Oregon Department of **ENERGY**

Radioactive Material Transport in Oregon: 2017-2018

2019 Report to the Oregon Legislature

OREGON 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. In addition, ORS 469.617 requires the agency to prepare and submit to the Governor for transmittal to the Legislative Assembly, on or before the start of each odd-numbered year Legislative session, a comprehensive report on the transport of radioactive material in Oregon. This document fulfills both of these requirements and provides information on radioactive material transport in and through Oregon during calendar years 2017 and 2018.

The 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, 575 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 over a two year period since the State of Oregon began tracking shipment numbers in 1982. It is also the fifth 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 2017-2018 that resulted in spillage or injury from radioactive material.

TABLE OF CONTENTS

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.

APPENDIX A SHOWS THE NUMBER OF PLACARDED RADIOACTIVE MATERIAL SHIPMENTS TRANSPORTED THROUGH OREGON FROM 1982 TO 2018.

APPENDIX B SHOWS THE SHIPMENTS BY ROUTE DURING 2017 AND 2018.

Currently, commercial nuclear facilities near the Hanford nuclear site in southeast Washington make up a significant 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. 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.

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 eleven Western and Rocky Mountain states, including Oregon. US Ecology disposes of wastes by burying it in trenches. The volume of 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, DOE 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 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 most waste shipments to Hanford into at least the mid-2030s.

Commercial Nuclear Fuel Fabrication

The AREVA facility in Richland, Washington 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

DOE buries a type of radioactive material 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, DOE 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 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 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.

DOE 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 133 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 ten shipments a year. Currently, the average number of shipments is between zero and two per year. The Navy made two shipments in 2018.

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.

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. DOE also stores spent nuclear fuel at Hanford and eventually will have immobilized high-level nuclear waste in temporary storage.

Should DOE 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 2017-2018 that resulted in spillage or injury from radioactive material.

Oregon Health Authority's Radiation Protection Services received and responded to 133 incidents reported during the biennium. These reports range from informational notifications to requests for a physical response by the department's radioactive materials program personnel.

Of the total incident reports, 40 (30 percent) were classified as transportation incidents. A breakdown of the major categories is given below:

> **Twenty-two** 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 22 contained radioactive materials and were sent back to their point of origin under U.S. Department of Transportation (USDOT) special permit.

Three separate incidents of metal scrap shipped to Washington scrap dealers from Oregon companies that triggered a radiation alarm. All three shipments were sent back to their points of origin in Oregon under USDOT special permit for further evaluation and subsequent disposal.

One incident of metal scrap shipped to the Lane County landfill from a county drop-off box triggered a radiation alarm. The radioactive material shipment was placed in an unoccupied area and subsequently disposed by a licensed radioactive materials waste broker.

One incident of a radiation alarm at an Oregon scrap dealer required a response but was found to be located at the scrap dealer's business site in Washington State. RPS personnel notified their Agreement State counterparts in Washington's Department of Health for follow up.

Ten 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. Of the 10 incidents, three were radioactive medical waste that was decayed-in-storage at Metro since the site holds a radioactive materials license from RPS to do so. The remaining seven waste shipments were returned to separate points of origin (hospital, industrial facility) by USDOT special permit for identification and subsequent disposal or decay-in-storage.

Three incidents involved requests to RPS from separate private citizens to remove a radioactive sources from separate residences. RPS personnel retrieved all items and transported to the RPS radioactive materials processing area for temporary storage and eventual disposal through a radioactive materials waste broker.

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 **five** radioactive material retrievals from K-12 schools performed during the biennium.

EMERGENCY PREPAREDNESS AND RESPONSE ACTIVITIES

The Oregon Department of Energy contracts with RPS to provide 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's health physicist staff train monthly to respond to and mitigate a transportation, accidental, or intentional radiological contamination event. RPS personnel are trained to provide unified command and control using the National Incident Management System's Incident Command System. This structure allows RPS to integrate response with other public safety organizations. Approximately 48 hours are dedicated to training for response operations per year.

RPS also collaborates with 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 to first responders and first receivers.

Over the 2017 calendar year, RPS provided or participated in the following training programs:

In February, RPS conducted a training session for Coos Bay Fire, Coos Bay Hazardous Materials Team number 15, and the 102nd CST. The course included basic and advanced radiation training to prepare the teams to mitigate a radiological contamination incident using a unified approach. Students had an opportunity to respond to a mock transportation accident with oversight provided by U.S. Army North and RPS.

In April, RPS health physicists joined Deschutes County Sheriff's Office, Redmond Fire and Rescue, Redmond Police Department, Salem Fire Hazardous Materials Team number 13, and the 102nd CST as subject matter experts in an exercise designed to validate Deschutes County's Emergency Response Plan and Standard Operating Procedures. The exercise also measured the Oregon National Guard's ability to conduct and coordinate interagency operations relating to a radiological contamination incident.

Also in April, RPS provided radiological training support to members of the Portland Police Bureau, Clackamas County Sheriff's Office, Port of Portland, Vancouver Police, and the Federal Bureau of Investigation. Instruction was delivered through a one-day scenario-based training program, in which RPS health physicists presented improved methods for surveying radiological materials.

In June, RPS partnered with the 102nd CST to provide training for Clackamas County Hazardous Material Team number 3. Topics included radiation basics, time, distance, shielding, and contamination vs exposure. Additionally, RPS suggested protocols designed to mitigate a large radiological contamination event followed by mass decontamination of persons and the

environment. Those skills can also be applied in response to any transportation accident that creates a large-scale contamination event.

In November, RPS used a newly developed curriculum to train Astoria Fire Hazardous Material Team number 11 in the response to potential incidents involving radiation and X-ray sources with high energies that are transported by private carriers on Oregon's roadways. RPS health physicists provided instructions in the use of digital survey equipment to identify potentially hazardous radioactive materials or X-ray devices.

Over the 2018 calendar year, RPS provided or participated in the following training programs:

In March, RPS and the 102nd CST provided radioactive material training to Medford Fire Department Regional Hazmat team 8. The training seminar focused on radiation contamination, survey meter operations, licensed radioactive material within their service area and materials being transported through public roads and highways;

RPS provided Coos Bay Fire Department Regional Hazmat Team 15 with radiological training relating to the storage, usage, and transportation of radioactive materials within the medical, academia, industrial and research industries. Training focused on materials stored and used within the Hazmat 15 service area which encompasses the region along the southern coast.

In July, RPS provided radioactive sources, a radiation safety officer, and a subject matter expert for the 102nd CST evaluated exercise. The evaluation is under the oversight of US Army North with the mission to ensure that operations pertaining to radioactive materials that may harm the public are appropriately mitigated by the 102nd CST and local mutual responders, with incident management provided by the local authorities.

In October, RPS provided radiation basics, survey meter operations, and radioactive sources to train new hazardous material technicians deployed by the Office of the State Fire Marshal through various local fire services. Instruction was focused on radiation basics, detector technology, detection techniques, and hands on radiation monitoring and search techniques. OSFM regional hazardous materials teams are Oregon's first response to mitigate a radiological transportation accident.

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 to 11 emergency responders in 2017, and 17 emergency responders in 2018.

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

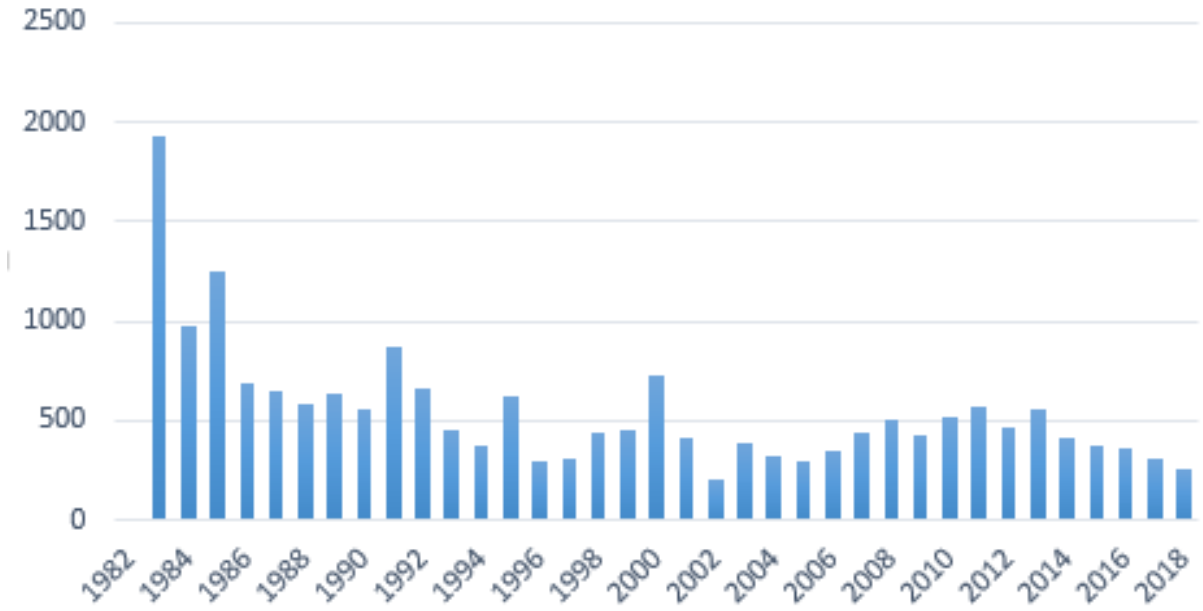
No additional legislation related to this topic is recommended at this time.

CONCLUSION

Carriers safely transported 575 placarded shipments of radioactive materials through Oregon during 2017 and 2018. 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 2018

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		
Total Shipments Since Beginning of Oregon Radioactive Material Permit Program: 21,068			



APPENDIX B: PLACARDED RADIOACTIVE SHIPMENTS BY ROUTE

2018	Interstate 5 thru state	Interstate 5 Fed Ex	Interstate 84 Columbia Gorge	US Highway 97	Interstate 84 Eastern Oregon	Total
January	1	3	5	0	28	32
February	0	1	0	0	11	12
March	1	2	0	0	18	21
April	0	0	7	0	19	20
May	1	0	2	1	26	29
June	0	5	0	0	25	30
July	0	0	3	0	24	26
August	1	1	2	0	21	25
September	1	0	1	0	25	26
October	0	1	1	0	12	14
November	1	4	0	3	11	18
December	0	2	0	0	8	10
Total	6	19	21	4	228	***263**
Percent	2%	8%	8%	1%	87%	

By-route and by-month totals are larger, as some shipments show up on more than one route.

2017	Interstate 5 thru state	Interstate 5 Fed Ex	Interstate 84 Columbia Gorge	US Highway 97	Interstate 84 Eastern Oregon	Total
January	1	2	1	0	28	30
February	4	4	6	2	16	26
March	0	2	6	0	24	26
April	0	0	2	0	27	27
May	0	2	2	0	27	29
June	1	1	0	0	21	22
July	1	2	2	0	25	30
August	0	1	1	0	14	15
September	2	3	0	0	21	26
October	2	2	1	0	29	33
November	0	2	0	0	18	20
December	0	3	1	0	25	28
Total	11	24	22	2	275	***312**
Percent	4%	8%	7%	>1%	88%	

By-route and by-month totals are larger, as some shipments show up on more than one route.

FOR MORE INFORMATION

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