

Preface

The purposes of the *Lawrence Livermore National Laboratory Environmental Report 2021* are to record Lawrence Livermore National Laboratory's (LLNL's) compliance with environmental standards and requirements, describe LLNL's environmental protection and remediation programs, and present the results of environmental monitoring at the two LLNL sites—the Livermore Site and Site 300. The report is prepared for the U.S. Department of Energy (DOE) by LLNL's Environmental Functional Area. Submittal of the report satisfies requirements under DOE Order 231.1B, "Environment, Safety and Health Reporting," and DOE Order 458.1, "Radiation Protection of the Public and Environment."

The report is distributed electronically and is available at <https://saer.llnl.gov/>, the website for the LLNL annual environmental report. Previous LLNL annual environmental reports beginning with 1994 are also on the website. Some references in the electronic report text are underlined, which indicates that they are clickable links. Clicking on one of these links will open the related document, data workbook, or website. Sampling location maps throughout this report were created using ArcGIS® software by Esri.

The report begins with an executive summary, which provides the purpose of the report and an overview of LLNL's compliance and monitoring results. The first three chapters provide background information: Chapter 1 is an overview of the location, meteorology, and hydrogeology of the two LLNL sites; Chapter 2 is a summary of LLNL's compliance with environmental regulations; and Chapter 3 is a description of LLNL's environmental programs with an emphasis on the Environmental Management System including pollution prevention.

The majority of the report covers LLNL's environmental monitoring programs and monitoring data for 2021: effluent and ambient air monitoring and dose assessment (Chapter 4); waters, including wastewater, storm water runoff, surface water, rain, and groundwater (Chapter 5); and terrestrial, including soil, sediment, vegetation, foodstuff, ambient radiation, and special status wildlife and plants (Chapter 6). The remaining two chapters discuss LLNL's groundwater remediation program (Chapter 7), and quality assurance for the environmental monitoring programs (Chapter 8). Complete monitoring data, which are summarized in the body of the report, are provided in Appendix A.

The report uses Système International units, consistent with the federal Metric Conversion Act of 1975 and Executive Order 12770, "Metric Usage in Federal Government Programs" (1991). For ease of comparison to environmental reports issued prior to 1991, dose values and many radiological measurements are given in both metric and U.S. customary units. A conversion table is provided in the glossary.

The report is the responsibility of LLNL's Environmental Functional Area. Monitoring data were obtained through the combined efforts of the Environmental Functional Area; Environmental Restoration Department; Physical and Life Sciences Environmental Monitoring Radiological Laboratory; and the Radiation Protection Functional Area.

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