Status Report to the Public
Fiscal Year 2016

Tennessee Department of
Environment and Conservation
Division of Remediation
Oak Ridge Office

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Acronyms

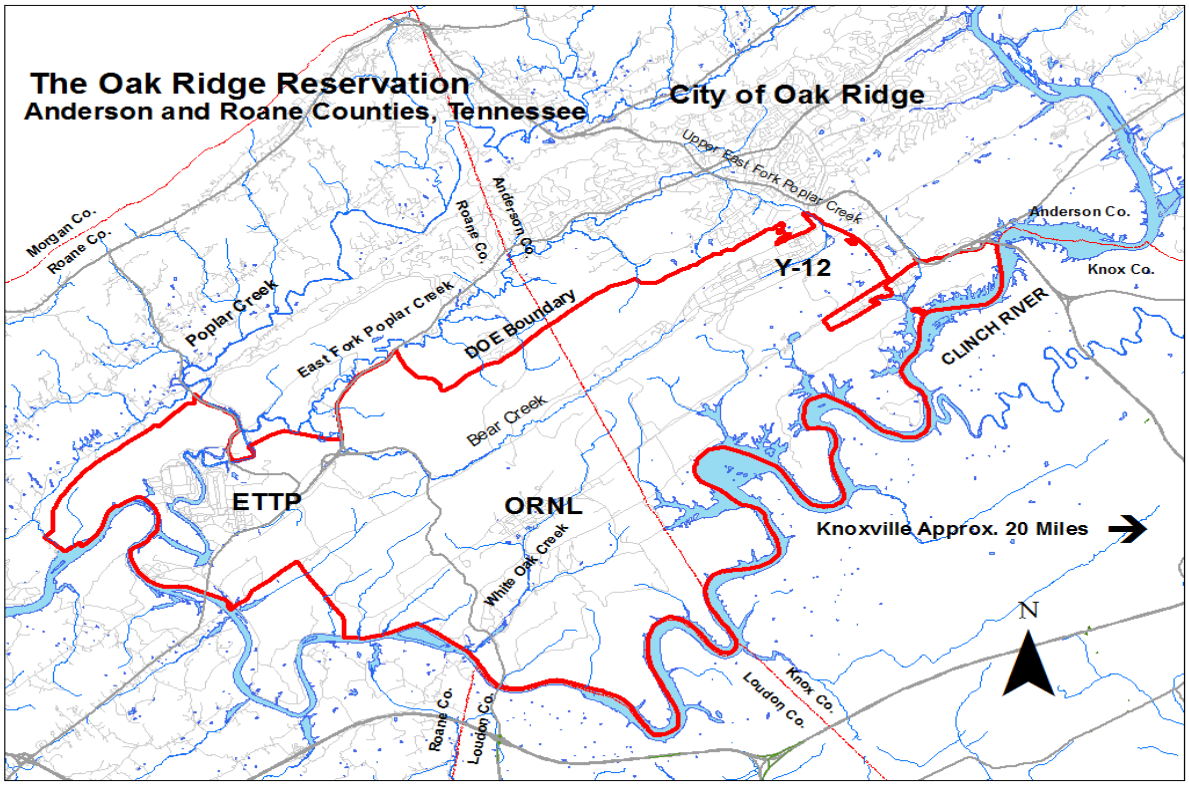
CBSQG	Consensus Based Sediment Quality Guidelines
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DCG	Derived Concentration Guides
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
EFPC	East Fork Poplar Creek
EMDF	Environmental Management Disposal Facility
EMWMF	Environmental Management Waste Management Facility
EPA	U.S. Environmental Protection Agency
ETTP	East Tennessee Technology Park
FFA	Federal Facility Agreement for the Oak Ridge Reservation
FFCA	Federal Facility Compliance Act
GW	groundwater
m^3	cubic meters
mg/L	milligrams per liter
mrem	millirem
MSRE	Molten Salt Reactor
NEPA	National Environmental Policy Act
NFS	Nuclear Fuel Services
NNSA	National Nuclear Security Administration
NPDES	National Pollutant Discharge Elimination System
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
PCB	polychlorinated biphenyl
pCi/g	picocuries per gram
PEC	Probable Effects Concentration
PRG	Preliminary Remediation Goal
RCRA	Resource Conservation and Recovery Act
RH	remote handled
RPM	radiation portal monitor
SNS	Spallation Neutron Source
STP	Site Treatment Plan
TDEC	Tennessee Department of Environment and Conservation
TOA	Tennessee Oversight Agreement
TRU	transuranic
TWPC	TRU Waste Processing Center
TWQC	Tennessee Water Quality Criteria
WAC	waste acceptance criteria
WIPP	Waste Isolation Pilot Plant
Y-12	Y-12 National Security Complex

Summary and Purpose

The United States Department of Energy Oak Ridge Reservation

The United States Department of Energy (DOE) Oak Ridge Reservation (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 ORR 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 Division of Remediation, Oak Ridge Office (TDEC), monitors the area to ensure there is no threat to public health and the environment from DOE's activities on the ORR. In addition, TDEC oversees DOE's cleanup of contamination resulting from decades of nuclear weapons production and other site missions.



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

Findings and Recommendations

DOE continues efforts to improve the overall health of the environment. There are, however, still legacy sources of contaminants that could be released as a result of engineering and/or administrative control failure. TDEC and DOE monitor continuously in an effort to assure that DOE's activities do not adversely impact the public health, safety and the environment.

Based on the results of monitoring and oversight conducted by TDEC for Fiscal Year 2016, the following findings and recommendations are made:

1. Consistent annual funding is needed for cleanup of the DOE ORR. DOE funding constraints for environmental cleanup have required TDEC and EPA to accept an extended cleanup schedule. TDEC advocates well-planned continuous physical onsite cleanup actions to meet CERCLA requirements and regulatory decisions.
2. Mercury in surface water in the East Fork Poplar Creek (EFPC) exceeds standards for protection of aquatic life. Mercury in EFPC surface water originates from historical releases that contaminated soils and groundwater at the Y-12 plant and deposited contaminants in stream sediments and floodplain soils. Although the mercury releases from the contaminated areas at Y-12 show a declining trend, they continue to contribute to the available mercury already in the EFPC ecosystem. To assist in this ecosystem recovery and to lower mercury concentrations in Lower East Fork Poplar Creek water and fish, a more comprehensive solution beyond mercury treatment at Y-12 is needed.
3. TDEC is currently working with DOE on the siting and design of additional waste disposal capacity for low-level radioactive and hazardous wastes generated from CERCLA cleanup activities on the ORR. This potential new DOE ORR landfill is referred to as the Environmental Management Disposal Facility (EMDF). To assist in the development of the waste acceptance criteria (WAC), the final Record of Decision on EMDF will be based on comprehensive site evaluation and modeling of the contaminants fate-and-transport. TDEC recommends increased efforts by DOE to minimize the need for the additional onsite waste disposal capacity by employing operational and disposal efficiencies at the current CERCLA Environmental Management Waste Management Facility (EMWMF). This includes reuse or recycle of waste, sorting segregation and waste volume reduction, sequencing projects that will allow for the use of the contaminated soils as the fill material, use of industrial landfills for suitable waste, and use of offsite disposal facilities.
4. TDEC, EPA and DOE have worked closely to develop a groundwater strategy for the ORR. Objectives include providing a framework for implementing early remedial actions and serving as a continuous long-term strategy for groundwater investigation and remediation implementation. The first mutually agreed upon investigation was directed toward the assessment of DOE ORR offsite groundwater contamination. While the results of the first phase of this Federal Facility Agreement for the Oak Ridge Reservation (FFA) project are being evaluated, TDEC continues with additional offsite residential sampling beyond the

original boundaries of the project, as well as supplementary sampling efforts for residences where DOE was not able to gain access. In addition, TDEC initiated an effort to obtain groundwater background data away from the ORR and upstream of the recognized groundwater flow gradient. Although TDEC commends DOE on residential groundwater sampling efforts, additional near term groundwater actions are recommended.

TDEC recommends that DOE initiate planning efforts and request funding for implementation of the “shovel ready” projects for remediation of groundwater, and for investigation of the horizontal and vertical extent of groundwater plumes on the ORR. This remediation work and planning effort should be performed concurrently with active investigation of groundwater residential wells in areas adjacent to the ORR.

Regulatory Framework

Tennessee Oversight Agreement

In 1991, TDEC and DOE signed the Tennessee Oversight Agreement (TOA), and TDEC created the Oak Ridge office to carry out its responsibilities under the agreement. The TOA provides a framework and funding for TDEC to oversee DOE's impact on the community in four ways: (1) a regulatory program to support state participation in the 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.

The TOA provides for comprehensive and integrated monitoring and surveillance of all media (i.e., air, surface water, soil, sediments, groundwater, drinking water, food crops, fish and wildlife, and biological systems). The emissions of pollutants (hazardous, toxic, chemical, radiological) from DOE operations on the ORR and surrounding environment are monitored and evaluated. This agreement allows TDEC to oversee radiological materials that are otherwise exempted from external regulation by the Atomic Energy Act.

Federal Facility Agreement for the Oak Ridge Reservation

TDEC, DOE, and the EPA ratified the FFA in 1992. It provides a legal framework allowing TDEC to enforce DOE cleanup of contamination from past ORR activities. The FFA outlines procedures for the investigation of problems, scheduling of activities, and implementation and monitoring of appropriate responses. Actions taken under the FFA conform to the 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.

TDEC ensures that clean-up activities scheduled on the ORR are implemented as planned. Enforcement is used as needed including assessment of stipulated penalties. TDEC participates in, and initiates, when needed, resolution of disputes as provided in the FFA and works with the parties involved to resolve disputes as expediently and efficiently as possible. TDEC 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.

National Environmental Policy Act

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.

Site Treatment Plan

Under the Federal Facilities Compliance Act (FFCA) of 1992, TDEC issued a Site Treatment Plan (STP)

for DOE that established milestones for treatment of mixed radioactive waste. At that time, there was no treatment technology or sufficient treatment capacity for mixed radioactive waste. Since the inception of the STP, DOE has reduced its inventory of legacy mixed waste on the ORR. Through the annual STP update process TDEC and DOE negotiate treatment schedules for the remaining inventory of the mixed waste, currently almost entirely limited to Transuranic (TRU) debris and Sludge.

Mercury Uptake in Biota

Morels are an edible mushroom species found on the ORR (TDEC photo)

Mercury Uptake in Biota

TDEC collects biota from ORR streams and terrestrial habitats to analyze for mercury (Hg) uptake. Study sites included upper and lower reaches of the EFPC and Poplar Creek. Sampling sites were selected based on known or suspected mercury-contaminated sites on the ORR.

The 2016 fiscal year monitoring included:

- TDEC collected 147 fungi samples from 16 EFPC and control sampling plots. Subsequent laboratory analyses revealed total mercury concentrations in collected fungi samples from the EFPC sites ranged from 0-79.0 mg/kg (dry weight); the control fungi samples ranged from 0-6.1 mg/kg (dry weight).
- Thirty-six fish gut samples were obtained from the Oak Ridge National Lab (ORNL) Environmental Sciences Division for gut content identification and mercury analyses. Laboratory analyses were not completed and will be provided in the next fiscal year report.

Aquatic Fauna Monitoring Programs

TDEC personnel preparing to sample at Bear Creek Station 3.3 (TDEC photo)

Independent Sampling by TDEC

The biotic integrity of streams originating on the ORR was determined by collecting semi-quantitative benthic macroinvertebrate samples from 14 study sites in four watersheds impacted by DOE operations. Those watersheds are East Fork Poplar Creek, Bear Creek, White Oak Creek, and Mitchell Branch. Samples were collected and processed following the TDEC standard operating procedures for macroinvertebrate surveys. Communities of benthic macroinvertebrates are collected and counted to determine the health of the stream relative to a background stream and applicable metrics. Benthic macroinvertebrates include insects, crustaceans, annelids, and mollusks that inhabit the bottom substrates of streams, and can be easily collected using aquatic sampling nets.

Generated data was analyzed using applicable metrics. An assessment score was calculated from the metrics and a site rating was assigned. Results indicate the biotic integrity in Bear Creek and Mitchell Branch has improved. Biotic integrity remains steady in Lower East Fork and Melton Branch (a tributary to White Oak Creek). Biotic integrity has deteriorated in lower White Oak Creek and Upper East Fork Poplar Creek. Continued benthic macroinvertebrate monitoring is warranted to provide a more thorough and accurate assessment of stream conditions.

Acoustic Monitoring of Bats

The Indiana bat is found on the ORR and is federally-listed as an endangered species
(Photo credit: Ann Froschauer / US Fish & Wildlife Service)

Acoustic Monitoring of Bats

In cooperation with the TDEC Division of Natural Heritage, Tennessee Wildlife Resources Agency, and the US Fish and Wildlife Service, TDEC conducts bat acoustic surveys and field investigations of bat habitat to determine occurrence and ultimately provide a census of bat species present on the ORR. The 2016 fiscal year monitoring included:

- completed acoustic surveys of the proposed airport site at the East Tennessee Technology Park (ETTP)
- conducted acoustic surveys of the proposed EMDF site at Y-12
- facilitated an infrared survey of a suspected bat cave on the ORR
- prepared comments for DOE environmental documents relating to ORR bats, especially federally-listed species

Monitoring Results

During the 2016 fiscal year, bat surveys were conducted at eight ORR and offsite areas. Approximately 226,000 files of acoustic data were recorded at 48 field stations and were ultimately processed with specialized, automated bat identification software (Kaleidoscope PRO) yielding 12,567 bat identifications. Fourteen species were identified during the subsequent software analysis. These bat surveys provide an inventory of bat species activity on the ORR given the population declines due to the white nose syndrome disease that now impacts at least seven cave bat species in 50 Tennessee counties including Anderson and Roane.

Threatened and Endangered Species Monitoring

Ginseng is found on the ORR and ranked by the TDEC Division of Natural Areas as having special concern-commercially exploited status. (Photo credit: DCR-DNH, Gary P. Fleming)

Threatened and Endangered Plants

In support of the TDEC Division of Natural Heritage, field surveys are conducted to evaluate threatened and endangered plant species on the ORR. This monitoring is conducted on an as-needed or requested basis. The 2016 fiscal year monitoring included:

- surveyed portions of the ORR for populations of Tennessee-listed rare plants such as Ginseng (*Panax quinquefolius*)
- conducted fern surveys (pteridophytes) on the ORR
- initiated a plant and animal species bio blitz survey in the McKinney Ridge area of the ORR
- prepared comments for DOE environmental documents relating to ORR threatened and endangered plant and animal species

Rare or suspected threatened and endangered species observed in the field were documented by collecting GPS coordinates and photographs. Data collected regarding threatened and endangered plant and animal species is essential for the protection and conservation of species present on the ORR. Field monitoring data collected were reported in the annual TDEC environmental monitoring report.

Vegetation Monitoring for Radiological Contamination

Vegetation sampling area along White Oak Creek in Melton Valley (TDEC photo)

Vegetation as an Indicator of Radiological Contamination

Monitoring vegetation near surface water can reveal potential impacts to the food chain from releases of radiological contaminants from the ORR. This program monitors vegetation in and near surface water, including springs, wetlands, streams, and floodplain areas. Locations at each of the three ORR sites (ORNL, ETTP, and Y-12) are sampled and background samples are collected for comparison. Streams such as White Oak Creek, East Fork Poplar Creek, and Bear Creek and its tributaries are routinely sampled for potential radiological contamination.

The EPA does not currently regulate radionuclide levels in vegetation. The Food and Drug Administration (FDA) has established guidelines called Derived Intervention Levels (DILs) to describe radionuclide concentrations at which the introduction to protective measures should be considered (FDA 1998, FDA 2005). A potentially more useful comparison is to the levels of alpha, beta, and gamma seen at a background location or other samples with low levels of radionuclides. Generally, this is done by determining that results more than twice background levels are considered elevated, at least at environmental levels.

Sampling Results

A total of twenty samples were collected including the background sample. Of these, three samples had gross alpha levels greater than twice background; two in Melton Valley at ORNL and one in Bear Creek Valley at a tributary of Bear Creek. Seven of the samples had gross beta levels greater than twice background levels; three collected along White Oak Creek, which runs from Bethel Valley into Melton Valley before entering the Clinch River, and four collected from Melton Valley. The three samples with detection of Cs-137 were from along White Oak Creek. These are areas that may warrant further analysis of other substrates. TDEC will continue to identify areas of concern on the ORR to evaluate the potential for bioaccumulation of radionuclides in historically contaminated areas.

Ambient Surface Water Monitoring

TDEC personnel collect surface water samples on the Clinch River (TDEC photo)

Ambient Surface Water Monitoring

TDEC conducted surface water sampling at various locations on Bear Creek, East Fork Poplar Creek, Mitchell Branch, Raccoon Creek, White Oak Creek, Poplar Creek, and the Clinch River. Samples were analyzed for metals and radiological constituents. Conductivity, pH, dissolved oxygen, and temperature were measured with YSI Professional Plus® Multiparameter water quality instruments.

Sampling Results

East Fork Poplar Creek total mercury values were above the Tennessee Water Quality Criteria (TWQC) for recreation (organisms only) at stream kilometers (km) 24.4 and 25.1. These two uppermost sampling locations both had verified total mercury concentrations of 0.19 µg/L (the TWQC is 0.051 µg/L). At km 23.4 and all sites downstream, mercury was not detected.
Raccoon Creek strontium-90 specific analysis showed activity of 10.1 pCi/L. Although Raccoon Creek does not have a drinking water classification, this value is above the EPA strontium-90 Maximum Contaminant Level (MCL) for drinking water of 8 pCi/L. Raccoon Creek is believed to be impacted by contaminated groundwater from Solid Waste Storage Area (SWSA) 3; the primary radiological contaminant is strontium-90 (Sr-90). At Bear Creek km 12.3, gross alpha, gross beta, conductivity, hardness, and total dissolved solids are elevated due to the groundwater impacts from the former S3 ponds site. These parameters decrease at the lower reaches of Bear Creek. All of the Clinch River data were below TWQC.

Surface Water Physical Parameters Monitoring

TDEC personnel collect water data at Bear Creek km 4.5 (TDEC photo)

Surface Water Physical Parameters Monitoring

On a monthly basis, TDEC collects surface water physical parameter data (dissolved oxygen, pH, temperature, and conductivity) at seven stream sites: East Fork Poplar Creek kilometer (EFK) 23.4, EFK 13.8, Bear Creek kilometer (BCK) 12.3, BCK 9.0, BCK 4.5, Mitchell Branch kilometer (MIK) 0.1, and Mill Branch kilometer (MBK) 1.6. MBK 1.6 is a reference site and provides data from a relatively unimpacted stream in the area. The program objectives are to create a baseline of water quality monitoring data, to determine possible water quality impairment issues, and to determine long-term water quality trends.

Monitoring Results

The data met all state water quality criteria for the parameters observed at the seven monitoring stations. High conductivity readings at BCK 12.3 indicate degraded water quality due to possible nutrient influx from the nearby capped S3 ponds and/or the Y-12 west end water treatment facility. Both of these facilities are located upstream and to the east of BCK 12.3.

Evaluating the Impact of Rain on Surface Water

TDEC personnel collect rain event samples at the P1 Pond Weir
(Photo courtesy of Mike Coffey, CDM Smith)

Evaluating the Impact of Rain on Surface Water

Heavy rains may lead to point and non-point source contaminant releases to ORR streams. These rain events are defined as one inch in a 24-hour period or two inches in a 72-hour period. The concern is that such large events could cause significantly more contamination movement than a smaller rain event. A surface water sampling program has been established to assess the degree of impact, if any, caused by these large rain events. Sites at four streams originating on the ORR, a background reference stream located off the reservation, and a varying number of drainage sites located around CERCLA Decontamination & Decommissioning (D&D) activities are being sampled quarterly if a qualifying rain event occurs. The streams sampled are East Fork Popular Creek, Bear Creek, White Oak Creek, and Mitchell Branch. The monitoring location for the background reference is located on Mill Branch.

Sampling Results

Comparison of results obtained from stream sampling during rain events to routine sampling events indicates that certain contaminants are being found at higher concentrations after rain events than during non-rain event sampling. Sampling at CERCLA D&D activity sites has shown a slower than expected decline in contaminants released during demolition activities. Continued sampling will assist in the determination of the effectiveness of actions taken to control the discharge of contaminants during heavy rains.

Groundwater Monitoring on the ORR and its Environs

TDEC personnel sample a residential well using a peristaltic pump (TDEC photos)

Groundwater Monitoring on the ORR and its Environs

TDEC sampled 10 springs and 11 residential wells during the 2016 fiscal year. The sampling effort assists TDEC's understanding of the water quality on and off the ORR along geologic strike to the northeast and southwest. The sampling allows TDEC to identify and potentially characterize unplanned releases from the ORR. TDEC uses the data to evaluate the effectiveness and adequacy of DOE's groundwater monitoring program.

Sampling Results

Each sample was analyzed for volatile organics, metals, inorganics, and radionuclides. Three springs exceeded criteria established by the EPA in the National Primary Drinking Water Regulations (NPDWR) for one or more of the following volatile organics: Cis-1,2-dichloroethene, trichloroethene, and vinyl chloride. Gross alpha and gross beta activities were measured but all were below the NPDWR. All of the springs that exceeded criteria are on the ORR.

No fission or activation products were reported to be present in the eleven offsite wells sampled by TDEC. Analysis from seven of eleven wells reported transuranic isotopes at concentrations above the minimum detectable activity and the error and below any NPDWR criteria. One well exceeded the NPDWR for lead (0.015 mg/L) at 0.068 mg/L.

Ambient Sediment Monitoring

TDEC personnel collect a sediment grab sample on the Clinch River (TDEC photo)

Ambient Sediment Monitoring

Contaminants from past DOE operations on the ORR have made their way into several streams that feed into Poplar Creek and the Clinch River. The major pathways of concern are East Fork Poplar Creek, Bear Creek, Mitchell Branch, and White Oak Creek. East Fork Poplar Creek is contaminated with mercury from past activities at Y-12. Mitchell Branch has elevated nickel, mercury, and gross beta sediment values. The major contaminants of concern from White Oak Creek are strontium-90 (Sr-90) and cesium-137 (Cs-137). In order to characterize and monitor the impact from these streams, TDEC sampled sediment in the Clinch River, Poplar Creek, East Fork Poplar Creek, Bear Creek, and Mitchell Branch. Sediment samples were analyzed for metals and radiological parameters.

Sampling Results

All of the sites sampled on East Fork Poplar Creek and Poplar Creek had mercury values above the consensus-based sediment quality guidelines (CBSQGs) probable effects concentration (PEC) of 1.06 mg/kg. At Mitchell Branch km 0.1, mercury and nickel exceeded their respective PECs. The radiological sediment data show that radiological parameters are well below DOE Preliminary Remediation Goal (PRGs). PRGs are upper concentration limits for specific chemicals in environmental media that are intended to protect human health.

Cs-137 was detected in the Clinch River samples at river miles 14.5, 10.0, 0.0, and in the Mitchell Branch sample. The recreational PRG for Cs-137 is 117 pCi/g (total soil/sediment TR 1.0E-06) while the highest Cs-137 value was 1.54 pCi/g at Clinch River Mile 14.5. Gross beta activity was highest at the Mitchell Branch location (248 pCi/g), while the next highest value was at Bear Creek (9.3 pCi/g). Gross alpha activity was highest at Mitchell Branch (11.0 pCi/g), more than twice the values of the other streams sampled.

Trapped Sediment Monitoring

Sediment trap at East Fork Poplar Creek km 23.4 (TDEC photo)

Trapped Sediment

The trapped sediment monitoring program captures suspended sediments that are actively being transported in streams that are exit pathways from the ORR. During the 2016 fiscal year, sediment traps were deployed at East Fork Poplar Creek, Bear Creek, and Northwest Tributary 5 (NT5). The samples were analyzed for metals and radiological compounds and compared to CBSQGs PEC for each metal and DOE PRGs for radiological constituents.

Sampling Results

All samples collected from East Fork Poplar Creek exceeded the CBSQGs PEC (1.06 mg/kg) for mercury. Concentrations of other metals were not at levels of concern. All gamma radionuclides detected are naturally-occurring (Pb-212, K-40, etc.). Isotopic uranium analysis suggests an increase in the percentage of U-235 above natural levels at the NT5 sampling location. NT5 is the main outfall for the Environmental Management Waste Management Facility (EMWMF); EMWMF has received waste resulting from ETTP decommissioning and demolition activities in recent years.

Fugitive Air Monitoring

TDEC personnel collecting and replacing air filters at ETTP (TDEC photo)

Monitoring ORR Sites for Airborne Radioactive Emissions

The fugitive air monitoring program uses eight high volume air samplers to monitor fugitive and diffuse sources of radioactive air emissions on the ORR. Four samplers are mounted on trailers, four are on fiberglass steps, and a background station is located at Fort Loudoun Dam. The seven mobile samplers are placed near sites where contaminants might be released, for example due to building demolition or remedial actions. The data from the mobile units are compared to the background station and standards provided in the Clean Air Act. During the 2016 fiscal year, TDEC monitored activities included the decommissioning and demolition of uranium enrichment facilities at ETTP, the central campus removal action at ORNL, footprint reduction activities at Y-12, and the disposal of radioactive waste at EMWMF in Bear Creek Valley.

Sampling Results

The fugitive air data have been largely consistent with background measurements with some minor variations in the gross alpha and gross beta measurements. Results from ORR perimeter air monitoring stations were similar to those reported for the background station. All the levels measured in the 2016 fiscal year were well below EPA Clean Air Act standards and are protective of human health and the environment.

Ambient Radiation Monitoring Using Environmental Dosimetry

TDEC personnel replace an environmental dosimeter at the Emory Valley pump station (TDEC photo)

Measurement of Ionizing Radiation in the Environment

Environmental dosimeters, commonly referred to as optically stimulated luminescence (OSL) dosimeters, are used to measure ionizing radiation exposures from all sources. These include background radiation to an individual [about 620 millirem (mrem) per year from cosmic radiation, natural radioactivity such as radon, radioactivity from fallout, and radioactivity from medical procedures] and additional radiation received from current and previous activities on the ORR (e.g., waste, reactors, radioisotope production, experiments). The dosimeters are used to determine the annual dose of radiation in millirem per year (mrem/year) that an individual would receive from external sources if he or she remained at the monitoring location twenty-four hours a day for one year. The reported doses should be viewed as conservative estimates of the maximum external dose an individual would receive for the period reported. The environmental dosimetry results are compared to the state and DOE maximum dose limit to members of the public, which is 100 mrem/year.

A total of 144 dosimeters are located throughout the ORR and its environs. The areas being monitored include offsite (background locations and the City of Oak Ridge), ETTP, ORNL, the Spallation Neutron Source (SNS), Y-12, and EMWMF.

Sampling Results

Overall, the radiation doses measured in the environmental dosimetry program in the 2016 fiscal year decreased or remained statistically the same as in the 2015 fiscal year. A total of 18 locations exceeded the 100 mrem screening level over the year: 17 at ORNL proper and one at SNS. The majority of these sites were associated with legacy facilities currently undergoing or scheduled for remediation.

Verification of Surplus Materials Release

TDEC personnel surveys a desk at the ORNL auction facility (TDEC photo)

Survey of Surplus Materials Released to the Public

DOE conducts auctions of surplus materials sold 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.

TDEC reviews radiological control procedures to ensure DOE follows guidelines for release of these materials to the public. TDEC conducts random, onsite radiological surveys before these materials are sold. These surveys are part of TDEC's larger radiological monitoring role on the ORR, ensuring that no potentially contaminated materials reach the public.

Survey Results

During the 2016 fiscal year, surveys of public auction items were conducted for one sale held by Y-12 Surplus Sales and for nine sales held by ORNL Surplus Sales. TDEC confirmed accuracy and validity of DOE evaluations prior to surplus materials sales.

EMWMF Portal Monitor

Truck hauling waste to EMWMF passes through the radiation portal monitor (TDEC photo)

EMWMF Portal Monitor

The EMWMF was constructed for the disposal of low-level radioactive waste and hazardous waste generated by remedial activities on the ORR. The facility is operated under the authority of CERCLA and is required to comply with regulations contained in the Record of Decision authorizing the facility. Only radioactive waste with concentrations below limits imposed by the WAC and agreed to by FFA parties are authorized for disposal in the facility.

To help ensure compliance with the WAC, TDEC has placed a radiation portal monitor (RPM) at the check-in station to monitor trucks transporting waste into the facility. The RPM uses two large area gamma-ray scintillators located on each side of the road to measure gamma radiation as trucks pass the check-in station. The RPM stores the measurements and associated information (e.g., date, time) and then uploads the data to a secure website where it is available for review. If measurements exceed a level predetermined by DOE and TDEC, the RPM software generates an alert notification that is sent by email to TDEC.

Monitoring Results

During the 2016 fiscal year, no alarms were sent due to the absence of radiological elevated shipments. This indicates there was no extensive gamma radiation detected in the loads of waste dispositioned in the on-site CERCLA radioactive waste landfill (EMWMF).

Continuous Gamma Radiation Monitoring

TDEC personnel prepare to upload data collected on gamma radiation monitor (TDEC photo)

Continuous Gamma Radiation Monitoring

Gamma radiation is emitted by various radionuclides that have been produced, stored, and disposed of on the ORR. TDEC deploys continuously reading gamma exposure rate monitors to 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.

TDEC's program monitors both TOA and FFA projects and oversees DOE activities. Areas monitored include the background station at Fort Loudoun Dam, ORNL 3000 Area, Molten Salt Reactor Experiment (MSRE), EMWMF, and SNS.

Monitoring Results

During the 2016 fiscal year, the monitored rates were within normally expected parameters.

RadNet Air Monitoring Program

TDEC personnel collect a sample at one of the RadNet air stations (TDEC photo)

Monitoring Air for Radioactive Releases

The EPA RadNet air monitoring program is designed to monitor potential pathways for significant releases that could result in population exposures as a consequence of routine and/or accidental releases of radioactivity from major sources across the nation.

In Oak Ridge, the program oversees DOE by monitoring the air for radiological contaminants. The program provides for radiochemical analysis of air samples collected from five RadNet air monitors located on the ORR. These samples are collected twice weekly by TDEC and analyzed at the EPA's National Air and Radiation Environmental Laboratory in Montgomery, Alabama.

Sampling Results

Gross beta results for the 2016 fiscal year did not exceed the screening level of 1.0 pCi/m^3. The gross beta results for each of the five RadNet monitors had similar trends and concentrations. These results were well below associated standards and were protective of the public health and the environment.

RadNet Drinking Water Monitoring Program

A drinking water sample being collected (TDEC photo)

Drinking Water Sampling for Radioactivity

Radioactive contaminants released on the ORR may enter local streams and be transported to the Clinch River, which is used as a source of raw water by local drinking water suppliers. The EPA RadNet drinking water monitoring program provides a means to evaluate the quantity of these contaminants in area water supplies and verify DOE monitoring.

For the Oak Ridge region, the EPA RadNet program provides radiochemical analysis of finished drinking water collected by TDEC quarterly from four local water systems. Utilities sampled include the Anderson County Utility District, the City of Oak Ridge Water Treatment Plant at Y-12, the West Knoxville Utility District, and the Kingston Water Treatment Plant. The four drinking water plants are sampled quarterly, though some analyses are only run annually on one or composite samples. Tritium analysis is completed quarterly.

Sampling Results

During the 2016 fiscal year, the twenty samples analyzed for tritium were well below drinking water limits and even below instrument minimum detectable concentrations. All four of the iodine-131 results were below detection limits. Results for the four local water treatment facilities in the program have all been well below applicable drinking water standards for the multiple radionuclides analyzed in this project. Results from the samples for tritium and iodine-131 meet state and EPA criteria for risk and consequently are considered protective of public health and the environment.

RadNet Precipitation Monitoring Program

TDEC personnel measures precipitation collected during the last sampling period (TDEC photo)

Monitoring Precipitation for Radioactive Contamination

The RadNet precipitation program oversees DOE by evaluating precipitation for radiological contaminants at three locations on the ORR, one at each of the three main facilities. These precipitation samplers are co-located with three of the RadNet air samplers. One sampler is located at ORNL near the High Flux Isotope Reactor and the Radiochemical Engineering Development Center in Melton Valley. A second precipitation sampling station is located east of the ETTP site. The third precipitation sampler is located east of the Y-12 facility. The samples at all locations are collected twice weekly by TDEC. Monthly composite samples are analyzed for gamma radionuclides. This program measures 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 indicate the presence of radioactive materials that may not be evident in particulate analysis. The project compares Oak Ridge results to other RadNet precipitation data. It can also be compared to drinking water standards as a conservative measure, since drinking water limits are intended to be protective of public health.

Sampling Results

During the 2016 fiscal year, RadNet precipitation monitoring at the three stations on the ORR showed values for the following gamma radionuclides for the composite monthly analyses: beryllium-7, potassium-40, radium-226, radium-228, cesium-137, and cobalt-60. Of these, beryllium-7, is a cosmogenic radionuclide and is made in the solar system. Potassium-40 is found in nature and even so was below or near detection limits. The results for radium-226 and radium-228 were below detection limits. The levels of cesium-137 and cobalt-60 were below detection limits and well below drinking water limits. Since the drinking water limits are intended to be protective of public health, the levels of cesium-137 and cobalt-60 detected in precipitation on the ORR do not pose a hazard to the public or the environment.

National Pollutant Discharge Elimination System Compliance

Aquatic Resource Alteration Permits and Wetlands Protection

Storm Drain-490 is an NPDES point of compliance (TDEC Photo)

National Pollutant Discharge Elimination System Compliance

TDEC conducted oversight of the various aspects of the ORR wastewater treatment facilities' operations, their radiological effluents, the storm water discharges, facility line repairs, the potential impacts to water quality, both on and off the ORR, and the possible impacts to human health and the environment.

Aquatic Resource Alteration Permits and Wetlands Protection

TDEC assisted DOE and the TDEC Water Pollution Control division in construction and maintenance projects on the ORR, which were covered by the Aquatic Resource Alteration Permits.

Clinch River Fish Monitoring Program

DOE conducts annual monitoring of sunfish and catfish in the Clinch River to examine potential exposure to the public from the consumption of contaminated fish. Sunfish (*Lepomis macrochirus, L. auritus, and Ambloplites rupestris*) are analyzed for selected metals, pesticides, polychlorinated biphenyls (PCB), metals, tritium, gross alpha, gross beta, gamma emitting radionuclides, and total radioactive strontium. Catfish (*Ictalurus punctatus*) are analyzed for metals, pesticides, PCBs, tritium, gross alpha, gross beta, gamma emitting radionuclides, and total radioactive strontium. Fish are collected at the following sites:

- Clinch River Mile 43.5 (Solway Bridge) upstream from all DOE inputs (CRK 70)
- Clinch River Mile 19.9 downstream from ORNL (CRK 32)
- Clinch River Mile 9.9 downstream from all DOE inputs (CRK 16)

DOE sample results for the 2016 fiscal year have not been reported, but in 2015, mercury was detected in the catfish tissue at all sites though levels were below the EPA precautionary level of 0.3 mg/kg. PCB-1260 was detected in the catfish tissue at all three sites but the levels were below the preliminary remediation goal (resident, fish tissue) 0.208 mg/kg. Due to PCB contamination, a “do not consume” advisory, issued by TDEC, is in effect for the Melton Hill Reservoir for catfish. A precautionary advisory for catfish (limit consumption to one meal per month) for the Clinch River Arm of Watts Bar Reservoir is in place. There are no concerns with ingestion of the sunfish; the mercury levels are below TDEC fish tissue advisory criteria. PCB levels are well below the DOE PRG risk level.

DOE Surface Water Monitoring Program

DOE collects surface water samples quarterly at Clinch River kilometers 16, 23, 32, 58, and 66; Fifth Creek kilometer 0.1; and White Oak Creek kilometers 1.0 and 6.8. Water samples are analyzed for gross alpha, gross beta and gamma emissions, and tritium. Additionally, samples collected at CRK 32 and CRK 66 are analyzed for strontium-89/90. Samples from Clinch River kilometers 16, 23, and 66 are analyzed for mercury.

TDEC accompanied DOE on 9/10/2015, 12/14/2015, and 6/23/2016. Proper sampling procedures were followed and QA/QC samples (a field duplicate, trip blank and field blank) were taken. Mercury was not detected at any of the sites. None of the other non-radiological data exceeded TWQC. Although Cs-137, Sr-89/90, and tritium were detected at White Oak Creek km 1.0, the levels were below the DOE PRGs.

Surface Water Physical Parameters

Surface water exiting the Y-12 facility is monitored using three continuous data loggers placed around Y-12. The loggers recorded pH, dissolved oxygen, turbidity, temperature, and oxidation reduction potential at each site. Two monitoring locations are on EFPC and a third monitoring location is on Bear Creek. The EFPC locations are to monitor the creek after the augmentation water supply was terminated and to determine a baseline prior to any mercury abatement work at Outfall 200. The Bear Creek location was installed after reviewing the discrete data from Bear Creek kilometer 12.3. Bear Creek kilometer 12.3 has shown to be impacted and there is a need to understand temporal trends with regard to physical parameter water quality. For the surface water physical parameters data, all samples met TWQC for the parameters observed at the seven monitoring stations on the ORR.

DOE ETTP Surface Water Monitoring Program

DOE collects surface water samples at 13 locations at ETTP (see table below). K-1710 and MIK 1.4 represent conditions upstream of ETTP. K-716 and CRK 16 are downstream of ETTP operations. K-1007-B and K-1700 are located at discharge points into Poplar Creek and K-901-A is located at a discharge point at the Clinch River. All of the sites are monitored for radionuclides and field readings (pH, dissolved oxygen, and temperature). In addition, some sites are monitored for metals and volatile organic compounds. Sampling sites, parameters, and frequencies of sampling can be obtained from the following table:

Station	Stream	V[1]	M[2]	Frequency
MIK 1.4	Mitchell Branch Mile 0.9	✓		Quarterly
MIK 0.82	Mitchell Branch Mile 0.51	✓	✓	Quarterly
MIK 0.71	Mitchell Branch Mile 0.44	✓	✓	Quarterly
MIK 0.59	Mitchell Branch Mile 0.37	✓	✓	Quarterly
MIK 0.45	Mitchell Branch Mile 0.28	✓	✓	Quarterly
K-1700	Mitchell Branch at mouth (Poplar Creek Mile 4.5)	✓	✓	Quarterly
K-716	Poplar Creek Mile 0.2		✓	Semiannually
K-1007-B	Pond drains into Poplar Creek at mile 1.5		✓	Semiannually
K-1710	Poplar Creek Mile 5.5		✓	Semiannually
K-901-A	Pond drains into Clinch River at river mile 11.4		✓	Semiannually
CRK 16	Clinch River Mile 9.9	✓	✓	Semiannually
CRK 23	Clinch River Mile 14.3		✓	Semiannually
K-700 Slough	K-700 Slough		✓	Semiannually

[1]Volatiles
[2]Metals

DOE used sound sampling practices during all phases of the sampling operations. Field replicates, trip blanks and field blanks were collected as part of their QA/QC protocol. None of the data exceeded TWQC or DOE PRGs.

DOE Milk Monitoring Program

DOE collected milk samples on alternate months at Claxton and Maryville locations. This sampling program tests raw milk from surrounding areas for radioactivity. At each location four 1-liter bottles of raw milk were purchased and analyzed for potassium-40 and all detectable gamma radionuclides. The only radionuclide found above the detection level was naturally occurring potassium-40.

DOE Vegetable Monitoring Program

DOE conducts annual radiological analyses (gross alpha, gross beta, gamma emitters, and uranium isotopes) on lettuce, tomatoes, and turnips purchased from area gardeners. Samples are purchased at the following locations: Lenoir City (southeast of ORNL), Scarboro Community, Oak Ridge (northeast of Y-12), Gamble Valley, Oak Ridge (northeast of Y-12), Wartburg vicinity (north of the ORR), Claxton (east of the ORR), Maryville (background), Eton Crossroad/Lenoir City (south of the ORR), north of ETTP, and Kingston (southwest of the ORR). With the exception of naturally occurring potassium-40, no gamma emitting radionuclides were detected above the minimum detectable activity.

Haul Road Surveys

TDEC personnel perform an ambient gamma survey of the Haul Road (TDEC photo)

Radiological Monitoring of the Haul Road

The Haul Road was constructed for and is dedicated to trucks transporting CERCLA radioactive and hazardous waste from remedial actions on the ORR for disposal at EMWMF in Bear Creek Valley. To account for wastes that may fall or be blown from the trucks while in transit, TDEC performs walk over inspections of the Haul Road and associated access roads. Anomalous items are surveyed, logged, and their description and location submitted to DOE for disposition. DOE has continued to demonstrate improvement in the number of items found over previous years.

Monitoring Results

During the 2016 fiscal year, ambient gamma and surface contamination readings were within the normal background ranges for the area. Thirteen anomalous items were found on the Haul Road and were properly dispositioned by DOE. The results indicate no evidence of risk to public health or the environment from current transfer activities.

EMWMF Surface Water Sampling

TDEC personnel monitor water at EMWMF with YSI-Pro® (TDEC photo)

EMWMF Surface Water Monitoring

During the 2016 fiscal year, TDEC monitored groundwater elevations, effluents, surface water runoff, and sediments at EMWMF. This facility was constructed to dispose of waste generated by remedial actions on the ORR and is operated under the authority of CERCLA. While the facility holds no permit from any state or federal agency, it is required to comply with applicable or relevant and appropriate requirements (ARARs) in the CERCLA Record of Decision (DOE, 1999) and with requirements associated with responsibilities delegated to the DOE by the Atomic Energy Act.

Monitoring Results

Scheduled monitoring using a YSI-Pro® was conducted at the EMWMF V-weir outfall and the underdrain. Parameters include temperature, pH, specific conductivity, dissolved oxygen, and oxidation reduction potential. One elevated pH reading (9.06) was due to high algae content in the sediment basin. All other parameters were within normal range. In addition, water samples were collected from the sediment basin outfall, the underdrain, Cell 6 (EMW-4B), GW-918, and NT-5. Analytes for these samples were gross alpha, gross beta, isotopic uranium, strontium-90, tritium, and technetium-99. Results, based on the sampling site, were in compliance with 25% of DOE's derived concentration guides (DCGs) These quantities represent the concentration of a given radionuclide in either water or air that results in a member of the public receiving a 100 mrem effective dose following continuous exposure for one year for each of the following pathways: ingestion of water, submersion in water, and inhalation.

Environmental Management Disposal Facility

Location of the existing EMWMF landfill and approximate locations being considered for the proposed EMDF landfill (Photo courtesy of DOE)

Environmental Management Disposal Facility

TDEC is working closely and collaboratively with DOE and EPA to select a site for a new landfill. DOE proposes to build a new landfill for disposal of radioactive and hazardous waste generated during cleanup of the ORR.

Like the existing EMWMF that has operated for the past 15 years, all candidate sites for the proposed EMDF lie in Bear Creek Valley. Hydrogeologic conditions are complex throughout the area, but Bear Creek Valley offers the most suitable potential locations.

TDEC, EPA, and DOE are working to resolve a dispute over DOE's Remedial Investigation/Feasibility Study (RI/FS) report. Evaluations in that report are used to select the best alternative for the waste disposal.

The three parties are working to reach agreements on collecting site-specific information, resolving technical issues like modeling risk, and developing preliminary waste acceptance limits for contaminants expected in the waste.

Decontamination and Decommissioning ETTP

Demolition of Building K-27 Begins (DOE photo)

Decontamination and Decommissioning at ETTP

D&D activities at ETTP were ongoing during the 2016 fiscal year. Demolition activities at Building K-31 were completed, including final waste disposition. Building K-31 is the fourth of five gaseous diffusion facilities at the site to be demolished. D&D activities at the fifth and final gaseous diffusion facility, Building K-27, began in the 2016 fiscal year and will continue into the 2017 fiscal year. In addition, demolition activities continued on other miscellaneous, ancillary facilities at ETTP.

TDEC oversees the demolition of all ORR facility D&D funded through CERCLA. Monitoring conducted by the program included reviewing and commenting on all CERCLA documentation, attending project team meetings, conducting site visits, reviewing stormwater pollution prevention plans, and resolving waste management issues.

Transuranic Waste Processing

Operation of manipulator arms at TWPC (DOE photo)

Transuranic Waste Processing

During the year, TDEC actively performed site visits, reviewed multiple documents, and participated in weekly meetings at the Transuranic (TRU) Waste Processing Center (TWPC). The latest schedule to commence contact-handled TRU waste shipments to the Waste Isolation Pilot Plant (WIPP) is the first quarter of calendar year 2017; the remote-handled TRU waste shipments are scheduled to resume toward the end of calendar year 2020.

The TWPC is tasked with:

- safely and compliantly managing and operating TWPC in support of processing legacy TRU waste
- performing surveillance and maintenance activities
- providing support to the Central Characterization Project (CCP) for final certification and disposition of TRU soil and debris waste at WIPP in New Mexico
- processing other contact handled/remote handled (CH/RH) TRU waste originating from ORNL
- processing Nuclear Fuel Services, Inc. (NFS) soils from Erwin, Tennessee

Low-Level Radioactive Waste

Legacy Low-Level Radioactive Waste

The Compliance Agreement between TDEC and DOE to dispose of legacy waste addresses DOE's legacy inventory of industrial and low-level waste stored at ETTP. This inventory potentially contained RCRA constituents. The implementation of the agreement, which is almost complete, resulted in sorting, segregation, processing, characterization, and disposition of 7,702 waste containers. Phase II of the Compliance Agreement is being implemented as funding become available. At the end of the 2016 fiscal year, this inventory was reduced to six containers of resin LLW. There was no change in the inventory from the end of the previous year. Based on DOE's assurance that these six remaining containers are included in their contract for safe/compliant storage, routine inspections and eventual disposal, the Compliance Agreement was terminated on March 23, 2016.

At the end of the 2016 fiscal year, DOE's inventory of this category of waste stood at 88 cubic meters (m^3). There was no change in the inventory from the end of the previous year. This is high activity, high dose, low-level waste that must be characterized and repackaged in hot cells like those at TWPC. The current priority at this facility is the processing of transuranic waste.

At the end of the 2016 fiscal year, Y-12 and ORNL did not have any legacy low-level waste inventory.

Newly Generated Low-Level Radioactive Waste

The "newly generated" category contains low-level waste generated since October 1, 2000. At the end of the 2016 fiscal year, DOE's inventory of this category of waste stood at 24 m^3. There was no change in the inventory from the end of the previous year.

The National Nuclear Security Administration (NNSA) has established a track record of routinely disposing of the newly generated low-level waste within the 365-day DOE Order required timeframe. At the end of the 2016 fiscal year, this inventory was 537 containers (in storage for less than 365 days).

At the end of the 2016 fiscal year, ORNL had generated 281 m^3 of low-level waste since October 1, 2015. Of this amount, 158 m^3 had been shipped for disposal. The remaining 123 m^3 had been in compliant storage awaiting shipment for disposal.

Site Treatment Plan for Mixed Wastes on the DOE ORR

Site Treatment Plan

As of June 30, 2016, DOE had met all TRU waste-related milestones of the Site Treatment Plan for Mixed Wastes on the DOE ORR (STP) for the 2016 fiscal year. Though they were 2016 fiscal year milestones, they were completed during the 2015 fiscal year. They are:

- accomplish final WIPP certification of 50% of the remaining RH-TRU waste inventory as shown in Table 4.1 of the STP (April 2, 2015)
- accomplish final WIPP certification of 50% of the remaining CH-TRU waste inventory as shown in Table 4.1 of the STP (April 2, 2015)

Mixed-waste storage at K-1065

As of the end of the 2016 fiscal year, the inventory of mixed-waste stored in K-1065, which is covered by the STP, was 88 containers. This is a decrease of six containers from the end of the previous year.

National Outreach and Cooperative Interstate Activities

TDEC 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 (ITRC) 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 (ECOS) 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. ITRC has trained over 100,000 participants since 1997. TDEC has a representative on the Institutional Controls Team and the Complex Sites Team. Another TDEC representative is the point of contact for the State of Tennessee and has been successful in promoting ITRC products throughout the state." The ITRC Web site is www.itrcweb.org.

National Governors Association Federal Facilities Task Force

The National Governors Association (NGA) 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.

State and Tribal Government Working Group

The State and Tribal Government Working Group (STGWG) is a forum in which all states and tribes affected by DOE sites can interact directly with 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. The working group more specifically focuses on long-term stewardship and institutional controls, natural resource damage assessment and restoration, and tribal issues.

Association of State and Territorial Solid Waste Management Officials

The Association of State and Territorial Solid Waste Management Officials (ASTSWMO) radiation task force 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 (DOD), Council of Radiation Control Program Directors (CRCPD), the Health Physics Society (HPS), and the American National Standards Institute (ANSI).

A TDEC staff member currently serves as chair of the Materials Management Radiation Task Force. The task force is currently developing a national position paper designed to raise awareness of Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM) and issues related to handling and disposal of these materials.

The Radiation Task Force chair represented the national Task Force, EPA Region 4, and TDEC during a plenary session presentation on TENORM on August 12 of 2015. Approximately 170 representatives of state, federal, and private organizations attended the session.

TDEC also has a member on the Sediment Focus Group.

Intergovernmental Meeting with DOE

The Energy Communities Alliance (ECA), ECOS, National Association of Attorneys General (NAAG), NGA, and STGWG 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.

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Roane County Environmental Review Board
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Stakeholder Organizations

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