Radioactive Material
Transport in Oregon 2013
Report to State and Local Governments

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Executive Summary

Oregon Revised Statute 469.609 requires the Oregon Department of Energy to submit a Radioactive Material Transport report to interested state and local government agencies. This document provides comprehensive information on radioactive material transport in and through Oregon during the calendar year 2013, including a safety program summary.

The Radioactive Material Transport Program helps prevent accidents involving the transport of radioactive material. The program also prepares for and handles mishaps if they occur. The Oregon Department of Energy is the lead state agency for the program and works with other state and local agencies to carry out the program’s mission.

During this report period, 554 shipments of radioactive materials entered or traveled in Oregon under authority of the state’s Radioactive Material Transport Permit Program. This compares to a similar number of shipments in recent years and represents a wide range of materials and hazards.

There were no transport accidents in Oregon that resulted in spillage or injury from radioactive material.

Regulating Radioactive Material Transport

The 1981 Legislature passed ORS 469.603 through 469.621 to regulate the transport of radioactive material. The law mandates effective emergency response to transport mishaps. Oregon’s statutes are consistent with federal safety standards.

Certain shipments of radioactive materials – depending on the radiation levels and if a carrier uses its vehicle to haul other materials – require information signs called placards.

Oregon statutes require carriers of all radioactive placarded shipments to obtain a state permit prior to transport through Oregon. The Oregon Department of Energy is the permitting authority authorized to delegate the authority to the Oregon Department of Transportation.

The Oregon Department of Transportation operates the state’s ports-of-entry; therefore, it can effectively track compliance with permitting regulations. The Oregon Department of Energy charges permit holders a fee for each placarded shipment that travels through the state. The charge is $70 for most shipments and $500 annually for some medical and industrial shipments. The fees help defray some of the costs to operate the State’s transport emergency preparedness program.

Additionally, the statutes require the Oregon Department of Energy to:

- Ensure truckers use the best and safest routes.
- Work with appropriate agencies of government at the local, state and national levels to ensure a swift and appropriate response to any accident.
- Work with the Oregon Health Authority to conduct adequate training and emergency planning along the transport routes.

The statutes also require the Oregon Health Authority to maintain a trained and equipped radiation emergency response team.
The Oregon Energy Facility Siting Council develops rules to implement the statutes, providing rulemaking authority to:

1. **Set requirements for notification; record keeping; reporting; packaging and emergency response.** Transporters must notify the State of certain radioactive material shipments; of any vehicle accidents; loss of any radioactive material; or tampering or obstruction of any shipments.

2. **Specify conditions of transport for certain classes of radioactive materials.** Motor vehicles must avoid transport during a road condition advisory unless vehicles have traction tires or devices. If the Director of the Oregon Department of Energy believes there is clear and immediate danger to public health or safety, the director may halt the transport of radioactive material. The Director may also impose civil penalties for violation of rules.

3. **Establish requirements for insurance, bonding or other indemnification.** Carriers must maintain a certain amount of insurance, pay for costs associated with response to an accident and indemnify the State from claims arising from the release of radioactive material during transport.

In 2013, the Energy Department approved changes that slightly modified the existing Administrative Rules. These changes:

- Clarified the reporting requirements for individual shipments.
- Allowed an option for electronic reporting of the information.

**Adjusted civil penalties for failure to report this information.**

**Shipment Activity**

Carriers transport radioactive materials in Oregon on a daily basis, including small amounts for industry and medical use. They also routinely transport industrial gauges with radioactive sources to work sites throughout the state. Many of these shipments do not require placards.

Currently, commercial nuclear facilities near the Hanford nuclear site in southeast Washington make up a significant number of the radioactive material shipments through Oregon. While most shipments pose a low risk, some do present unique hazards.

Attachment 1 shows the number of placarded radioactive material shipments transported through Oregon from 1982 through 2013. Attachment 2 shows the shipments by route during 2013.

**Low-level radioactive waste**

Perma-Fix Northwest, a commercial facility in Richland, Washington treats low-level radioactive waste from around the nation. Perma-Fix returns the treated waste to the sender, or sends it on to disposal sites.

US Ecology, a commercial disposal site at Hanford, manages the low-level waste sent from hospitals, nuclear power plants, industries and universities in 11 Western and Rocky Mountain states, including Oregon. US Ecology disposes of wastes by burying it in trenches. The volume of waste shipped to the US Ecology site in recent years has declined significantly from the 1980s and early 1990s.
Radioactive Material Transport in Oregon 2013

U.S. Department of Energy nuclear weapon production and research sites throughout the country previously shipped low-level waste to government burial trenches at Hanford. In 1999, DOE selected Hanford as the primary disposal site for significant amounts of the nation’s low-level and mixed low-level waste. This DOE decision could have resulted in thousands of shipments over the next several decades. However, litigation prevented DOE from shipping these wastes to Hanford. A separate litigation settlement extended the moratorium on waste shipments to Hanford through at least 2022.

Commercial nuclear fuel fabrication

The AREVA facility in Richland, Washington, fabricates fuel for use in commercial nuclear reactors. Trucks carrying facility-related raw materials and finished products travel through Oregon.

Transuranic waste

DOE buries transuranic waste at the Waste Isolation Pilot Plant in southeast New Mexico. Transuranic waste includes lab equipment, tools, rubble, soil and sludges tainted with small amounts of plutonium and other radioactive materials.

In July 2000, Hanford began limited transuranic waste shipments to WIPP. For a time, these shipments represented a significant percentage of the radioactive material that traversed the state. The state restricts WIPP shipments through Oregon to Interstates 82 and 84 in northeast Oregon.

Beginning in 2010, Hanford sent shipments of transuranic waste to the Idaho National Laboratory for repackaging, before sending it to WIPP. These shipments traveled along the same route in Oregon as WIPP-bound shipments.

Although Hanford has large quantities of transuranic waste to dispose of at WIPP, DOE has decided to focus on shipments from other DOE sites. Therefore, DOE anticipates that there will be no transuranic waste shipments from Hanford during the next few years.

Commencing in 2015 or 2016, DOE expects that shipments from Hanford will resume at significantly higher numbers than before.

The following table shows the number of Hanford transuranic waste shipments from 2000-2013.

<table>
<thead>
<tr>
<th>Hanford transuranic waste shipments</th>
<th>2000-2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>5</td>
</tr>
<tr>
<td>2001</td>
<td>5</td>
</tr>
<tr>
<td>2002</td>
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<td>2004</td>
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<tr>
<td>2005</td>
<td>100</td>
</tr>
<tr>
<td>2006</td>
<td>79</td>
</tr>
</tbody>
</table>

Through Jan. 27, 2014, the WIPP site accepted 11,867 shipments from 12 DOE sites – 572 of those shipments from Hanford. An additional 77 shipments of transuranic waste traveled from Hanford through Oregon to the Idaho National Laboratory.

Oregon worked with other Western states and DOE to develop and implement a
comprehensive transport safety program for these shipments. The program includes:

- Higher standards for the drivers and trucking companies.
- A “defect-free” standard for inspections.
- Procedures to keep the trucks off the road when weather conditions are especially hazardous.
- Training of first responders and hospital emergency room personnel along the shipping routes.
- Advance notice of shipments provided to the states.
- Near-real time tracking of the shipments, using satellite-tracking systems.

DOE has agreed to the above-regulatory protocols for certain other shipments.

At some point, Hanford will begin shipping “remote-handled” transuranic waste. So far, Hanford has only shipped “contact-handled” transuranic waste, which has very little penetrating radiation. Remote-handled waste does contain penetrating radiation and requires heavy lead shielding in the transportation container.

**Naval nuclear reactor compartment shipments**

Since 1986, the U.S. Navy disposed of 125 reactor compartments from deactivated nuclear submarines and cruisers at Hanford. The Navy removes the irradiated nuclear fuel from the reactors; cuts-out a section of the submarine or cruiser containing the reactor compartment and welds steel plates over any opening to seal the compartments. The Navy conducts this work at the Puget Sound Naval Shipyard in Bremerton, Washington. The Navy then sends these compartments, classified as low-level waste, by barge up the Columbia River to Hanford for disposal.

Through most of the 1990s and into the early part of the 2000s, the Navy averaged between seven and 10 shipments a year. Currently, the average number of shipments is between zero and two per year. The Navy did not make a reactor compartment shipment in 2013.

The Oregon Health Authority’s Radiation Protection Services and the Washington Department of Health periodically inspect these shipments, prior to departure, to ensure they meet state and federal transport regulations.

**Rail shipments**

The Navy periodically ships spent nuclear fuel from its Navy ships by rail from Puget Sound Naval Shipyard, to the Idaho National Laboratory. These rail shipments travel through about 200 miles of northeast Oregon. Oregon Energy works with the Navy to provide information about these shipments to state and local emergency responders. The Navy does not share shipment schedules with the state.

**Spent nuclear fuel and high-level waste**

The federal government canceled plans to build and operate a geologic repository in Nevada for the nation’s spent nuclear fuel and high-level nuclear waste. This decision potentially leaves highly radioactive waste “stranded” in Oregon and Washington State for years to come.

Portland General Electric stores irradiated nuclear fuel at the shutdown Trojan nuclear plant northwest of Portland. Energy Northwest stores nuclear fuel at the Columbia Generating...
Station nuclear plant near Richland, Washington. DOE also stores nuclear fuel at Hanford and eventually will have immobilized high-level nuclear waste in temporary storage.

DOE will at some point transport this highly radioactive waste through Oregon to an interim storage facility or a geologic repository, assuming DOE is successful in siting either facility. The Oregon Department of Energy will be involved with extensive planning and training before DOE transports these materials, regardless of the destination.

DOE has developed a preliminary strategy to develop an interim storage facility for a limited amount of commercial spent fuel, while they locate and study a new geologic repository site. Should DOE open an interim storage facility, the initial spent fuel could come from shutdown nuclear reactors such as Trojan. DOE would like to begin shipping to an interim storage facility in 2021.

Summary of Transport Accidents and Incidents

There were no transportation incidents in Oregon that resulted in spillage or injury from radioactive material. One transportation-related event may have resulted in exposure of radiation workers to very small amounts of radioactive materials. The calculated and actual doses were less than 0.1 percent of the annual limit for radiation workers.

Radiation Protection Services received and responded to 51 incident reports. These reports ranged from information notifications to requests for a physical response by the department’s radioactive materials program personnel.

Of the total incident reports, Radiation Protection Services classified 25 (49 percent) as transportation incidents. They include the following:

- **Twelve** incidents of radiation alarms at three Oregon metal scrap dealers for gondolas (open top type of rolling rail stock) and trucks carrying scrap metal transported from in-state and out-of-state locations. RPS determined three of these alarms to be false and confirmed that nine contained radioactive materials. Of the nine confirmed cases, the scrap dealers sent eight back to their point of origin and Radiation Protection Services took possession of the remaining source.

- **Six** incidents of radiation monitor alarms for metal scrap from Oregon locations at Washington state scrap yards. In all six instances, the scrap load was returned to the Oregon site for further evaluation.

- **Three** incidents of radiation waste alarms at the Covanta waste-to-energy facility in Brooks, Oregon, for waste trucks entering the facility. All of these incidents involved medical waste. Radiation Protection Services personnel removed the radioactive materials, transported the materials to Portland and placed them into the department’s storage facility for decay and disposal.

- **Two** incidents were radiation waste alarms from the Portland Metro South waste transfer station for incoming waste trucks. The waste comes from commercial and private sources and both were determined
to be medical waste. One was resolved by sending the waste truck back to the waste origin, the other by Radiation Protection Services personnel packaging/transporting the waste back to the department’s Portland office for decay-in-storage.

The two remaining transportation incidents were unique:

The first was extensive damage reported to a portable nuclear materials gauge while the gauge was being used at a temporary jobsite. The normally shielded gamma source (Cesium 137) housed on a rod was crushed out of its storage position by a construction roller, potentially exposing workers to radiation. The gauge rod was placed into a temporary shielded transport bucket, and transported – by highway – back to the licensee’s office. Radiation Protection Services conservatively estimated worker dose at 4.5 millirem total dose for the event (workers are allowed 5,000 millirem dose annually; therefore the incident dose was about 0.1 percent of annual dose). There were zero doses from dosimetry worn by workers and were no injuries during this event.

The second incident was a notification of a radioactive scrap metal shipment from Washington State through Oregon to California. This shipment was transported under U.S. Department of Transportation special exemption.

Emergency Preparedness and Response Activities

The Oregon Department of Energy contracts with Radiation Protection Services to provide radiological training to first responders and hospital emergency room personnel. Radiation Protection Services provides basic and advanced radiation emergency response courses.

Radiation Protection Services focused this year on collaboration with the Regional Hazardous Materials response teams and the Oregon National Guard. The goal of this collaborative mission is to ensure that multiple agencies can work together to mitigate a nuclear or radioactive material incident and establish a unified command system.

In March, Radiation Protection Services worked with the Coos Bay HazMat Team and the Oregon National Guard’s 102nd Civil Support Team to conduct a radioactive material exercise. The exercise involved coordinating a long-term radiological material operation focusing on locating the source; isolating spilled or lost materials and decontamination of team members mitigating an accident.

Radiation Protection Services participated in a regional training coordination meeting in May with the Oregon State Fire Marshal’s Office and local fire departments, which provide hazardous materials response. The training identified equipment needed to be procured or available for the initial HazMat Team response involving radioactive materials.

In July, Radiation Protection Services participated in a Regional Hazardous Material Training meeting and presented information on Rad Responder, a cloud-based database to document radiation levels and sampling locations. This program allows personnel at the command post and the Agency Operations
Center real-time data during a radiological accident and environmental survey operations. Also in July, Radiation Protection Services presented advance radiation mitigation techniques for transportation emergencies to members of Hermiston’s HazMat Team.

Radiation Protection Services also provided radiological training to the Umatilla Tribal Fire Department in February and to the Douglas County Health Department and Emergency Management staff in June. Both trainings focused on awareness of radiological materials being transported through their respective areas and appropriate initial response actions.

Radiation Protection Services, in partnership with the Oregon Health Authority’s Health Security Preparedness and Response program, participated in the Radiation Injury Treatment Network tabletop exercise hosted by Oregon Health and Science University.

The goals of the Radiation Injury Treatment Network are:

1. To develop treatment guidelines for managing hematologic toxicity among victims of radiation exposure.
2. To educate health care professionals about pertinent aspects of radiation exposure management.
3. To help coordinate the medical response to radiation events.
4. To provide comprehensive evaluation and treatment for victims at participating centers.

In addition, the Oregon Department of Energy contracts with Oregon State University’s Radiation Center to provide annually advanced training in radiological response to members of Oregon’s regional Hazardous Material Response Teams. Additionally, State police officers and emergency responders from other state, federal and local agencies participate in this training. OSU provided this advanced training to about 25 people in 2013.

Conclusion

Carriers transported about 554 placarded shipments of radioactive materials safely through Oregon during 2013. Radiation Protection Services provided comprehensive emergency preparedness training upon request. There were no serious shipment accidents or violations.
ATTACHMENT 1

Placarded Radioactive Material Shipments transported through Oregon
1982 through 2013

Total Shipments: 19,348

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<td>421</td>
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*Last year that US Ecology site was open to the nation.
**ATTACHMENT 2**

Placarded Radioactive Shipments by Route – 2013

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<thead>
<tr>
<th></th>
<th>Interstate 5 thru state</th>
<th>Interstate 5 Fed Ex</th>
<th>Interstate 84 Columbia Gorge</th>
<th>US Highway 97</th>
<th>Interstate 84 Eastern Oregon</th>
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<td>10</td>
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<tr>
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<td>20%</td>
<td>4%</td>
<td>2%</td>
<td>75%</td>
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*There were 554 total shipments. By-route and by-month totals are larger, as some shipments show up on more than one route.*