

the Oak Ridge  
Reservation

*Annual Site*  
**ENVIRONMENTAL**  
*Report*

**SUMMARY**



**2007**



## Message from the Department of Energy and the National Nuclear Security Administration

Each year the Department of Energy conducts environmental monitoring at each of the three sites on the Oak Ridge Reservation – the Oak Ridge National Laboratory, the East Tennessee Technology Park, and the Y-12 National Security Complex. The information we collect is presented in this summary report, the data volume, and a more comprehensive publication entitled the *Annual Site Environmental Report*.

Each of these reports is vitally important because it allows DOE to clearly provide details to our stakeholders about our environmental-monitoring programs. The environmental monitoring also assists us in achieving our missions in science, national security, environmental management, and nuclear energy.

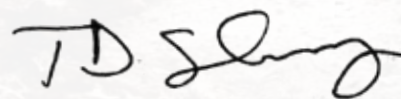
The information presented in this summary clearly shows that Oak Ridge is a safe community for its citizens, and part of the reason for that is the Department's resolute focus on safety. The work at each of our facilities is highly detailed and technically complex, but it is our commitment and duty to perform all of our activities safely. No matter what we do, our first priority is to protect the well-being of our workers, the surrounding communities, and the environment.

In closing, we would like to offer our gratefulness and appreciation to the gifted students at Karns High School who worked diligently to assemble this summary document. On behalf of the entire Department of Energy, we congratulate each of you for your effort, enthusiasm, and willingness to support DOE with this project.

We hope that you enjoy reading the *2007 Annual Site Environmental Report Summary*.



Gerald G. Boyd



Theodore Sherry



U.S. DEPARTMENT OF  
**ENERGY**



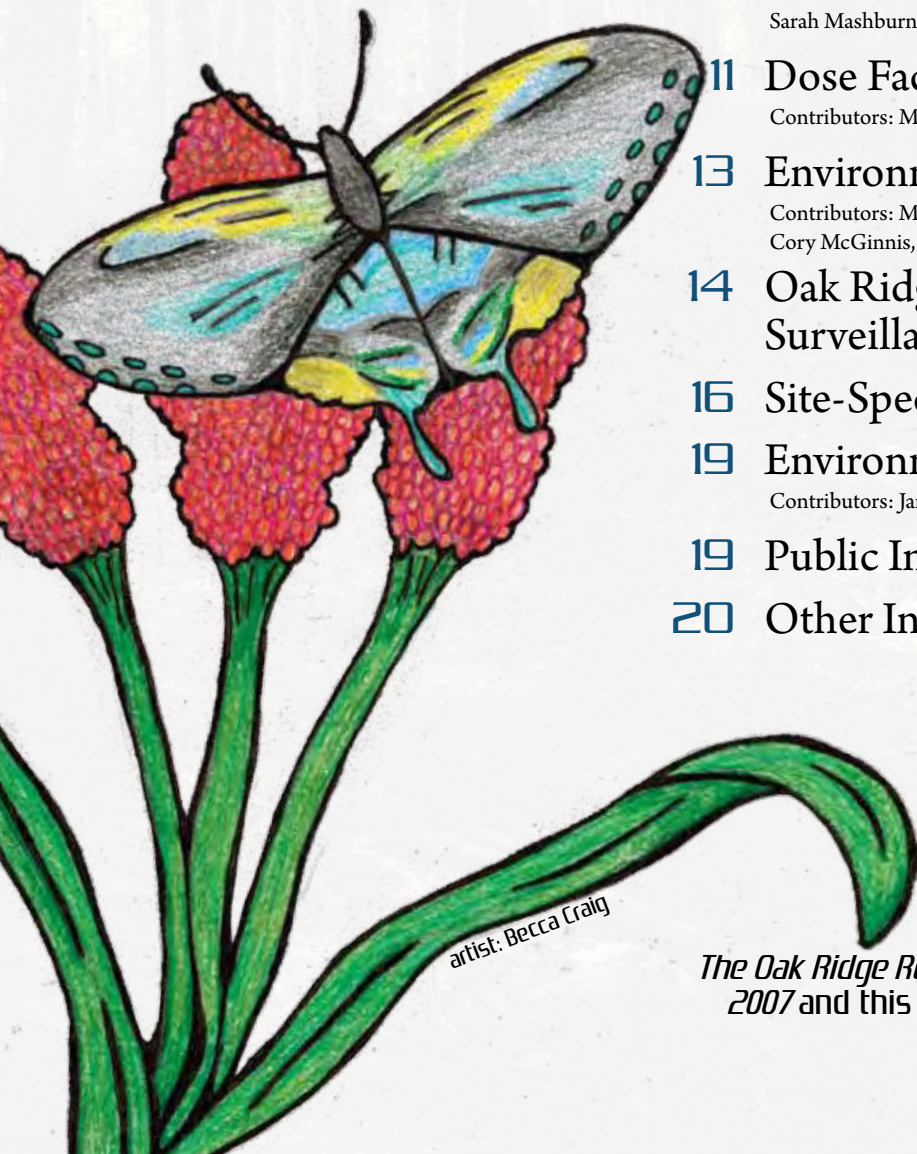


# The Oak Ridge Reservation Annual Site Environmental Report Summary

Date published: February 2009

## About the Annual Site Environmental Report

The *Oak Ridge Reservation Annual Site Environmental Report* is prepared and published each year to inform the public of the environmental activities that take place on the reservation and in the surrounding areas. It is written to comply with DOE Order 231.1A, *Environment, Safety, and Health Reporting*. This document has been prepared to present the highlights of the *Oak Ridge Reservation Annual Site Environmental Report 2007* in an easy-to-read, summary format.



## Contents

- 3 Credits
- 4 History of the Oak Ridge Reservation  
Contributors: Devin Lynch, Elaina Riggs, Derrick Menn, Connor Furlong, Tandy Carmichael, Tyler Justice
- 5 Background, Setting, and Site Overview  
Contributors: Tatiana Silvas, Haley Powell, Madison Neveu, Kayla Chesney
- 7 Environmental Compliance  
Contributors: Caitlin Moore, Christy Vitkus, Melissa Thomas, Lindsey Morrell
- 10 Radiation  
Contributors: Logan Underwood, Jacob Wright, Sarah Craft, Forrest Lyell, Sarah Mashburn
- 11 Dose Facts  
Contributors: Matt Ward, Courtney Wheeler, Zachary Ridings
- 13 Environmental Monitoring  
Contributors: Matt Ward, Logan Underwood, Kayla Chesney, Jacob Wright, Cory McGinnis, Lindsey Morrell, Joshua Heidel, Daisy Augustadt
- 14 Oak Ridge Reservation  
Surveillance Monitoring
- 16 Site-Specific Environmental Monitoring
- 19 Environmental Management  
Contributors: Jared Heyns, Devin Lynch
- 19 Public Involvement
- 20 Other Information Resources

The *Oak Ridge Reservation Annual Site Environmental Report 2007* and this summary are on the World Wide Web at <http://www.ornl.gov/asr>.





**Karns High School**  
*English II Honors 2008*

*This is a graphic representation.*



Dear reader,

Over the past few months our class has had the privilege of working on a project with the Department of Energy's Oak Ridge Office to prepare the *Oak Ridge Reservation Annual Site Environmental Report Summary 2007*. We thoroughly enjoyed this assignment, which gave us a unique opportunity to learn about the history of the Oak Ridge Reservation, current missions at the three major sites, and environmental regulations and programs that protect and enhance the environment. It is really surprising how much time, effort, and money is devoted to protecting and bettering the environment in the Oak Ridge area. We also loved learning about John Hendrix, the Manhattan Project, calutron girls, and radiation protection techniques.

During the fall 2007 semester, speakers and representatives from Oak Ridge National Laboratory, the Y-12 National Security Complex, and the East Tennessee Technology Park visited our class weekly to help us with this project, and in November we spent an entire day at the Oak Ridge facilities. Our class appreciates all the time and effort the scientists, lawyers, radiation specialists, graphics experts, and others dedicated to helping us succeed in developing the annual report summary for 2007. We learned something new every time we worked on this report and now have a better range of knowledge about the history of our community. Plus we have participated in producing a public document that will share the information we've learned with a large readership in an easy-to-understand format. Our class hopes that the end result of all this hard work will help other students and the community understand about the missions (past and present) of the facilities on the Oak Ridge Reservation and the efforts to monitor and protect the environment. So with that, we thank everyone at Oak Ridge who helped us on this project!

Fall 2008 English II Honors Students, Karns High School

Jared Heyns  
 Devin Lynch  
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 Daisy Augustadt  
 Connor Furlong  
 Haley Powell  
 Melissa Thomas  
 Derrick Menn  
 Connor Furlong

## Credits

### Pictured Contributors

*Hanging from tree, from left to right:* Caitlin Moore, Tandy Carmichael

*Standing on tree branch, from left to right:* Zachary Ridings, Devin Lynch

*Sitting on tree branch, from left to right:* Matt Ward, Derrick Menn, Kayla Chesney, Sarah Craft, Jacob Wright, Tyler Justice, Cory McGinnis, Connor Furlong, Logan Underwood, Forrest Lyell, Jared Heyns

*Jumping from tree branch, from left to right:* Elaina Riggs, Courtney Wheeler, Sarah Mashburn, Christy Vitkus, Daisy Augustadt, Tatianna Silvas

*Standing on ground, from left to right:* Lindsey Morrell, Madison Neveu, Joan Hughes, Vicki Mayfield, Kim Eaton

*Lying on ground, from left to right:* Haley Powell, Melissa Thomas

*Not pictured:* Joshua Heidel

### Production Team

Fall 2008 English II Honors Students, Karns High School

Kim Eaton, Instructor, Karns High School

Joan Hughes, Project Director, Oak Ridge National Laboratory

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Erin Collins, Front Cover Artwork, Karns Middle School Student Artist

Creative Media, Oak Ridge National Laboratory, Design, Illustration, Layouts, Editing, and Photography



# History of the Oak Ridge Reservation

John Hendrix was a resident of what is now Oak Ridge, Tennessee, more than 40 years before the city was built on Black Oak Ridge. He is sometimes called The Prophet of Oak Ridge, and his vision foretold of the city and the factory in Bear Creek Valley long before government officials even imagined the need for the secret facilities that were to be built in Oak Ridge. According to Hendrix, who grew up in Bear Creek Valley, a voice told him to sleep on the ground for forty nights and he would learn about the future. After the forty nights, he predicted that “Bear Creek Valley some day will be filled with great buildings and factories and they will help toward winning the greatest war that will ever be. There will be a city on Black Oak Ridge, and the center of authority will be on a spot between Sevier Tadlock’s farm and Joe Pyatt’s Place.” John Hendrix died in 1915 at age 49 and did not see his predictions come true, but 28 years after his death, the city of Oak Ridge was built specifically for the war effort, and his predictions proved to be uncannily accurate.

In 1941 the area now known as Oak Ridge was a rural area consisting of small towns, farms, and Appalachian communities,

but this changed rapidly and drastically beginning in 1942, when along with Los Alamos, New Mexico, and Hanford, Washington, Oak Ridge was chosen as a site for the secret Manhattan Project. The Great Project, as it was then called, was a massive undertaking of the U.S. government to produce the first nuclear weapons that played a major role in ending World War II. Oak Ridge was the fifth-largest city in Tennessee during World War II, with a population of more than 75,000. Workers from all over the world came to the area to build and operate three huge facilities to aid in producing the world’s first atomic weapons. The availability of electricity from nearby Norris Dam was an important consideration in selecting Oak Ridge as a site for the Manhattan Project, as was a cheap labor force in nearby Knoxville. Topography was also a key factor—the Oak Ridge plants sit in valleys separated by ridges, which would contain any accidental explosions, and the distance from the coast precluded the risk of attacks on the facilities by sea. There is also speculation that politics had a role in the selection of Oak Ridge for the Great Project. U.S. Senator K. D. McKellar, from Tennessee, chaired the Senate Appropriations Committee at the time and was asked by President Roosevelt

to approve the provision of significant funds for the war effort without raising suspicions regarding their use. It is rumored that Senator McKellar replied, “Yes, Mr. President, I can do that for you. Now just where in Tennessee are you going to put that thing?”

The Y-12 Plant (now the Y-12 National Security Complex) was built to separate uranium-235 from naturally occurring uranium using an electromagnetic process. At its peak the Y-12 Plant employed 22,000 workers. The K-25 Plant (now the East Tennessee Technology Park [ETTP]) was built to extract uranium-238 from uranium-235 by a process known as gaseous

*Entire neighborhoods sprang up in a day’s time. One kid remembered coming home from school one afternoon and not being able to find his house because of all the new construction in the neighborhood that day. — Tandy Carmichael*

diffusion. The K-25 Plant was operated by 12,000 workers and included the largest structure ever built at that time. X-10 (now Oak Ridge National Laboratory [ORNL]) was a pilot site for a larger plutonium production plant built in Hanford, Washington. The Graphite Reactor used neutrons emitted in the fission of uranium-235 to convert uranium-238 into a new element, plutonium-239.

*The “calutron girls” at the Y-12 Complex played an important role in the production of enriched uranium, even though at that time they had no idea what they were actually doing. These young women, many of whom were just out of high school, were recruited to watch the meters and turn the dials that controlled the electric current in the electromagnetic calutrons that produced enriched uranium used in the first atomic bomb. The calutron girls were trained to do exactly as they were told, without question or discussion. They did know, however, that they were performing a task that was important to their nation’s security and that could ultimately help win the war.*





# Background, Setting, and Site Overview

## Oak Ridge Reservation Setting

The Department of Energy's (DOE's) Oak Ridge Reservation (ORR) encompasses about 33,732 acres of mostly contiguous land owned by DOE in the Oak Ridge area. Most of it lies within the corporate limits of the city of Oak Ridge. The residential section of Oak Ridge forms the northern boundary of the reservation. The Tennessee Valley Authority's Melton Hill and Watts Bar reservoirs on the Clinch and Tennessee rivers form the southern and western boundaries. The population of the ten-county region surrounding the ORR is about 911,080, with about 1.5% of the labor force employed on the reservation. Other towns close to the reservation include Oliver Springs, Clinton, Lake City, Lenoir City, Farragut, Kingston, and Harriman.

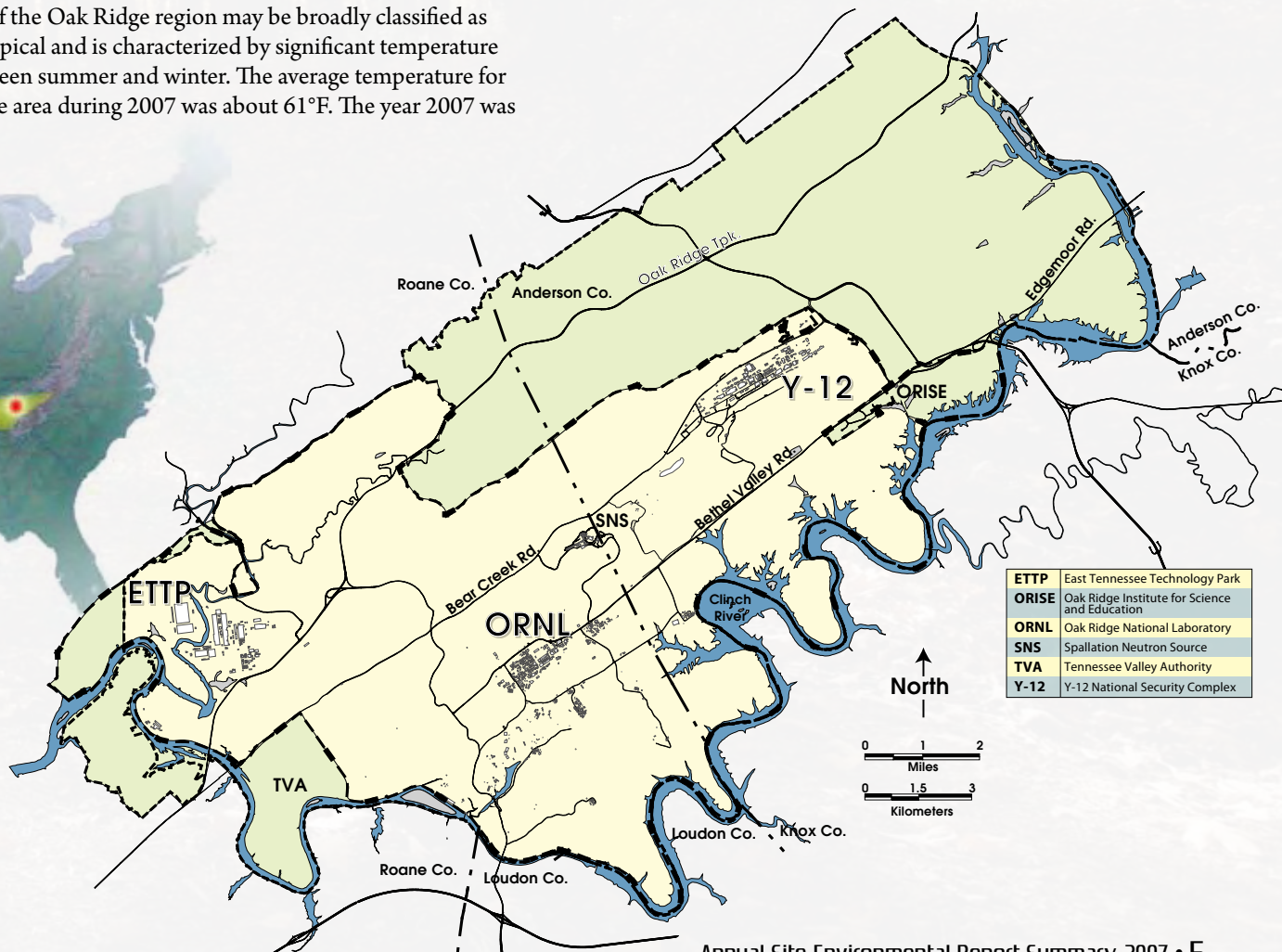
Knoxville, the major metropolitan area nearest Oak Ridge, is located about 25 miles to the east and has a population of about 182,340. Except for the city of Oak Ridge, the land within 5 miles of the ORR is semirural and is used primarily for residences, small farms, and cattle pastures. Fishing, boating, water skiing, and swimming are popular recreational activities in the area.

The climate of the Oak Ridge region may be broadly classified as humid subtropical and is characterized by significant temperature changes between summer and winter. The average temperature for the Oak Ridge area during 2007 was about 61°F. The year 2007 was

the second warmest measured in Oak Ridge between 1948 and 2007. The coldest month is usually January, and July tends to be the warmest month.

Average annual precipitation in the Oak Ridge area for the 30-year period from 1978 to 2007 was about 53 inches, including about 11 inches of snowfall annually (*Local Climatological Data Annual Survey with Comparative Data, Oak Ridge, Tenn., National Oceanic and Atmospheric Administration, 2006*). Total rainfall during 2007 was about 36 inches, and total 2007 snowfall was approximately 1 inch. It was the driest year on record in Oak Ridge (a 60-year record), marking the fourth consecutive year with below-normal precipitation.

In 2007 wind speeds on the ORR, measured at approximately 33 feet above ground level, averaged 2.7 miles per hour. The local ridge-and-valley terrain reduces average wind speeds at valley bottoms, resulting in frequent periods of nearly calm conditions, particularly during clear, early morning hours.





## There are three major facilities on the ORR.

**ETTP** had its beginnings in the Manhattan Project during World War II with an original mission to produce highly enriched uranium for use in atomic weapons. The gaseous-diffusion plant was permanently shut down in 1987, and today's mission is focused on cleaning up the environment, decontamination and decommissioning of facilities, and management of legacy wastes. Bechtel Jacobs Company LLC (BJC) is the environmental management contractor for DOE's Oak Ridge Office, which is performing this cleanup work.

**ORNL** was first established in 1943 as part of the secret Manhattan Project to pioneer a method for producing and separating plutonium. Today ORNL supports the nation with peacetime science and technology, high-performance computing systems, biology, materials science, neutron science, and national security. ORNL also hosts the U.S. Project Office for the International Thermonuclear Experimental Reactor (known as ITER) project and is home to the BioEnergy Science Center.

**The Y-12 National Security Complex** is currently managed by B&W Technical Services Y-12 L.L.C. (B&W Y-12). It is a key facility in the U.S. Nuclear Weapons Complex and is responsible for ensuring the safety and reliability of the nation's nuclear weapons stockpile.

## About the U.S. Department of Energy & the National Nuclear Security Administration

DOE is responsible for U.S. energy policy and nuclear safety and oversees the nation's nuclear weapons program, nuclear reactor production for the U.S. Navy, energy conservation, energy-related research, radioactive waste disposal, and domestic energy production.

DOE's Oak Ridge Office oversees and manages major federal programs in the areas of science, environmental management, nuclear fuel supply, and national security at ORNL, ETTP, and the Oak Ridge Institute for Science and Education (ORISE). The Oak Ridge Office has a major financial impact on the Oak Ridge area as it is the fourth largest employer in Tennessee and pays more than \$76.9 million in state and local taxes.

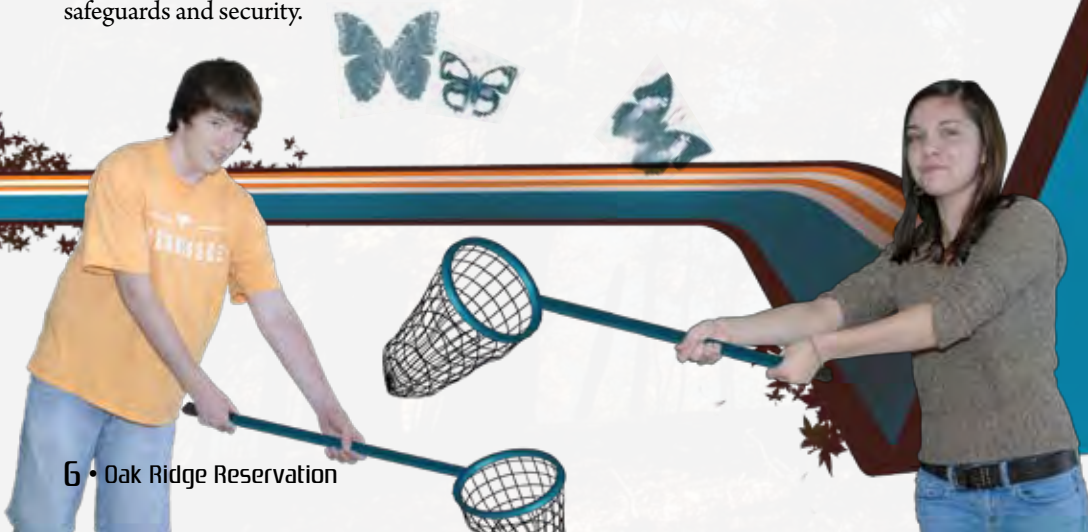
*The NNSA is in charge of—and improves the safety, reliability, and performance of—the nation's nuclear weapons. —Haley Powell*

Congress established the National Nuclear Security Administration (NNSA) in 2000 as a separately organized agency of DOE to ensure the security of the nation's nuclear weapons. NNSA works in partnership with other government agencies and national laboratories and production plants to conduct maintenance; dismantle retired weapons; refurbish warheads; and maintain

the capability to design, manufacture, and certify new warheads. NNSA also works to reduce the danger of weapons of mass destruction all over the world and provides the U.S. Navy with safe and reliable nuclear propulsion plants.

The NNSA Y-12 Site Office is responsible for operation of the Y-12 facilities. The Y-12 Site Office is made up of two major contractors: management and operations and safeguards and security.

*The Department of Energy sponsors more basic scientific research than any other U.S. federal agency. —Haley Powell*





# Environmental Compliance

DOE's operations on the ORR are required to be in compliance with environmental standards established by a number of federal and state statutes and regulations, executive orders, DOE orders, and contract clauses. The two principal environmental regulatory agencies for the ORR are the U.S. Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC).

EPA, founded in 1970 under President Richard Nixon, is responsible for establishing and enforcing environmental standards and employs 18,000 staff members across the United States to support its mission. In addition to its regulatory role, EPA sponsors important research and supports and sponsors pollution- and waste-reduction initiatives.

TDEC is responsible for protecting and improving the quality of the state's land, air, water, and recreation resources. With more than 3,200 employees, it is the chief environmental and natural resource regulatory agency in Tennessee and has delegated responsibility from EPA to regulate sources of

- ▶ air pollution,
- ▶ water pollution,
- ▶ solid and hazardous waste,
- ▶ radiological health issues,
- ▶ underground storage tanks,
- ▶ water supply, and
- ▶ groundwater.

The table on the following pages summarizes the laws and regulations applicable to DOE activities on the ORR and the 2007 compliance status across the reservation. In addition, there were no releases of hazardous substances exceeding reportable quantities, no reportable oil sheens, and no fish kills on the ORR during 2007.

However, on July 20, 2007, a single notice of violation (NOV) was issued for EITP (for a chromium storm-water discharge exceedance). A joint effort among TDEC, DOE, and BJC was initiated to investigate and correct the situation. There were no penalties or consent orders issued to the Y-12 Complex in 2007. One NOV was received due to two minor violations at Y-12 noted during the annual Resource Conservation and Recovery Act (RCRA) audit conducted by TDEC. Both issues have been corrected to the satisfaction of TDEC. No NOV's or penalties associated with RCRA inspections were issued for ORNL activities and facilities during 2007.

Numerous facilities at the EITP site have been leased to private entities over the past several years. The compliance status of the ORR lessees is not discussed in this report.

Numerous appraisals, surveillances, and audits of ORR environmental activities were conducted during 2007 (see the table on page 18). The table does not include internal DOE prime contractor assessments for 2007.

The state of Tennessee also conducts a program of independent monitoring and oversight of DOE activities on the ORR through the Tennessee Oversight Agreement (TOA). The TOA is a voluntary agreement between DOE and the state of Tennessee and is designed to assure the citizens of Tennessee that their health, safety, and environment are being protected through existing programs and through substantial new commitments by DOE. More information on the TOA is available at <http://www.state.tn.us/environment/doe/>.

*The Environmental Protection Agency and the Tennessee Department of Environment and Conservation are the primary regulatory agencies overseeing activities on the Oak Ridge Reservation.—Lindsey Morrell*



artist: Kelli Carter



artist: Polina Li



artist: Kati Tran



# Applicable Laws/Regulations and 2007 Status

## *Regulatory Program Description*

## *2007 Status*

**The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** provides the regulatory framework for remediation of releases of hazardous substances and of inactive hazardous waste disposal sites.

The ORR has been on the EPA National Priorities List since 1989. The ORR Federal Facility Agreement (FFA) was initiated in 1992 among EPA, TDEC, and DOE. The FFA establishes the framework and schedule for developing, implementing, and monitoring remedial actions on the ORR.

**The National Environmental Policy Act (NEPA)** requires consideration of how federal actions may impact the environment and an examination of alternatives to the proposed actions. NEPA also requires that decisions include public input and involvement through scoping and review of NEPA documents.

During 2007 UT-Battelle, BJC, and B&W Y-12 activities on the ORR were in full compliance with NEPA requirements. Procedures for implementing NEPA requirements at the three major ORR sites have been fully developed and implemented.

**The National Historic Preservation Act** was enacted to protect the nation's historical resources by establishing a comprehensive national historic preservation policy.

The ORR has several facilities eligible for inclusion in the *National Register of Historic Places*. Proposed activities are reviewed to determine potential adverse effects on these properties, and methods to avoid or minimize harm are identified.

**The Clean Air Act (CAA)** and Tennessee environmental conservation laws regulate the release of air pollutants through permits and air quality limits. Emissions of radionuclides are regulated by EPA via the National Emission Standards for Hazardous Air Pollutants (NESHAPs) authorizations.

Authority for implementation and enforcement of the CAA has been delegated to the state of Tennessee by EPA. In 2007 all three major ORR sites operated in conformance with the CAA Title V Operating Permit Program.

**The Clean Water Act (CWA)** seeks to improve surface water quality by establishing standards and a system of permits. Wastewater discharges are regulated by National Pollutant Discharge Elimination System (NPDES) permits issued by TDEC.

Discharges to surface water at each of the three sites are governed by NPDES permits. A compliance rate of greater than 99% was achieved by the three major ORR sites in 2007.

**The Safe Drinking Water Act** establishes minimum drinking water standards and monitoring requirements.

The city of Oak Ridge supplies potable water to the Y-12 Complex and to ORNL. The K-1515 sanitary water plant provides drinking water for ETTP and for an industrial park south of the site.

**Emergency Planning and Community Right-to-Know Act**, also referred to as the Superfund Amendments and Reauthorization Act, requires reporting of emergency planning information, hazardous chemical inventories, and environmental releases of certain toxic chemicals to federal, state, and local authorities.

DOE facilities on the ORR are in full compliance with emergency planning and reporting requirements. There were no releases of hazardous substances exceeding reportable quantities in 2007.

**Resource Conservation and Recovery Act (RCRA)** governs the generation, storage, handling, and disposal of hazardous wastes. RCRA also regulates underground storage tanks containing petroleum and hazardous substances, universal waste, and recyclable used oil.

The Y-12 Complex, ORNL, and ETTP are defined as large-quantity generators of hazardous waste because each generates more than 1,000 kilograms of hazardous waste per month. Each site is also regulated as a handler of universal waste. Each site operates in accordance with the RCRA permits that govern waste treatment, storage, and disposal units.





## Regulatory Program Description

## 2007 Status

**The Toxic Substances Control Act (TSCA)** regulates the manufacture, use, and distribution of all chemicals.

The ORR facilities manage TSCA-regulated materials, including polychlorinated biphenyls (PCBs). The ORR PCB Federal Facilities Compliance Agreement between EPA and DOE provides a forum that addresses legacy PCB-use issues across the ORR.

**ORR Floodplains Management Programs** are established to avoid, to the extent possible, adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.

ORR Floodplains Management Programs incorporate management and protection goals into planning, regulatory, and decision-making processes through each site's NEPA program. Goals include flood loss reduction, minimization of the impact of floods, and the restoration and preservation of ORR floodplains.

**ORR Protection of Wetlands Programs** are implemented to minimize the destruction, loss, or degradation of ORR wetlands and to preserve and enhance their beneficial values.

Protection of approximately 600 acres of ORR wetlands is implemented through each site's NEPA program, and surveys for the presence of wetlands are conducted on a project- or program-as-needed basis.

**The Endangered Species Act** prohibits activities that would jeopardize the continued existence of an endangered or threatened species or cause adverse modification to a critical habitat.

The ORR is host to several plant and animal species that are categorized as endangered, threatened, or of special concern.

**DOE Order 231.1A, Environment, Safety, and Health Reporting**, ensures timely collection, reporting, analysis, and dissemination of information on environment, safety, and health issues.

The *Oak Ridge Reservation Annual Site Environmental Report* is published to summarize ORR environmental activities and to characterize environmental performance.

**DOE Order 435.1, Change 1, Radioactive Waste Management**, is implemented to ensure that all DOE radioactive waste is managed in a manner that protects workers, public health and safety, and the environment.

UT-Battelle, B&W Y-12, and BJC all generate radioactive waste and have implemented waste certification programs.

**DOE Order 450.1A, Environmental Protection Program**, has the objective of implementing sound stewardship practices that protect the air, water, land, and other natural and cultural resources affected by DOE operations. DOE facilities meet this objective by implementing environmental management systems.

UT-Battelle, B&W Y-12, BJC, and other DOE contractors on the ORR have implemented environmental management systems that are integrated with the specific site's integrated safety management systems.

**DOE Order 5400.5, Radiation Protection**, was established to protect members of the public and the environment against undue risk from radiation. This order establishes standards and requirements for operations of DOE and DOE contractors.

The derived concentration guides provided in DOE Order 5400.5 are employed on the ORR to ensure that effluents and emissions do not affect the environment or public and worker safety and health and to ensure that all doses meet the "as low as reasonably achievable" policy.





# Radiation

## Definition

Radiation is energy in the form of particles or rays given off by atoms as they go from an unstable to a stable state. Some radioactive atoms exist naturally; others are human-made. Radiation has always been present in the environment and in our bodies.

The fact is radiation is all around us, and everyone is exposed to radiation through normal daily activities. We actually need some radiation to sustain life. However, at certain levels radiation causes harm or damage by killing or altering living cells. Health effects of radiation are not determined by whether the radiation is naturally occurring or human-made, but rather by the levels of exposure.

There are two main types of radiation: ionizing, which is known to cause tissue damage, and nonionizing. Normally, an atom has an equal number of protons and electrons; however, atoms can gain or lose electrons in a process called “ionization.” Ionizing radiation is capable of changing the chemical state of matter and causing biological damage and can be harmful to human health. Types of ionizing radiation include alpha, beta, and gamma radiation. Nonionizing radiation bounces off or passes through matter without displacing electrons. Examples of nonionizing radiation include visible light and radio waves.

## Sources and Pathways of Radiation

Radiation is everywhere. Most occurs naturally, and a small amount is human-made. Naturally occurring radiation is also called background radiation. Natural sources include the following:

**Cosmic radiation**—Electrically charged particles from outer space continuously hit the earth’s atmosphere. The atmosphere provides some shielding against cosmic radiation, and therefore, the intensity of cosmic radiation increases with altitude above sea level.

**Terrestrial radiation**—Rocks, soils, and minerals in the earth contain radioactive materials.

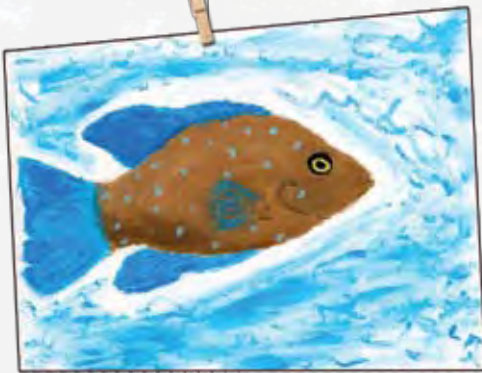
**Internal radiation**—All people have radioactive isotopes inside their bodies from birth, and radionuclides in air and food enter the body as we breathe and eat.

Exposure to cosmic and terrestrial radiation varies in different parts of the world due to differences in elevation and to the effects of the earth’s magnetic field. The variation in internal radiation dose from one person to another is not as great as the variation in dose from cosmic and terrestrial sources.

Exposures to human-made sources of radiation are mainly from medical procedures and X-rays. Other human-made sources include consumer products, such as tobacco and building materials.



artist: Taylor Piper



artist: Lizzie Pearson

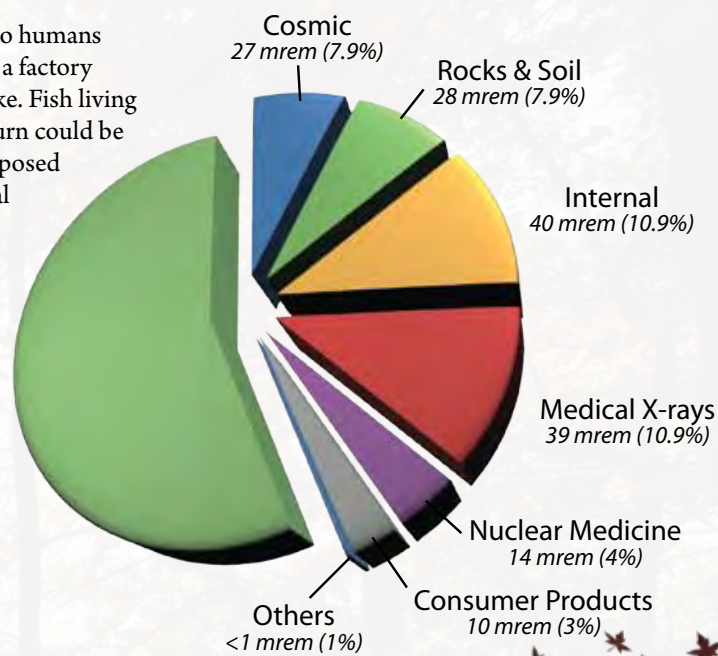




Radiation pathways are the routes by which radiation is transferred to humans through the environment. An example of a water pathway would be a factory discharging runoff containing radioactive pollutants into a lake. Fish living in the lake would be exposed to the pollutants and in turn could be eaten by a fisherman who would then also be exposed to the pollutants. Some of the environmental pathways that could result in public exposure to radiation resulting from Oak Ridge activities include breathing air; drinking water; and eating fish, deer, turkey, or geese.

Radon  
200 mrem (54.5%)

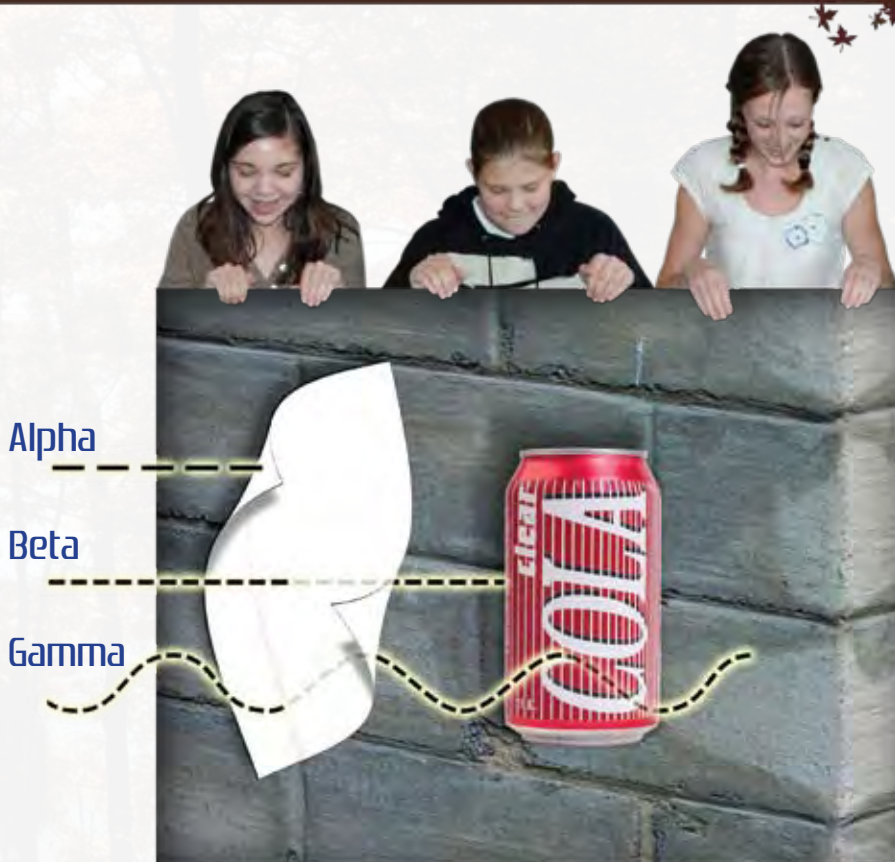
*I never knew radiation comes from so many sources. —Logan Underwood*



## Dose Facts

Radiation dose denotes the amount of radiation, or energy, absorbed by a person. A rem is a unit used to measure the potential biological damage to the body caused by exposure to, and the subsequent absorption of, radiation. A millirem is one one-thousandth of a rem. A person would get that amount of radiation from residing 2 days in Denver or 3 days in Atlanta. The average annual radiation dose to individuals in the United States is about 360 millirems, with approximately 300 millirems coming from natural sources and about 60 millirems from human-made sources.

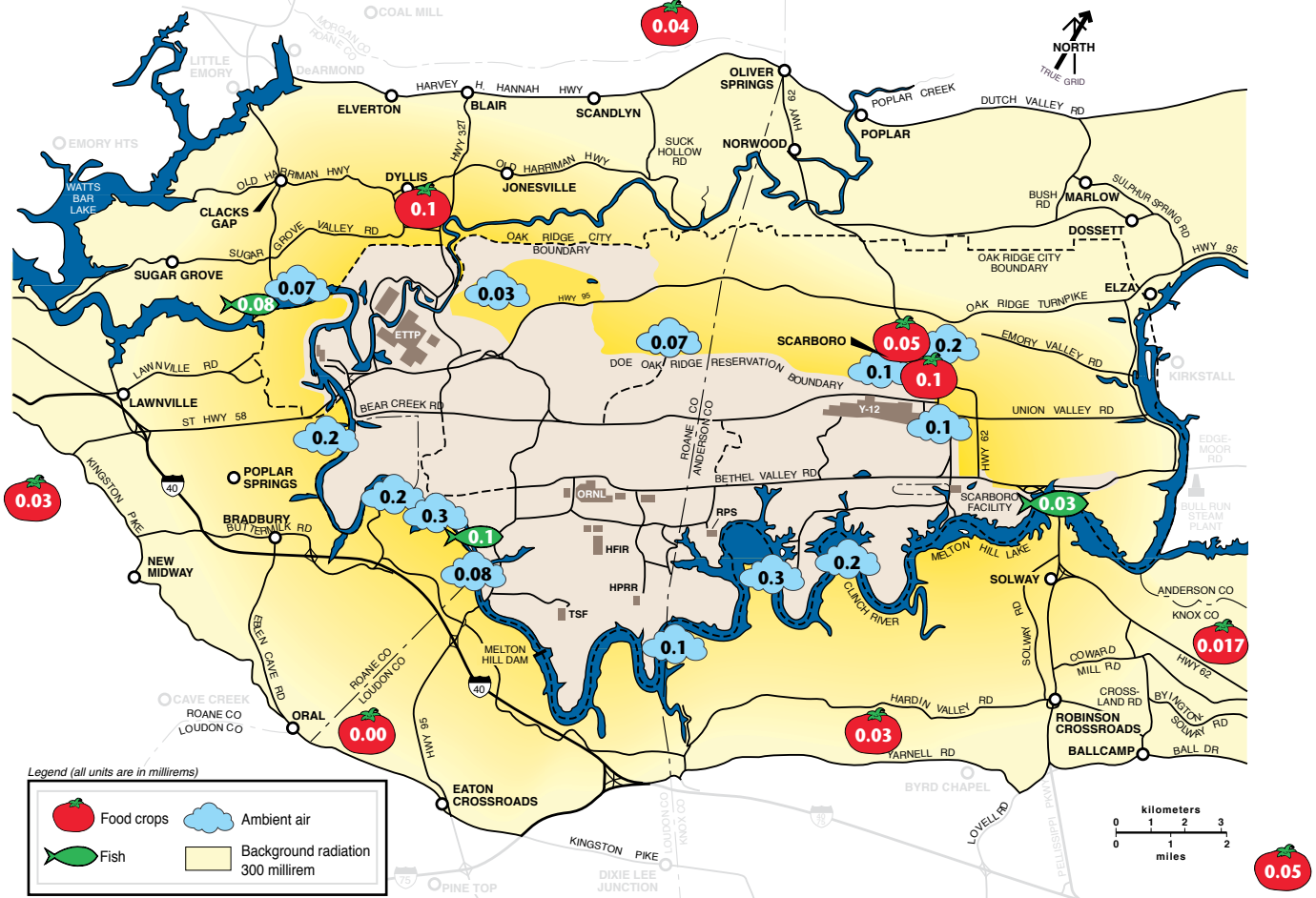
Potential radiation doses to the public from operations at the DOE Oak Ridge facilities are estimated using monitored and estimated release data, environmental-monitoring and surveillance data, estimated exposure conditions, and environmental transport codes. In 2007 the estimated worst-case dose that could have been received by a member of the public from DOE's Oak Ridge activities was 4 millirems. The calculated doses tend to be overestimates, and it is likely that actual doses received by typical people in the Oak Ridge area are less than the estimates.





The fact of the matter is that radiation is all around us, and everyone is exposed to radiation through normal daily activities. —Jacob Wright

## Possible Radiation Doses (On or Near the Oak Ridge Reservation)



A maximally exposed member of the public could have received an effective dose of about 4 millirems from all radiation sources on the ORR during 2007. —Courtney Wheeler

## Summary of Maximum Potential Radiation Effective Doses

Pathway	Dose to maximally exposed individual	
	millirem	millisievert
Airborne effluents		
(All pathways)	0.3	0.003
Liquid effluents		
- Drinking water	0.2	0.002
- Eating fish	0.9	0.009
- Other activities	0.1	0.001
Eating deer	2.0	0.02
Eating geese	0.1	0.001
Eating turkey	0.1	0.001
Direct radiation	0.4	0.004
All pathways	4.1	0.041





# Environmental Monitoring

Environmental monitoring is performed across the ORR to confirm that no member of the public is exposed to hazardous substances or radionuclides above regulatory levels from DOE activities. There are two primary types of environmental monitoring and sampling. Effluent monitoring involves collecting and analyzing liquid or gaseous samples at the point of emission. This could be a pipe discharging water from a facility or a stack emitting gaseous discharges from an operation or activity. Surveillance monitoring involves collecting and analyzing samples of air, water, soil, vegetation, wildlife, biota, and other media from the reservation and the nearby areas. Each major facility conducts site-specific monitoring programs and participates in a reservation-wide surveillance monitoring program that measures radiological and nonradiological parameters directly in environmental media adjacent to the facilities.

## *Defining Environmental Monitoring* by Matt Ward

*So, what exactly is this “monitoring” stuff? Why is it important anyway? Well, environmental monitoring is basically how DOE makes sure nothing it is doing in Oak Ridge harms the environment or the public. It’s how DOE checks air and water releases from its facilities to make sure there are no adverse environmental effects in the surrounding areas. This is accomplished with effluent and surveillance monitoring.*

*Now the definition of effluent monitoring is rather simple to understand despite the big name. Basically it’s sampling what comes out of the end of the pipe and what gets released directly into the environment. This includes both liquid and gaseous discharges, which are often regulated by permits. Think of a factory, any factory. Say a paper mill for instance. It brings in trees and makes them into paper. But where do the leaves and bark go? And what does changing the tree into paper make that is extra. Well, the smoke, water, and debris that are the other outputs (besides the paper) are examples of things that come out of the end of the pipe—waste created or left over after making something. Every business has this waste or leftovers. At Oak Ridge, DOE samples everything it puts out through drains, stacks, sewer pipes, or vents to make sure nothing is harmed.*

*Now what about surveillance monitoring? Well, it’s pretty much what it sounds like. Surveillance is sampling plants, animals, water, soil, and air and checking for different chemicals that could have come from the effluent waste just described.*

*So environmental monitoring in Oak Ridge is like a safety net. At Oak Ridge they sample almost everything in the environment to keep us safe.*

*To quote Mad-Eye Moody, “CONSTANT VIGILANCE!”*

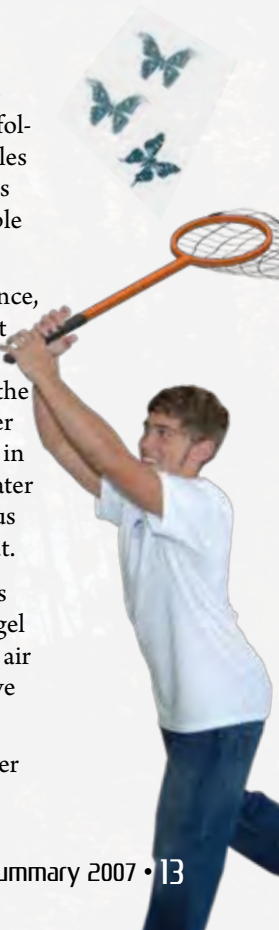
## How Environmental Monitoring Is Performed

All of this monitoring usually starts when a sampling technician goes out into the field and collects samples to be tested later. These technicians collect all kinds of samples, including air, water, soil, plants, vegetables, and creatures—from the tiniest bugs in the creek to animals as big as deer. Sampling technicians have extensive training and education and must follow complicated procedures to make sure they do it right. For instance, preservatives may have to be used in some samples to keep them fresh and to prevent them from changing form or volatilizing before they get to the lab. And not all samples that have to be preserved use the same preservatives, so technicians have to be able to identify the right one, or the sample will not be representative.

To complicate things even more, there are sometimes several different ways to collect a certain type of sample. For instance, surface water can be sampled by composite or grab sampling methods. Composite sampling basically uses machines that pull up water from a stream a little at a time over a set sampling period like a week or a day. In the water sampling we observed, a jug of water was collected from a creek over a week’s time and stored in a refrigerated cabinet. At the end of the week, the jug was shaken, and a sample was then poured from the jug into clean, preserved bottles. Another type of water sampling is called grab sampling. This way is simpler. The technicians take the bottles into the stream and position them in a way that they catch water coming downstream. But if you need a groundwater sample, there is yet another method. Water has to be pumped from a well into plastic or glass jars. After these water samples have been collected by any of the various methods, they go to analytical laboratories, where testing for the presence of radiation and other pollutants is carried out.

Air samples are usually collected with various types of filters. DOE air sampling programs in Oak Ridge often use pumps to pull air through paper or glass fiber filters to collect particulates, through charcoal to collect gases, and through silica gel to collect tritium in water. The effluent stack sampling involves installing a probe into the stack that has nozzles that pull air through the filters. The filters are collected by the sampling personnel and then sent to a lab to be analyzed for radioactive and other types of pollutants.

Animal sampling is performed in a variety of ways. In some cases animals are screened live and then released, and in other cases bones and muscles are removed from dead specimens for laboratory analytical processes. Sampling programs and results from 2007 environmental activities on the ORR are described on the next two pages.





# Oak Ridge Reservation Surveillance Monitoring

In addition to environmental monitoring conducted at the three major Oak Ridge DOE installations, reservation-wide surveillance monitoring is performed to measure radiological and nonradiological parameters directly in environmental media adjacent to the facilities. Data from the ORR surveillance programs are analyzed to assess the environmental impact of DOE operations on the entire reservation and the surrounding area.

**Meteorological Monitoring** – Eight meteorological towers provide data on atmospheric conditions on the ORR. Data from the towers are used in modeling to predict impacts from facility operations and as input for emergency response atmospheric models. The meteorological data are also used to support various research and engineering projects.

**Ambient Air** – Ambient air is the surrounding air, and in this report the term specifically refers to the air surrounding the ORR. In addition to the exhaust-stack monitoring performed at each of the three major Oak Ridge DOE installations, ambient air is monitored to measure radiological parameters at eight locations that could be affected by DOE activities and at a reference location not within the potential impact area of ORR activities. Data from this ambient air monitoring are used to assess the impact of DOE operations on local air quality. The sampling systems consist of a high-volume air sampler used to collect particulates on a glass fiber filter and a column of silica gel used to collect water vapor containing tritium. Laboratory analyses are performed to determine the concentrations of radionuclides, and the results are compared to DOE reference levels known as derived concentration guides. In 2007 all radionuclide concentrations were less than 1% of the applicable derived concentration guides, indicating that DOE activities did not have a significant impact on local air quality.

**External Gamma Radiation Monitoring** – External gamma radiation monitoring is conducted to determine whether radioactive emissions from the ORR are increasing external radiation levels and to compare results from year to year. Exposure rates are recorded weekly at six ambient air stations. The average ORR exposure rate for 2007 was within the range of normal background levels in Tennessee, indicating that activities on the ORR do not increase external gamma levels in the area above normal background levels.

**Surface Water** – Surface water is a possible route for contaminants to move from the ORR into areas that could be accessed by the public. In 2007 surface water samples were collected from three locations on the Clinch River in addition to the samples collected to meet the requirements of the NPDES permits and other site-specific monitoring programs at the three major operating facilities. The samples were analyzed for metals, radioactivity, water quality parameters, and in some cases volatile organic compounds and PCBs. Comparison of 2007 surface water sampling results from a location upstream of DOE operations with samples from a downstream location show that there were no statistically significant differences in the parameters of interest, indicating that Oak Ridge activities are not adversely affecting the water quality of the Clinch River.

**Food Crops** – Another possible route for contaminants from the ORR to reach the public is through the consumption of food crops grown offsite in



artist: Lindsay Caves



artist: Rachel Crane



artist: Morgan Howell



areas that could potentially be affected by DOE activities. In 2007 samples of hay, tomatoes, lettuce, and turnips were collected from gardens or fields grown near the reservation and were analyzed for gross alpha, gross beta, gamma emitters, and uranium isotopes. The results were at background levels and were consistent with historical values, indicating that DOE activities in Oak Ridge do not significantly impact the radionuclide concentrations in locally grown produce.

**Milk** – The ORR 2007 milk-sampling program consisted of grab samples collected every other month from dairy farms in Powell, Claxton, and Maryville. The milk samples were analyzed for gamma emitters and tritium and for total radioactive strontium to ensure that radionuclides from reservation activities are not reaching the public through the grass-cow-milk route. All results were consistent with historical and background levels, indicating that DOE operations are not influencing radionuclide concentrations in local milk.

**Fish** – Fish from three locations on the Clinch River are collected annually to ensure that members of the public are not exposed to contaminants from Oak Ridge activities by consuming fish from the river. Sunfish and catfish are collected at each location, filleted, frozen, and sent to a laboratory for analyses for selected metals, pesticides, PCBs, tritium, gross alpha, gross beta, gamma-emitting radionuclides, and total radioactive strontium. Consumption of fish in the Melton Hill and Watts Bar Reservoirs, including areas that are not impacted by ORR activities, is limited by an advisory issued by TDEC for PCBs. PCBs are found in water bodies all over the United States, and the local advisory is for the entire reservoir and not just areas that could potentially be affected by the Oak Ridge DOE facilities. This advisory is applicable to atypical consumers such as pregnant or nursing women, children, and subsistence fishermen. Consistent with this advisory, PCBs were detected in both species at all locations in 2007.

**White-Tailed Deer** – Three weekend deer hunts were held on the Oak Ridge Wildlife Management Area, which is part of the ORR, during November and December 2007. These annual deer hunts were managed by the Tennessee Wildlife Resources Agency and DOE. Shotgun/muzzleloader and archery hunts yielded a total harvest of 361 deer (221 bucks and 140 does), which were screened for radioactivity prior to release to the hunter. Three deer were retained by officials for exceeding administrative release limits. This is consistent with retention rates from previous years.

**Canada Geese** – Open hunts for Canada geese are held each year in counties adjacent to the ORR. In addition, in September 2007 a Canada goose hunt was held in the Solway and Freels Bend area of the ORR with hunters being allowed to take wood duck and teal on one of the hunt days. To determine the potential impact of consuming geese that could have accessed areas affected by DOE facilities in Oak Ridge, 202 geese were captured on the ORR during June 2007. Whole-body gamma scans were conducted to determine concentrations of gamma-emitting radionuclides accumulated by these waterfowl. No geese exceeded administrative limits.

**Turkey** – Two wild turkey hunts were held on the reservation during March and April of 2007. Hunting was open for both shotguns and archery. Thirty-one turkeys were harvested; none exceeded administrative release limits established for radiological contamination.



artist: Kirsten Martin



artist: Jenny Tran



artist: Sarah Bowers



artist: Sarah Woods



# Site-Specific Environmental Monitoring

In addition to the ORR-wide environmental monitoring described in the previous section, site-specific monitoring is conducted at the three major Oak Ridge DOE installations.

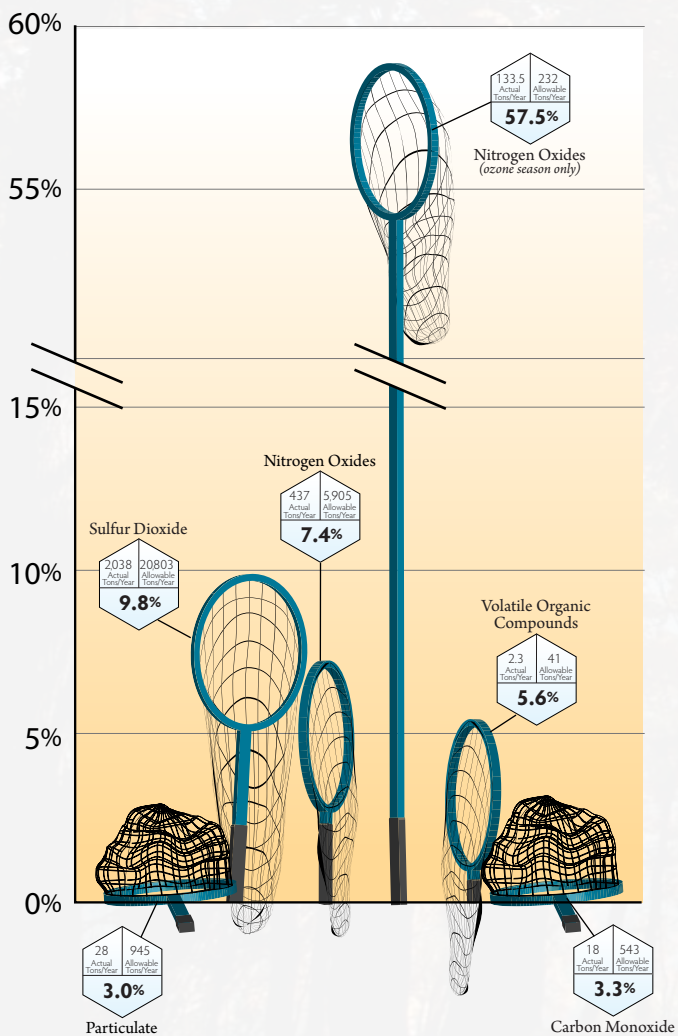
## Y-12 National Security Complex

At the Y-12 National Security Complex, an environmental management system (EMS) modeled on the international standard ISO 14001:2004 is used as a tool to manage, control, and minimize or eliminate potential environmental impacts associated with site activities. The EMS is designed to help improve environmental performance, provide for compliance with the law, improve efficiency and effectiveness, and promote stewardship. Protection of the environment includes monitoring of water, air, soil, and biota and measuring progress in achieving environmental performance goals.

Surface streams and wastewater discharges are regulated by TDEC under a site-wide NPDES permit. This permit covers more than 65 outfalls and storm-water monitoring locations. More than 1,700 analytical samples and field measurements were collected for analysis in 2007. During 2007 the Y-12 NPDES compliance rate was greater than 99.9%. One NPDES permit violation was reported when data

for an oil and grease sample was unavailable for one weekly sample due to a computer error in the laboratory. There was 100% compliance with the industrial and commercial users wastewater permit for discharge of sanitary wastewater to the city of Oak Ridge publicly owned treatment works.

Actual vs. Allowable Air Emissions from Y-12 Steam Plant, 2007



A CAA Title V permit regulates air emissions from 36 emission sources and more than 100 air emission points at the Y-12 Complex. More than 3,500 stack samples were collected in 2007, and an estimated 1.1 kilograms of uranium were released into the atmosphere from Y-12 activities in 2007. The resulting total effective dose of 0.15 millirem was significantly less than the DOE limit of 10 millirems. The Y-12 Steam Plant burns coal and natural gas and is a primary source of criteria pollutants at Y-12. All monitored results were in compliance with the Title V permit in 2007.

More than 240 groundwater wells and springs were sampled in 2007. Results were consistent with past sampling data. Primary contaminants in groundwater are nitrates, volatile organic compounds, metals, and radionuclides. Of these, volatile organic compounds are the most widespread. In general, groundwater contamination trends are stable or decreasing.

Six environmental audits/inspections by outside regulatory agencies (TDEC and the city of Oak Ridge) were conducted at the Y-12 National Security Complex during 2007. One NOV was received at Y-12 in 2007 as a result of the RCRA inspection by TDEC in which there were findings related to improper labeling of a waste container and storage of waste aerosol cans. Both problems were corrected.

There were no releases of hazardous substances exceeding reportable quantities, no reportable oil sheens, and no fish kills at Y-12 during 2007.

As a means of measuring progress in continual environmental performance improvement, B&W Y-12 establishes environmental objectives and targets (or goals) and tracks performance during the year. In 2007 Y-12 achieved 11 of 12 goals (92%) that resulted in overall environmental improvements. Significant among them were achieving a greater than 90% reduction in generation of a waste stream, implementing use of B20 biodiesel in the diesel fleet, disposing of more than 3,800 unneeded materials and chemicals, and eliminating the use of an ozone-depleting chemical (Freon-113) from a cleaning operation.



## Oak Ridge National Laboratory

EMSs modeled after the international standard ISO 14001:2004 are employed by UT-Battelle and other DOE contractors performing work at ORNL to measure, manage, and control environmental impacts of DOE activities on the site.

UT-Battelle demonstrates compliance with environmental requirements and a commitment to achieve environmental excellence through the employment of an EMS registered to ISO 14001:2004. The UT-Battelle EMS is a fully integrated set of environmental management services for UT-Battelle activities and facilities and for environment management and support services that UT-Battelle provides to other DOE contractors at ORNL.

In 2007 compliance with the NPDES permit for ORNL was determined by approximately 7,000 analytical tests on water samples along with numerous measurements and field observations from 169 locations. The 2007 NPDES compliance rate was greater than 99.9%, with only one measurement exceeding numeric NPDES permit limits. This measurement also caused a calculated exceedance of a second, monthly average permit limit. The noncompliances occurred at the ORNL Steam Plant Wastewater Treatment Facility, where measurements of iron on January 11, 2007, exceeded permit limits. Investigations did not determine the cause of the exceedance, but there were no recurrences in 2007. Several surface-water monitoring points and 49 groundwater wells at ORNL were also sampled by UT-Battelle during 2007, and all data were consistent with historical monitoring results.

Airborne discharges from ORNL, both radioactive and nonradioactive, are subject to regulation by EPA and the TDEC Division of Air Pollution Control. Radioactive airborne discharges at ORNL consist primarily of ventilation air from radioactively contaminated or potentially contaminated areas, vents from tanks and processes, and ventilation for hot-cell operations and reactor facilities. The calculated dose to the maximally exposed off-site individual from all radiological airborne release points at ORNL during 2007 was 0.26 millirem, which is well below the NESHAPs standard of 10 millirems. UT-Battelle holds a Title V permit for ten emission sources, all of which operated in full compliance with permit conditions during 2007.

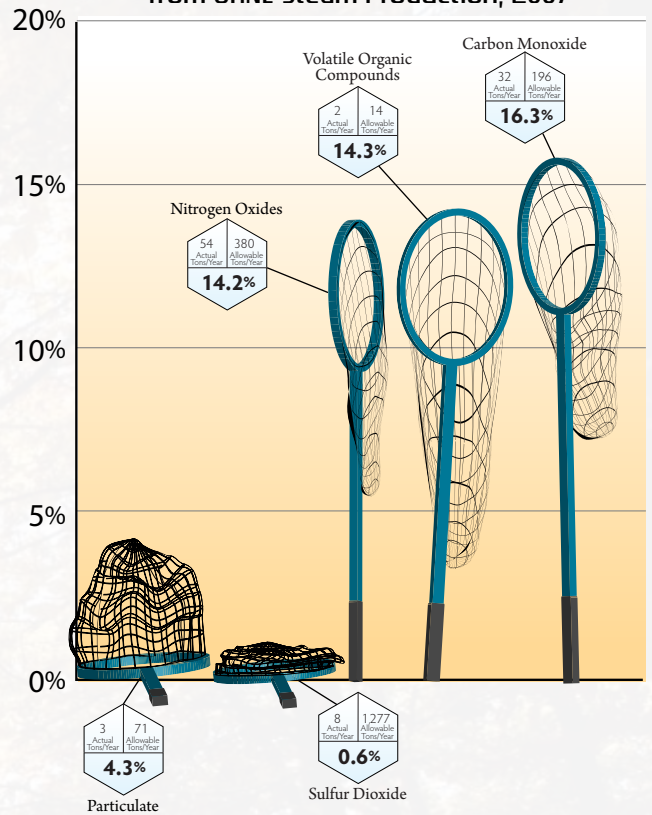
Several environmental audits/inspections by outside agencies were conducted at ORNL during 2007. Assessors included TDEC; NSF Strategic Registrations, Ltd.; and the Radiological Assessment Corporation. No NOVs were issued as a result of these audits and inspections.

There were no releases of hazardous substances exceeding reportable quantities, no reportable oil sheens, and no fish kills at ORNL during 2007.

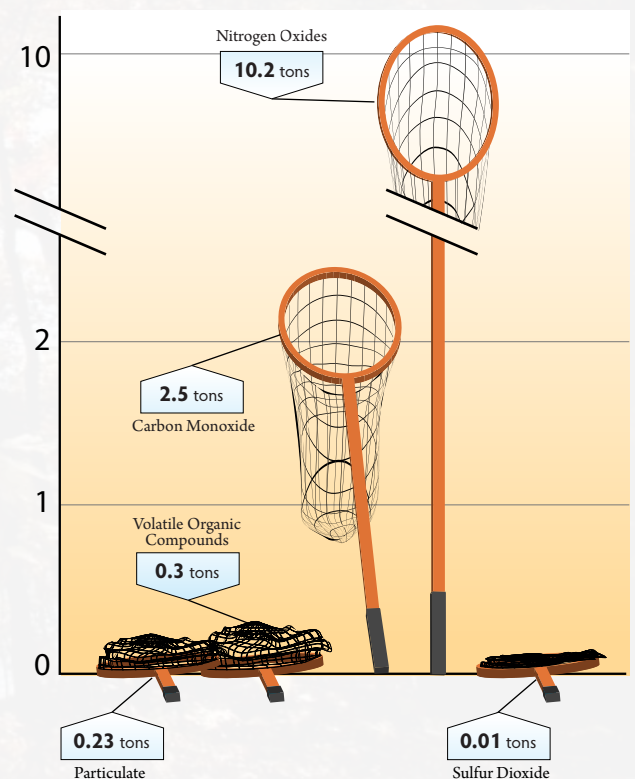
## East Tennessee Technology Park

During 2007 thousands of samples and field measurements were taken at air, surface-water, groundwater, and biological monitoring locations. Sampling results showed that liquid effluent discharges from EITP were greater than 99% compliant with the terms of applicable permits, and air effluent discharges were 100% compliant. None of the liquid effluent noncompliances resulted in a fish kill or the discharge of a reportable quantity of any pollutant. Caged clams and

Actual vs. Allowable Air Emissions from ORNL Steam Production, 2007



Actual Emissions of Criteria Pollutants from Permitted EITP Sources, 2007







artist: Kristen Eubanks

game fish from several locations were analyzed for PCBs. Benthic macroinvertebrate and fish communities on Mitchell Branch were studied. Toxicity tests were conducted at several Mitchell Branch locations and associated storm-water outfalls. Data from these studies indicate that while past operations at ETTP have negatively impacted the aquatic environment, changes in operations and remedial actions have begun to heal the damage, and the aquatic environment has begun to recover.

Dose estimates based on results from monitoring of air emissions in 2007 demonstrate levels well below the NESHAPs limit of 10 millirems. In 2007 the maximally exposed individual was estimated to have received a dose of approximately 0.02 millirem. No direct monitoring of nonradiological air contaminants is required at ETTP. Instead, monitoring of key process and air-pollution-control-device parameters is performed to ensure compliance with permit limits.

In 2007 both the state of Tennessee and EPA inspected waste storage and other operations at ETTP. No findings or violations were noted.

*The Oak Ridge Reservation is being cleaned up under a Federal Facilities Agreement with DOE, the Environmental Protection Agency, and the state of Tennessee.*

—Devin Lynch

Date	Reviewer	Subject	Issues
May 7-10	TDEC, RCRA	<b>UT-Battelle</b>	
May 22	TDEC	TDEC Annual RCRA Inspection	0
May 31	TDEC	ORNL NPDES Permit Renewal	0
Jun 18-21	NSF-ISR	ORNL NPDES Permit Renewal	0
Jul 19	TDEC	EMS Reassessment Audit	0
Aug 10	TDEC	ORNL NPDES Permit Renewal	0
Sep 11-12	RAC	ORNL NPDES Permit Renewal	0
Sep 27	TDEC	ORNL Dose Assessment	0
Nov 5-7	TDEC	ORNL NPDES Permit Renewal	0
Nov 20	TDEC	TDEC Annual RCRA inspection at Y-12 Complex	0
Dec 6	TDEC	ORNL NPDES Permit Renewal	0
Feb	TDEC	ORNL NPDES Permit Renewal	0
Feb	EPA/TDEC	<b>Bechtel Jacobs Company</b>	
Sep	TDEC	RCRA Storage Area	0
		TSCAI	0
		CNF, TSCAI wastewater, ETTP storm-water outfalls	0
Feb 20-22	TDEC	<b>Y-12 Complex, B&amp;W Y-12</b>	
Feb 27	City of Oak Ridge	Annual Clean Air Compliance Inspection and NO <sub>x</sub> RATA Observation	0
May 9	TDEC	Pretreatment Inspection	0
Jul 25	TDEC	RCRA Inspection of OST Garage	0
Aug 28	City of Oak Ridge	RCRA Inspection of Union Valley Facility	0
Nov 5-7	TDEC	Pretreatment Inspection	0
		Annual RCRA Inspection	2

**Abbreviations**

- CNF Central Neutralization Facility
- EMS Environmental Management System
- EPA Environmental Protection Agency
- ETTP East Tennessee Technology Park
- NPDES National Pollutant Discharge Elimination System
- NSF-ISR NSF International Strategic Registrations, Ltd.
- ORNL Oak Ridge National Laboratory
- OST Office of Secure Transportation
- RAC Radiological Assessment Corporation
- RATA Relative Accuracy Test Audit
- RCRA Resource Conservation and Recovery Act
- TDEC Tennessee Department of Environment and Conservation
- TSCAI Toxic Substances Control Act Incinerator



# Environmental Management

DOE's Environmental Management Program in Oak Ridge is responsible for completing the cleanup of the ORR safely with reduced risks to the public, workers, and environment. Portions of land and facilities on the reservation are contaminated with radioactive elements, mercury, asbestos, PCBs, and industrial wastes from past activities, which now must be cleaned up. Environmental Management is the largest DOE program in Oak Ridge and includes an aggressive effort to complete a large portion of the cleanup by 2011, including the ETPP site. There has been a lot of progress, but there is still much to do.

The Oak Ridge Environmental Management Closure Project includes three major subprojects: Melton Valley Closure, East Tennessee Technology Park Closure, and Balance of Reservation. Each of these subprojects is driven by specific records of decision, the Federal Facility Compliance Act, and the site treatment plan for the ORR. The overall Oak Ridge Environmental Management Program is managed by BJC, along with a variety of other contractors and subcontractors for specific projects.

The fiscal year 2007 edition of *Cleanup Progress: Annual Report to the Oak Ridge Community* (DOE/ORO-2254) is available to the public at the DOE Information Center, 475 Oak Ridge Turnpike, Oak Ridge (865-241-4780 or 1-800-382-6938, option 6). This document discusses ongoing cleanup activities on the ORR. The status of projects at ETPP, the Melton Valley area of ORNL, and other reservation sites is included. The report also addresses waste management initiatives and public involvement activities for fiscal year 2007.

## Public Involvement

Many remediation projects on the ORR have moved from the decision-making phase to actual fieldwork. However, DOE continues to seek public input in many areas affecting ORR cleanup. In 2007 public input was sought on a number of initiatives, including the following:

- ▶ update of the public involvement plan for CERCLA activities on the DOE ORR (DOE/OR/01-2163&D2),
- ▶ engineering evaluation/cost analysis for the demolition and disposal of the Central Pollution Control Facility at the Y-12 National Security Complex,
- ▶ evaluation of the possibility of conducting an oral history initiative,
- ▶ release of the updated remediation effectiveness report (DOE/OR/01-2289&D3) and discussion of the report at the May 2007 Oak Ridge Site-Specific Advisory Board (ORSSAB) meeting,
- ▶ environmental assessment to evaluate the potential environmental impacts of processing uranium-233,
- ▶ the Building 3019 Complex shutdown at ORNL,
- ▶ permit renewal for transuranic storage areas and the Transuranic Waste Processing Center,
- ▶ covenant deferral requests for ETPP property,
- ▶ modifications of waste permits for ORR facilities, and
- ▶ recommendation to establish a mechanism for the independent review of DOE's remedial actions and reindustrialization activities.



artist: Haley Blank



artist: Kristin Caulpetzer



artist: Stacey Snyder



artist: Matilda Appelo



## Public Involvement (continued)

Public involvement initiatives also included the monthly distribution of *Public Involvement News*, distribution of the fiscal year 2007 version of the cleanup progress report, and updates of project fact sheets that are made available at the DOE Information Center. Other venues through which members of the public can participate in decision-making or obtain information include the following resources:



artist: Catherine Hawley



artist: Brina Laster



artist: Amira Sakalla

- ▶ The DOE Information Center is the central location for public information about all DOE programs in Oak Ridge. The Information Center is located at 475 Oak Ridge Turnpike in Oak Ridge and can be reached by phone at 865-241-4780 or 1-800-382-6938, option 6. The website is available at [http://www.oakridge.doe.gov/info\\_cntr](http://www.oakridge.doe.gov/info_cntr).
- ▶ ORSSAB is an independent, federally appointed citizens' panel that provides advice and recommendations to DOE on the Environmental Management Program in Oak Ridge. All meetings are open to the public. Information is also available at <http://www.oakridge.doe.gov/em/ssab/> or by calling 865-241-4583. ORSSAB also has a video lending library.
- ▶ The ORR Local Oversight Committee (LOC) represents counties and communities affected most directly by DOE activities in Oak Ridge and is funded by a grant from TDEC's DOE Oversight Division. LOC board members are concerned with human health and the environment and with the economic and social well-being of the community. The LOC publishes the annual TDEC DOE Oversight Division's status report to the public, which presents an independent view of the safety and quality of the Oak Ridge environment. The LOC has established a citizen's advisory panel to enable interested citizens to study the issues in depth and make recommendations to the LOC. The LOC may be contacted at <http://www.local-oversight.org> or at 865-483-1333.
- ▶ TDEC's DOE Oversight Office provides independent state oversight of DOE's Oak Ridge activities. Information is available at <http://www.state.tn.us/environment/doeo>.
- ▶ DOE's Oak Ridge public affairs office covers programs in science, environmental management, and nuclear fuel supply at ORNL, ETRF, and ORISE. This office may be reached at 865-576-0885.
- ▶ The Y-12 National Security Complex public affairs office may be contacted for information on national security programs at 865-576-9918. Information is available at <http://www.yso.doe.gov>.
- ▶ A monthly calendar of meetings and announcements is highlighted on the web at <http://www.oakridge.doe.gov> under the Public Activities section.

## Other Information Resources

- ▶ Department of Energy–Oak Ridge Office: <http://www.oakridge.doe.gov>
- ▶ Department of Energy–Oak Ridge Office Public Information Line: 1-800-382-6938
- ▶ Department of Energy: <http://www.energy.gov>
- ▶ Department of Energy Environmental Management Program: <http://www.oakridge.doe.gov> (Click on Programs then select Environmental Management.)
- ▶ Oak Ridge Accelerated Cleanup: <http://www.bechteljacobs.com/projects.shtml>
- ▶ Oak Ridge National Laboratory: <http://www.ornl.gov/>
- ▶ B&W Technical Services Y-12 L.L.C.: <http://www.y12.doe.gov/>





*This is a graphic representation.*

## Disclaimer

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