



RADIOACTIVE MATERIAL TRANSPORT IN OREGON: 2019

2020 Report to
**STATE AND LOCAL
GOVERNMENT**

by the
**OREGON
DEPARTMENT OF
ENERGY**



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DEPARTMENT OF
ENERGY

EXECUTIVE SUMMARY

Oregon Revised Statute 469.609 requires the Oregon Department of Energy to submit an annual report to interested state and local government agencies on the transport of radioactive material in Oregon. This document fulfills this requirement and provides information on radioactive material transport in and through Oregon during calendar year 2019.

Oregon’s Radioactive Material Transport Program helps prevent accidents involving the transport of radioactive material. The program also prepares for responding to 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, 249 shipments of radioactive materials entered or traveled in Oregon under authority of the state’s Radioactive Material Transport Permit Program. This marks the fewest number of shipments during a calendar year since 2002. It is also the sixth year in a row that has seen a decline in the overall number of shipments. The shipments that are occurring represent a wide range of materials and hazards.

There were no transport accidents in Oregon during 2019 that resulted in spillage or injury from radioactive material.

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REGULATING RADIOACTIVE MATERIAL TRANSPORT

The 1981 Legislature passed Oregon Revised Statutes 469.603 through 469.621 to regulate the transport of radioactive material. The law mandates effective emergency response to transport incidents. Oregon 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 to transport through Oregon. The Oregon Department of Energy is the permitting authority, but is authorized to and delegates this 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 go primarily towards training first responders and other emergency personnel along the state’s transport corridors.

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

- 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; 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 with 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 the required traction tires or devices. If the Oregon Department of Energy director believes there is clear and immediate danger to public health or safety, the director may halt a shipment 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.

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. Because of the small amount of radioactivity involved, many of these shipments do not require placards.

Currently, commercial nuclear facilities near the Hanford Nuclear Site in southeast Washington make up a substantial number of the radioactive material shipments through Oregon. Previously, Hanford was responsible for the majority of shipments through Oregon. For more than 40 years, the federal government produced plutonium at Hanford for nuclear weapons. That process created huge amounts of waste and since 1989, Hanford has been the site of the world’s largest environmental cleanup. Some Hanford waste has already been transported through Oregon to disposal facilities in other states. Eventually many more such shipments will occur, but not likely during the next several years.

While most of the current shipments in Oregon pose a low risk, some do present unique hazards.

Low-level Radioactive Waste

Perma-Fix Northwest, a commercial facility in Richland, Washington, treats low-level radioactive waste from around the nation, using thermal treatment, size reduction, and compaction. Perma-Fix then returns the treated waste to the sender or sends it on to a disposal site.

US Ecology, a commercial disposal site at Hanford, disposes of 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

APPENDIX A SHOWS THE NUMBER OF PLACARDED RADIOACTIVE MATERIAL SHIPMENTS TRANSPORTED THROUGH OREGON FROM 1982 TO 2019.

APPENDIX B SHOWS THE SHIPMENTS BY ROUTE DURING 2019.

waste now shipped to the US Ecology site is significantly less than volumes disposed in the 1980s and early 1990s.

U.S. Department of Energy nuclear weapon production and research sites throughout the country previously shipped low-level waste to government-owned burial trenches at Hanford. In 1999, USDOE selected Hanford as one of two sites (the other is in Nevada) to receive significant amounts of the nation's low-level and mixed low-level waste. The USDOE decision could have resulted in thousands of shipments over the next several decades. However, litigation prevented USDOE from shipping these wastes to Hanford. A separate litigation settlement extended the moratorium on most waste shipments to Hanford into at least the mid-2030s.

Commercial Nuclear Fuel Fabrication

The Framatome facility in Richland, Washington (previously AREVA) fabricates fuel for use in commercial nuclear reactors. Trucks carrying raw materials for that use travel through Northeast Oregon. The new reactor fuel travels through Oregon as well.

Transuranic Waste

USDOE buries a type of radioactive waste called "transuranic" at the Waste Isolation Pilot Plant in southeast New Mexico. Transuranic waste includes lab equipment, protective clothing, tools, rubble, soil, and sludge tainted with small amounts of plutonium and other radioactive materials.

A release of radioactive material from WIPP in February 2014 contaminated portions of the facility and led to a halt in shipments. Waste disposal resumed in early 2017.

From July 2000 through August 2011, Hanford made 572 transuranic waste shipments to WIPP. An additional 77 shipments of transuranic waste traveled from Hanford through Oregon to the Idaho National Laboratory for repackaging.

Even though WIPP has resumed disposal operations, Hanford is not expected to ship anytime soon. Due to other cleanup priorities at Hanford, new transuranic waste shipments to WIPP are not anticipated until sometime after 2025.

From 2003 through 2011 (other than 2009, when no transuranic shipments were made from Hanford), WIPP 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.

Once they resume, USDOE expects that transuranic waste shipments from Hanford will occur at significantly higher numbers. A recent Hanford document projected as many as 6,250

transuranic shipments remain to be made from Hanford. Many of these shipments would have much higher levels of radioactivity than the waste that was previously shipped through the state.

Oregon worked with other Western states and USDOE 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 road or 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 a satellite tracking system.

USDOE has agreed to the “above-regulatory” protocols for certain other shipments as well.

Naval Nuclear Reactor Compartment Shipments

Since 1986, the U.S. Navy disposed of 135 reactor compartments at Hanford from deactivated nuclear submarines and cruisers. 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 and Intermediate Maintenance Facility in Bremerton, Washington. The Navy then sends those compartments, classified as low-level waste, by barge down the Washington coastline and then up the Columbia River to Hanford.

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 made two shipments in 2019.

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

Rail Shipments

The Navy periodically ships irradiated nuclear fuel from its warships by rail from Puget Sound Naval Shipyard to the Idaho National Laboratory. These rail shipments travel through about 200

miles of northeast Oregon. The Oregon Department of Energy works with the Navy to provide information about these shipments to state and local emergency responders. Because these are considered “national security” shipments, the Navy does not share shipment schedules with the state.

Spent Nuclear Fuel and High-level Waste

The federal government is more than 20 years behind its contractual commitment to commercial nuclear power plant operators to open a geologic disposal facility by 1998 for spent nuclear fuel and high-level waste. There are still efforts in Congress to resurrect the federal government’s choice of Yucca Mountain in Nevada as the nation’s repository, but even if momentum for Yucca Mountain were to emerge and be sustained, it would still take well over a decade to get through licensing, legal challenges, and construction of the disposal facility and a railroad line to access the facility. In the meantime, private companies have partnered with local governments in West Texas and Southeast New Mexico to propose interim consolidated storage facilities. Such an arrangement would take congressional action to move forward though advocates for these projects say shipments could begin within the next several years.

This situation leaves highly radioactive waste “stranded” in both Oregon and Washington State for years to come.

Portland General Electric stores 791 irradiated, or spent, nuclear fuel assemblies in 34 large concrete and steel canisters at the former Trojan nuclear plant site northwest of Portland. Energy Northwest stores spent nuclear fuel at the Columbia Generating Station nuclear power plant near Richland, Washington. USDOE also stores spent nuclear fuel at Hanford and eventually will have immobilized high-level nuclear waste in temporary storage.

Should USDOE or a private company be successful in opening an interim consolidated storage facility, the initial spent fuel could come from shutdown nuclear reactors such as Trojan. The Oregon Department of Energy will be involved with extensive planning and training before these materials are transported through Oregon, regardless of the destination.

SUMMARY OF TRANSPORT ACCIDENTS AND INCIDENTS

There were no transportation incidents in Oregon during 2019 that resulted in spillage or injury from radioactive material.

Oregon Health Authority’s Radiation Protection Services (RPS) received and responded to 56 incidents reported during the year. These reports ranged from informational notifications to requests for a physical response by the department’s radioactive materials program personnel.

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Of the total incident reports, **24** (43 percent) were classified as transportation incidents. A breakdown of the major categories is given below:

Fourteen incidents of radiation alarms at three Oregon metal scrap dealers for gondolas (open top type of rolling rail stock) and/or trucks carrying scrap metal originating from in-state and out-of-state locations. All fourteen contained low-level radioactive materials and were sent back to their point of origin under U.S. Department of Transportation (US DOT) special permit.

Three incidents of radiation waste alarms from the Portland Metro South and Metro Central waste transfer stations for incoming waste trucks. The facility normally receives municipal solid waste from both commercial and private sources. All three incidents were radioactive medical waste and in one of these cases, the waste (landscaping debris mixed with trash) was decayed-in-storage at Metro since both stations hold a radioactive materials license from RPS to do so. In the other two cases the waste was returned to the point of origin (hospitals) under US DOT special permit for identification and subsequent disposal or decay-in-storage.

One incident of a radiation waste alarm from the Coffin Butte Landfill (in Benton County) for three incoming waste truck trailers containing biosolids from a municipal wastewater treatment facility. All three were returned to their point of origin under US DOT special permit for identification (short-lived radioactive medical waste) and determined safe for disposal at Coffin Butte by a radioactive waste contractor.

One incident of an industrial radiography source “lost” during transit by a contracted carrier from an Oregon licensee’s site to a licensed facility in Louisiana. These shipments of high activity radioactive sources are tracked by the U.S. Nuclear Regulatory Commission’s National Source Tracking System from point of shipment to destination with expected arrival times. The package was found seven days after its expected arrival date by the carrier with the source intact and undamaged at the carrier’s secure “lost package” site in Tennessee. The package was subsequently shipped to the Louisiana site the next day.

One incident involving scrap metal sheets transported by vehicle from a federal site to an Oregon scrap metal site that set off the site’s radiation detector. Six workers transporting the material were taken to a local hospital for monitoring for radiation contamination before RPS was notified. RPS determined the low-level radioactive material to be fixed in the metal sheets and not a contamination hazard. Radiation doses to the workers were determined to be 2,000 times below the maximum permissible dose for the public (100 millirem per year). Two metal sheets were kept at the scrap metal dealer’s site for disposal by a waste broker and the remaining sheets

transported back to the federal site under US DOT special permit for subsequent disposal.

One incident involving a damaged portable moisture/density gauge that set off an Oregon scrap metal site's radiation detector. The damaged gauge was transported back to the point of origin, a separate scrap metal site in Hermiston. RPS was notified of the damaged gauge by the Hermiston site and responded to investigate. The gauge was severely damaged and not shippable under US DOT special permit; however, the sources were intact and undamaged. The gauge and sources were stored in secure storage on site until disposal by a waste broker.

One incident involving a portable moisture/density gauge damaged by a bulldozer at a temporary jobsite and then transported by vehicle back to the licensee's site in Portland. RPS responded and found that the sources and source shielding were intact, while the gauge housing sustained minor damage. The device was shipped back to the manufacturer.

Two incidents involved requests to RPS from individual private citizens to remove a radioactive source from a residence. RPS personnel retrieved items from one citizen (naturally-occurring radioactive material) and transported them to the RPS radioactive materials processing area for temporary storage and eventual disposal through a radioactive materials waste broker. In the second incident, the private citizen transported the radioactive sources (radium dial watches) to the RPS office where they were also taken and placed into storage for disposal.

Besides the reported incidents above, RPS also responds to occasional requests from the Oregon Department of Environmental Quality to retrieve unused/old radioactive materials in science laboratories of Oregon K-12 schools. The materials are transported to RPS for temporary storage and subsequent disposal through a radioactive materials waste broker. There were **three** radioactive material retrievals from K-12 schools performed during the year.

EMERGENCY PREPAREDNESS AND RESPONSE ACTIVITIES

The Oregon Department of Energy, through a mutual agreement with Oregon Health Authority's Radiation Protection Services, provides radiological training to first responders and hospital emergency room personnel. RPS provides basic and advanced radiation emergency response courses and serves as subject matter experts for Oregon's law enforcement, fire service, hazardous materials response teams and private industry. RPS also collaborates with

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the Oregon National Guard's 102nd Civil Support Team in a joint effort to enhance radiological surveying and response capabilities by developing and delivering coordinated training.

RPS ensures that all of its staff members are trained to respond to assist in the mitigation of an accidental or intentional release of radioactive materials that could affect Oregonians. Throughout the 2019 calendar year, RPS invested time and funding for staff development by pursuing basic and advanced radiological Emergency Response Operations training provided by the U.S. Center for Domestic Preparedness. This provides for unified staff development and operational protocols. Abilities and information are then passed on to Oregon Department of Energy's partnering agencies, first responders, and first receivers through developed curriculums.

In January, all of RPS's staff attended training provided by the U.S. Department of Energy's Transportation Emergency Preparedness Program (TEPP). The Modular Emergency Response Radiological Transportation Training is designed to ensure that students are provided the necessary skills to mitigate a radiological transportation accident. This training is passed on by RPS to Oregon's first responders and regional hazardous materials response teams along the major transportation routes within the state. In addition to RPS staff, representatives of the following organizations also attended the training: Oregon Department of Transportation's Rail Division; Portland Fire Department; Portland Police Bureau; and Mosier Fire District.

TEPP trainers provided additional training in Portland in August. Representatives of the following organizations attended that training: Portland Airport Fire and Rescue; Tualatin Valley Fire and Rescue; Umatilla County Fire District #1; Portland Fire and Rescue; and the Army National Guard.

During February, RPS provided two health physicists as evaluators and subject matter experts for the National Guard's 102nd Civilian Support Team's proficiency evaluation for radiological incidents. Team members are evaluated for the ability to search for lost radiological sources shielded within a debris field that could be caused by a motor carrier accident or radiation dispersal device. In addition, various fire, law enforcement, Emergency Medical Services and first receivers participated in the event. An estimated 40-50 individual players participated in the exercise.

In May, RPS commenced an unmanned aerial vehicle (UAV) radiation survey program. This project is designed to reduce or remove the emergency responder from being exposed to unnecessary radiation when working an emergency incident. Participants will become eligible to operate and train fire and other safety agencies along transportation corridors within the state of Oregon. A total of four UAVs have been purchased and will be equipped with radiation survey and isotope identification equipment. In addition, the UAVs are equipped with cameras to allow the Incident Commander and appropriate personnel to monitor the accident scene, providing enhanced situational awareness.

Over the course of June, RPS developed new air sampling protocols with equipment purchased during 2019. Air sampling for radioisotopes is vital while personnel are working a radiological transportation incident. Training on the new equipment was located at the Portland Fire and Rescue Training Center. Upgraded air sampling equipment allows for continuous monitoring while working a transportation incident. Air sampling units are battery powered and require no generators or AC electrical support.

In July, RPS trained and provided subject matter experts to Salem Fire Department personnel and the Office of the State Fire Marshal's regional Hazmat Team number 13. Subject matter covered included worker radiation safety, use of survey meters, and decontamination techniques. Regional Hazmat teams are a vital resource for radiation transportation events. Multiple teams could provide for long-term operations which may be necessary when mitigating a contamination incident when radioactive materials are released within the environment.

Also in July, Oregon Department of Energy and RPS staff participated in a multi-agency discussion facilitated by the Office of State Fire Marshal (OSFM), about radioactive material transport response preparedness throughout the state. WIPP shipments were discussed as well as resources that each service provider can bring to the scene of a radiological incident or accident. Notification procedures were reviewed and revised resulting from discussion among the participants.

In October, RPS provided instruction staff to support the OSFM hazardous technician course in radiological emergencies and contamination. Personnel with various fire services that provide regional hazard materials response participated. This included personnel from two regional teams located along the WIPP transportation route – Umatilla County Fire District #1 and the Ontario Fire Department. The course was provided by Tualatin Valley Fire District's training division.

In addition, the Oregon Department of Energy contracts with Oregon State University's Radiation Center to annually provide advanced training in radiological response to members of Oregon's Regional Hazmat Teams. State police officers and emergency responders from other state, federal, and local agencies also participate in this training. OSU provided this training in April/May 2019 to 16 emergency responders.

AN EVALUATION OF THE EFFECTIVENESS OF ENFORCEMENT ACTIVITIES AND THE DEGREE OF COMPLIANCE WITH APPLICABLE RULES

Since the establishment of its program, Oregon has experienced few compliance problems regarding the state's regulation of radioactive material transport. The carriers meet state standards, apply for and carry state permits, and pay their fees.

Inspections both within the state and nationally have shown that trucks carrying radioactive materials are, on average, better maintained than trucks carrying other hazardous materials. ODOE believes this difference is the result of the special attention paid to radioactive material shipments.

A SUMMARY OF OUTSTANDING PROBLEMS CONFRONTING THE OREGON DEPARTMENT OF ENERGY IN ADMINISTERING ORS 469.550, 469.563, 469.603 TO 469.619 AND 469.992

None noted.

RECOMMENDATION FOR ADDITIONAL LEGISLATION

No additional legislation related to this topic is recommended at this time.

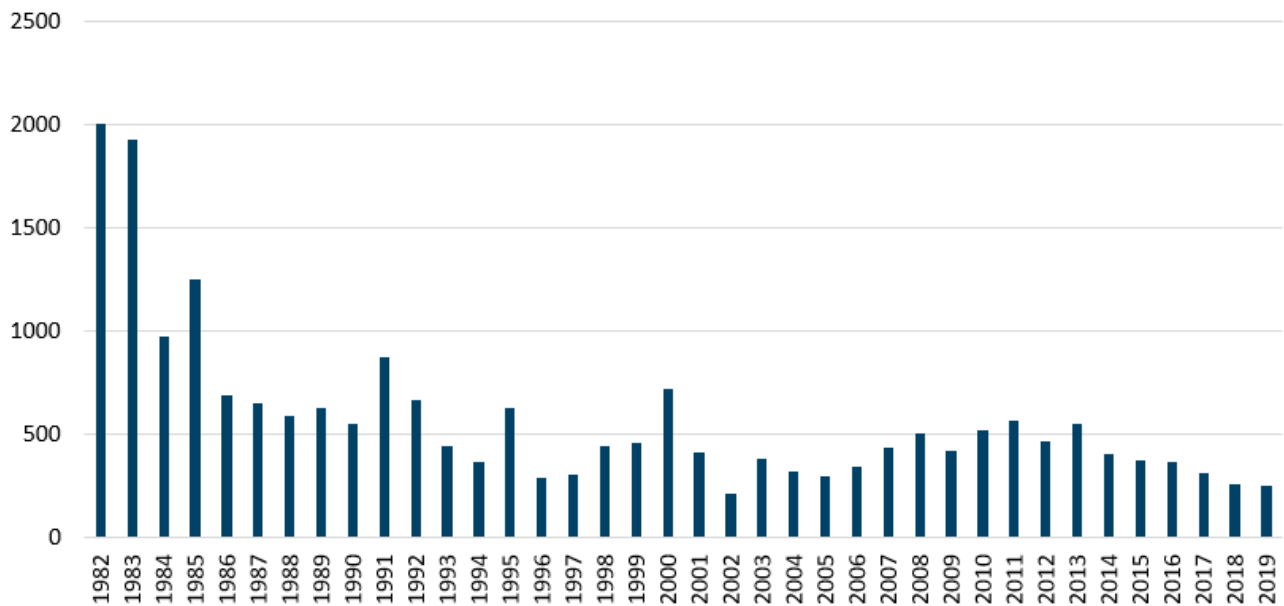
CONCLUSION

Carriers safely transported 249 placarded shipments of radioactive materials through Oregon during 2019. RPS provided comprehensive emergency preparedness training upon request. There were no serious shipment accidents or violations.

APPENDIX A: PLACARDED RADIOACTIVE MATERIAL SHIPMENTS TRANSPORTED THROUGH OREGON – 1982 THROUGH 2019

Year	# Shipments	Year	# Shipments
1982	2,000+	2001	410
1983	1,928	2002	211
1984	973	2003	385
1985	1,250	2004	324
1986	690	2005	300
1987	653	2006	345
1988	588	2007	438
1989	629	2008	509
1990	551	2009	421
1991	876	2010	518
1992	664	2011	570
1993	447	2012	466
1994	369	2013	554
1995	628	2014	408
1996	290	2015	371
1997	304	2016	366
1998	444	2017	312
1999	459	2018	263
2000	724	2019	249

Total Shipments Since Beginning of Oregon Radioactive Material Permit Program: 21,887



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APPENDIX B: PLACARDED RADIOACTIVE SHIPMENTS BY ROUTE

2019	Interstate 5 thru state	Interstate 5 Fed Ex	Interstate 84 Columbia Gorge	US Highway 97	Interstate 84 Eastern Oregon	Total
January	0	4	0	0	30	34
February	3	4	6	3	13	23
March	0	2	0	0	26	28
April	0	1	0	0	13	14
May	1	1	1	0	10	12
June	1	3	1	0	18	22
July	0	4	1	0	16	19
August	0	2	1	0	16	18
September	0	8	0	0	16	24
October	6	7	5	0	15	28
November	0	4	1	0	7	11
December	0	4	1	0	12	15
Total	11	43	17	3	192	*249
Percent	4%	17%	7%	1%	77%	

**By-route and by-month totals sometimes do not match, as some shipments show up on more than one route.*

FOR MORE INFORMATION

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