



Department of Energy

Washington, DC 20585

January 22, 2020

Dr. Martin Keller, Director
Alliance for Sustainable Energy, LLC
National Renewable Energy Laboratory
15013 Denver West Parkway
Golden, Colorado 80401 8220

WEL-2020-01

Dear Dr. Keller:

The Office of Enterprise Assessments' Office of Enforcement has completed an evaluation of an electrical shock event that occurred on June 14, 2019, at the National Renewable Energy Laboratory's (NREL) Field Test Laboratory Building, during which a researcher received a shock to his left hand and chest from a 277-volt power source. The source of the electrical shock was an energized wire supporting the insulating jacket around an in-house built NREL Research Gasifier (NRG) system furnace. Alliance for Sustainable Energy, LLC (Alliance) reported noncompliances associated with the incident into the Department of Energy's Noncompliance Tracking System (NTS) on August 15, 2019, under NTS-EE-GO-ASE-BOP-2019-0009825 - *Employee receives electrical shock on insulation retaining wire.*

During this evaluation, the Office of Enforcement also reviewed other recent electrical safety-related events that have occurred at NREL over the past two years to determine if there may be broader programmatic deficiencies in Alliance's implementation of the electrical safety requirements prescribed under 10 C.F.R. Part 851, *Worker Safety and Health Program*. The Office of Enforcement identified one other electrical shock event that occurred on October 18, 2018. Noncompliances associated with the event were reported into the NTS on March 7, 2019, under NTS-EE-GO-ASE-BOP-2019-0008739 - *Employee receives shock while adjusting a research furnace.* In this event, a researcher received an electrical shock to her left hand from an exposed conductor while preparing an experimental sample to run in a furnace (AMI-390 Three Station Catalyst Characterization System) in the Field Test Laboratory Building.

The Office of Enforcement's evaluation of both electrical shock events identified concerns that warrant management attention regarding Alliance's implementation of 10 C.F.R. Part 851, *Worker Safety and Health Program* requirements.



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The Office of Enforcement's review revealed that Alliance did not adequately identify and assess potential electrical hazards for both in-house built and commercial equipment. The NRG is an NREL-built system and the design review, approval, and commissioning process did not identify the potential hazard associated with the proximity of a metal wire fastener to a heater lead electrical terminal during the initial construction of the system in 2009 and that electrical tape applied to the terminal was not rated for the high operating temperature of the furnace. Degradation of the electrical tape subsequently exposed the fastener and insulation retaining wire to electrical voltage. Additionally, subsequent safety assessments and system reconfigurations of the NRG did not identify the hazardous condition. Regarding the AMI-390 Three Station Catalyst Characterization System, periodic electrical safety inspections, service/preventive maintenance, and testing did not identify that a section of energized wire was not covered by insulation. Both furnaces involved in the electrical shock events are over 10 years old and periodic inspections, maintenance, and testing did not identify the defective conditions that exposed employees to electrical hazards.

Finally, Alliance did not implement effective training to communicate the need for immediate medical attention following electrical shock events. Actions taken by both researchers after receiving an electrical shock resulted in delayed medical evaluation. In the June 14, 2019, event, rather than immediately reporting to the clinic, the researcher and co-worker went to the Environment, Safety, and Health office and presented to the clinic approximately 20 minutes after the electrical shock for evaluation. In the October 18, 2018, event, the researcher continued to set-up the experiment, initiated the computer program to start the furnace heating, and then reported the incident to the line manager.

The Office of Enforcement acknowledges that Alliance is conducting an extent-of-condition review to identify other insulated equipment that may have hidden electrical hazards under thermal insulation. However, the performance deficiencies identified above demonstrate that there may be potential weaknesses in Alliance's hazard recognition, identification, and assessment processes, and effective communication of the importance in seeking immediate medical attention after receiving an electrical shock. These deficiencies reveal potential violations of 10 C.F.R. Part 851, *Worker Safety and Health Program*.

The Office of Enforcement has elected to issue this Enforcement Letter to convey concerns regarding Alliance's worker safety and health program. Issuance of this Enforcement Letter reflects DOE's decision to not pursue further enforcement activity against Alliance at this time. In coordination with the Office of Energy Efficiency and Renewable Energy and the Golden Field Office, the Office of Enforcement will continue to monitor Alliance's efforts to maintain a safe workplace.

This letter imposes no requirements on Alliance and no response is required. If you have any questions, please contact me at (301) 903-7707.

Sincerely,

A handwritten signature in black ink that reads "Kevin L. Dressman". The signature is fluid and cursive, with a long horizontal flourish extending to the right.

Kevin L. Dressman

Director

Office of Enforcement

Office of Enterprise Assessments

cc: Derek Passarelli, GFO
Heath Garrison, Alliance