

SAFE, SECURE, AND SUSTAINABLE OPERATIONS

Conducting safe, secure, environmentally sound operations and modernizing the Laboratory's infrastructure to meet evolving mission needs

Committed to the highest level of operational performance, LLNL implements best practices in environment, safety, and health (ES&H), and security. Management systems support continuous improvement in work practices. Prudent risk management coupled with active measures to prevent accidents ensures the safety of employees and the public. Investments are targeted at modernizing the Laboratory's infrastructure.



Cyber security analysts Patrick Stevens (left) and Darren Lynch discuss the use of SafeWeb—a tool to protect LLNL computers from malicious websites.

Administrator Shirley Davis discusses physical security as part of a security awareness campaign in December 2016 that included a traveling exhibit of interactive displays and information handouts.



Award-Winning ES&H

The Laboratory's injury and illness rates remain near historic lows. FY 2016's total recordable case (TRC) rate of 1.40 continues recent excellent performance, and the days away, restricted, or transferred (DART) rate, which is a measure of severity of injuries, is 0.57. Both figures are down by more than 40 percent since the contract transition in 2008. LLNL received two National Safety Council awards for its low rate of lost workday incidents. Continual improvement is a key facet of LLNL's Integrated Safety Management System, which is certified with Occupational Health and Safety Assessment Series (OHSAS) 18001 accreditation. In addition to its ergonomics program, Livermore launched new initiatives to reduce slips, trips, and falls—the most common injuries. With nearly 1,000 people participating in the Wellness Program's annual Get Active Campaign, LLNL won the distinction as this year's *Fittest DOE Lab in the Nation*.

Effective Operations

In FY 2016, operations at LLNL were effectively and efficiently managed, with notable successes in many areas. In ES&H, the Laboratory maintained ISO 14001 and OHSAS 18001 certification and external auditors identified 34 noteworthy practices. Nuclear Operations implemented improvements in facility-level nuclear safety, provided effective assessments, and supported Laboratory programs and other DOE sites in the areas of Nuclear Criticality Safety and Safety Basis. The Laboratory's Emergency Management program completed all deliverables according to its Emergency Readiness Assurance Plan, including a full-participation exercise and two functional exercises at facilities with potentially hazardous operations. In addition, the Cyber Security Program provided a stable and responsive operating environment in support of successful mission execution. Laboratory-wide efforts are under way to heighten security awareness and improve overall performance.

In addition, LLNL had many successes delivering efficient and effective business operations, systems, and information technology. Of particular note, Director Bill Goldstein received DOE's Director of the Year award for encouraging and promoting collaborations with small businesses. In the prior year, nearly 63 percent of the \$350 million spent for services in support of LLNL's missions were awarded to small businesses. DOE's goal is 52 percent.

Safety in work practices is paramount, especially in facilities such as the High Explosives Applications Facility, which houses high-explosives firing tanks, energetic-material synthesis laboratories, and a two-stage gun (shown with technician Paul Dealmeida) for shock-physics experiments.

Improvements to Work Planning

LLNL worked an ambitious schedule in FY 2016 to complete the infrastructure necessary for Laboratory-wide implementation of the revamped work planning and control (WP&C) process. This major undertaking will change how mission, site-wide service, and facility and infrastructure work is planned, scheduled, and released. The goal is to create and implement a single WP&C process across the Laboratory that is more robust and efficient and provides value-adding work control documents and processes.

Overall, the Laboratory is on track with phased implementation of the WP&C process, which for mission-directed work affects more than 3,500 employees operating under more than 1,150 existing work control documents. Accordingly, changes are being pursued deliberately and cautiously. The Laboratory began early implementation of the new process at Site 300 in early April. Implementation has also begun in selected program areas at the main site. A Functional Management Review completed in September 2016 concluded “the WP&C process has significant potential and, once realized, can serve as a template for the DOE Complex.”

Progress Toward Site Sustainability Goals

LLNL’s Environmental Management System, which has International Organization for Standardization (ISO) 14001 accreditation, ensures

environmentally responsible work practices. These practices provide a systematic approach to identifying and reducing the environmental impact of Laboratory activities. The 2015 *Site Annual Environmental Report* (issued in October 2016) records LLNL’s compliance with environmental standards, describes environmental protection and remediation programs, and presents the results of environmental monitoring.

LLNL also met its sustainability goals in FY 2016. The Laboratory has already achieved its FY 2020 greenhouse-gas reduction goal of 28 percent. In addition, Livermore has maintained vigilance in its water-savings program. The Laboratory is meeting California Governor Jerry Brown’s mandatory potable water irrigation-reduction requirements and has reduced irrigation usage by more than 50 percent since FY 2013. However, the demand for cooling tower water (e.g., used for high-performance computing facilities) remains substantial. Operations began in February 2016 at a 10-acre 3.3-megawatt solar farm located in LLNL’s northwest buffer zone. The solar farm is generating about 500 megawatt-hours per month to help meet goals for renewable energy use.

Maintaining the Infrastructure

LLNL invested nearly \$18 million from the site support budget to improve the workplace environment. This work included roof repairs, heating, ventilation and air conditioning replacement, utility upgrades, and facility improvements, and achieved, for the first time since the contract transition, the annual investment goal of 2 percent of Replacement Plant Value. The investment also increased funding and staffing for infrastructure and maintenance at LLNL’s remote experimental complex, Site 300. With \$11 million direct funding, LLNL replaced 11 pieces of foundational but obsolete equipment required for the weapons program. Examples include commissioning of a hydroform pressing machine (see p. 4) and high-speed digital framing cameras used in hydrodynamic experiments. These improvements strengthened Livermore’s overall infrastructure and enhance work effectiveness and safety as activities ramp up for the W80-4 life extension program. Efforts also began to migrate applied materials engineering capabilities out of a 60-year-old substandard building into a modernized complex with a smaller, more efficient footprint.



(above) The Emergency Operations Center provides centralized coordination of response activities. In an actual emergency, the center would be assisted by trained employee volunteers, who periodically practice in drills and exercises.

(below right) LLNL’s 3.3-megawatt solar farm is operational.