Department of Energy
Washington, DC 20585

December 9, 2022

Dr. Craig S. Leasure
Vice President for National Laboratories
The Regents of the University of California
Office of the President
1111 Franklin Street
Oakland, California 94607

WCO-2022-03

Dear Dr. Leasure:

The Office of Enterprise Assessments' Office of Enforcement has completed its investigation into the facts and circumstances associated with five significant safety events that occurred during calendar year 2020 at the Lawrence Berkeley National Laboratory. The Regents of the University of California (UC) documented the third event (i.e., abrasive blasting injury that occurred on February 12, 2020) in the Department of Energy's (DOE) Noncompliance Tracking System under report NTS-SC-BSO-UC-OPERATIONS-2020-0009992, dated April 16, 2020. The Office of Enforcement issued an Investigation Report to UC documenting the results of the investigation on May 16, 2022.

On January 2, 2020, during a lifting operation, UC workers lost control of a 180-pound steel retaining pin, which fell 9 feet from the top of the Advanced Light Source's Synchrotron tunnel to the floor. A protective acrylic glass exclusion zone barrier and a switch box sustained minor damage; however, there was no damage to the storage ring vacuum chamber or adjacent beamlines.

On February 7, 2020, while UC workers raised and extended a telehandler's boom to position a suspended load, the telehandler unintentionally tipped forward and the fork assembly hit a pedestrian guardrail on the top of a retaining wall. The top rail was broken, and the mid rail stopped the telehandler's boom from descending further. No workers were injured, and the load sustained minor damage.

On February 12, 2020, a UC subcontracted worker was seriously injured while performing abrasive blasting using a 25-foot-high scaffold inside an aboveground water storage tank. When the blast hose malfunctioned, the worker's right forearm was struck by the stream of abrasive blasting material, causing severe lacerations to the forearm and elbow. Despite these injuries, the worker was able to self-rescue by climbing down the scaffolding ladder and exiting the tank. The injured worker was hospitalized for six days and received skin grafts to close the wounds.

On May 19, 2020, when UC workers were using a telehandler to relocate a suspended load, the telehandler tipped over and the boom landed on the cab of a work vehicle parked nearby. No workers were injured; the telehandler and the damaged vehicle sustained approximately $33,000 in towing and repair costs.

On July 28, 2020, a UC worker suffered a complex fracture to the distal phalanx of the left thumb while performing annual preventive maintenance on a roof hood exhaust. When the worker noted that the exhaust blower's pulley and belt were actively rotating, they attempted to slow and stop the rotating parts with their left hand, which became pinched in the rotating pulley and belt of the fan mechanism.

UC developed corrective action plans for each of these events to address program deficiencies leading to the noncompliance conditions. The corrective actions are wide-ranging and, if effectively implemented, should adequately address the issues that led to the occurrence of these five events.

In accordance with 10 C.F.R. § 851.41, *Settlement*, the Office of Enforcement has elected to resolve any potential noncompliances with requirements enforceable under 10 C.F.R. Part 851, *Worker Safety and Health Program*, through execution of a Consent Order. In deciding to enter into this Consent Order, DOE placed considerable weight on the underlying safety significance of the potential violations as well as UC's investigations, responses, and corrective actions that are likely to prevent recurrence.

DOE reserves the right to re-open this investigation if DOE later becomes aware that UC provided any false or materially inaccurate information. Further, if there is a recurrence of worker safety and health deficiencies similar to those identified in this Consent Order, or a failure to timely comply with the terms and conditions prescribed in the Consent Order (or other related actions that UC subsequently determines to be necessary) to prevent recurrence of the identified issues, then the Office of Enforcement may pursue additional enforcement activity. The Office of Enforcement, Office of Science, and DOE Berkeley Site Office will continue to closely monitor UC's implementation of worker safety and health requirements until the issues associated with this Consent Order are fully resolved.

Enclosed please find a signed copy of the Consent Order. Please sign the Consent Order and retain a copy for your records. Please return the signed copy to the Office of Enforcement within 1 week from the date of receipt. Please follow all instructions specified in in the enclosure. By signing this Consent Order, you agree to comply with all of the terms, including payment of the monetary remedy, specified in section IV of the Consent Order and in the manner prescribed therein.

If you have any questions concerning this Consent Order, please contact me at 301-903-4033 or your staff may contact Ms. Shannon Holman, Acting Director, Office of Worker Safety and Health Enforcement, at 301-903-0100.

Sincerely,

Anthony C. Pierpoint
Director
Office of Enforcement
Office of Enterprise Assessments

Enclosure: Consent Order (WCO-2022-03)

cc: Paul Golan, SC-BSO
Michelle Flynn, The Regents of the University of California

Enclosure

In the matter of	) Report No. NTS-SC-BSO-UC-OPERATIONS-2020-0009992
The Regents of the University of California	) Consent Order WCO-2022-03

CONSENT ORDER INCORPORATING AGREEMENT BETWEEN
U.S. DEPARTMENT OF ENERGY AND
THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

I

The Regents of the University of California (UC) is responsible for the management and operation of the Department of Energy's (DOE) Lawrence Berkeley National Laboratory (LBNL). UC is the prime contractor under Contract No. DE-AC02-05CH11231 (Contract), entered into with the DOE Office of Science's Berkeley Site Office (BSO).

II

Five significant safety events occurred at LBNL from January through July 2020 as follows:

Event #1 – Steel Pin Drop
On January 2, 2020, the Advanced Light Source facility began a maintenance shutdown. The scheduled maintenance work inside the Synchrotron (a ring-shaped particle accelerator tunnel) required the removal and re-positioning of multiple 20,200-pound, high-density concrete accelerator-roof blocks (installed as shielding from ionizing radiation) using a specialized bridge crane. During the lifting operation, UC riggers and mechanical technicians lost control of a 180-pound steel retaining pin, which fell 9 feet from the top of the Synchrotron tunnel to the floor. A protective acrylic glass exclusion zone barrier and a switch box sustained minor damage; however, there was no damage to the storage ring vacuum chamber or adjacent beamlines.

Event #2 – Telehandler Overload
On February 7, 2020, a Genie® GTH-1056 telehandler (i.e., powered industrial truck) equipped with a Star Industries® Model 1360B Heavy Duty Extendable Truss Boom (i.e., jib) and a 1,102-pound (500-kilogram) electric chain hoist was used to lift and lower a table (30 inches wide by 12 feet long, weighing 100 pounds) from an elevated parking area to a lower-floor pedestrian

entry door at Building 2. The load (including attachments) was configured and lifted without the use of a lift plan as required by UC; instead, the rigging team referred to the telehandler's load chart to determine whether the load weight was appropriate. The weight of the jib (585 pounds) was not factored into the estimated weight of the load. When UC operators raised and extended the crane boom to position the load, the telehandler unintentionally tipped forward and the fork assembly (below the jib) hit a pedestrian guardrail on the top of a retaining wall. The top rail was broken, and the mid rail stopped the telehandler's boom from descending further. No workers were injured, and the table sustained minor damage.

Event #3 – Abrasive Blasting Injury

On February 12, 2020, a worker was seriously injured while performing abrasive blasting inside a 230,000-gallon aboveground water storage tank (i.e., tank 82). UC subcontracted with Superior Tank Solutions, Inc. (STS) under Subcontract No. 7515612 to perform routine maintenance inspections on three water tanks at LBNL. During STS inspections, corrosion was discovered on the interior roof surface of tank 82. After this discovery, UC expanded the STS scope of work to include repair of the affected areas. STS subcontracted corrosion removal and the subsequent application of corrosion-resistant coating to Advanced Industrial Services, Inc. (AIS) under a blanket subcontract agreement with STS for "all jobs in calendar year 2020."

AIS used a Schmidt® Bulk Blaster and metallic shot media to descale the interior roof surface of tank 82. Two AIS workers performed the abrasive blasting (descaling) using a 25-foot mobile scaffold to access the interior roof surface of the tank. During the blasting work, a spring-actuated flow control switch (i.e., a dead-man switch) failed in one of the two blasting nozzles, allowing the flow of abrasive blasting media to continue after the worker had released the switch mechanism. One worker held the malfunctioning nozzle while the other worker climbed down the scaffold and exited the tank to report the problem to the AIS supervisor. The AIS supervisor disconnected the dead-man switch cord and closed the hose choke valve, but neither of these actions corrected the malfunction. The supervisor then closed the media flow valve, stopping the flow of blasting media to the hose. Once the flow of blasting media ceased, the AIS worker inside the tank laid the malfunctioning blasting hose on the scaffold decking and resumed blasting the tank roof surface with the other, properly functioning, blasting hose.

Shortly after the worker resumed the blasting work, the malfunctioning hose reenergized. The energy of the blasting media returning to the hose, along with the air displacement within the line, caused the hose to whip upwards violently, striking the worker in the leg, and wrenching the nozzle assembly up from the scaffold decking. The worker's right forearm was then struck by the stream of abrasive blasting material, causing severe lacerations to the forearm and elbow.

Despite these injuries, the worker was able to self-rescue by climbing down the scaffolding ladder and exiting the tank with assistance from a co-worker, who remained outside the tank. The AIS supervisor immediately notified the UC Construction Manager for the project and was instructed to call local emergency services. The UC Berkeley Police and the Alameda County Fire Department (ACFD) paramedics responded and transported the injured worker (via

ambulance) to Highland Hospital in Oakland, California. The injured worker was hospitalized for six days and received skin grafts to close the wounds.

Event #4 – Telehandler Tip-Over
On May 19, 2020, a Genie® GTH-1056 telehandler was used to relocate a storage tent from Building 5 to Building 31. With the crane boom elevated, extended, and under load, the UC operator attempted to reverse the telehandler on a steeply sloped road with a 180-degree rearward bend. The left rear wheel of the telehandler left the road surface, causing the telehandler to shift and become unstable. The telehandler tipped over and the boom landed on the cab of a work vehicle parked nearby. No workers were injured. The telehandler and the damaged work vehicle sustained approximately $33,000 in towing and repair costs.

Event #5 – Complex Finger Fracture
On July 28, 2020, a UC preventive maintenance technician (PMT) suffered a complex fracture to the distal phalanx of the left thumb while performing annual preventive maintenance (PM) on a hood exhaust located on the roof of Building 2. Although a lockout/tagout was performed on the correct electrical circuit, the PMT noted that the exhaust blower's pulley and belt were actively rotating. The PMT attempted to slow and stop the rotating parts with their left hand, which became pinched in the rotating pulley and belt of the fan mechanism. The employee was taken to an offsite emergency services facility for treatment.

Additional Information
UC reported noncompliances revealed by Event #3 into the DOE's Noncompliance Tracking System (NTS), identified as NTS-SC-BSO-UC-OPERATIONS-2020-0009992, on April 16, 2020. The associated corrective actions listed in NTS were completed between May 28, 2020, and August 1, 2022.

On December 2, 2020, DOE's Office of Enterprise Assessment's Office of Enforcement notified UC of its decision to investigate the facts and circumstances associated with these five events and potential deficiencies in the implementation of 10 C.F.R. Part 851 (Part 851), *Worker Safety and Health Program* (WSHP), requirements. Due to DOE's pandemic safety protocols, the Office of Enforcement used videoconferencing to conduct investigation interviews from May 24 through 27, 2021.

In a letter dated September 6, 2022 to the Office of Enforcement, UC requested a Consent Order to settle the matter under investigation. The settlement request referenced information provided during the Enforcement Conference held on August 30, 2022, and proposed additional actions to be completed by October 30, 2023.

UC's investigations of these five events collectively identified seven apparent causes, four contributing causes, five root causes, four causal factors, and three management concerns, resulting in the development of 48 corrective actions. While each of the corrective actions have been completed, the Office of Enforcement's investigation identified additional concerns regarding UC's implementation of the WSHP requirements, specifically:

- UC's apparent cause analysis (ACA) of Event #1 did not identify that the crane operator's certification to operate the specialized bridge crane had expired on August 12, 2018, nearly 18 months before the event, and thus did not identify the crane operator's lapse in certification as a possible contributing cause.
- UC's ACA of Event #2 lacked the depth and rigor required to identify and resolve all the causes leading to this event. For example, the corrective actions did not fully address the potential violations identified by this investigation and may not prevent recurrence of the event. UC's investigation focused narrowly on the event and did not identify potential noncompliances or procedural deficiencies related to safe practices for telehandler operations. Specifically, UC's corrective actions did not address systemic weaknesses in work planning and control, including those evident by the addition of a hoisting mechanism to the telehandler and operating it as a mobile crane to lift and lower a suspended 100-pound table vertically and to move it horizontally. Furthermore, UC did not provide training on the telehandler that specifically included the jib attachment and operator's manual. Finally, the actions did not include a review by UC to determine the adequacy and effectiveness of the corrective actions for the systemic weaknesses demonstrated during this event.
- UC's root cause analysis (RCA) of Event #3 did not identify deficiencies in the fall protection program or emergency rescue plan related to working in confined spaces as management concerns. During the event, the AIS workers attached their fall arrest equipment to the mobile scaffolding erected inside tank 82. The scaffolding was not engineered as a certified anchorage point and was not able to withstand the dynamic loads of a worker falling from elevation. In addition, the permit-required confined space rescue capabilities of the ACFD were not adequately verified for a scenario involving workers on scaffolding approximately 25 feet above ground level inside tank 82.
- UC's RCA of Event #4 did not identify the lack of training and practical evaluation of telehandler operators on sloped surfaces as a possible contributing cause. The Office of Enforcement's investigation revealed that the training and practical evaluations of powered industrial truck operators were limited to flat surfaces (e.g., parking lots with minimal slope).
- UC's corrective action plan (CAP) for Event #5 ascribed the newly included hazards to mechanical energy and, specifically, to vent hood exhaust blowers. The extent-of-condition review indicated that Laboratory-wide rooftop fans did not include mechanical and other energy inputs, contrary to the full PM schedule. The CAP also specified re-training for authorized workers but did not include a systematic approach for including newly hired workers or specify the use of a training needs analysis to determine the specific training requirements of maintenance workers. The corrective actions did not fully address the potential violations identified in this investigation and may not prevent a recurrence of the event.

III

Pursuant to 10 C.F.R. § 851.41, *Settlement*, at any time during enforcement proceedings, DOE may resolve any or all outstanding issues with a Consent Order if the settlement is consistent with 10 C.F.R. Part 851, *Worker Safety and Health Program*.

To resolve potential noncompliances with worker safety and health requirements, and in consideration of UC's investigations, causal analyses, and comprehensive corrective action plans to address program deficiencies leading to the noncompliance conditions, DOE and UC have reached agreement to resolve this matter through execution of this Consent Order.

IV

Accordingly, the terms of this Consent Order are as follows:

In consideration of the mutual agreements set forth in this section, the sufficiency and adequacy of which are acknowledged by DOE and UC (hereinafter the "Parties"), the following terms represent agreement by the authorized representatives of the Parties to resolve by settlement the potential noncompliances at LBNL, in lieu of an enforcement action that DOE may issue pursuant to 10 C.F.R. § 851.42, *Preliminary notice of violation.*

1. UC shall complete the following actions by July 30, 2024:

    a. Implement any remaining items on the referenced CAPs for the five events and verify closure of all 48 identified corrective actions including the August 2022 *Effectiveness Review Report for the February 2020 Abrasive Blasting Incident Corrective Actions*, the May 2020 Telehandler event (Corrective Action 10391-18), and the 2022 Lock Out/Tag Out assessments CAP (reference LBNL-CATS 10644).

    b. Implement the proposed actions listed in UC's settlement request letter entitled *Settlement Proposal re: Abrasive Blasting, Material Handling and Hazardous Energy, NTS Report Number: NTS-SC-BSO-UC-OPERATIONS-2020-0009992, NTS Report Date: May 16, 2022*, dated September 6, 2022, excluding the NFPA 70E assessment, and including the modification to develop and implement a training and qualification program for mechanical lockout/tagout with recurring training requirements.

    c. Provide quarterly written updates to the Office of Enforcement and BSO on the status of corrective actions or associated milestones for items 1.a, and 1.b, above.

    d. Notify the Office of Enforcement and BSO, in writing, of any corrective actions requiring an extension at least 30 calendar days before the prescribed due date.

    e. Provide the Office of Enforcement and BSO with copies of the results of the remaining effectiveness reviews within 30 calendar days after completion.

    f. Undergo an independent validation review by the BSO approximately six to nine months after completion of item 1.e, above.

    g. Notify the Office of Enforcement and BSO upon completion of all actions specified in items 1.a, 1.b, 1.e, and 1.f, above, within 30 calendar days after completion.

2. In lieu of issuance of an enforcement action pursuant to 10 C.F.R. § 851.42 and 851.43, *Final notice of violation*, DOE entered into this Consent Order with UC. Additionally, in consideration of the action to be taken by BSO, affecting the fiscal year 2020 Performance Evaluation Report rating with the resultant fee reduction related to the multiple safety events,

and consistent with 10 C.F.R. § 851.5(c), *Enforcement*, no monetary remedy is included in this Consent Order.

3. UC agrees to return a signed copy of this Consent Order within one week from the date of receipt, via email, to the Director, Office of Enforcement, at enforcementdocketclerk@hq.doe.gov.

4. The effective date of this Consent Order shall be the date upon which UC signs this Consent Order.

5. This Consent Order shall constitute a full and final settlement of the potential noncompliances identified in the referenced NTS report, subject to UC's completion of all actions set forth in item 1 above, to the satisfaction of DOE and the Office of Enforcement.

6. No "cost" as defined in the Federal Acquisition Regulation, 48 C.F.R. § 31.205-47, *Costs related to legal and other proceedings*, incurred by, for, or on behalf of UC relating to coordination and cooperation with DOE concerning the investigation of matters covered by this Consent Order, shall be considered allowable costs under the Contract. However, costs incurred by, for, or on behalf of UC relating to the development and implementation of corrective actions (including costs associated with the effectiveness review required under item 1 above), may be considered allowable costs under the Contract.

7. This Consent Order does not preclude DOE from reopening the investigation or preclude DOE from issuing an enforcement action under 10 C.F.R. § 851.42 with respect to a potential noncompliance if: (a) after the effective date (as provided in item 4, above), DOE becomes aware of any false or materially inaccurate facts or information provided by UC; (b) there is a recurrence of worker safety and health deficiencies similar to those identified above; or (c) UC fails to complete all actions identified in item 1, above, in a timely and effective manner to prevent recurrence.

8. Any modification to this Consent Order requires the written consent of both Parties.

9. UC waives any and all rights to appeal or otherwise seek judicial or administrative review of the terms of this Consent Order. DOE retains the right to judicially enforce the provisions of this Consent Order by all available legal means.

10. This Consent Order is issued pursuant to DOE's authority under Section 234C of the Atomic Energy Act of 1954, as amended (42 U.S.C. § 2282c), and the implementing provisions of Part 851 governing enforcement of worker safety and health requirements at DOE sites.

11. This Consent Order shall become a Final Order after the signed copy, referenced in item 3 above, is filed by the Office of Enforcement's Office of the Docketing Clerk.

On behalf of my respective organization, I hereby agree to and accept the terms of the foregoing Consent Order.

FOR Office of Enforcement

Date 12/9/22

Anthony C. Pierpoint, PhD
Director
Office of Enforcement
Office of Enterprise Assessments

FOR the Regents of the University of California

Date 12/12/2022

Craig S. Leasure, PhD
Vice President for National Laboratories
University of California
Office of the President