



RADIOACTIVE MATERIAL TRANSPORT IN OREGON: 2021

Report to
**STATE AND LOCAL
GOVERNMENT**

by the
**OREGON
DEPARTMENT OF
ENERGY**



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ENERGY**

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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 2021.

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, 260 shipments of radioactive materials entered or traveled in Oregon safely under authority of the state's Radioactive Material Transport Permit Program, a partnered program between ODOE, the Oregon Department of Transportation, and the Oregon Health Authority. The shipments that are occurring annually on our roadways represent a wide range of materials and hazards which will be explained later in this report.

There were no transport accidents in Oregon during 2021 that resulted in spillage or injury from radioactive material.

The full report is available online: <https://www.oregon.gov/energy/Data-and-Reports/Pages/Reports-to-the-Legislature.aspx>

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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, ODOE, is the permitting authority, but is authorized to and delegates this authority to the Oregon Department of Transportation. ODOT 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 fee is set in rule by the Energy Facility Siting Council and can be found at Oregon Administrative Rule 345-060-0006. The fees go primarily toward training first responders and other emergency personnel along the state's transport corridors.

Additionally, the statutes require ODOE 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.

TYPES OF SHIPMENT ACTIVITY

Carriers transport radioactive materials in Oregon daily, including small amounts for industry and medical use. They also routinely transport industrial gauges with radioactive sources to work sites throughout the state.

APPENDIX A SHOWS
THE SHIPMENTS BY
ROUTE DURING 2021

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

As noted, much of the radioactive material transported through Oregon is destined to or from the Tri-Cities region in southeast Washington state, approximately 30 miles north of Umatilla.

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 an appropriate 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 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 in the United States. Trucks carrying raw materials, mainly Uranium Hexafluoride, UF-6, travel through Northeast Oregon regularly. UF-6 shipments account for the majority of placarded shipments every year. When the Framatome facility makes new fuel, that new reactor fuel travels back through Oregon as it heads to commercial nuclear power plants in other regions of the country.

Transuranic Waste

The USDOE emplaces a type of radioactive waste called Transuranic, or TRU, at the Waste Isolation Pilot Plant, WIPP, in southeast New Mexico near Carlsbad. The WIPP facility is the nation's only geologic repository for defense related and generated radioactive waste that is a legacy waste stream from the nation's production of plutonium. Transuranic waste includes lab equipment, protective clothing, tools, rubble, soil, and sludge contaminated and 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, though not from the Hanford site. 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 those shipments resume in the future, USDOE expects that transuranic waste shipments from Hanford will occur at significantly higher numbers and will occur over several years. 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.

Because ODOE and other Oregon agencies have experience overseeing these types of shipments in our state, specific issues are not anticipated once these shipments resume. ODOE also supports efforts to train first responders along the transportation corridors, to maintain our state's safety readiness for major shipping campaigns.

ODOE HAS WORKED WITH USDOE AND OTHER WESTERN STATES TO DEVELOP AND IMPLEMENT A TRANSPORT SAFETY PROGRAM.

ODOE has also worked with other Western states and the 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.



A submarine reactor compartment heads up the Columbia River for disposal at Hanford in 2017.

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. In 2021, the Navy made two shipments.

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.

ODOE works with ODOT's Rail Safety Unit hazardous materials staff throughout the year to ensure that Oregon is made aware of and is monitoring known amounts of radioactive material including waste and scrap metal that is being transported by rail within the state.

Spent Nuclear Fuel and High-level Waste

As is well-known, there is no national, federal deep geologic disposal facility for the nation's spent nuclear fuel from commercial power plants or high-level waste from defense operations. The previously considered Yucca Mountain, Nevada facility is no longer under consideration. Private companies have partnered with local governments in west Texas and southeast New Mexico to propose interim consolidated storage facilities, though neither facility has been constructed.

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 spent nuclear fuel and other high-level radioactive waste "stranded" in both Oregon and Washington State, likely for years to come.

The TROJAN Independent Spent Fuel Storage Installation

Portland General Electric stores 791 irradiated (or spent) nuclear fuel assemblies in 34 large concrete and steel canisters called casks at the former Trojan nuclear plant site northwest of Portland. This facility is called an Independent Spent Fuel Storage Installation, or ISFSI. It is a

secured facility on the site of the former nuclear power plant operated by PGE. The Trojan ISFSI Site Certificate is under the Oregon Energy Facility Siting Council's authority until a national repository exists and Trojan's spent fuel can be moved.

Similarly, Energy Northwest, operator of the Columbia Generating Station nuclear power plant near Richland, Washington, also stores spent nuclear fuel onsite, also at an ISFSI. In the future, CGS's spent fuel could be transported through Oregon as part of removal to a national repository or interim national storage location, if such a repository were to be developed in the future.



34 casks store spent fuel at the former Trojan Nuclear Power Plant site.

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 the period of January 1, 2021, through December 31, 2021 that resulted in spillage or injury from radioactive material.

The Oregon Health Authority's Radiation Protection Services Division received and responded to 61 incidents reported during 2021. 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, **20** (33%) were classified as transportation incidents. A breakdown of the major categories is given below:

Twelve 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 12 contained low-level radioactive materials. Ten of the 12 were sent back to their point of origin under US DOT special permit. Two of these left the scrap metal site and returned to their sites of origin before a US DOT special permit could be issued.

Four 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 four incidents involved low-level, short-lived radioactive medical waste, three of which were returned to the point of origin

(hospitals) with the fourth decayed-in-storage at Metro since both Metro stations hold a radioactive materials license from Radiation Protection Services to do so.

One additional waste alarm at Portland Metro South involved higher-activity radioactive sealed sources found in residential trash. The sources were isolated and placed into locked storage on site. RPS personnel responded and determined the sources to be long-lived radioactive material (radium) used for medical therapy in the 1930s and 1940s. The sources shall remain in secure storage at Metro until a disposal pathway is determined.

One incident involved a shielded fixed gauge containing an industrial radioactive sealed source (cesium) that set off the radiation alarms at an Oregon metals scrap dealer in January. The scrap was received from a Utah metals scrap site. The dealer, an Oregon radioactive material licensee, was unaware that lost/recovered gauges with sources must be reported to RPS upon discovery.

In October, during a scheduled site visit to retrieve items, a radioactive materials waste broker found the gauge and reported it to RPS. RPS personnel responded and found the gauge intact and were able to determine the gauge owner from the gauge serial number and manufacturer. RPS subsequently reported the recovered gauge to the U.S. Nuclear Regulatory Commission.

The scrap dealer, who holds a radioactive materials license with RPS, is temporarily storing the gauge on site until disposal can be arranged with the gauge owner and manufacturer.

One incident involved a request made to RPS from a private citizen to identify a radioactive source brought to a regional hazardous materials site. RPS personnel responded and identified the material as magnesium-thorium alloy. The mag-thor was found to be exempt from RPS regulation but is isolated and being stored outside the citizen's residence. RPS is currently in discussion with the citizen to determine disposal of the material.

One incident involved discovery of five small containers of uranium-238 metal by agents of the federal Department of Homeland Security and the FBI during a search for Weapons of Mass Destruction at an international shipper's site in Portland. The uranium was prepared for shipping to Australia by a U.S. company (undetermined) outside Oregon. RPS personnel responded and found the quantities of uranium to be shipped and destination authorized by the U.S. Nuclear Regulatory Commission. RPS forwarded all information over to the USNRC to investigate who the shipper is and whether that company is authorized to ship this uranium overseas.

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. However, due to COVID-19 restrictions in 2021, no RPS in-

person first responder training occurred for hospitals. However, 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. This course was successfully presented in the fall of 2021 to members of the public safety community and the Oregon National Guard's 102nd Civil Support Team.

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 the 102nd CST in a joint effort to enhance radiological surveying and response capabilities by developing and delivering coordinated training.

RPS ensures that all 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. RPS continues investing 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. Annual training opportunities and information are then passed on to the Oregon Department of Energy's partnering agencies, first responders, and first receivers through developed curriculums.

In 2019, 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 the UAVs and train fire and other safety agencies along transportation corridors in 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.

RPS developed new air sampling protocols with equipment purchased in 2019. Air sampling for radioisotopes is vital while personnel are working a radiological transportation incident. 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.

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 PROGRAM IMPROVEMENTS

In 2021, ODOE self-initiated a comprehensive in-house audit of the radioactive material transportation program. Some of the questions that posed in the audit include whether the permit fee schedule currently used, as set in administrative rule, is sufficient to pay for first responder training, equipment, and other program administration tasks, as intended by statute. The audit revealed that fees collected do not match the current program costs. The current fee schedule has not changed since 1986.

In response, ODOE is working with internal program and budget staff and is scheduled to work with the Energy Facility Siting Council to review and consider a rulemaking project that would assess if the fee schedule should be adjusted. The rulemaking project is expected to be initiated by EFSC in early 2023.

Also in 2021, ODOE partnered with ODOT, OHA, and DEQ hazardous material staff to form a work group to assess and collaborate throughout the year for both commercial vehicle and rail activities. This work group meets regularly to determine if existing statutes and administrative rules are adequate to address any transport issues on Oregon roads and railways.

ODOE's Information Technology staff completed a major project in 2021 that updated the online reporting portal that trucking companies use to report shipments in Oregon. The goal of this update is to help gather more route data from the permitted trucking companies so the agency can provide better information to the public and public officials about radioactive material shipments in Oregon. ODOE can also focus training efforts in specific geographic areas if the data shows new shipment route trends.

CONCLUSION

Carriers safely transported 260 placarded shipments of radioactive materials through Oregon during 2021. There were no serious shipment accidents or violations.

RADIOACTIVE MATERIAL TRANSPORT IN OR: SHIPMENTS IN 2021

APPENDIX A: PLACARDED RADIOACTIVE SHIPMENTS BY ROUTE IN 2021

	NE Oregon I-84	Through Gorge	Interstate 5	Highway 97	FED EX I-5	Totals
January	17	0	9	3	6	35
February	8	0	1	4	5	18
March	5	0	6	4	5	20
April	15	0	3	6	9	33
May	19	1	1	3	6	30
June	19	1	1	1	5	27
July	18	1	0	0	2	21
August	12	1	0	0	0	13
September	10	0	0	0	1	11
October	14	0	0	0	1	15
November	15	2	2	0	0	19
December	14	0	0	1	3	18
Totals	166	6	23	22	43	260
Percent by Route	64%	2%	9%	8%	17%	

FOR MORE INFORMATION

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