

1. INTRODUCTION

1.1 SITE DESCRIPTIONS

The Oak Ridge Reservation (ORR), a government-owned, contractor-operated facility, contains three major operating sites: the Y-12 National Security Complex (Y-12), Oak Ridge National Laboratory (ORNL), and East Tennessee Technology Park (ETTP). These facilities were constructed as part of the Manhattan Project, producing components for the first nuclear weapons. The primary missions of the three sites have evolved over the years and continue to adapt to meet the changing defense, energy, and research needs of the United States.

Operated by BWXT Y-12, L.L.C., Y-12 is a manufacturing facility that continues to play an integral role in the nation's nuclear weapons complex. The National Nuclear Security Administration's (NNSA's) Y-12 Site Office has oversight of Y-12. NNSA carries out the national nuclear security responsibilities of the U.S. Department of Energy (DOE).

ORNL is a multiprogram science and technology laboratory managed for DOE by UT-Battelle, LLC. At ORNL, researchers focus on basic and applied research to advance the nation's energy resources, environmental quality, scientific knowledge, science education, and national economic competitiveness. The laboratory also performs work for non-DOE sponsors when such activities complement DOE missions and address important national or international issues. The laboratory is a program of DOE's Oak Ridge Operations (ORO) field office.

The mission of ETTP is environmental cleanup and reindustrialization/reuse of the assets of the shutdown gaseous diffusion plant formerly known as the Oak Ridge K-25 Site. This mission is accomplished through the DOE-Environmental Management (DOE-EM) Program. The scope of the DOE-EM mission includes environmental restoration activities across ORR, including remedial actions at the Y-12 and ORNL sites. ORR is on the U.S. Environmental Protection Agency's (EPA's) National Priorities List (NPL), and environmental restoration is being addressed under a Federal Facility Agreement (FFA) with EPA and the state of Tennessee. DOE's ORO field office manages the DOE-EM mission on the ORR.

1.2 PURPOSE

The Environmental Monitoring Plan (EMP) for ORR is an omnibus document providing a single point of reference for the effluent monitoring and environmental surveillance programs conducted by the DOE contractors at their respective sites and ORR areas outside specific facility boundaries.

Authorization and requirements for the EMP are contained in DOE Order 5400.1, *General Environmental Protection Program* (DOE Order 5400.1), Chap. IV, which states that environmental monitoring consists of two major activities: effluent monitoring and environmental surveillance. This EMP is intended to document the rationale and design criteria for the effluent monitoring and environmental surveillance programs, extent and frequency of

sampling and analysis, analytical laboratory procedures, quality assurance (QA), implementation, and reporting. Guidance for the specific contents of the EMP is provided through DOE Order 5400.5, *Radiation Protection of the Public and the Environment* (DOE Order 5400.5); DOE/EH-0173T, *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance* (the *Regulatory Guide*); and state and federal regulations that implement federal environmental laws.

The effluent monitoring and environmental surveillance programs described by this EMP are two of several programs that collect and analyze data to assess the impacts of ORR activities on the environment and human health. Others include the projects related to DOE-EM environmental restoration (ER) and/or waste management efforts. For example, the DOE-EM-sponsored Water Resources Restoration Program (WRRP) evaluates remedial project effectiveness by comparing baseline information with post-remediation data and specified performance goals. This and other special studies carried out on ORR in support of remediation projects provide data supplemental to the routine, historical environmental effluent and surveillance monitoring conducted by the individual site programs.

Where appropriate, integration between these various programs involves an integrated sampling approach to avoid duplicative data collection. Besides the WRRP, another example is the Biological Monitoring and Abatement Program (BMAP), which has components that serve to satisfy compliance requirements of each ORR facility's National Pollutant Discharge Elimination System (NPDES) permits and help define and assess needed remedial actions performed by DOE-EM programs. Additionally, the ORR effluent and surveillance monitoring data are provided to the Oak Ridge Environmental Information System (OREIS) for integration with sampling and analysis results from remedial investigations. OREIS is the primary component of the data management program for restoration projects and fulfills requirements prescribed in both the FFA and the Tennessee Oversight Agreement.

Many of the EMP elements exist as documentation in support of precedent regulatory requirements, (e.g., the NPDES permits for each of the facilities and components of those permits such as the BMAP). These elements are integrated into the EMP by reference. Consequently, as programs are modified to reflect changes in regulatory requirements or permit conditions, the EMP is continually consistent with the specific document updates. This approach is compatible with the direction provided in DOE Order 5400.1.

The EMP outlines the goals of environmental monitoring for ORR and its facilities. Compliance activities include both specific requirements of regulations and the “*should*” statements of the *Regulatory Guide*. Some additional program activities, not required for regulatory compliance, are included in this EMP. These activities are considered to be best management practice (BMP) surveillance measures and are so noted in the plan. These BMP activities provide for the continuation of established sampling programs or are new activities intended to confirm the design basis of the EMP.

The ORR Annual Site Environmental Report (ASER) is required by DOE Order 231.1, *Environmental, Safety and Health Reporting* (DOE Order 231.1) and summarizes the results of the various environmental monitoring programs. The reader is encouraged to refer to the ASER, as necessary, to understand the context of the EMP.

1.3 EMP CONTENTS

Information in the EMP is presented as follows:

- introduction (Sect. 1);
- information for monitoring liquid and airborne effluents (Sect. 2);
- meteorological monitoring programs and their roles in dispersion modeling and dose calculation (Sect. 3);
- environmental surveillance activities, addressed by individual medium (Sect. 4);
- laboratory procedures that apply to the environmental monitoring programs (Sect. 5);
- summary of the rationale for the dose calculations and description of the methodology used (Sect. 6);
- data management, analysis, and statistical treatment of data (Sect. 7);
- reports produced from the environmental monitoring data (Sect. 8); and
- a general quality assurance plan (QAP) that covers all environmental monitoring activities (Sect. 9).

At the end of each section, or appropriate subsection, the EMP lists the requirements (identified as *should** statements) in the *Regulatory Guide* and a specific response to each.

The presentation of *should** statements is an exact mirroring of *should** statements contained in the *Regulatory Guide* and is presented to facilitate a review of the *Regulatory Guide* requirements with respect to the EMP. This EMP and the supporting documents and practices referenced shall be complied with unless change is formally authorized in accordance with published procedures.

1.4 REGULATORY GUIDE PERFORMANCE CRITERIA

The *Regulatory Guide*, Sect. 1, Introduction, contains four *should** statements. These statements, as listed in “Summary of Effluent Monitoring and Environmental Surveillance Program Elements,” are provided below along with responses specific to the issues addressed in each statement.

- a. **Operators of DOE-controlled facilities *should** provide the capabilities to detect and quantify planned and unplanned releases of radionuclides, consistent with the potential for off-site impact, and to support consequence assessments as necessary.**

The effluent monitoring and environmental surveillance programs described within this EMP and the program data documented in the ASER are intended to demonstrate that (1) the public and environment are adequately protected and (2) operations comply with DOE and other applicable federal, state, and local standards and requirements.

With these monitoring programs and the associated instrumentation, through either real-time monitoring or sample collection, facilities can detect and/or quantify unplanned releases. In the case of monitoring National Emission Standards for Hazardous Air Pollutants (NESHAP)-gaseous effluents and NPDES-liquid effluents, both federally permitted programs have taken into account scenarios that potentially may impact the environment.

In the case of emergencies, each facility has the capability and mission to alter normal sampling frequencies, parameters, etc., to collect samples that might help characterize the type and extent of the unplanned release. Additionally, each site has the capability, through portable samplers or collection of grab samples, to collect samples at locations that are not normally monitored, thereby getting closer to the source or affected area. Based on the available information as to the type of material that may have been released, additional adjustments may be made to collect a representative sample and assess the effluent. In all cases of unplanned releases, the main objective would be to collect data, through appropriate sampling and analysis procedures, that accurately support the overall assessment.

- b. **The recommendations found in this guide *should** be incorporated into the design and operation of effluent monitoring and environmental surveillance systems.**

All of the recommendations of the *Regulatory Guide* have been considered in the design of the EMP. Each *should** statement is specifically addressed at the end of the appropriate section.

- c. **Documentation of the decisions made concerning incorporation of the specific guidance statements, including a description of any alternative methods selected, *should** be included in the site EMP.**

*The presentation of “*should*” statements is an exact mirroring of *should** statements contained in the *Regulatory Guide* and is presented to facilitate review of the *Regulatory Guide* requirements with respect to the EMP. This EMP and the supporting documents and practices referenced shall be complied with unless change is formally authorized in accordance with published procedures.

Documentation is provided in the rationale and design basis sections of the monitoring and surveillance sections as well as in the responses to the *should** statements at the end of each section.

- d. The potential for airborne or liquid release of radioactive material (including accidental releases) *should** be evaluated and documented in the EMP. Based on this documentation, those effluent streams that do not have the potential for releasing radioactive material are not subject to selected provisions of this guide. Heads of Operations Offices, in consultation with appropriate Program Office and EH-1, may approve specific requests for exemptions.**

The potential for airborne and liquid effluent releases has been considered and documented in the rationale and design basis sections of the effluent monitoring chapters.