STATE OF HAWAII
DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS
OCCUPATIONAL SAFETY & HEALTH DIVISION

In the Matter of: UH – School of Earth & Science Technology Hawaii
Natural Energy Institute Inc
Inspection No. 1133727
Inspection Site: 1680 East West Rd POST 802
Honolulu, HI 96822

SETTLEMENT AGREEMENT

The undersigned Employer and the Director of the Department of Labor and Industrial Relations, Hawaii Occupational Safety and Health Division (HIOSH), in settlement of the Citation and Notification of Penalty (Citation), issued on September 16, 2016, as a result of the above inspection hereby agree as follows:

1. The Employer and Director agree that the citation(s) and penalties are re-grouped and amended as follows:

<table>
<thead>
<tr>
<th>Citation 1, Item 1</th>
<th>$7,700.00</th>
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<tbody>
<tr>
<td>Citation 1, Item 2</td>
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<td>Citation 1, Item 3</td>
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<td>Citation 1, Item 4</td>
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<td>Citation 1, Items 5a &amp; 5b (Previously Items 5 &amp; 6)</td>
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<tr>
<td>Citation 1, Items 6a &amp; 6b (Previously Items 7 &amp; 8)</td>
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<td>Citation 1, Item 7 (Previously Item 9)</td>
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<td>Citation 1, Items 8a &amp; 8b (Previously Items 10 &amp; 11)</td>
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<tr>
<td>Citation 1, Items 9a – 9d (Previously Items 12-15)</td>
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<td>TOTAL</td>
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2. The penalty reduction is in consideration of the Employer’s prompt abatement of the cited hazards and efforts to prevent their recurrence.

3. The Director agrees to amend the following Alleged Violation Descriptions (AVD) as follows:

Citation 1 Item 1
AVD shall be amended to read:

12-60-2(a)(3) of the Hawaii Administrative Rules (HAR): Every employer shall provide safe work places and practices by elimination or reduction of existing or potential hazards. Elimination of existing or potential hazards by design, process substitution, or other appropriate methods is preferred because it eliminates the need for further employee protection. When elimination is not feasible, reduction of existing or potential hazards to acceptable
levels, using methods such as engineering or administrative controls, isolation, or guarding, shall be promptly used. When these methods are inadequate to reach acceptable levels, personal protective equipment shall be provided and used.

POST Bldg. Lab 30 and adjacent areas - The employer failed to provide a safe work place by reducing employee exposure to potential explosion and fire hazards. On or about March 16, 2016, laboratory personnel mixed compressed gases from hydrogen, carbon dioxide and oxygen cylinders into a 13 gallon Speedaire tank equipped with an Ashcroft digital gauge to produce feedstock gas for research.

Between February 1, 2016 thru March 16, 2016, laboratory personnel utilized various ratios of the previously identified gases in their research efforts without conducting a hazard assessment and creating a written operating procedure. Feedstock gas meeting the parameters of the research would provide continual feeding of the microorganism to provide biofuels and bioplastics. The digital gauge used on the 13 gallon Speedaire tank at the time of the explosion was not evaluated as a possible ignition source and the tank itself was not evaluated for use with flammable gases.

The failure to eliminate and or reduce explosion hazards may have contributed to a severe injury to a Post Doctorate Researcher, nearly a million dollars of damage and evacuation of occupants and employees of the SOEST building on March 16, 2016. Feasible means of abatement might include decreasing the amount of hydrogen and other flammable gases in the laboratory and utilizing consensus standards (CGA, NFPA, ANSI/AIAA). The consensus standards refer to the following protective measures including but not limited to, shielding (Blast Barriers or similar), pressure equipment design, pressure relief venting to a safe location, fire protection, electrical bonding and grounding, physical spacing, use of appropriate equipment, labeling, and maintenance procedures for work with hydrogen of such quantities.

Citation 1 Item 2
AVD shall be amended to read:

12-60-2(b)(2)(B), HAR: The employer shall ensure that practices are understood by all employees and are underscored through training, positive reinforcement, correction of unsafe performance, and, if necessary, through a clearly defined and communicated disciplinary system.
POST Bldg. Lab 30 and adjacent areas - The employer did not ensure that its safety practices were followed by employees and underscored through training, positive reinforcement and a clearly defined and communicated disciplinary system. The following practices were not being followed by employees:

1) Inspection reports for January 4, 2016 at POST 06 and on January 12, 2016 at POST 30 were not issued to Principal Investigators at the conclusion of the inspections.

2) Abatement responses to EHSO Inspections by Principal Investigators conducted on January 4, 2016 at POST 06 and on January 12, 2016 at POST 30 were not turned in within the 30 day period with signature and corrections by Principal Investigators as required by the employer.

3) Laboratory personnel checklist training provided to all lab personnel was not always filled out (signed by Post-Doctoral Researcher) and available for EHSO review as required by the employer.

4) Inventory chemical lists for POST 30 was not updated.

5) Departmental level responsibilities include oversight over the Principal Investigators to ensure compliance with the University's safety and health requirements.

The above mentioned practices/procedures were developed by the employer to address safety and health issues in the laboratory. Failure to adhere to the abovementioned practices undermines the employer's safety and health program.

Citation 1 Item 3
AVD shall be amended to read:

12-60-2(b)(3), HAR: The employer shall conduct periodic in-house safety and health inspections so that new or previously missed hazards or failures in engineering, work practice, and administrative controls are identified. The in-house inspections will be conducted by individuals who are trained to recognize hazardous conditions, as members of the safety and health committee or a person designated and trained by the employer for the facility safety and health program.

POST Bldg. Lab 30 - The employer did not ensure periodic in house inspections were being performed in HNEI Laboratories to determine new or previously missed hazards.
Annual inspections conducted by the EHSO do not provide enough frequency to account for frequent changes in engineering and work practice controls occurring the laboratory. Inspections were not conducted by someone trained to recognize the specific hazards, if any, associated with the following engineering change and the work practice change.

No inspections were conducted to determine if the design change to a 13 gallon intermediate tank used to hold compressed hydrogen, carbon dioxide and oxygen was appropriate for use with flammable mixtures.

No inspections were conducted to determine if the design change from an analog gauge to a digital gauge was appropriate for use with potentially flammable mixtures.

The aforementioned demonstrates one instance for the employer to ensure that inspection frequency and inspector qualifications meet the demands of the employer's safety and health program.

Citation 1 Item 4
AVD shall be amended to read:

12-60-2(b)(4)(C), HAR: The employer shall ensure that the supervisors and managers understand their responsibilities under the safety and health program and their importance to the safety and health of the workplace. In particular, the training for managers and supervisors shall enable them to: Recognize potential hazards; Maintain safety and health protection in the work area; and Reinforce employee training on the nature of the potential hazards and required protective measures.

POST Bldg. Lab 30 - Laboratory personnel working under the Principal Investigator did not use the required PPE at all times required. No progressive disciplinary action initiated or documented by the Principal Investigator. No retraining provided to Principal Investigator to ensure that safety and health protections are maintained in the laboratory, specifically that Principal Investigator enforces the mandatory use of PPE and other safety and health requirements.

Principal Investigator responsibilities per the chemical hygiene plan include a recognition of potential hazards to include addressing PPE non-compliance issues in the laboratory after repeated violations. Director responsibilities per the chemical hygiene plan include a recognition that maintaining chemical inventories are current for all laboratories under the HNEI. The aforementioned responsibilities were not clearly understood by Principal Investigator and Director prior to March 16, 2016.
Settlement Agreement  
UH – School of Earth & Science Technology Hawaii Natural Energy Institute Inc  
Page 5

Citation 1 Item 6a (previously identified as Citation 1, Item 7)  
AVD shall be amended to read:

29 CFR 1910.38(c)(4) [Refer to 12-60-50(a), HAR]: Minimum elements of an emergency action plan. An emergency action plan must include at a minimum: Procedures to account for all employees after evacuation.

HNEI Labs in POST Bldg. - The employer's emergency action plan(s) did not list the evacuation meeting point nor a way to account for the evacuees. At the laboratory level, no written plan was in place for the lab occupants to follow in particular no specific procedures for an uncontrolled chemical release.

4. Except for the agreed upon amendments described above, the Citation is confirmed in all other respects.

5. The Employer, by signing this Settlement Agreement, hereby waives its rights to contest the original citation(s) and penalties, and as amended in this agreement.

6. The Employer agrees to immediately post a copy of this Settlement Agreement in a prominent place at or near the location of the violation(s) referred to above. This Settlement Agreement must remain posted until the violations cited have been corrected, or for 3 working days, whichever is longer.

7. The Employer agrees to continue to comply with the Hawaii Occupational Safety and Health Law and the applicable safety and health standards.

8. By entering into this agreement, the Employer does not admit that it violated the cited standards for any litigation or purpose other than a subsequent proceeding under the Hawaii Occupational Safety and Health Law.

9. The Employer agrees:
   a. to pay the assessed penalties as modified herein within 20 days of the date this agreement is executed; and,
   b. to pay reasonable attorney's fees and costs if the Employer defaults on the payment of the penalties and Director institutes legal action to recover the unpaid penalties.
10. This Settlement Agreement shall be considered a final order of the Director of the Department of Labor and Industrial Relations.

Jan Gouveia, Vice President for Administration, University of Hawaii
Date: 10/05/2016

Tin Shing Chao, Manager
Occupational Health Branch
Date: 10/6/16

Richard Rocheleau, Director of Hawaii Natural Energy Institute, School of Earth & Science Technology
University of Hawaii
Date: 10/6/16