



# RADIOACTIVE MATERIAL TRANSPORT IN OREGON 2022-2023

Submitted to  
**STATE AND LOCAL  
GOVERNMENT**

by the  
**OREGON  
DEPARTMENT OF  
ENERGY**



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DEPARTMENT OF  
ENERGY

February 2024

## 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 requirements and provides information on radioactive material transport in and through Oregon during calendar years 2022 and 2023.

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, 364 placarded 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 2022-2023 that resulted in spillage or injury from radioactive material.

This complete 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, and 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 federally placarded radioactive shipments to also obtain a state permit to transport through Oregon. The Oregon Department of Energy is the permitting authority but is authorized to and delegates that permitting authority to the Oregon Department of Transportation.

The Oregon Department of Transportation, ODOT, operates the state's ports-of-entry and can therefore 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 are set in rule by the Energy Facility Siting Council in OAR 345, Division 60. The fees go primarily toward training first responders and other emergency personnel along the state's transport corridors.

During this reporting period, ODOT issued 80 permits for radioactive material shipments.

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 statute also requires 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.

Special note: During this report period, ODOE conducted an internal audit of internal processes to evaluate the overall program, including data collection. This audit showed that the agency needed to update the online Trip Report that is used to gather specific information from the trucking companies and carriers that move radioactive materials in Oregon. An ODOE IT specialist, working with ODOT, changed the route report form to gather this additional data.

## 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. Because of the small amount of radioactivity involved, many of these shipments do not require placards and thus do not require a radioactive material transport permit from Oregon.

**Appendix A** shows the number of placarded radioactive material shipments transported through Oregon from 1982 to 2023.

Currently, commercial nuclear facilities near the Tri-Cities in southeast Washington make up a significant number of the radioactive material shipments through Oregon. For 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. During this reporting period, this trend did not change.

Previously, shipments to and from the Hanford nuclear site, also near the Tri-Cities in Washington, were 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 radioactive 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, US 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 US DOE decision could have resulted in thousands of shipments over the next several decades. However, litigation prevented US 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 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 status and Hanford Tank Waste***

US DOE disposes of 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.



*Transuranic waste retrieval (2004).*

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*TRU container with contaminated equipment.*

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.

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 US DOE restricts WIPP shipments through Oregon to Interstates 82 and 84 in Northeast Oregon.

While WIPP resumed disposal operations in 2017, Hanford transuranic waste (TRU waste) has not yet shipped in significant quantities to New Mexico. Due to other cleanup priorities, new TRU waste shipments to WIPP are not anticipated until 2028. Once the

shipments resume, DOE expects the TRU shipments from Hanford will occur at significantly higher numbers. For the past several years, TRU waste has been packaged and stored safely on the Hanford Site awaiting authorization to be shipped to WIPP.

ODOE and its partners will be involved with the transportation planning process to ensure shipments will be safely moved through Oregon.

A recent Hanford document projected as many as 6,250 transuranic shipments remain at the site. ODOE is confident that these shipments can and will occur safely thanks to the agency's experience overseeing this program and its close coordination with US DOE.

Oregon is an involved participant on multiple regional and national forums for safe transportation of radiological material. ODOE and ODOT staff coordinate with other western states and US DOE, through the Western Interstate Energy Board (WIEB), WIPP Transportation Technical Advisory Group, WIEB High-Level Radioactive Waste Committee, and the National Transportation Stakeholders Forum.



*Hanford's Central Waste Complex TRU storage area.*

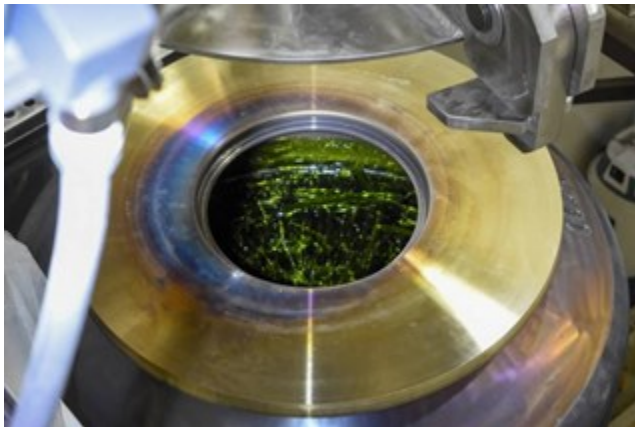
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The program priorities include:

- Establishing higher standards for the drivers and trucking companies.
- Ensuring a “defect-free” standard for inspections.
- Developing procedures to keep the trucks off the road when road or weather conditions are especially hazardous.
- Providing training of first responders and hospital emergency room personnel along the shipping routes.
- Ensuring that US DOE gives advance notice of shipments provided to the states.
- Ensuring US DOE continues to provide a near real-time tracking of the shipments, using a satellite tracking system, TRANSCOM.

US DOE 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 in New Mexico, expected to commence in 2028.

In 2023, Hanford's Direct Feed Low Activity Waste process, also known as DFLAW, took a step forward toward the vitrification process that was started over 20 years ago, by turning tank waste into glass.



*Top of test glass container, December 2023.*

The “direct-feed” portion refers to the waste being separated to remove the more radioactive portion so that the resulting low-activity (less radioactive) waste can be fed directly to the Waste Treatment and Immobilization Plant’s Low-Activity Waste Facility for vitrification (immobilization in glass).

The Waste Treatment and Immobilization Plant reached another historic milestone in December 2023 when it successfully poured, filled, and transferred the first container of

clean glass in the plant’s Low Activity Waste Facility. The first molten pool of glass was created during the commissioning process by heating up batches of glass beads, called frit, into the first of two state-of-the-art melters. The melters will transform Hanford’s low-activity radioactive and chemical tank waste into a vitrified glass form safe for disposal.

The initial test container is filled with only glass and not radioactive/chemical tank waste; it will be hauled on a specially designed truck and trailer to the Chemical Waste Management of the Northwest landfill, a hazardous waste landfill located near Arlington, Ore., for disposal. In 2023,



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several practice runs of the 250-mile round trip route were completed safely. The test canisters are disposed at the commercial landfill in Oregon, and not the Hanford on-site landfill, in order to preserve space at the Hanford landfill for radioactive waste.

Special note: Oregon will not be receiving any Hanford waste that contains radioactive material. The Chemical Waste Management of the Northwest facility is permitted to accept the test glass, which has no radioactive components (this landfill also has a radiation detection portal, which scans all incoming waste loads for radioactivity and can separate and properly manage any waste that is identified as containing radioactivity). Once the Hanford DFLAW vitrification facility is operational and creating glass logs using Hanford tank waste, the waste will be disposed at a specially designed landfill on-site at Hanford called the “integrated disposal facility.”



*Example of containers that were used to transport test glass to Arlington, OR in 2023.*

### **Naval Nuclear Reactor Compartment Shipments**

Since 1986, the U.S. Navy has 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.



*A decommissioned submarine reactor at the Puget Sound Naval Shipyard in Bremerton, WA (2022).*

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 shipment in 2022 and two shipments in 2023.

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. Oregon officials were invited to conduct an inspection of shipment in the fall of 2022 and 2023 before the barges left the dock at the Puget Sound Naval Shipyard in Bremerton, Washington.



*Decommissioned submarine reactors in storage at Hanford.*

## ***Rail Shipments, Current and Future Through Oregon***

The Navy periodically ships spent irradiated nuclear fuel from its warships by rail from Puget Sound Naval Shipyard in Bremerton, Washington to the Idaho National Laboratory near Idaho Falls, Idaho for disposal. These rail shipments typically travel through about 200 miles of northeast Oregon. Because these are considered national security shipments, the Navy does not share shipment schedules with the state.

Future rail shipments of radioactive waste are expected to include the removal of the spent nuclear fuel at the Portland General Electric Trojan Independent Spent Fuel Storage Installation in Columbia County near Ranier, Oregon, when an approved interim or permanent geologic repository is identified. While this will not occur for many years or decades, ODOE and ODOT will be ready to work with partners to ensure safe shipping.

Hanford could also elect to ship grouted tank waste or TRU waste by rail in the future.

ODOE and in-state partners are continuing to stay engaged in the discussion and planning activities of future rail shipments with other western states as part of the Western Interstate Energy Board's High-Level Radioactive Waste committee and the U. S. Department of Energy through the National Transportation Stakeholders Forum.

## ***Spent Nuclear Fuel and High-level Waste***

There is no national repository for spent nuclear fuel or high-level radioactive waste at this time. The Yucca Mountain site in Nevada is no longer under consideration as a destination for the nation's nuclear waste. ODOE has been following recent developments to site interim

nuclear waste storage facilities in Texas, New Mexico, or elsewhere; however, these facilities, if they were to be approved by state, federal, and local regulators, are many years or decades from accepting waste. Further, US DOE has also begun to engage communities with interest in a *consent-based siting* approach to establish a national repository. Both of these approaches to dealing with spent fuel will take many years to conclude, and many more years before a facility might be located and constructed. ODOE is engaged in the discussion and is monitoring the progress of all concepts that might eventually result in a national consolidated nuclear waste storage facility.

The Northwest hosts nuclear waste at multiple locations. 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 in Columbia County. Energy Northwest stores spent nuclear fuel at the Columbia Generating Station nuclear power plant near Richland, Washington. US DOE also stores spent nuclear fuel at Hanford and eventually will have immobilized high-level nuclear waste in temporary storage. Should a national repository storage facility or an interim storage facility eventually be opened, spent fuel from shutdown nuclear reactors such as Trojan are expected to be some of the first nuclear waste ‘in the queue’ to move to such a national repository. The Oregon Department of Energy will be involved with extensive planning and training before these materials are transported from or through Oregon.



*Concrete and steel storage canisters at the former Trojan site.*

It is anticipated that when Trojan’s spent fuel is removed it will likely be moved by rail due to the weight of the specialized containers that will be used to safely move this fuel to another location. In 2022, ODOT rail safety staff conducted an inspection of the Trojan site to help complete the state’s pre-plan for de-inventorying the Trojan site by rail.

## **SUMMARY OF TRANSPORT ACCIDENTS AND INCIDENTS**

There were no transportation incidents in Oregon in 2022 or 2023 that resulted in spillage or injury from radioactive material.

Oregon Health Authority’s Radiation Protection Services received and responded to a total of 65 reported incidents during 2023. 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, 36 (55 percent) were classified as radiological transportation incidents. A breakdown of the major categories is given below:

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- Sixteen 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 16 contained low-level radioactive materials. Fourteen of the 16 were sent back to their point of origin under U.S. Department of Transportation Special Permit (USDOT SP). Of the two remaining alarm events, one was a truck with low-level radioactive material in the truck bed that left the site before a permit could be issued. For the second, the radioactive material was unloaded and kept on site for source identification and disposal through a waste broker at an out of state disposal facility.
- Fifteen incidents of radiation waste alarms from the Portland Metro South and Metro Central waste transfer stations for incoming waste trucks and private parties. The facility normally receives municipal solid waste from both commercial and private sources. Fourteen incidents involved low-level, short-lived radioactive medical waste, four of which were returned to the point of origin (hospitals) and 10 decayed-in-storage at Metro since both Metro stations hold a radioactive materials license from Radiation Protection Services (RPS) to do so. The fifteenth incident involved exempt Naturally Occurring Radioactive Material (uranium/thorium-bearing minerals) brought into Metro by a member of the public that Metro did not take possession of.
- Two waste alarms were reported at the Dry Creek Landfill in Eagle Point for municipal solid waste received at the site. Each load contained household trash contaminated with small quantities of a medical radioisotope (lutetium-177) used for cancer treatment. The radioactive trash was segregated in both cases and the short-lived isotope allowed to decay at the site to background radiation levels.
- One waste alarm was reported at the Waste Management facility in Arlington for a waste load of electrical arc chutes that came from the Puget Sound Naval Shipyard in Bremerton, Washington. These arc chutes contain small quantities of natural thorium and were returned to Bremerton by USDOT special permit.
- One transportation incident involved discovery of a radioactive materials shipping package in a parking lot of an industrial park located adjacent to a nuclear pharmacy. The undamaged package contained a medical radioisotope (iodine-131) used for patient therapy that was produced at the pharmacy earlier in the day. A contracted courier had stopped to pick up several shipping packages at the pharmacy 20 minutes prior and the package fell off and under the truck during loading of several packages and was left behind. The package was discovered by a worker from an adjacent business and returned to the pharmacy.
- One transportation incident at Metro Central's domestic hazardous materials receipt site. A member of the public brought in an older device that contained four glass electron tubes, each containing a small quantity of cesium-137 that is exempt from regulation. The Oregon Department of Energy determined that the tubes can be

disposed of at a landfill.

In addition to the reported incidents above, RPS also responds to occasional requests from the Oregon Department of Environmental Quality (DEQ) 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 no radioactive material retrievals from K-12 schools performed during 2023.

## **EMERGENCY PREPAREDNESS AND RESPONSE ACTIVITIES**

The Oregon Department of Energy contracts with OHA-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 102<sup>nd</sup> 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. Emergency responders from other state, federal, and local agencies also participate in this training as well as the National Guards Civil Support Team, CST. This training at OSU occurred in 2022 and will occur again in 2024.

In February 2023, numerous Oregon responders from ODOE, OHA, CST, State Fire Marshal Office, and hospitals attended the FEMA-sponsored Radiological Operations Support Specialist, ROSS, course at Oregon State University.

## **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.

ODOE believes that 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. In 2021, EFSC updated these rules.

ODOE has conducted an internal audit of its program to ensure that fees charged to transporters of radioactive material are appropriate to cover program expenditures. The internal audit showed that fees for radioactive shipments should be reviewed and reconsidered, particularly as the fees have not been changed in over 30 years. The review process and potential fee increase will be conducted as a rulemaking project by EFSC, expected to begin in 2024.

## **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.” Neither EFSC nor ODOE are making recommendations for legislation at this time.

## **CONCLUSION**

Carriers safely transported 364 placarded shipments of radioactive materials through Oregon during 2022 and 2023. 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 – 1983 THROUGH 2022**

<b>Year</b>	<b># Shipments</b>	<b>Year</b>	<b># Shipments</b>
1983	1,928	2004	324
1984	973	2005	300
1985	1,250	2006	345
1986	690	2007	438
1987	653	2008	509
1988	588	2009	421
1989	629	2010	518
1990	551	2011	570
1991	876	2012	466
1992	664	2013	554
1993	447	2014	408
1994	369	2015	371
1995	628	2016	366
1996	290	2017	312
1997	304	2018	263
1998	444	2019	267
1999	459	2020	356
2000	724	2021	256
2001	410	2022	138
2002	211	2023	226
2003	385		
<b>Total Shipments Since Beginning of Oregon Radioactive Material Permit Program: 20,881</b>			

**FOR MORE INFORMATION**

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DEPARTMENT OF  
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*Published February 2024*