

# Executive Summary

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## Overview

The US Department of Energy's (DOE's) Oak Ridge Reservation (ORR) is located in Roane and Anderson counties in East Tennessee, about 40 km (25 miles) from Knoxville. ORR is one of DOE's most unique and complex sites. It encompasses three major facilities and thousands of employees that perform every mission in the DOE portfolio—energy research, environmental restoration, national security, nuclear fuel supply, reindustrialization, science education, basic and applied research in areas important to US security, and technology transfer. ORR was established in the early 1940s as part of the Manhattan Project for the purposes of enriching uranium and pioneering methods for producing and separating plutonium. Today, scientists at the Oak Ridge National Laboratory (ORNL), DOE's largest multipurpose national laboratory, conduct world-leading research in advanced materials, alternative fuels, climate change, and supercomputing. The Y-12 National Security Complex (Y-12 or Y-12 Complex) is vital to maintaining the safety, security, and effectiveness of the US nuclear weapons stockpile and reducing the global threat posed by nuclear proliferation and terrorism. The East Tennessee Technology Park (ETTP), a former uranium enrichment complex, is being transitioned to a clean, revitalized industrial park.

DOE has established an integrated safety management system (ISMS) to integrate safety into all aspects of work at its facilities. Safety, as defined in ISMS, encompasses protection of the public, the worker, and the environment and includes all safety, health, and environmental disciplines (i.e., radiation protection, fire protection, nuclear safety, environmental protection, waste management, and environmental management). Several contractors, including UT-Battelle, LLC; Babcock & Wilcox Technical Services Y-12, LLC (B&W Y-12); Consolidated Nuclear Security, LLC (CNS); URS | CH2M Oak Ridge LLC; Wastren Advantage, Inc.; Oak Ridge Associated Universities; and Isotek Systems LLC, are responsible for carrying out the various DOE missions at the three major ORR facilities. (Note: For most of the reporting year, B&W Y-12 was the managing contractor for the Y-12 Complex, with CNS assuming that role under a new contract July 1, 2014.) These contractors manage and implement environmental protection programs through environmental management systems (EMSs) that adhere to International Organization for Standardization standard 14001: 2004, *Environmental Management Systems*, and are integrated with ISMS to provide unified strategies for managing resources. An EMS is a continuous cycle of planning, implementing, evaluating, and improving processes and actions undertaken to achieve environmental missions and goals. Routine, external (independent) audits of contractor-implemented EMSs on the reservation are typically conducted annually and, if applicable, a triennial recertification is also performed. Detailed information on contractor EMSs is provided in Chapters 3, 4, and 5.

DOE operations on ORR have the potential to release a variety of constituents into the environment via atmospheric, surface water, and groundwater pathways. Some of the constituents, such as particles from diesel engines, are common at many types of facilities, while others, such as radionuclides, are unique to specialized research and production activities like those on ORR. Any releases are highly regulated and carefully monitored. DOE is committed to enhancing environmental stewardship and managing the impacts its operations may have on the environment and encourages the public to participate in matters related to ORR's environmental impact on the community by soliciting citizens' input on matters of significant public interest and through various communications. DOE also provides public access to information on all its Oak Ridge environmental, safety, and health activities.

The *Oak Ridge Reservation Annual Site Environmental Report* (ASER) is prepared for DOE according to the requirements of DOE O 231.1 B, *Environment, Safety and Health Reporting*. ASER includes data on the environmental performance of each of the major DOE ORR contractors and describes significant accomplishments in pollution prevention and sustainability programs that serve to reduce all types of waste and pollutant releases to the environment. An environmental report for ORR that provides consolidated data on overall reservation performance and status has been published annually since the mid-1970s. ASER is a key component of the DOE effort to keep the public informed about environmental conditions across DOE/National Nuclear Security Administration sites. The report is prepared for readability, and frequent reference to other sections, chapters, and reports is made throughout the report to avoid redundancy.

## 2014 Impacts

DOE ORR operations in 2014 continued to result in minimal impact to the public and the environment. Permitted discharges to air and water were well below regulatory standards, and potential radiation doses to the public from activities on the reservation were significantly less than the 100 mrem standard established for DOE sites in DOE O 458.1, *Radiation Protection of the Public and the Environment*.

The maximum radiation dose that a hypothetical off-site individual could have received from DOE activities on ORR in 2014 was estimated to be 0.6 mrem from air pathways 1.1 mrem from water pathways (drinking water, fish consumption, swimming, recreation, and other uses), and 1.1 mrem from consumption of wildlife harvested on ORR. This is about 3% of the DOE 100 mrem standard for all pathways and is significantly less than the 300 mrem annual average dose to people in the United States from natural or background radiation. The 2014 maximum hypothetical dose is consistent with those calculated for the previous 5 years (2009–2013), which have ranged from 3 to 5 mrem.

## Environmental Monitoring

Extensive environmental monitoring is conducted across ORR each year. Site-specific environmental protection programs are carried out at ORNL, the Y-12 Complex, and ETTP, and ORR-wide environmental surveillance programs, which include locations and media on and off the reservation, are conducted to enhance and supplement data from site-specific efforts. In 2014, thousands of samples and measurements of air, water, direct radiation, vegetation, fish, and wildlife collected from across the reservation were analyzed for both radioactive and nonradioactive contaminants. Sample media, locations, frequencies, and parameters were selected based on environmental regulations and standards, public and environmental exposure pathways, public concerns, and measurement capabilities. Chapters 2 through 7 of this report provide detailed summaries of the environmental protection and surveillance programs on ORR. These extensive sampling and monitoring efforts demonstrate DOE's commitment to safety; protecting human health; complying with regulations, standards, DOE orders, and "as low as reasonably achievable" principles; reducing the risks associated with past, present, and future operations; and improving cost-effectiveness.

## Compliance with Environmental Regulations

Federal, state, and local government agencies, including the US Environmental Protection Agency and the State of Tennessee, monitor ORR and enforce compliance with applicable environmental regulations. These agencies issue permits, review compliance reports, participate in joint monitoring programs, inspect facilities and operations, and/or oversee compliance with regulations. Compliance with environmental regulations and DOE orders related to environmental protection provides assurance that on-site processes do not impact the public or the environment adversely.

During 2014, there were only a few instances of noncompliance with regulations, permits, and DOE orders, which were promptly addressed to ensure that no adverse environmental or public health effects resulted. Noncompliances and notifications made to regulatory agencies during the year are summarized below, and detailed information is provided in Chapters 2–5 of this report.

- During 2014 a Tennessee Department of Environment and Conservation (TDEC) inspection at Y-12 identified three alleged violations related to the use of an incorrect checklist, missing labels, and improper labeling. The issues were administrative in nature, with no identified potential for environmental insult, and were immediately corrected.
- Three reportable occurrences related to Y-12 water programs occurred during 2014: (1) an oil sheen was observed on upper East Fork Poplar Creek within the Y-12 Complex, (2) an upset condition led to material from a stack being dispersed onto a building roof and the area adjacent to the building, and (3) minnow-sized dead fish were observed in East Fork Poplar Creek.
- A TDEC inspection at ORNL identified three alleged violations related to (1) an open satellite waste container, (2) an open 90-day accumulation area container, and (3) the location of the 90-day accumulation area in the vicinity of heavy equipment operation. The alleged violations were immediately corrected, and there was no environmental insult associated with these issues.
- A notice of violation was issued to UT-Battelle by TDEC for failure to notify TDEC of the demolition of two small structures (about 300 ft<sup>2</sup> each). Although the facilities did not contain asbestos, the regulations require that TDEC be notified before any building demolition.

Chapter 2 provides a detailed summary of ORR environmental compliance during 2014, and Chapters 3, 4, and 5 discuss each facility's compliance status for the year.

## Pollution Prevention and Site Sustainability

Numerous pollution prevention and sustainability programs across ORR embody efforts to achieve enduring sustainability in facilities, operations, and organizational culture. These programs promote energy and water conservation, building efficiency, sustainable landscaping, green transportation, sustainable acquisition, and waste minimization, which in turn reduce life-cycle costs of programs and projects and reduce risks to the environment. During 2014, ORR contractors were recognized for excellence in pollution prevention and sustainability programs with multiple awards, which are described in Chapters 3, 4, and 5.

## Cleanup Operations in 2014

ORR has played key roles in US defense and energy research. However, past waste disposal practices and unintentional releases have left land and facilities contaminated. These contaminants include radioactive elements, mercury, asbestos, PCBs, and industrial wastes. The DOE Environmental Management (EM) program is responsible for cleaning up these sites, and numerous cleanup projects are under way at the reservation's three main facilities.

In 2014, the most notable EM accomplishment on ORR was completion of the K-25 Building Demolition Project at ETTP. This project, DOE's largest ever demolition project, was completed 6 months ahead of schedule, which enabled work on the K-31 Demolition Project to begin earlier than expected. EM also continued planning activities for capital asset projects that will further advance ORR cleanup objectives. These include construction of a mercury treatment facility at Y-12, construction of a new disposal facility that will accept debris from future cleanup at Y-12 and ORNL, and construction of a sludge treatment facility at the Transuranic Waste Processing Center.

