

Oregon Department of **ENERGY**

Radioactive Material
Transport in Oregon:
2019-2020

2021 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 2019 and 2020.

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, 623 shipments of radioactive materials entered or traveled in Oregon safely under authority of the state's Radioactive Material Transport Permit Program. The shipments that occur represent a wide range of materials and hazards.

There were no transport accidents in Oregon during 2019-2020 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. Placarding requirements are established by the U.S. Department of Transportation. 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 significant number of the radioactive material shipments through Oregon. As an

APPENDIX A SHOWS THE NUMBER OF
PLACARDED RADIOACTIVE MATERIAL SHIPMENTS
TRANSPORTED THROUGH OREGON FROM 1982
TO 2020.

APPENDIX B SHOWS THE SHIPMENTS BY ROUTE
DURING 2019 AND 2020.

example, Uranium Hexafluoride, UF-6, a product that is used in the nuclear energy industry to make new reactor fuel, accounts for approximately 30 percent of Oregon's radioactive material shipments total annually.

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.

U.S. 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. U.S. Ecology disposes of waste by burying it in trenches. The volume of waste now shipped to the U.S. Ecology site is significantly less than volumes disposed in the 1980s and early 1990s.

U.S. Department of Energy nuclear weapons 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 (formerly known as AREVA) 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

USDOE buries a type of radioactive material called “transuranic” at the Waste Isolation Pilot Plant, WIPP, 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 in New Mexico 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 in 2017, Hanford waste 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. Oregon’s agreement with the USDOE restricts WIPP shipments through Oregon to Interstates 82 and 84 in Northeast Oregon.

Once the shipments resume, USDOE expects that transuranic waste (TRU waste) shipments from Hanford will occur at significantly higher numbers.

Radioactive Material Transport in Oregon – 2019-2020

For the past several years, TRU waste has been packaged and stored safely on the Hanford Site awaiting authorization to be shipped to the Waste Isolation Pilot Plant, WIPP, in Carlsbad New Mexico.

The state of Washington is currently negotiating with the USDOE to resume TRU shipments. Oregon is monitoring those discussions and we will be involved with the transportation planning process to ensure those shipments will be safely moved through Oregon.

A recent Hanford document projected as many as 6,250 transuranic shipments remain to be made from Hanford. Many of these shipments will have much higher levels of radioactivity than the waste that was previously shipped through the state, however, we are confident that these shipments can occur safely because of our experience overseeing this program and our close coordination with USDOE.

Oregon has worked with other Western states and USDOE, through the Western Governors Association WIPP Transportation Technical Advisory Group National Transportation Safety Forum and Western Interstate Energy Board, 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. ODOE and its partners including other state agencies, Oregon State University, and local governments and first response agencies along the shipping routes remain ready to implement the comprehensive transport safety program upon resumption of shipments from Hanford to WIPP New Mexico.

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 10 shipments a year. Currently, the average number of shipments is between zero and two per year. The Navy made two shipments in 2019 and one shipment in 2020.

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

Should USDOE 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 2019-2020 that resulted in spillage or injury from radioactive material.

Oregon Health Authority's Radiation Protection Services (RPS) received and responded to 96 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, **38** (40 percent) were classified as transportation incidents. A breakdown of the major categories is given below, as reported to ODOE by RPS:

Twenty-three 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 twenty-three contained low-level radioactive materials. Twenty-one were sent back to their point of origin under USDOT special permit. Two of these left the scrap metal site and returned to their sites of origin before a USDOT special permit could be issued.

Seven 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 seven 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 six cases, the waste was returned to the point of origin (hospitals) under USDOT special permit for identification and subsequent disposal or decay-in-storage.

Two separate incidents of radiation waste alarms from the Coffin Butte Landfill. This site normally receives municipal solid waste from both commercial and private sources. One incident concerned three incoming waste truck trailers containing radioactive materials mixed with biosolids from a municipal wastewater treatment facility. The trailers were returned to their point of origin under USDOT special permit for identification (short-lived radioactive medical waste) and determined safe for disposal at Coffin Butte by a radioactive waste contractor. The second incident concerned a waste trailer delivering a load to the site containing radioactive medical waste. The trailer was isolated offsite, and the waste allowed to decay to near background levels before disposal at the site.

One incident of an industrial radiography source lost during interstate 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 (NSTS) 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 federal 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 2000 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 USDOT 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, without application for a USDOT special permit from RPS. RPS was notified of the damaged gauge by the Hermiston site and responded to investigate. The gauge was severely damaged and not shippable under USDOT special permit; however, the sources were found intact and undamaged. The gauge was stored in secure storage on site until disposal performed 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 in a Type A shipping package without a USDOT special permit. RPS responded and found that the sources and source shielding were intact, the gauge housing sustaining 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 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.

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 Troopers and emergency responders from other state, federal, and local agencies also participate in this training. This training at OSU occurred in 2019 but was halted in 2020 due to COVID-19 restrictions. Training is expected to resume in the spring of 2021.

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

The Department notes no outstanding problems in administering ORS 469.550, 469.563, 469.603 to 619, or 469.992. ORS 469.992 allows the Director of the Oregon Department of Energy or the Energy Facility Siting Council to impose civil penalties for violations of statutes, rules, site certificates, and other Department-issued orders.

The Energy Facility Siting Council has adopted rules governing the procedures for assessing and issuing violations and enforcement penalties at OAR 345, Division 29. The Council is currently undertaking a rulemaking project to update the Division 29 rules.

While not specifically related to a problem in administering the statutes, the proposed rule changes are needed to ensure that the enforcement of laws and rules governing the transport and disposal of radioactive materials and wastes is sufficient to protect public health and safety and the environment by incentivizing preventative measures, to ensure that radioactive materials or wastes are not improperly transported or disposed of in Oregon, and to require appropriate mitigation or penalties when a violation occurs.

Among other changes, the new rules, if adopted, would:

- Specify that formal enforcement proceedings related to the transport and disposal of radioactive materials or wastes, including contested case proceedings, would be conducted under the authority of the Director of the Oregon Department of Energy.
- Establish new procedural requirements for the conduct of enforcement proceedings related to the transport and disposal of radioactive materials or wastes, including issuance of a Pre-Enforcement Notice and Notice of Enforcement Action in place of a Notice of Violation.
- Expand the Department Director's ability to require a responsible party to provide additional information in response to a Pre-Enforcement Notice.
- Establish new classifications for violations involving the transport or disposal of radioactive materials or wastes.
- Make a civil penalty available for all violations involving the transport or disposal of radioactive materials or wastes and establish a new methodology for civil penalty calculation.

At the time of this report's publication, the Energy Facility Siting Council is reviewing the proposed rule changes and accepting public comments. The Council is expected to decide on the rules in spring 2021.

Further, as part of due diligence, ODOE is conducting an internal audit of the program to ensure the agency is charging the appropriate fees to cover program expenditures and to see if there are areas that need improvements.

RECOMMENDATION FOR ADDITIONAL LEGISLATION

ORS 469.617(4) requires that the legislative report include any “recommendations for additional legislation as the Energy Facility Siting Council considers necessary and appropriate.” The Oregon Department of Energy is supporting proposed legislation in the 2021 session that would update and clarify the state’s laws around radioactive waste and enhance ODOE’s existing enforcement program, corrective action authority, and civil penalty rules. The bills are SB 246 and HB 2831. Specific to transportation of radioactive materials, the proposed legislation would clarify in ORS 469.525(1) that, in addition to the current ban on radioactive waste disposal facilities in Oregon, no person may arrange for disposal of radioactive waste in Oregon or transport radioactive waste for disposal in Oregon, except as otherwise provided in statute and rule.

CONCLUSION

Carriers safely transported 623 placarded shipments of radioactive materials through Oregon during 2019 and 2020. RPS provided comprehensive emergency preparedness training upon request. There were no serious shipment accidents or violations.

Radioactive Material Transport in Oregon – 2019-2020

APPENDIX A: PLACARDED RADIOACTIVE MATERIAL SHIPMENTS TRANSPORTED THROUGH OREGON – 1982 THROUGH 2020

Year	# Shipments	Year	# Shipments
1982	2,000+	2002	211
1983	1,928	2003	385
1984	973	2004	324
1985	1,250	2005	300
1986	690	2006	345
1987	653	2007	438
1988	588	2008	509
1989	629	2009	421
1990	551	2010	518
1991	876	2011	570
1992	664	2012	466
1993	447	2013	554
1994	369	2014	408
1995	628	2015	371
1996	290	2016	366
1997	304	2017	312
1998	444	2018	263
1999	459	2019	267
2000	724	2020	356
2001	410		
Total Shipments Since Beginning of Oregon Radioactive Material Permit Program: 22,261			

Radioactive Material Transport in Oregon – 2019-2020

APPENDIX B: PLACARDED RADIOACTIVE SHIPMENTS BY ROUTE

2019 Placarded Radioactive Shipments by Route

	NE Oregon I-84	Through Gorge	Interstate 5	Highway 97	FED EX I-5	Total Shipments
January	30	0	0	0	4	34
February	13	6	3	3	4	29
March	26	0	0	0	2	27
April	13	0	0	0	1	14
May	10	1	1	0	1	13
June	18	1	1	0	3	23
July	16	1	0	0	4	21
August	16	1	0	0	2	19
September	16	0	0	0	8	24
October	15	5	6	0	7	33
November	8	1	0	0	4	13
December	12	1	0	0	3	16
Totals	193	17	11	3	43	267
Percent by Route	72%	6%	4%	1%	16%	

2020 Placarded Radioactive Shipments by Route

	NE Oregon I-84	Through Gorge	Interstate 5	Highway 97	FED EX I-5	Total Shipments
January	8	2	0	0	5	13
February	9	0	1	0	3	13
March	19	0	2	0	7	28
April	2	0	7	0	9	12
May	13	0	10	0	14	37
June	9	0	8	4	17	38
July	15	0	6	4	8	33
August	18	0	0	2	8	28
September	28	0	0	4	6	38
October	21	0	2	5	6	34
November	18	1	1	5	6	31
December	27	0	0	5	11	43
Totals	187	3	37	29	100	356
Percent by Route	53%	1%	10%	8%	28%	

FOR MORE INFORMATION

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