



**Tennessee Oversight Agreement
Status Report to the Public
Fiscal Year 2013**

**Tennessee Department of
Environment and Conservation**
Division of Remediation

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Cover photo (TDEC), East Fork Poplar Creek at Oak Ridge Turnpike. Warning Sign, "Avoid swimming, wading, or fishing in these waters".

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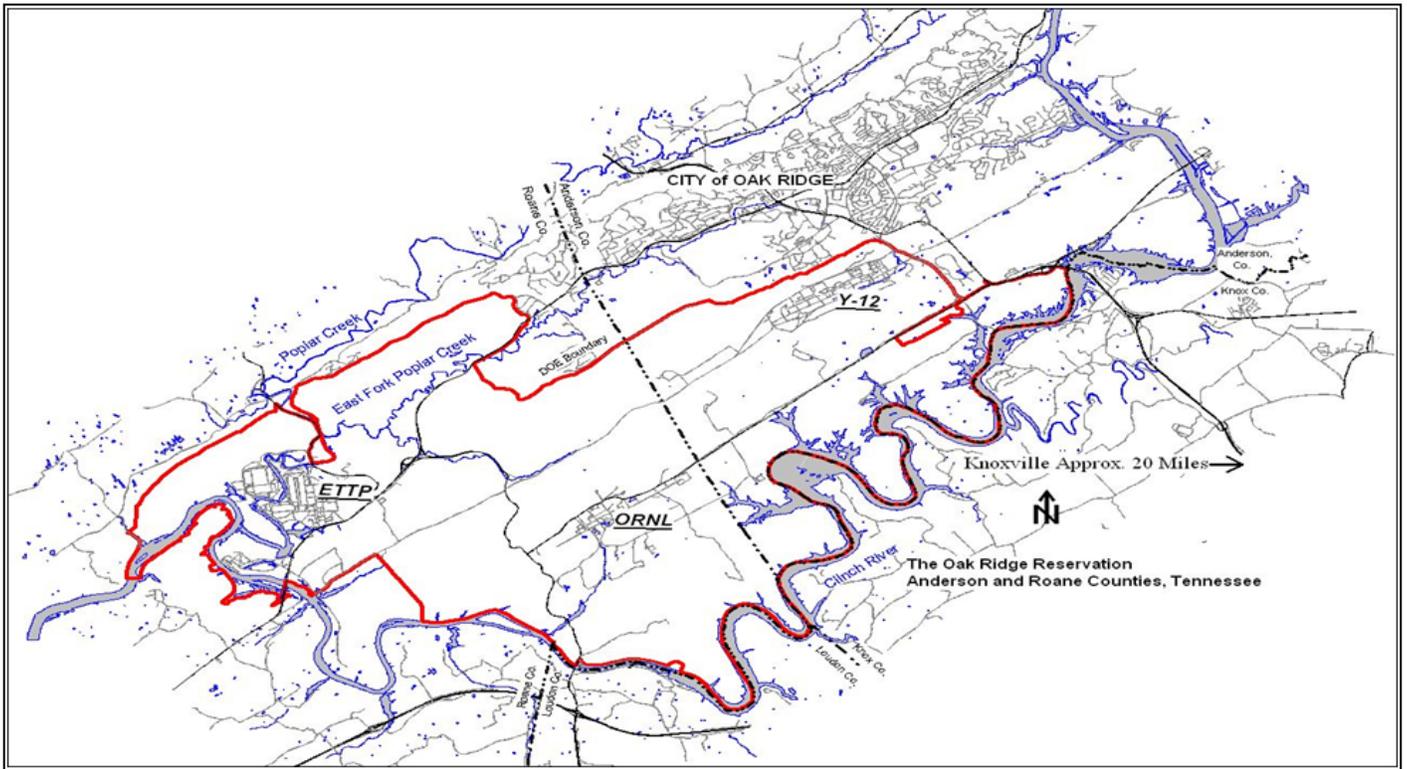
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Acronyms

BMAP	Biological Monitoring and Abatement Program
BORCE	Black Oak Ridge Conservation Easement
CAP	Citizens' Advisory Panel
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CRM	Clinch River Mile
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
EM	Environmental Management
EMWMF	Environmental Management Waste Management Facility
EPA	U.S. Environmental Protection Agency
ETTP	East Tennessee Technology Park
FDA	U.S. Food and Drug Administration
FFA	Federal Facilities Agreement
FY	fiscal year
m ³	cubic meters
mrem	millirem
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NRDA	Natural Resource Damage Act
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
ORRCA	Oak Ridge Reservation Communities Alliance
PCB	polychlorinated biphenyl
pCi/g	picocuries per gram
pCi/L	picocuries per liter
pCi/m ³	picocuries per cubic meter
ppm	parts per million
PRG	Preliminary Remediation Goal
RCRA	Resource Conservation and Recovery Act
RMO	Radiation Monitoring Oversight
RSL	Regional Screening Level
TDEC	Tennessee Department of Environment and Conservation
TEMA	Tennessee Emergency Management Agency
TOA	Tennessee Oversight Agreement
TRU	Transuranic
TSCA	Toxic Substances Control Act of 1976
TVA	Tennessee Valley Authority
TWPC	TRU Waste Processing Center
TWRA	Tennessee Wildlife Resources Agency
VOA	Volatile Organic Aromatic
WIPP	Waste Isolation Pilot Plant

Summary and Purpose



Major features of the Oak Ridge Reservation area (TDEC map)

The United States Department of Energy (DOE) Oak Ridge Reservation (ORR)

The ORR is located almost entirely within the corporate boundaries of the City of Oak Ridge, Tennessee, and straddles the line between Anderson and Roane counties. To the north and east lie residential areas of the City of Oak Ridge and the Clinch River bounds the ORR on the south and west. Counties adjacent to the Reservation include Knox and Loudon. Meigs and Rhea counties are downstream of Roane County on the Tennessee River. The nearest cities are Oak Ridge, Oliver Springs, Kingston, Lenoir City, Harriman, Farragut, and Clinton. Knoxville is the nearest major metropolitan area and lies approximately 20 miles to the east.

The state of Tennessee, through the Tennessee Department of Environment and Conservation's (TDEC) Division of Remediation, DOE Oversight Office, monitors the area to ensure that there is no threat to public health and the environment from DOE's activities on the ORR. In addition, office staff oversee DOE's cleanup of contamination resulting from decades of nuclear weapons production and other site missions.

Overall Conclusions

The year 2012-13 monitoring results showed no unacceptable risk to the public. DOE has made efforts to improve the overall health of the public and the environment. There are still significant sources of contaminants that could be released as a result of engineering and/or administrative control failure. Additionally, sources of gamma radiation exposure that still exist must be effectively isolated from the public. The probability of offsite groundwater contamination is also a concern that is being addressed. Mercury in water exceeds standards for protection of aquatic life in East Fork Poplar Creek and originates from the stream and floodplain and not just sources in Y-12. Monitoring indicates potential issues with EMWMF that has inferences to new disposal development. It is necessary and prudent for the state and DOE to continue monitoring efforts in order to detect and evaluate, as early as possible, potential releases and radiation that could affect the public. The state considers these factors in helping to manage cleanup with DOE and the U.S. Environmental Protection Agency (EPA).

Regulatory Programs

Tennessee Oversight Agreement (TOA)

In 1991 the State of Tennessee and DOE signed the TOA, and TDEC created the office to carry out its responsibilities under the agreement. The TOA provides a framework and funding for the state to oversee DOE's impact on the community in four ways: (1) a regulatory program to support state participation in the Federal Facility Agreement (FFA); (2) a non-regulatory program of independent environmental monitoring and oversight; (3) an emergency response program; and (4) an outreach program to increase public awareness and involvement. Figure 1 shows the organizational structure of the Department of Energy Oversight Office.

Federal Facility Agreement (FFA)

The state, DOE, and the EPA ratified the FFA in 1992. It provides a legal framework allowing this office to enforce DOE cleanup of contamination from past ORR activities. The FFA outlines procedures for investigation of problems, scheduling of activities and implementation and monitoring of appropriate responses. Actions taken under the FFA conform to Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), the Resource Conservation and Recovery Act of 1976 (RCRA), and other federal and state laws.

The National Environmental Policy Act of 1969 (NEPA) applies to proposed federal actions that could significantly affect the human environment, requiring federal agencies to consider environmental impacts and provide for public review and comment. DOE is required to incorporate NEPA values into CERCLA actions on the ORR.

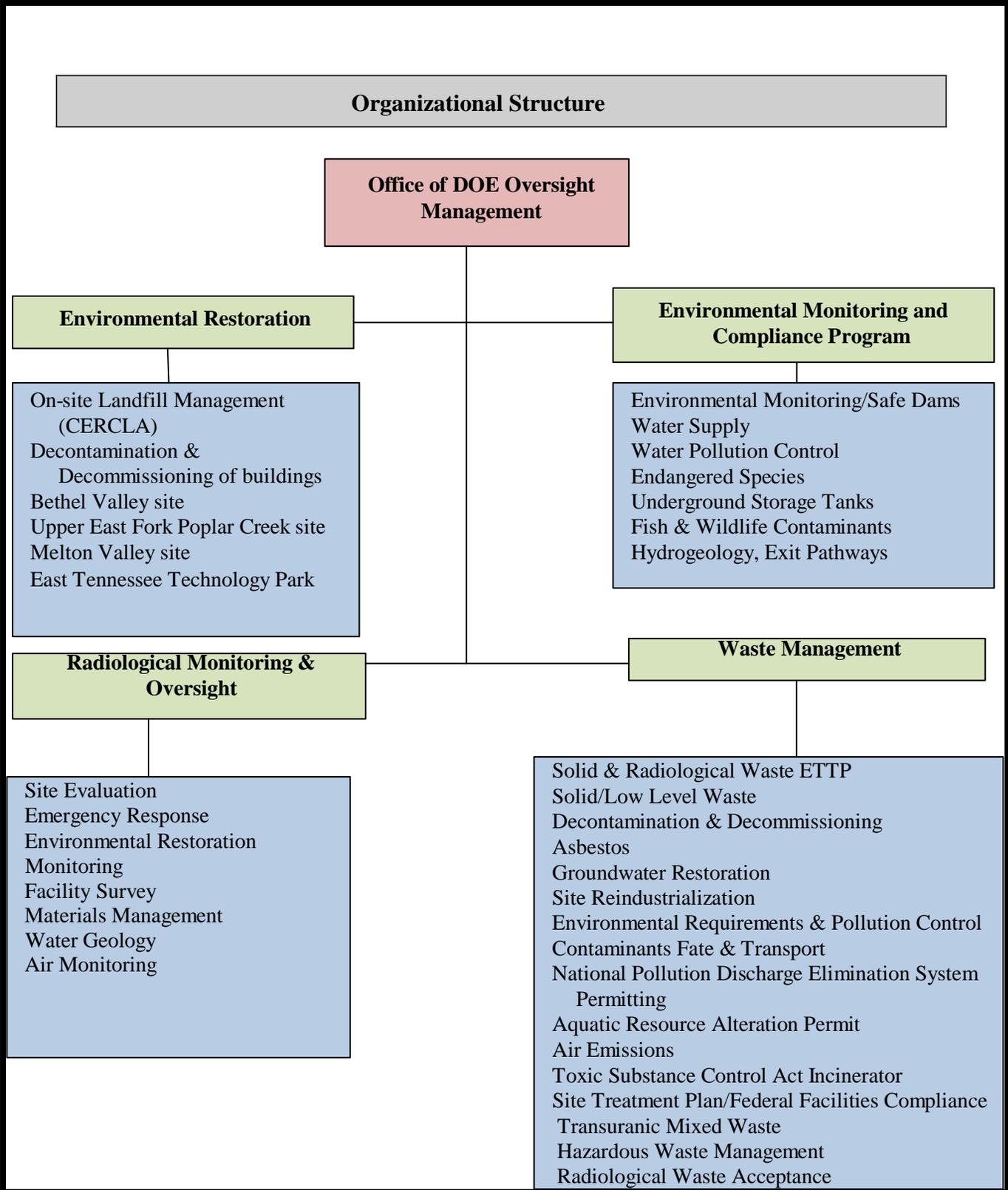


Figure 1: Organizational Structure of the DOE-O Office

Key Products and Services

The Tennessee Oversight Agreement provides for comprehensive and integrated monitoring and surveillance for all media (i.e., air, surface water, soil, sediments, groundwater, drinking water, food crops, fish and wildlife and biological systems) and better public understanding of issues involving the Oak Ridge Reservation. The emissions of any pollutants (hazardous, toxic, chemical, radiological) from DOE operations on the Oak Ridge Reservation and surrounding environment are monitored and evaluated. This agreement allows the state to oversee radiological materials that are otherwise exempted from external regulation by the Atomic Energy Act.

DOE-O ensures that clean-up activities scheduled at DOE-ORR are implemented as scheduled. Enforcement is used as needed including assessment of stipulated penalties. The state participates in, and initiates when necessary, resolution of disputes as provided in the FFA and works with the parties involved to resolve disputes as expediently and efficiently as possible. The office also serves as the state natural resource trustee representative for the DOE-Oak Ridge National Priority List site, investigating natural resource injuries and determining monetary damages in accordance with the Natural Resource Damage Assessment Act.

The Federal Facilities Compliance Act (FFCA) Site Treatment Plan mandates that the department promptly review each deliverable submitted by USDOE for the characterization and treatment of legacy mixed waste. Reviews result in approval, conditional approval, or disapproval of waste characterization packages and treatment schedules. Disapproval comments are provided to DOE for correction of deficiencies

Workload Management

DOE-O regularly reviews program workload, including progress in completion of annual work plan activities. Staff resources are distributed based on overall office workload. DOE-O management meets routinely to discuss workloads and staffing patterns. Staffing resources are utilized across program boundaries when necessary to achieve a goal or complete a work project.

Internal Controls

DOE-O develops an annual budget based on its work plan each year. The budget for the work plan is determined with funding levels provided by DOE in TOA grants. The work plan includes the costs for personnel along with administrative costs such as equipment, rent, utilities, communications, travel, etc. Staff are required to complete *Time and Activity Reports* daily. At the end of each pay period (twice monthly), time is entered into the state's computer system (Edison). DOE-O uses this information and reviews of monthly expenditure reports from the Division of Fiscal Services to make informed decisions about expending revenue. This includes decisions about hiring, travel and training. The goal each year is to insure that DOE-O expenses do not exceed revenue.

Challenges & Issues

1. Consistent annual funding required for the continuous and effective cleanup of the DOE Oak Ridge Reservation
 - a. DOE's inability to provide necessary funding for continuous and effective environmental restoration at DOE-ORR has required TDEC and EPA to accept an extended cleanup schedule. Continuous physical onsite remedial action is required by CERCLA; and
 - b. DOE-O needs assistance from local, state and federal representatives to ensure that DOE conducts an effective cleanup of the Oak Ridge Reservation.
 - c. DOE-ORR and DOE-Headquarters must request the funds necessary to perform the environmental investigations and cleanup activities on the Oak Ridge Reservation from Congress as stipulated in the FFA
2. Mercury in Lower East Fork Poplar Creek water and fish is likely from the stream itself and not just from sources up in the Y-12 plant. A more comprehensive solution is necessary than just mercury treatment in Y-12.
3. Troublesome hydrogeology at EMWMF creates questions for a proposed new disposal facility.
4. Deep groundwater may turn out to be a significant off-site exposure pathway. Development of near and long term strategies is necessary.
5. Maintaining emergency response capabilities to react to onsite and offsite releases when emergencies occur on the Oak Ridge Reservation. DOE-O assists TEMA by participating in emergency response exercises and responses to site emergencies to prevent/minimize radiological, chemical or physical hazards from these releases.

Annual Budget & Program Staffing FY 13

1. DOE Oversight Annual Funding

Funding Source	Funding Amount (\$)
State General Funds	0
DOE M&O Grant	1,920,400
DOE FFA Grant	2,880,900
Environmental Protection Fees	0
STP Review, Cost Recovery*	43,000
Total Budget	4,844,300

*Billed to SWM and reimbursed by DOE, typically

2. Program Staffing

Program Area	Positions (filled)
Administration	7 (5)
Environmental Monitoring	8 (8)
Environmental Restoration	6 (6)
Radiological Monitoring*	13 (12)
Waste Management	10 (9)
Total*	44 (40)

*Includes one NRDA Staff Person (EPM2) that works for the office of general council

Tennessee Oversight Agreement Activities

1. State Monitoring on the Oak Ridge Reservation (ORR) and Environs Biological Sampling

Stations/oversight	Number	Met Criteria
Benthic Macroinvertebrates ^a	19	9
Periphyton (Diatoms) ^a	5	2
Aquatic Vegetation ^b	14	7
Geese Roundups, Rad ^c	1	1
T&E Surveys ^a	6	6
Deer GPS Tracking ^{a, e}	17	15
Deer Hunts ^d	2	1
Turkey Hunts ^d	2	2
Total	66	43

a - Met ecological protection (non-impaired) criteria

b - >2X background as compared to a reference station.

c - One or more captured geese failed the administrative release limit of 5 pCi/g.

d - One or more harvested animals failed the administrative release criteria of 20 pCi/g bone tissue and/or 5 pCi/g for the whole body count.

e- Successful deployment/recovery of GPS collar and evaluation of tracking and samples. Two deer had elevated contaminants in hair.

The biotic integrity of impacted streams on the Oak Ridge Reservation is less than optimal compared to reference conditions. Of all sites sampled during 2012, two headwater locations, BCK 12.3 and EFK 25.1, received the lowest Tennessee Macroinvertebrate Index scores and ratings, partially supporting/moderately impaired (C rating). This is not surprising in light of the fact that each headwater stream continues to receive impacts (i.e., metals, nutrients) from within the confines of the Y-12 Plant. The remaining ORR stream sites had biological condition ratings of partially supporting systems with slight to moderate impairment. Surface water sampling results indicate that mercury continues to be persistent in East Fork Poplar Creek; elevated nutrient concentrations, uranium and strontium, and high conductivity continue to persist in upper Bear Creek, and elevated gross alpha, gross beta, plus mercury and nutrients persist in White Oak Creek.

Future benthic monitoring will test for the potential confounding perturbations associated with tributary outfall into Bear Creek associated with the EMWFM waste cell operations. Ongoing CERCLA remedial activities on the ORR continue to have an impact on the aquatic biological communities in East Fork Poplar Creek, Mitchell Branch, the White Oak Creek watershed and Bear Creek. Future benthic monitoring should capture temporal and spatial changes by documenting changes in the macroinvertebrate communities on the ORR.

A searchable database (Microsoft® Access 2010) of all 2010-2012 benthic taxa collected and identified from ORR streams is available upon request.

The Periphyton (Diatom and non-Diatom algae) program collected 25 samples in 2011 at five locations along Bear Creek and its northern tributaries 3, 4 and 5. The periphyton stream survey

is used to analyze and develop scores to generate a biological index value for comparison of impacted stream sites to a reference.

Diatom taxa responded to impacts in Bear Creek by exhibiting increasing relative abundance and distributions of pollution-tolerant diatoms in the upper BCK sites. In contrast, pollution-sensitive diatoms became more dominant and increased their relative abundance at the downstream sites which compared well with the reference stream data.



Gerry Middleton places a prepared substrate for monitoring periphyton, the algae that live on submerged rocks. (TDEC photo)

Aquatic vegetation is monitored from springs, wetlands, and streams on the Oak Ridge Reservation. The aquatic vegetation sampled (such as watercress and cattails) is then analyzed for radiological contaminants. While the likelihood of human consumption is remote, there is a definite potential for contaminated vegetation to be consumed by wildlife and for the contaminants to bioaccumulate in them, creating both ecological and potential human health risks. In 2012, seven of the 14 vegetation samples met sampling criteria for gross alpha and gross beta contamination. Two sites had levels of gross alpha and gross beta greater than twice the background levels. Five other sites had levels of gross beta greater than twice the background levels. Most of the sites sampled had known or suspected contamination.



Left, Natalie Pheasant collects vegetation for sample analysis, Collected sample, right. (TDEC photos)

Right, Shannon Young (TWRA) holds a goose while it is being surveyed for radioactive contamination, (TDEC Photo)



Above, Gerry Middleton observes geese enjoying a pond on DOE property. Remediation reduces the likelihood of wildlife contamination. (TDEC Photos)

During the Annual Goose Roundup, the Department of Energy (DOE), Oak Ridge National Laboratory (ORNL) Environmental Protection and Waste Services, ORNL Analytical Chemistry Division, ORNL summer interns, university staff and graduate students, and Tennessee Wildlife Resource Agency (TWRA) staff form field teams to capture geese on the ORR and perform whole body screenings on them to determine if the birds are radioactively contaminated.

During the June 2013 roundup, 44 geese were captured and none were retained that exceeded the game release limit (ORNL 1998).

All captured geese were transported and relocated to an offsite TWRA wildlife management area in Greene County, Tennessee. Since none of the birds analyzed showed signs of contamination, no additional offsite sampling was conducted by DOE-O staff.



Left, bat call recorder deployed on a tree. The recordings are analyzed with computer software to identify bats by their echolocation calls. Right, Gerry Middleton and Wes White deploy another at a pond on the DOE reservation. (TDEC photos)

In the Final Zone 1 RI/FS for ETP, page 9-24, section 9.2.2.4 Threatened and Endangered Species, “In the summer 2004, federally listed gray bats were recorded, using an Anabat acoustic bat identification system, foraging over the K-1007-P1 Holding Pond.” During 2013, TDEC analyzed acoustic recordings from ponds and other habitat in the ETP zone 1 area using two different computer codes. The duplicate analysis agreed on the identification of grey bats. Indiana bats were indicated, but the data results were not reported as confidently by the software.

Botanical fieldwork remains to be completed on all 3000 acres of the Black Oak Ridge Conservation Easement, particularly to map additional rare habitat and associated plant communities, and to document exotic pest-plant invasions. TDEC DOE-O staff will continue to report new rare plant findings to the Resource Management Division, Natural Areas Program and Natural Heritage Inventory Program) and to the TWRA, and to provide field support as needed.

For Deer GPS Tracking, the goal was to determine their home range and potential movements outside their home range. The scientific literature provides considerable evidence that wildlife (i.e., carnivores, herbivores, omnivores, piscivores), subsisting in habitats impacted by industrial pollution, are ingesting environmental contaminants from their respective food chains. Tracked deer sometimes traveled miles outside home ranges. Two deer exhibited elevated metals in hair samples.

Dale Rector and Gerry Middleton take vital signs on a whitetail deer (Kathy) as she recovers from immobilization chemicals. She now has a new automatic releasing GPS tracking collar that can be found by radio (TDEC photos).



The office monitored results from the fall deer hunts. Two weekend deer hunts were conducted in 2012, 256 deer were harvested. One deer was retained due to internal radiological contamination. One Oak Ridge deer hunt was canceled because of a security breach at Y-12. There are normally three weekend hunts each fall.

The office monitored results from the turkey hunts. TWRA conducted weekend turkey hunts in 2013, 49 turkeys were harvested and none were retained due to internal radiological contamination.



Wild Turkey on the DOE Oak Ridge Reservation, (TDEC photo)

Drinking Water Sampling

Stations	Number	Met Criteria
ORR Potable ^a	13	13
RadNet, utility drinking water	5	5
Residential Well GW ^b	1	1
Total	19	19

a - Rules for Public Water Systems - TDEC 1200-05-01

b - Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology. Maximum Contaminant Level Goals (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety. National Primary Drinking Water Regulations (NPDWRs or primary standards) are legally enforceable standards that apply to public water systems. National Secondary Drinking Water Regulations (NSDWRs or secondary standards) are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. Health Advisory: A Health Advisory is given by government or health authorities to the public to communicate the potential hazards of a contaminant and describes non-regulatory concentrations at which no adverse health effects would be anticipated. (2011 Edition of the Drinking Water Standards and Health Advisories – EPA 820-R-11-002)

In the Oak Ridge area, EPA’s RadNet Drinking Water program provides radiochemical analysis of finished drinking water collected quarterly from five local water systems by office air and water staff. These are sampled to determine if contamination for the Oak Ridge Reservation is in the water supplied by public water utilities. Results for the five local water treatment facilities in the program have all been well below applicable drinking water standards for the multiple radionuclides analyzed in this project.

The ORR Potable Water program conducts monthly and non-routine inspections of the potable water distribution system. Thirteen samples were collected and all samples were compliant with TDEC Rules for Division of Water Supply, Public Water Systems (1200-05-01). One residential water well was sampled and it met drinking water standards.



Natalie Pheasant collects a RadNet potable water sample from a local utility, (TDEC photo)

Surface Water

Stations	Number	Met Criteria^a
Ambient Surface Water Sampled	11	10
Physical Field Parameters	7	5
Benthic Macroinvertebrates, chemicals	19	14
Rain Event	0	NA
EMWMF	11	10
Sediment Grab ^{b(c)}	11	11 (6)
Sediment Trap ^{b(c)}	1	1 (0)
Total	60	51

a - Tennessee Water Quality Criteria (TWQC) - TDEC 1200-04-03.
 b - DOE Recreation Preliminary Remediation Goals (PRG)
 c - Probable Effects concentration for toxicity to aquatic invertebrates

The 2012 Ambient Surface Water final results indicate that very low concentration levels of *arsenic*, *mercury*, and *strontium-90* were present in the Clinch River tributaries. These low level COC values compare very well to historical data. None of the non-radiological COC results were greater than the TWQC, except for the Fall Event *Poplar Creek Mile 1.0 mercury* result which was equal to the TWQC mercury limit of ($<0.051 \mu\text{g/L}$). None of the radiological COC results were greater than DOE PRGs. There are no TWQC for radiological compounds.

For the surface water Physical Parameters, other than the low pH and dissolved oxygen values observed in Bear Creek and Mitchell Branch, the remaining data was in control relative to Tennessee water quality criteria for the parameters observed at the seven monitoring stations on the ORR. The low dissolved oxygen values in both Bear Creek and Mitchell Branch remain a concern. In addition, the elevated conductivity values observed in Bear Creek are also of concern. As legacy DOE ORR pollution has negatively impacted East Fork Poplar Creek, Bear Creek, and Mitchell Branch, continued physical parameter monitoring is justified and needed at the seven monitoring creek stations.

Along UEFPC, continuous monitoring of the physical parameters revealed the effects that augmentation water have on the stream. The office continues to monitor the stream to determine if fish kills or other discharges at Y-12 can be identified with continuous monitoring.

The Benthic Macroinvertebrate Surface Water Monitoring program is performed in conjunction with the benthic macroinvertebrate survey. Water samples are collected and analyzed to determine the stressors for the macroinvertebrates. The water samples are compared to the TWQC. Mercury levels exceeded the TWQC in all five East Fork Poplar Creek sample locations.

The Rain Event Surface Water Monitoring program was not conducted in 2012-2013.

The Environmental Management Waste Management Facility (EMWMF) was constructed to dispose of waste generated by remedial activities on the ORR and thus can contain a variety of hazardous substances, including various radionuclides. In accordance with the Tennessee Oversight Agreement, which requires the state to provide monitoring as needed to verify DOE data and assess the effectiveness of DOE contaminant control systems on the ORR, the effluents of the site are sampled when deemed necessary. In addition, staff visits the site at least twice weekly to monitor basic water quality parameters and operations. pH was observed above criteria at the sediment basin outfall.

The Sediment Monitoring program collected 11 sediment grab samples located on the Clinch River and some of its tributaries that are considered potential exit pathways. The sediment samples were compared to DOE Preliminary Remediation Goals (PRGs). No compounds exceeded DOE PRGs. Five stations did not meet Probable Effects Concentrations for toxicity to invertebrates.

The Trapped Sediment Monitoring program captures sediments that are actively being transported in the river. One sediment trap was recovered. The sample was analyzed for metals and radiological compounds and compared to DOE PRGs. No compounds exceeded DOE PRGs. Probable Effects Concentrations for aquatic toxicity was exceeded for mercury at Poplar Creek Mile 2.2.



Robert Storms collects a water sample from the EMWMF V-weir/outfall. (TDEC photo)

Groundwater Sampling

Stations	Number	Met Criteria*
Springs	11	3
Monitoring Wells	2	1
Total	13	4

Groundwater Criteria is EPA (MCL) Maximum Contaminant Levels, National Secondary Drinking Water Standards, and EPA Health Advisory. (2011 Edition of the Drinking Water Standards and Health Advisories – EPA 820-R-11-002)

Eleven springs and two wells were sampled for DOE related contaminants. Three springs met criteria and one well. The impacted springs and well are in Bear Creek valley, which is a documented contaminated area.

Air Quality Sampling

Stations	Number	Met Criteria*
HAPs**	3	2
RadNet Air	5	5
Fugitive	5	5
ORR Perimeter	10	10
RadNet Precipitation	3	3
Total	26	25

*For hazardous air pollutants or radionuclides.

**If assume chromium is hexavalent only.

Three stations were sampled for hazardous chemicals and one had chromium above standards if it was hexavalent chromium. This is a conservative way to evaluate data. Most chromium in the environment is not hexavalent.

Particulate air samples are collected twice weekly at the five RadNet Air monitoring stations on the Oak Ridge Reservation and analyzed for radioactive contaminants at the EPA's National Air and Radiation Environmental Laboratory in Montgomery, Alabama. In 2012, all five sites sampled met the designated criteria.



RadNet sample media being collected for shipment to EPA labs. (TDEC photo)

The fugitive air monitoring program uses eight high-volume air samplers. Four samplers are mounted on trailers and three are on non-mobile mounts to monitor fugitive/diffuse sources of radioactive air emissions; the other is at Fort Loudoun Dam and serves as a background station. Since four samplers are mobile, the units can be placed near sites where contaminants might be released (e.g. due to building demolition or remedial activities) on short notice. The three non-mobile mounted samplers could be moved with slightly longer lead times. The data from the samplers is compared to the background station and standards provided in the Clean Air Act. All seven monitored locations were in compliance in 2012.

The RadNet Precipitation monitoring program analyzes monthly composite precipitation samples from three stations on the Oak Ridge Reservation. Analysis of the samples measures radiological contaminants that are washed out of the atmosphere and carried to the earth's surface by precipitation. There are no standards that apply directly to contaminants in precipitation, but the data can provide an indication of the presence of radioactive materials that may not be evident in particulate analysis. This project uses RadNet precipitation data throughout the United States for reference, as well as drinking water limits. All three sites met sampling criteria in 2012.

Radiological Monitoring

Stations/events	Number	Met Criteria*
Real Time Gamma	6	6
Haul Road Survey	52	52
Environmental Dosimeters	141	119**
Transportation	0	NA
Facility Surveys	3	2
Surplus Sales	7	7
Total	209	186

* Contamination not present and exposure pathways below criteria.

** Criteria is 100 mrem/year (allowable dose to members of the public). None of the areas that exceeded criteria were accessible to the public.

Gamma radiation is emitted by various radionuclides that have been produced, stored, and disposed of on the ORR. The office deploys continuously reading gamma exposure rate monitors at locations on the ORR where exposure rates are expected to fluctuate over relatively short periods of time. These monitors record gamma radiation levels at predetermined intervals over extended periods, providing an exposure rate profile that can be correlated with changing environmental and/or man-made conditions. Some sites are downloaded weekly while others are downloaded monthly, depending on the type of site being monitored. In 2012, the office monitored five sites plus background. All sites were in compliance.

The Haul Road was constructed for, and is dedicated to, trucks transporting CERCLA radioactive and hazardous waste from remedial activities on the ORR to the Environmental Management Waste Management Facility in Bear Creek Valley for disposal. To account for wastes that may fall or be blown from the trucks in transit, office personnel perform walk over inspections of the road and associated access roads weekly. Items noted are surveyed for radiological contamination, documented, and their description and location submitted to DOE for disposition. During 2012 a number items were noted that had potentially fallen from trucks transporting waste to the EMWMF, but none exhibited radioactivity in excess of free release limits and all were removed expeditiously after being reported to the Department of Energy.

In order to assess the risks posed by radioactive contaminants on the ORR, the office began monitoring ambient radiation levels on and in the vicinity of the reservation in 1995. The program provides conservative estimates of the potential dose to members of the public from exposure to external radiation attributable to DOE and baseline values for measuring the need and effectiveness of remedial activities. In this effort, environmental dosimeters were placed at 141 locations on and in the vicinity of the ORR in 2012, collected and processed quarterly, and the quarterly results compiled to derive the annual dose over the year for each location. The annual dose for each location was then compared to background values, previous results, and the state dose limit for members of the public of 100 mrem/year. It should be noted, the annual dose for the monitoring locations represents the total dose of radiation an individual would receive, if he remained at the location twenty-four hours a day for a year. Since this is unlikely on the reservation, the actual dose to any individual would be expected to be a fraction of the annual dose reported for the stations. Of the 141 sites monitored in 2012, twenty-two locations (twenty-

one at ORNL and one at Spallation Neutron Source) exceeded the 100 mrem/year standard used to evaluate the results.



Gary Riner uses a rope and pulley system to deploy a gamma radiation logger on the main stack at the Spallation Neutron Source. (TDEC Photo)



John Wojtowicz performing the quarterly dosimeter deployment at the Molten Salt Reactor Experiment (MSRE) at Oak Ridge National Laboratory. The MSRE can be seen in the background. (TDEC photo)

The primary objectives of the Facility Survey Program of DOE-O is to investigate and inform citizens and local governments of the physical condition and, the past and present-day potential for release of chemical and radiological contaminants from facilities to the environment on the Oak Ridge Reservation. This information is also incorporated into local emergency preparedness planning. Three facilities were surveyed and one was found to have a potential to release contamination to the environment.

DOE conducts online and onsite auctions of surplus materials to the public. These materials range from furniture to shop equipment to vehicles. Some materials, such as scrap metal, may be sold under annual sales contracts. Other materials are staged at various sites around the ORR awaiting public auction or sale. Staff from the office's Radiological Monitoring and Oversight (RMO) Program review radiological control procedures to ensure that DOE and its contractors follow guidelines for release of these materials to the public. Office staff members conduct random, onsite radiological surveys before these materials are dispositioned. These surveys are part of the office's larger radiological monitoring role on the ORR. Scrap metal sales at ORNL and Y-12 and procedures for release are also monitored under this program. No contamination above free release standards was found.

Only radioactive waste with concentrations below limits imposed by wastes acceptance criteria agreed upon by FFA parties are authorized for disposal in the EMWMF. To help ensure compliance with the WAC, the state has placed a Radiation Portal Monitor at the check-in station for trucks transporting waste into the facility. As the waste passes through the portal, radiation levels are measured and transmitted to a secure web site, monitored by the office's Radiological Monitoring and Oversight Program. When anomalous measurements are noted, EMWMF personnel are notified, the source and nature of the waste determined, and readily available information on the waste reviewed. If the preliminary review fails to account for the elevated results, the information is submitted to the office's waste audit team for further investigation and

disposition. Anomalous results from two waste lots were submitted to the Audit Team in 2012 for consideration. One of these (waste derived from the demolition of the 3026-C Radioisotope Development Laboratory) is currently being audited; the second (heat exchangers used in the Oak Ridge Research Reactor) remains under consideration.

2. Emergency Response

Events	Number	Met Criteria*
Exercises, Graded	1	1
General Emergencies	0	na
Site Area Emergency	0	na
Exercises, not graded	2	2
Total	3	3

Met core exercise objectives, or response to actual event.

3. National Environmental Policy Act Review (NEPA)

NEPA requires federal agencies to ensure that citizen participation and environmental impacts are properly factored into the agency's decision-making.

The division commented on the following NEPA document in 2012-13.

- *The National Environmental Policy Act (NEPA), Programmatic Environmental Assessment (PEA) for the Recycle of Scrap Metals Originating from Radiological Areas (DOE EA-1919).* This PEA evaluates site alternatives for the management of scrap metals originating from DOE order 458.1 (Metals with volumetric radioactive contamination are not included in the scope).

NEPA requires decisions to be made through a sustained process of inquiry, analysis, and learning. It ensures that federal agencies provide the public an opportunity to learn about and comment on significant proposals. When followed as required, it ensures adequate planning and prevents costly mistakes.

NEPA documents related to federal decisions affecting the ORR are available for the public to review at DOE's Information Center.

4. Low-Level Radioactive Waste

At ETTP, the Compliance Agreement between TDEC and DOE to address the management and disposition of hazardous and mixed wastes generated as a result of sorting, segregation, processing and characterization of wastes previously determined to be non-hazardous, which includes the category of "newly generated" low-level radioactive waste, is almost complete. The Phase II of the Compliance Agreement is being implemented as funding and capacities become available. As of the end of FY 2013, this inventory was 177 containers/items, which includes 40 PCB electrical transformers and 4 classified PCB containers.

As per DOE Order 435.1, low-level waste is not allowed to be in storage for longer than one year. If it is, then there has to be an approved plan in place that addresses the waste which may

be out of compliance with this order. The TDEC DOE Oversight office communicated this expectation to DOE-EM that consequently resulted in the following DOE action. Earlier in FY 2013, DOE's prime UCOR was directed by DOE-EM to prepare such a plan. In response, UCOR prepared Radioactive Waste Management Basis for the Oak Ridge Reservation in October 2012 that was consequently approved by DOE in November 2012.

As of the end of FY 2013, Y-12 did not have legacy LLW inventory. Of the last six containers which were once used in the barrier wall at Y-12 and were suspected of containing quantities of U-235 that would be considered economically viable for recovery, four have been shipped to NNSA for disposal as LLW. The remaining two containers have been opened and are slated to be sent to NNSA for disposal by September 30, 2013. No U-235 has been or is planned to be recovered from any of these six containers.

ORNL does not have legacy LLW inventory.

The "newly generated" category contains low-level waste generated since October 1, 2000. As of the end of FY 2013, DOE-EM's inventory of this category of waste stood at 66 m³. This represents a decrease of 25 m³ from the previous year.

Although NNSA has established a track record of routinely disposing of the newly generated LLW waste within the 365 day timeframe, due to waste characterization and certification concerns, there was a small inventory of 6 containers at the end of FY 2013.

As of the end of FY 2013, ORNL had generated 513 m³ of low-level waste since October 1, 2012, which is the beginning of DOE's new fiscal year. Of this amount, 287 m³ had been shipped for disposal. The remaining 226 m³ has been in compliant storage awaiting shipment for disposal.



The waste is almost all gone from this storage building at ETTP, (DOE photo)

5. Federal Facility Compliance Act, Site Treatment Plan (STP)

TRU WASTE PROCESSING

Throughput has increased, but equipment breakdowns and waste anomalies caused lower productivity than expected. Our oversight of the facility shows no serious concerns, even though a faster processing goal is expected by schedule.

The facility must be expanded with a build-out to be able to treat legacy sludges. This build-out is now a line item appropriation that is subject to external financial and engineering oversight. There is no current certification of TRU wastes for offsite disposal at the Waste Isolation Pilot Plant (WIPP). Processing results in Suspected TRU, Low Level and Mixed Low Level waste. The Low Level and Mixed Low Level wastes are then shipped offsite for disposal and credit is given towards the total volume reduction of the STP. The suspected TRU waste is then placed back into storage awaiting certification for shipment to WIPP.

TRU waste is not considered completely processed and off the STP until it is certified for disposal at WIPP, or treated, if necessary and shipped to disposal.

TSCA INCINERATOR

The TSCA incinerator closed operations. The RCRA permit is being closed out. It is expected that by association with chemicals, the RCRA close out will remove most radioactive contamination too. DOE Oversight will integrate the closed facility with the CERCLA ROD for ETTP after the RCRA closure is complete.

Oak Ridge Reservation Landfills

The office's Waste Management Program oversees DOE's solid waste disposal activities to ensure that DOE adheres to provisions of the Resource Conservation and Recovery Act (RCRA) and to the rules and regulations governing solid waste disposal in Tennessee. DOE disposes of ORR's solid wastes in landfills located at the Y-12 National Security Complex. All wastes going to these landfills must be non-radioactive and non-hazardous. DOE must use approved procedures when receiving, compacting, and covering waste.

The office performs a monthly audit of DOE's landfills on the ORR. It also reviews DOE practices to ensure that radioactive waste is not disposed in these landfills. Additionally, Special Waste Requests submitted to the State by DOE for the utilization of the landfills are randomly audited on a frequent basis.

During FY 2013 the landfills were found to be operating in full compliance with all regulations. For this reporting period the summary of the approximate waste deposition in the three ORR landfills and the remaining capacities is as follows:

<u>Landfill</u>	<u>Volume (cu yds.)</u>	<u>Remaining Capacity (in years)</u>
Industrial Landfill IV	64.6	127
Sanitary/Industrial Landfill V	21,634	36
Construction/Demolition Landfill VII	14,865	45

Modernization at Y-12 is a high priority. The following buildings were demolished during FY 2013 under the non-CERCLA D&D program at Y-12: 9404-2, 9404-3A, 9404-4, 9409-4, 9409-9, 9720-12, 9720-19, 9720-19A and 9720-19B.

During FY 2013, Office Building 3546 and Coal Yard Runoff Basin 2546 were demolished under the non-CERCLA D&D program of ORNL. The Basin was drained, refilled and planted. Additionally, preparation was made for future demolitions, including the 7000 area. Furthermore, the following properties were sold via Excess Property Sales during the timeframe:

2546 (Coal Yard Runoff Basin Monitoring Building)

7048 (Local Air Monitoring Station for 7025)

7086 (Flammable Gas Storage building)

7089 (Flammable Storage building)



The Y-12 chestnut ridge non-hazardous waste disposal facilities left, and nonhazardous demolition activities above. (DOE Photos)

6. Federal Facility Agreement (FFA) for the Oak Ridge Reservation (Negotiated Activities)

Y-12 NATIONAL SECURITY COMPLEX

- a. Upper East Fork Poplar Creek (UEFPC)
 - i. Completed soil characterization of the 81-10 area (EU-9)
 - ii. Completed relining of the storm drains in WEMA. This should dramatically reduce mercury inputs into East Fork Poplar Creek.
 - iii. Completed installation of mercury traps in the storm drain system. This should reduce mercury inputs into East Fork Poplar Creek.
- b. Bear Creek Valley – No activities have occurred here since the completion of Phase I of the Bear Creek Valley Interim Record of Decision.

OAK RIDGE NATIONAL LABORATORY (ORNL)

- a. Bethel Valley
 - i. D&D of the Building 3026 hot cells continues.
 - ii. The Core Hole 8 extraction system was activated.
 - iii. Completed legacy material disposition from building 3038.
- b. Melton Valley – Monitoring of offsite monitoring wells continued.

EAST TENNESSEE TECHNOLOGY PARK (ETTP)

- a. Zone 1 – Work continues toward developing a final ROD for this area.
- b. Zone 2 – No current activities have occurred in the past year.
- c. Remaining Facilities D&D efforts continue on the East Wing of the K-25 building

OFFSITE – Outside the DOR-ORR Boundary

- a. Lower Watts Bar Reservoir (LWBR) – NRDA activities were finalized on this operable unit. Long-term monitoring continues.
- b. Clinch River/Poplar Creek – Long-term monitoring continues.
- c. Lower East Fork Poplar Creek (LEFPC) floodplain – this action was completed in 2000.

NATURAL RESOURCE DAMAGES

- a. Lower Watts Bar Reservoir – The Trustee Council finalized all matters pertaining to the settlement of damages. An Administrative Order of Consent was signed by DOE and the state to finalize this agreement. Construction of fishing projects will close out this project.
- b. Oak Ridge Reservation – The Trustee Council is pursuing a final settlement for damages on the entire ORR.

Local Outreach

The office is supportive of efforts to inform the community about environmental issues associated with the ORR. It undertakes community outreach efforts at venues such as the Secret City Festival and National Night Out. The office also provides grant funding for the Oak Ridge Reservation Communities Alliance (ORRCA). An office representative attends ORRCA meetings. The office has an *ex officio* membership on DOE's Oak Ridge Site Specific Advisory Board (SSAB) and has a representative present at its monthly meetings. On request, the office provides speakers for schools and citizen groups.

The office not only discusses ORR environmental issues but also disseminates information and materials related to general pollution prevention, home radon monitoring, recycling and similar activities. The office is often the first contact by a concerned individual for just about any environmental question. Likewise other TDEC offices may receive questions regarding ORR issues that are then forwarded to the DOE Oversight Office.

The office works specifically with the following local and regional organizations on issues associated with the ORR:

- Watts Bar Interagency Working Group,
- Oak Ridge Reservation Communities Alliance, and
- Oak Ridge Site Specific Advisory Board.



Bobcats at the K901 pond at ETTP
(TDEC photo)

National Outreach and Cooperative Interstate Activities



The office participates in activities and meetings as a member or affiliate of the following organizations.

Interstate Technology and Regulatory Council The Interstate Technology and Regulatory Council was formed in 1995 as a multi-state coalition working to achieve regulatory acceptance of innovative environmental technologies. The state-led council became affiliated with the Environmental Council of States in 1999 and has been working closely with that organization to promote innovative technologies that would lead to more cost-effective and efficient site cleanups. ITRC offers free internet training and documents provided by the different teams. The office has a representative on the Natural Attenuation of Metals and Radionuclides Team. Another member in the office is the Point of Contact for the State of Tennessee and was instrumental in the document development and internet training of “Decontamination and Decommissioning of Radiologically Contaminated Facilities.” Access to the ITRC website is www.itrcweb.org. Another serves on the ITRC Advisory Board.

National Governors Association Federal Facilities Task Force The task force is composed of governor-appointed policy and technical representatives from states hosting major DOE facilities. NGA task force members work collaboratively with DOE officials on technical, economic, and political challenges, including budget and regulatory issues, waste treatment and disposal options, and equitable decisions on waste management.

National Conference of State Legislatures’ State and Tribal Government Working Group The State and Tribal Government Working Group is a forum in which all tribes affected by DOE sites can interact directly with the states and DOE. The working group helps ensure that DOE facilities are operated and cleaned up in compliance with all applicable federal and state laws and regulations, and tribal rights. These rights include those retained by treaty and conferred by statute and the trust responsibility. Remedies must also protect human health, safety, and the environment.

Intergovernmental Meeting with DOE The Energy Communities Alliance, Environmental Council of the States, National Association of Attorneys General, National Governors Association, and State and Tribal Government Working Group meet annually with DOE. The meeting provides an opportunity for senior DOE officials to talk with these groups collectively. It also allows the groups to coordinate on issues involving the operation and cleanup of the DOE complex.

The Association of State and Territorial Solid Waste Management Officials Radiation Task Force This organization tracks radiation-related issues that could affect states. The group emphasizes federal facility issues and has cooperative projects with the EPA, DOE, Department of Defense, Council of Radiation Program Directors, the Health Physics Society, and the American National Standards Institute. The office has members on the Radiation Focus Group and the Sediment Focus Group.

Contacts

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Roane County Environmental Review Board

Roane County Courthouse
200 E. Race Street
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Web site: www.roanegov.org/erb.html

STAKEHOLDER ORGANIZATIONS

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