

Executive Summary

Overview

The Oak Ridge Reservation (ORR), managed by the US Department of Energy (DOE), is located in Roane and Anderson counties in East Tennessee about 40 km (25 mi) from Knoxville. The ORR is one of DOE's most unusual and complex sites. It encompasses three major facilities and thousands of employees who 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. The 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 leading-edge 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's signature integrated safety management system (ISMS) integrates safety in 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).

The ORR is managed by three DOE Program Secretarial Offices and their management and operating contractors and support contractors. This 2015 *Oak Ridge Reservation Annual Site Environmental Report* (ASER) contains detailed and complex information provided to the DOE ORR integrating contractor by contractors including UT-Battelle, LLC; Consolidated Nuclear Security, LLC; URS | CH2M Oak Ridge LLC; Northwind/Wastren Advantage, Inc.; Oak Ridge Associated Universities; and Isotek Systems LLC. Three key chapters were prepared as follows: Chapter 3 by URS | CH2M Oak Ridge LLC (UCOR), the lead environmental management contractor for ETTP; Chapter 4 by Consolidated Nuclear Security, LLC, which manages and operates the Y-12 National Security Complex; and Chapter 5 by UT-Battelle, LLC, which manages the Oak Ridge National Laboratory. In addition, the aforementioned contractors are responsible for independently carrying out the various DOE missions at the three major ORR facilities. These contractors manage and implement environmental protection programs through environmental management systems 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. Detailed information on contractors' environmental management systems is provided in Chapters 3, 4, and 5.

DOE operations on the ORR have the potential to release a variety of constituents into the environment via atmospheric, surface water, and groundwater pathways. Some of these 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 conducted on the 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 it encourages the public to participate in matters related to the 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 of its Oak Ridge environmental, safety, and health activities.

The ASER is prepared for DOE according to the requirements of DOE O 231.1B, *Environment, Safety, and Health Reporting*. The 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 the ORR that provides consolidated data on overall reservation performance and status has been published annually since the mid-1970s. The ASER continues to be a key component of the DOE effort to keep the public informed about environmental conditions across DOE and National Nuclear Security Administration sites. The report is prepared for readability, and frequent references to other sections, chapters, and reports are made throughout to avoid redundancy.

2015 Impacts

DOE ORR operations in 2015 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 a hypothetical off-site individual could have received from DOE activities on the ORR in 2015 was estimated to be 0.4 mrem from air pathways, 1 mrem from water pathways (drinking water, fish consumption, swimming, recreation, and other uses), and 1 mrem from consumption of wildlife harvested on the 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 2015 maximum hypothetical dose is consistent with those calculated for the previous 5 years (2010–2014).

Environmental Monitoring

Extensive environmental monitoring is conducted across the ORR each year. Site-specific environmental protection programs are carried out at ORNL, the Y-12 Complex, and ETPP. The ORR-wide environmental surveillance programs, which include locations and media both on and off the reservation, are conducted to enhance and supplement data from site-specific efforts. In 2015 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 the ORR. These extensive sampling and monitoring efforts demonstrate DOE's commitment to ensuring 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 Tennessee Department of Environment and Conservation (TDEC), monitor the ORR for 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. Continued compliance with environmental regulations and DOE orders assures on-site processes do not adversely impact the public or the environment.

During 2015 there were only a few instances of noncompliance with regulations, permits, and DOE orders. These were promptly addressed to ensure minimal 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 through 5 of this report.

- The Y-12 Complex had one unplanned release of a hazardous substance which required notification of the regulatory agencies. On June 9, 2015 during the demolition of Building 9808, 2,117 pounds of mercury and mercury-containing sludge were spilled, which exceeded a hazardous substance reportable quantity. This event was reported to the appropriate agencies in accordance with regulatory requirements.
- ETTP received one environmental violation in 2015. This violation occurred at ETTP during a routine inspection for a missing used oil drum label on a drum in the facility's garage. The condition was immediately corrected and documented in UCOR's quality assurance tracking system. No penalties were assessed in 2015.
- Although a notice of violation was issued by TDEC on August 5, 2015 for a drinking water monitoring deficiency, the Y-12 Plant Water System retains the state's "Approved" designation.
- A notice of violation issued to UT-Battelle by TDEC was received on January 20, 2015 for failure to include two emergency generators in a timely manner in the ORNL site air permit. This was self-reported to TDEC on November 11, 2014 and the omission has since been corrected. The two generators are now included in a permit issued January 23, 2015.

Chapter 2 provides a detailed summary of ORR environmental compliance during 2015, 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 the 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. In 2015, 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 2015

The ORR has played key roles in US defense and energy research. However, past waste disposal practices, operational and industrial practices, changing standards, and unintentional releases have left land and facilities contaminated. Contaminants include radioactive elements, mercury, asbestos, polychlorinated biphenyls, 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 2015 the most notable EM accomplishment on the ORR was completion of the 750,000-square-foot K-31 Building Demolition Project at ETTP. Demolition was completed on the K-861 Switch House,

which was the power distribution and electrical switching station for the K-31 Building. With the demolition of K-31, only one gaseous diffusion building remains at ETTP—the K-27 Building. The removal of transite paneling on the outer skin of the K-27 Building began in 2015, and building demolition is anticipated to be completed in 2016. Historic preservation of the K-25 Site continued in 2015 with the completion of the conceptual design of the Equipment Building, Viewing Tower, K-25 History Center, Wayside Exhibit, and K-25 slab delineation. EM also continued planning activities for capital asset projects that will further advance ORR cleanup objectives. These include a mercury treatment facility at Y-12, a new disposal facility that will accept debris from future cleanup at Y-12 and ORNL, and a sludge treatment facility at the Transuranic Waste Processing Center.