



## Department of Energy

Washington DC 20585

November 30, 2009

Dr. Samuel Aronson  
Director  
Brookhaven National Laboratory  
40 Brookhaven Avenue  
Upton, New York 11973-5000

WCO-2009-01

Dear Dr. Aronson:

This letter refers to the U.S. Department of Energy's (DOE) Office of Health, Safety and Security's, Office of Enforcement evaluation of Brookhaven Science Associate's (BSA) investigation and response to the October 13, 2008, propane gas explosion that destroyed building 637, well house number 12, at the Brookhaven National Laboratory. By letter dated May 26, 2009, BSA requested DOE consideration of a Consent Order with respect to the safety issues associated with this event.

Fortunately, no injuries resulted from this catastrophic event. Following the event, BSA promptly secured the incident scene and initiated an investigation. Contrary to these immediate initial actions, however, the potential regulatory implications associated with this event were not self-identified and reported to DOE in a timely manner. BSA waited until the first phase of a protracted investigation effort was completed to report the event and potential regulatory noncompliances into DOE's Noncompliance Tracking System on February 6, 2009.

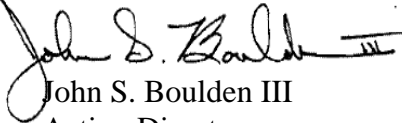
DOE has evaluated the results of BSA's investigation and analysis of the event and finds that they represent a comprehensive and thorough evaluation of the deficiencies leading to the well house explosion. The investigation identified safety-related deficiencies in facility design, configuration management, hazard identification, hazard controls, training and qualifications, and adherence to work order instructions. Therefore, despite concerns with timeliness in reporting and completing a causal analysis and extent of condition review, the Office of Enforcement concludes that an investigation into this event by DOE is not warranted. Pursuant to section 234C of the Atomic Energy Act, as amended, 42 U.S.C. § 2282c, and DOE regulations at 10 C.F.R. Part 851, *Worker Safety and Health Program*, DOE hereby elects to issue this Consent Order to BSA in lieu of pursuing other enforcement options. Under this Consent Order, BSA agrees to remit a \$250,000 monetary remedy, payable to the Treasurer of the United States, in accordance with the directions in the enclosed order.



In choosing to issue this Consent Order, the Office of Enforcement has exercised significant latitude based on the broad extent of your investigative efforts and corrective actions. DOE has taken this approach in part to allow BSA to sustain momentum in implementing corrective actions expeditiously. In accordance with the terms and conditions of the enclosed Consent Order, any changes to the corrective actions or target completion dates shall receive prior approval by the Manager, Brookhaven Site Office.

Enclosed are two signed copies of the Consent Order. Please sign both, keep one for your records, and return the other to this office within one week from the date of receipt of this order. Other than submission of the settlement amount and signed copy of the Consent Order, no written response to this letter is required.

Sincerely,

A handwritten signature in black ink, appearing to read "John S. Boulden III". The signature is written in a cursive style with a horizontal line at the end.

John S. Boulden III  
Acting Director  
Office of Enforcement  
Office of Health, Safety and Security

Enclosures

cc: William Brinkman, SC-1  
Michael Bebon, BSA  
Charles Dimino, BSA  
Richard Azzaro, DNFSB

In the matter of ) Report No. NTS--BHSO-BNL-BNL-2009-0002  
)  
Brookhaven Science Associates )  
)  
) Consent Order 2009-01

CONSENT ORDER INCORPORATING AGREEMENT BETWEEN  
U.S. DEPARTMENT OF ENERGY AND BROOKHAVEN SCIENCE ASSOCIATES

I

Brookhaven Science Associates (BSA) operates the Brookhaven National Laboratory (BNL) for the Department of Energy (DOE), and is a limited-liability company founded by Stony Brook University and Battelle, a nonprofit, applied science and technology organization.

II

At approximately 9:35 p.m. on October 13, 2008, an explosion occurred in building 637, well house number 12, due to a propane gas leak that was ignited by a component in the motor control center. The explosion demolished the 640 square foot building and propelled debris 30 feet outward, but there were no injuries. Well house number 12 supported one of six wells that provide potable water to BNL. It contained a well pump with electric motor, an auxiliary engine powered by propane gas, and two tanks containing water treatment chemicals. The two chemical storage tanks, one containing sodium hydroxide and the other containing sodium hypochlorite, survived the explosion intact. A 1,000 gallon tank that supplied propane gas to the auxiliary engine, which was located 45 feet from the building, was also undamaged by the explosion.

At approximately 3:00 p.m. on the day of the explosion, an operator entered the normally unoccupied building to perform repair work on the auxiliary drive engine. The repairs were not completed by the end of the work shift, and the system was locked and tagged out, and the building secured. It is believed that the propane was released through the carburetion system of the auxiliary drive engine due to inadvertent activation of the propane solenoid by the operator.

BNL police heard the explosion and initiated incident response by contacting the BNL Fire Rescue Group to request assistance. Upon arrival at the explosion site, Fire Rescue determined that there were no casualties and secured the propane gas supply. BSA activated the Emergency Operations Center and managed the incident as an Operational Emergency in accordance with the site emergency plan. Shortly after 12:00 a.m., the incident scene was determined to be stable and secure for subsequent investigation.

The day after the explosion, the BSA Assistant Laboratory Director for Environment, Safety and Health formally appointed an investigation committee to determine the cause of the explosion. Later that day, the propane systems associated with other well houses were secured. While the investigation was initiated promptly, its completion was protracted. A first phase consisting of a technical and engineering evaluation of the event was completed in late January 2009 following a recommendation from the DOE Brookhaven Site Office (BHSO) to apply additional analysis techniques in the investigation. Phase II of the investigation consisted of a causal analysis that was performed with the assistance of expertise from outside the laboratory and was broadly focused on management systems and human performance. The phase II causal analysis report was not issued until five months after the explosion, and a corrective action plan for the phase I and phase II reports was not completed until April 30, 2009. Further investigative and analytical efforts included an extent of condition review report that was issued on June 1, 2009, and an extent of cause review that was completed in September 2009. In the meantime, BSA also completed a code-based inspection of all real property propane systems on site.

BSA's investigation into this event identified deficiencies in facility design, configuration management, hazard identification, hazard controls, training and qualifications, and adherence to work order instructions. Specifically, the well house was not designed in accordance with National Fire Protection Association 37, *Stationary Combustion Engines and Gas Turbines*; its configuration was never documented and maintained, which resulted in a failure to identify that interlocks for the auxiliary drive engine were bypassed sometime after installation; propane was not identified as a hazard in work planning and control documents; operators were not trained on auxiliary drive engine operation and maintenance or propane hazards; and lockout/tagout of the auxiliary drive engine was not adequate. The investigation also identified that recent changes to work order instructions to correctly identify the drive engines as propane-fueled rather than diesel-fueled were not adequately communicated to maintenance workers. This change was implemented in response to a January 2008 BSA assessment of diesel/gas engine potable well water pumps that included a walkthrough of building 637.

### III

BSA voluntarily reported this matter to DOE via the Noncompliance Tracking System (NTS-BHSO-BNL-BNL-2009-0002), but it was not reported in a timely manner as the NTS report was submitted on February 6, 2009.

Despite concerns with timeliness, DOE has evaluated the results of BSA's investigation, causal analysis, and extent of condition review and has concluded that the findings and conclusions with respect to the well house explosion are comprehensive. DOE finds that the evaluations are thorough, disclose the relevant facts, including identification of potential violations of worker safety and health requirements, and objectively assess the actual, potential, and programmatic safety significance of these potential violations. DOE's evaluation of BSA's investigation of this event leads DOE to conclude that a full independent investigation by DOE is not warranted.

DOE has also evaluated and agrees with the adequacy of the corrective actions completed to date and those proposed by BSA in the above referenced NTS report. DOE notes, however, that the schedule for implementing the corrective actions is extended in that some of the actions will not be completed until late calendar year 2010. In addition, some corrective actions have only recently been identified in response to the extent of cause review. In consideration of these factors, BSA agrees to provide DOE with written updates on the status of corrective action implementation not less than once per calendar quarter until all of the corrective actions are completed, including those actions being managed under work breakdown structure 2.4.1 of the *BSA Management Plan for Laboratory Response to Propane Explosion at Well House #12*.

#### IV

DOE and BSA have agreed to issuance of this Consent Order to avoid potentially protracted and otherwise unnecessary additional investigation by DOE and possible enforcement proceedings that could result in a Notice of Violation and the imposition of a civil penalty.

#### V

DOE acknowledges that BSA's execution of, and payment in accordance with, this Consent Order does not constitute or imply admission by BSA of potential regulatory violations. DOE and BSA agree that the sum paid by BSA to resolve this matter shall not be considered a reimbursable cost. Pursuant to 41 U.S.C. § 256(k) and the implementing provisions of 48 C.F.R. § 31.205-47, *Federal Acquisition Regulation*, DOE and BSA further agree that all costs incurred by, for, or on behalf of BSA relating to DOE's initial actions to investigate the matter covered by this Consent Order shall be treated as unallowable under Contract No. DE-AC02-98CH10886 between DOE and BSA.

#### VI

This Consent Order is issued pursuant to Section 234C of the Atomic Energy Act of 1954, as amended (42 U.S.C. § 2282c), and 10 C.F.R. § 851.41. BSA agrees to pay to the Treasurer of the United States (Account Number 891099) an amount of \$250,000 reflecting an agreed amount in lieu of any subsequent investigation and possible Notice of Violation.

#### VII

DOE agrees to not pursue an enforcement action, civil penalty, or contract fee reduction for any potential worker safety and health violations pertaining to the referenced matters. However, DOE reserves the right to comment on the well house number 12 explosion in DOE's annual performance evaluation of BSA. DOE may subsequently consider enforcement action if it later becomes known that any of the facts or information provided regarding the described events are false or inaccurate in any material way.

This Consent Order does not preclude DOE from conducting an investigation or pursuing enforcement action against BSA for: (1) incidents or conditions other than described in the

above referenced NTS report, or (2) a failure to complete the corrective actions as outlined in the above NTS report.

### VIII

ACCORDINGLY, it is hereby ordered as follows:

1. BSA will proceed with the corrective actions detailed in NTS report NTS--BHSO-BNL-BNL-2009-0002 and the corrective actions identified pursuant to action #70 of the NTS report. BSA will provide written updates on the status of corrective action implementation to BHSO not less than once per calendar quarter until all corrective actions are complete. BSA will provide objective evidence of corrective action completion to BHSO for each corrective action identified in the NTS report no later than the NTS report target date for that action. Further, BSA will provide objective evidence of corrective action completion, no later than the BNL verification date, to BHSO for each corrective action identified in the aforementioned BSA Management Plan pursuant to action #70 of the NTS report. Any required changes to the corrective actions or associated target completion dates shall receive prior approval by the BHSO Manager. Any failure by BSA to timely complete such corrective actions or provide written updates on corrective action status in accordance with this Consent Order may, at the sole discretion of DOE, constitute a sufficient basis to reopen the investigation with respect to the subject potential violations.
2. BSA agrees to remit \$250,000 by check, draft, or money order payable to the Treasurer of the United States (Account Number 891099) within 15 days of the issuance of this Consent Order. Payment shall be sent by overnight carrier to the Director, Office of Enforcement, at the following address:  
  
Director, Office of Enforcement  
Attention: Office of the Docketing Clerk  
HS-40  
U.S. Department of Energy  
19901 Germantown Road  
Germantown, MD 20874-1290
3. Upon completion and verification of all corrective actions to the satisfaction of DOE, the payment made to DOE under this Consent Order shall completely resolve and serve as a full and final settlement of any and all enforcement actions taken under 10 C.F.R. Part 851 arising from the referenced NTS report.
4. This Consent Order shall become a Final Order upon receipt of said amount referenced in item 2 above.

BSA waives any and all rights to appeal or otherwise seek judicial review of this Consent Order. However, DOE and BSA retain the right to judicially enforce the provisions herein by all legal means.

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

FOR DOE Office of Enforcement

FOR DOE Brookhaven Site Office

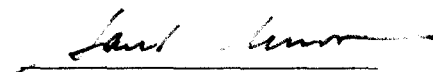


John S. Boulden III  
Acting Director  
Office of Enforcement



Michael D. Holland  
Manager  
Brookhaven Site Office

FOR Brookhaven Science Associates



Samuel Aronson, Ph.D.  
Director  
Brookhaven National Laboratory