent inspection protocols would ensure that vehicles were maintained to the highest standards, avoiding accidents related to mechanical failure.

- Bad weather policies and procedures would keep shipments off the road during times of bad weather and road conditions, avoiding situations where accidents might be caused by hazardous road conditions.
- Safe parking criteria during abnormal conditions would allow trucks to be parked safely until conditions improved to allow safe passage.

The bad weather procedures, safe parking requirements and inspection programs were greatly facilitated by DOE's decision to provide states with shipment information through its satellite tracking system called TRANSCOM.

When the states had completed development of all the individual elements of the transportation safety program, they recognized that the elements should be integrated into one comprehensive guide. Therefore, the states and DOE worked together to prepare the Western Governors' Association *WIPP Transportation Safety Program Implementation Guide*. This guide then served as the foundation for DOE's transportation plan for WIPP shipments, for its carrier management plans, and for the states' implementation programs.

An important element of the WIPP transportation program is that DOE pre-selected routes from each shipping location as if each shipment was a Highway Route Controlled Quantity (HRCQ) shipment, even though the vast majority of WIPP shipments are not HRCQ. This principally means that shipments will use the most direct routes, following interstate highways where possible. DOE requires its carriers to use only these routes. This pre-selection of routes allowed the states to focus their training resources along a more limited number of routes, rather than train along multiple routes which may or may not experience shipments. As DOE added additional shipping sites in the Midwest and Southeast, they consolidated two proposed routes into one route, allowing states to maximize their training resources, even though this meant more shipment miles for some shipments.

DOE's commitment to the transportation safety program was demonstrated by events involved with the very first scheduled shipment to WIPP. Once the permitting was completed, the first shipment was scheduled to depart March 25, 1999 from Los Alamos National Laboratory in New Mexico to the WIPP facility. DOE and State of New Mexico officials planned significant public information events to "celebrate" the opening of the WIPP facility. When the first shipment was ready to depart Los Alamos at 12:01 a.m., however, fog in the valley below created conditions that required the shipment to be delayed under the bad weather and road condition procedures. Rather than dispatching the shipment, DOE followed the procedures, and delayed departure of the first shipment for 20 hours until 8 p.m. Although many people were disappointed in the delay of the landmark first shipment, those that had been working to develop the transportation safety program marked the delay as a success story. In spite of the pressure to undertake the first shipment, DOE diligently followed the transportation safety program procedures.

Inspection data over the life of the program also indicate that the program is working to avoid accidents through diligent maintenance of vehicles and through the use of high quality drivers. Each WIPP shipment is inspected at the point of origin prior to departure and at various points along the route. For the period from the first shipment in 1999 through December 31, 2005, WIPP vehicles and drivers were found to have a violation rate of only 7.94 percent. This is an extremely low rate for violations. For purposes of comparison, inspections of trucks in general in 2005 resulted in a violation rate of 73 percent. For trucks carrying hazardous materials, the violation rate was 18 percent. Because of the low number of violations, the Commercial Vehicle Safety Alliance (CVSA) concluded that "WIPP shipments continue to be one of the safest commercial truck shipments today" [3].

Another measure of success of the program is the avoidance of hazardous travel conditions. Although it is difficult to quantify, it is safe to say that for the most part, WIPP vehicles have avoided hazardous

travel conditions that could have resulted in an accident involving the WIPP vehicle. Most of this avoidance of hazardous travel conditions has been achieved through diligence on the part of DOE, the WIPP carriers, and the states in making the determination of acceptable weather and road conditions to dispatch a shipment. In its 2002 Program Evaluation Report, WGA noted that:

“Given that more than 1,000 shipments took place during this time, the fact that so few shipments required diversion to safe parking indicates that the decision on when to ship has generally been sound. When the need for safe parking has come up, the WIPP drivers have followed the procedures and parked in acceptable locations” [4].

It should be noted, as discussed later in this paper, that during the initial years of the shipping program, the shipping campaign benefitted from the abnormally dry winter conditions from the drought being experienced in much of the west.

### **WIPP TRANSPORT SAFETY RECORD THROUGH 10 YEARS**

Perhaps the best measure of the success of the program has been the extraordinarily low rate of crashes involving WIPP vehicles. As of November 2008, DOE reports that “loaded” WIPP shipments have covered 8.3 million miles [5]. Since WIPP shipments began, loaded and unloaded WIPP trucks have been involved in about a dozen crashes with other vehicles<sup>1</sup>. Most could be considered relatively minor, and most would not have been significant enough to be reported under the Motor Carrier Safety Administration (MCSA) Crash reporting program<sup>2</sup>. None caused damage to the shipping containers or led to a release of radioactive materials. Significantly, of the dozen or so crashes involving WIPP vehicles, only one was a chargeable accident to a WIPP driver. That incident involved the vehicle leaving the road due to driver illness. The remainder of the crashes were chargeable to another driver. There is not enough information on the nature of these crashes to accurately categorize them for comparison to the large truck crash statistics maintained by MCSA. However, given the “fender-bender” nature of the majority of the crashes involving WIPP shipments, it is safe to assume that the crash rate for WIPP shipments is much lower than for commercial truck shipments in general.

It is also important to note that none of the crashes involving WIPP vehicles occurred because of bad weather or road surface conditions. In contrast, for large truck property damage-only crashes, 12.2 percent occurred during bad weather conditions, and 22.2 percent occurred during bad road surface conditions [6]. The WIPP bad weather and road conditions procedures have kept the WIPP vehicles off of highways when conditions favor crashes.

While it is not possible to quantify the numbers of accidents that were avoided because of the skill and training of the WIPP drivers, there is at least one example where the additional training requirements for WIPP drivers likely prevented an already disastrous accident scene from escalating further. On August 19, 2004, there was a multiple car crash on Interstate 80 between Laramie and Cheyenne, Wyoming. Thirty-six vehicles were involved in several accidents due to wet and extremely foggy conditions, resulting in more than 30 people injured and four fatalities. Seven semi-trailers were involved in the crash [7]. The fog materialized quickly enough that there was not time to alert a WIPP vehicle traveling on this stretch of highway. Unlike the many drivers involved in the crash, however, the WIPP driver recognized the hazard created by the dense fog and slowed to a safe speed. When the driver arrived at the

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<sup>1</sup> The authors are not aware of a published compilation of all incidents involving WIPP shipments. The WGA has tracked incidents over the years and developed its own compilation of incidents. WGA shares this information with state representatives on the WIPP Work Group.

<sup>2</sup> Reported crashes include those with a fatality, an injury requiring transport away from the scene, or at least one vehicle disabled requiring towing.

scene of the multiple vehicle crash, he correctly realized that accidents were still occurring, with vehicles plowing into the crash scene. Therefore, he pulled the WIPP truck off of the road and drove past the scene of the crash.

The driver stayed with the vehicle to maintain security of the WIPP vehicle and to report the crash while the co-driver returned on foot to the crash scene to rescue another truck driver from his burning vehicle. Although the WIPP vehicle was parked in the barrow pit, numerous news crews covering the accident did not notice it. There were no immediate reports in the local media that a WIPP truck was in the vicinity of the crash. In fact, only much later was it reported that a vehicle thought to be carrying hazardous materials was in the area of the crash. The driver of the WIPP vehicle acknowledged that his required defensive driving course was instrumental in being able to avoid the crash. He said, "Everything I learned that day kicked in in two seconds." He added, "It shows WIPP's protocol and criteria for safety are a pretty good thing" [8].

## **PROGRAM EXPERIENCES FEW CHANGES**

The WIPP transportation safety program has held up tremendously well. A number of minor changes have occurred over the years but the program is largely the same as the program that was in place when the first WIPP shipment left Los Alamos National Laboratory in March 1999.

Several of the most significant changes to the program are positives. TRANSCOM, the web-based satellite tracking system used for the shipments, is far more reliable than the dial-up system that was first used in the 1990s. Improvements in the mapping portion of the program provide much more accurate visual location information for the user. Advance notice to the states and others through an 8-week schedule is far more accurate and reliable than earlier versions.

DOE has asked for only a few minor changes to the protocols and procedures. After the first few years of shipments, DOE asked that changes be made to the driver experience requirements. DOE indicated that well-qualified drivers were not able to meet one nuanced requirement of the driver standards agreed to by DOE and the states. The states agreed to the change.

DOE also asked that "High Wind Warning" be dropped from the weather procedures as a disqualifying condition, primarily because it caused major disruptions to their schedules. The state police members on the WGA group objected. They said the standard was established not so much because of the handling characteristics of the WIPP vehicle, but concern for the handling of other vehicles on the road. DOE dropped its request and "High Wind Warning" remains a disqualifying condition for shipments to be on the road.

The states asked that "Ice Storm Warning" and "Sleet Warning" be added to the disqualifying weather conditions after the National Weather Service issued these advisories in Oregon prior to a shipment departure. DOE agreed.

New Mexico made significant changes to its inspection program. Prior to January 2005, the state inspected all WIPP shipments to the CVSA Level VI standards (enhanced, defect-free voluntary standards). Beginning in January 2005, all HRCQ WIPP shipments and all WIPP shipments arriving alone are inspected at Level VI. For non-HRCQ shipments arriving at the New Mexico Ports-of-Entries in groups, every fifth shipment is inspected at Level VI, and the rest are inspected to the much lower standards of a Level II inspection, with a radiological survey added.

There have also been changes in the carrier contracts; changes in the frequency of the carrier audits; an increased security focus following the terrorist attacks of 2001; and significant improvements to the emergency responder training modules.

## **PROBLEMS WITH ADHERENCE TO THE PROGRAM REQUIREMENTS**

The cooperative partnership that exists between DOE and the Western states is one of the key reasons that the WIPP transport safety program has been such a success. But that doesn't mean there haven't been disagreements or friction between the parties. In addition, occasional driver error has resulted in non-compliance with the WIPP transport program.

The carrier audit program has been inequitable from nearly the beginning. When WIPP shipments began, CAST Transport of Colorado was the carrier. Western states strongly advocated a rigorous, independent audit of the carriers and the State of Colorado fulfilled that responsibility in auditing CAST. However, when Tri-State was added in late 2000 as the second WIPP carrier, it did not receive host state audits because it was headquartered outside of the West and Missouri was not a part of the program. As a result, Tri-State ended up being audited much less frequently. Despite repeated requests from the Western states, DOE was reluctant to conduct rigorous audits of the type conducted by Colorado.

A more recent problem related to WIPP carriers was the exclusion of Western state representatives in the process to select WIPP carriers in 2007. DOE had previously included Western states in the carrier selection process but did not on these occasions. DOE-CBFO said in hindsight that unfortunately, it had not provided sufficient internal justification to the Contracting Officer and Legal Counsel to allow Western state participation in the carrier selection. DOE-CBFO did commit to allowing Western state participation in future carrier selection processes [9].

Another area of disagreement was DOE's reluctance to commit that all intersite shipments of transuranic waste would adhere to the same standards as shipments destined for WIPP. State arguments that the same material should be handled in a consistent manner did not convince DOE – principally because at the time, DOE desired to move some TRU waste from the Mound Site in Ohio to the Savannah River Site in South Carolina using a railcar that was not certified as a Type B shipping container – a requirement of the WIPP transport program. DOE typically did agree to follow the WIPP protocols for all other intersite shipments of transuranic waste, including shipments to Hanford from sites in Ohio and California in late 2002 and early 2003, but would not agree to it as a general policy.

Once DOE completed the shipments using the railcar, it eventually agreed that WIPP protocols would be used for all TRU waste shipments made by truck, with the provision that “if shipments are contemplated using protocols other than those agreed to for TRU waste shipments to WIPP, negotiations will be held with affected states and tribes prior to the commencement of shipments” [10].

On a few occasions, WIPP drivers have gone off prescribed routes without approval. At least twice in Idaho, shipments deviated from the approved route due to driver error. In one case, the driver continued until he reached an approved turn-around point. In the other case, the driver attempted to turn around in an emergency-vehicle-only turnout on the highway. A new driver on a shipment from Los Alamos took a wrong turn and went through the city of Los Alamos, New Mexico, rather than using the truck route (the approved WIPP route). Most recently, a driver went off route to have mechanical problems fixed at a truck dealership. The routing problems have been mostly resolved by DOE's making sure that all drivers are better informed as to the specific routes that are allowed and exactly how to get to those routes.

Finally, DOE has not been responsive to requests from some Western states – primarily Washington and Oregon – who have asked that DOE consider a regional, seasonal shipping schedule to the extent



possible. The intent would be to reduce or eliminate winter shipments from Northern sites such as Hanford, and focus instead during the winter months on shipments from Southern sites such as the Savannah River Site and Oak Ridge, which just began shipping in 2008. DOE has stated there is not enough volume of waste from Southern sites to completely eliminate winter shipments from the West, yet it has made no effort whatsoever to at least reduce shipments from the West during the winter and shift even a portion of its truck fleet to the South. Shipping schedules for Hanford and the Idaho National Laboratory typically called for as many shipments per week during the winter months as during the summer months.

Winter shipments from Hanford and the Idaho National Laboratory are frequently delayed due to inclement weather or bad road conditions and the winter of 2007-2008 was particularly harsh. Due to the severe drought in much of the West, winter weather for the initial years of the WIPP shipping program was much better than historical conditions. It seems that a repeat of the 2007-2008 conditions is more likely the norm than the milder winters of the first eight years of shipping.

However, all-in-all, the cooperative relationship between DOE and the Western states is unprecedented for a program of this type and even the best of partners have occasional disagreements.

### **THE WIPP TRANSPORT PROGRAM AND ITS APPLICABILITY TO RAIL**

In 2002, DOE began work on licensing the proposed TRUPACT-III cask. This is a large cask that would be used to carry large items for disposal at WIPP. Due to its large size, this cask will likely require overweight truck permits for highway shipments. Even with an overweight permit, the load in the cask might still be weight limited to travel on highways. Therefore, DOE began investigating the use of rail for shipments using this cask.

WGA initiated a project to use the WIPP Transport Safety Program Implementation Guide as the basis for a similar program for rail shipments. Translating the highway procedures to rail proved challenging for a number of reasons. One of the major problems was that for whatever reason, DOE did not work cooperatively with the states on this project. Therefore, the process used successfully for truck shipments was not followed for this project. Rail carriers were also resistant to working cooperatively with the states to develop specific procedures and protocols. The rail carriers repeatedly stated that they've been hauling hazardous materials for decades; that their accident rate is at historic lows; and they better than anyone understand their system and what is necessary to safely complete these shipments.

Fundamental differences between rail and highway also contributed to the difficulty of the project. For highway shipments, the state controls the highway. Rail, in contrast, involves private rights-of-way with limited access. Most shipments of materials by rail are conducted under the "common carrier" provisions of the Department of Transportation. DOE was proposing to use these provisions, greatly limiting what they could require of the railroads. For example, DOE could not specify the routes used for the shipments. This created significant consternation for the states, since the railroads indicated that they would use routes through counties that had never received emergency response training. Some of the possible routes would also have used track in much lower condition than the track paralleling the existing highway routes. Union requirements for crews would also limit the capability of selecting the "best crews" for the shipments, in contrast to the highly trained and qualified drivers used for highway shipments. States are pre-empted from requiring their own inspections of rail equipment and carriers, and may inspect rail shipments only under the Federal Railroad Administration process. Western states have very few trained rail inspectors.

In spite of these challenges, WGA was able to produce a draft guide for WIPP rail shipments. Although many problems and issues remained that needed to be worked through in a cooperative process, the draft

does provide a reasonable starting point to begin implementation of a safety program for rail shipments whether of TRU waste, or for future shipments of spent nuclear fuel and high-level waste.

### **KEEPING COMPLACENCY OUT OF THE PROGRAM**

In its 2006 report *Going the Distance? The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States*, the National Academies' Committee on Transportation of Radioactive Waste acknowledged that "...the challenges of sustained implementation should not be underestimated" [11]. While the Committee's comment focused on eventual shipments of spent fuel and high-level radioactive waste to Yucca Mountain, WIPP shipments are equally susceptible to the problem of complacency. The authors conclude that sustained vigilance when shipping campaigns become "routine" is a difficult challenge for shippers and their state partners to meet.

Shipments to WIPP originally were an unusual event. Everyone involved in the program took considerable care in preparation for shipments, as well as for the actual conduct of the shipment. Part of the reason for the high level of attention to detail has to be the public and state officials' scrutiny of these unusual events. Once the shipments become more routine, public and state official scrutiny undoubtedly falls off. Experience with WIPP shipments indicates that over time, the level of attention to detail may fall off as the shipments become more routine. There are several examples in terms of the preparation of the WIPP shipments, such as the eight drums shipped from INL that had the filters removed, a drum that arrived at WIPP without the lid having been properly secured, and a drum that arrived at WIPP that was not WIPP-certified waste.

There are indications that WIPP shipments are becoming routine for state officials as well as for DOE and its contractors. As mentioned above, in the 2002 Program Evaluation, WGA noted that very few of the first 1,000 shipments needed to be diverted to safe parking, meaning that the protocols for bad weather were being followed effectively. The winter of 2007-2008, however, was an extremely bad year along many of the Western routes. Interstate 80 in Southern Wyoming, for example, was closed in District 1 (southeast Wyoming) 270.5 hours on 15 occasions from January 1 to February 15. Interstate 80 in District 2 (south central Wyoming) was closed 233 hours on 12 occasions during the same time period. The Wyoming Department of Transportation (WYDOT) ran out of sand in Cheyenne on January 1 and had to buy an additional 10,000 tons. As of March 1, WYDOT had 23 snow plows hit by motorists. One snow plow was hit by three different semis before it ended up off the road. Many days along Interstate 80 there were gusts over 100 mph.

Although statistics are currently not available on the number of times WIPP shipments required safe parking during this time frame, some states just accepted that they would "routinely" direct WIPP shipments to safe parking, and did so many times. This, in spite of the dispatch requirement that "a shipment should not be dispatched if the forecast predicts severe weather or bad road conditions which would affect the safety of the shipment when the shipment is anticipated to be in that area" [12]. Some states still consider the need to safe park a WIPP shipment due to bad weather as an abnormal incident that should be infrequent, not commonplace.

Perhaps most telling is the increase in violations found during the CVSA inspections, both at the point of origin and en route. From October 2002 to December 2006, violations at the point of origin increased from 7.35 percent to 9.91 percent, and en route violations increased from 5.86 percent to 10.34 percent. During that same time frame, out-of-service violations also increased significantly, from 0.0 percent to 0.14 percent for the drivers and 1.26 percent to 3.59 percent for vehicles<sup>3</sup> [13].

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<sup>3</sup> It must be noted that the inspections are to a very stringent standard, requiring the vehicle and driver to be "defect free" before leaving the point of origin.

The carriers and their drivers do know that they will be inspected at both the origin and at various points en route. Therefore, the increase in violations is difficult to explain, other than perhaps complacency is setting in.

### **ADVOCATING A SIMILAR, ABOVE-REGULATORY APPROACH FOR YUCCA MOUNTAIN SHIPMENTS**

DOE's Transportation Practices Manual establishes a set of standard transportation practices for DOE organizations to use in planning and executing certain shipments of radioactive materials. The Transportation Practices Manual indicates that highway shipments of spent nuclear fuel and high-level waste to Yucca Mountain may be handled in much the same way as shipments to WIPP, although detailed operational plans are yet to be developed and that could result in significant differences [10].

According to the Transportation Practices Manual, rail shipments would be handled considerably different. That reflects both the fundamental differences between rail versus highway and DOE's previous resistance to resolving those differences with the states, as was mentioned earlier.

DOE's Office of Civilian Radioactive Waste (DOE-RW) is responsible for planning shipments of spent nuclear fuel and high-level waste to a national repository under the Nuclear Waste Policy Act (NWPA). DOE-RW officials, in working level conversations with state representatives at various times in recent years, have indicated that they believe the WIPP transport safety program is more rigorous (and expensive) than is necessary, and NWPA shipments to Yucca Mountain will not necessarily be conducted using the above-regulatory standards and state participation that DOE agreed to for WIPP shipments.

The authors disagree and strongly believe that *at a minimum*, the WIPP transport safety program should be the template for planning all NWPA shipments. For highway shipments, the WIPP program can easily be transferred to NWPA shipments<sup>4</sup>. For rail shipments, the Western states' experience in attempting to "translate" the WIPP highway procedures to rail indicates that considerable discussion and negotiation is needed between DOE-RW, the railroads, and the affected states. That experience also indicates to us that the common-sense elements that are part of the existing WIPP transportation plan do directly apply to rail shipments – although many of the specific procedures will need to be modified.

Western Governors have endorsed the WIPP Transportation Safety Program Implementation Guide as an "excellent framework for transportation planning," and recommend "a similar document...as a base document" for DOE's spent nuclear fuel and high-level waste transportation programs. Further, they recommend that DOE "must look to the WIPP transportation and other successful shipping programs for guidance" in conducting its NWPA shipping campaign [14].

States have seen that the WIPP transportation program is highly successful and that the trucks have generally traveled safely and uneventfully. In our view, state officials would not be interested in weaker standards for shipments that pose a considerably higher level of hazard and will also likely be much more controversial.

We can't even envision how DOE could possibly attempt to sell a lesser program. Consider the reaction of states, tribes, local government – not to mention the public – if DOE were to attempt to say that less

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<sup>4</sup> While DOE-RW's announced intent is to make the vast majority of shipments to Yucca Mountain by rail, there are questions about their ability to do that – given the massive job ahead in constructing a rail line to Yucca Mountain and the fact that many of the reactors do not have rail access. Some portion of the shipments – perhaps a large portion – will be made by highway.

qualified carriers and drivers are acceptable, or that inspections don't really need to be that rigorous, or that it's acceptable for trucks to be on the road when the snow is flying. Common sense would dictate that any of those changes would increase the likelihood of accidents and would therefore not be acceptable.

## CONCLUSION

The common-sense attributes of the WIPP Transportation Safety Program have been proven out over the past decade – more than 7,000 shipments that have certainly met the Western Governors' standard of "safe and uneventful," and there is public confidence that the shipments can be conducted safely. The above-regulatory protocols and procedures that DOE has adopted to ensure high quality carriers and drivers, well-maintained trucks, designated routes, restrictions on when the trucks can travel, and a well trained emergency response capability, have prevented all but a handful of minor crashes and led to wide-spread support for the transportation program.

DOE's partnership with the states and the states' buy-in to the program cannot be overlooked. Rather than take DOE to court to stop WIPP shipments or to enforce certain operational agreements – such as has happened with other federal programs – in contrast, the states' confidence in the program means that they have been willing to stand side-by-side with DOE in speaking publicly on behalf of the transportation program and endorsing its principles.

These lessons should not be lost on DOE-RW officials as they move forward in planning for NHPA shipments. The authors strongly encourage DOE-RW to work cooperatively with the states in developing a transportation safety program for NHPA shipments that embraces the extra-regulatory provisions of the WIPP program.

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