



Department of Energy
Washington, DC 20585

March 20, 2008

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. John J. Grossenbacher
President and Laboratory Director
Battelle Energy Alliance, LLC
Idaho National Laboratory
2525 Fremont Avenue
Idaho Falls, Idaho 83415-3695

WEA-2008-01

Dear Mr. Grossenbacher:

This letter refers to the Department of Energy (DOE) investigation into the facts and circumstances associated with the fume hood fire that occurred in building TRA-668 at the Reactor Technology Complex on June 12, 2007, and the electrical shock of two firefighters responding to a wildland fire at the Idaho National Laboratory on July 14, 2007. The results of our investigation were discussed with you and members of your staff on November 8, 2007, the final day of the onsite portion of our investigation, and provided to you in an Investigation Report dated December 5, 2007.

Based on our evaluation of the evidence in this matter, including written comments provided in your letter of January 3, 2008, regarding the factual accuracy of our investigation report, DOE has concluded that violations of 10 C.F.R. Part 851, *Worker Safety and Health Program*, have occurred. Accordingly, DOE is issuing the enclosed Preliminary Notice of Violation (PNOV) with four violations categorized as Severity Level I and one violation categorized as Severity Level II. DOE elected to handle this matter through a contract action under Contract No. DE-AC07-05ID14517. The Idaho Operations Office reduced the earned fee in the amount of \$250,000 in your end-of-year contract performance evaluation. This constitutes a penalty under 10 C.F.R. Part 851 for the violations identified in this PNOV.

DOE views the violations associated with both events as having high safety significance. Although the burns sustained by the chemist performing the Portable Isotopic Neutron Spectroscopy (PINS) simulant chemical operations were minor, the severity of the burns was likely reduced because the chemist was wearing a second set of gloves, which were not prescribed by the governing work control document. The fire was sufficiently intense to melt other containers in the



fume hood, some of which contained oxidizers. Oxidizing substances can be explosive when mixed with red phosphorus, the chemical that initiated the fire. In addition, it is fortuitous that the chemist, the workers who were treated for smoke inhalation, and other workers who were exposed to the smoke do not appear to have suffered more serious health effects given that red phosphorus emits toxic byproducts, including phosphine gas, when involved in a fire.

DOE is particularly concerned that corrective actions taken in response to previous events, involving deficiencies in work control and utilizing the independent hazard review process, were not effective in improving the process to the degree necessary to prevent the fume hood fire. This includes corrective actions related to work scope definition, hazard recognition, hazard mitigation, and the roles and responsibilities of principal investigators, laboratory managers, and laboratory space coordinators/custodians; all of which were contributing factors in this event. Furthermore, although your investigation into the fume hood fire was formal and detailed, DOE determined that the corrective actions from your investigation were too narrowly focused and that an additional causal factor and three judgments of need warranted attention in order to prevent recurrence of the same or similar types of process failures. Based on these factors, and the fact that this was a self-disclosing event, DOE determined that no mitigation was warranted for this event. DOE positively views your efforts to identify and substitute alternative materials in the PINS simulant formulas to eliminate the use of red phosphorus and other hazardous materials, thereby reducing the hazards to workers. DOE notes, however, that this initiative was not part of your corrective action plan, and thus has not been formally extended to other projects involving hazardous chemicals.

The two firefighters who were shocked by the electrical energy, which was transferred from a 69-kilovolt power line to their response vehicle and equipment, could have been electrocuted. Furthermore, DOE remains very concerned that longstanding problems with the site's radio communications system have not been fully resolved. Although some compensatory measures have been enacted, DOE believes that continued and aggressive effort is needed to ensure that the safety of workers and responders is not jeopardized by communications equipment failures during emergencies. Therefore, while your investigation into this event was thorough and generally resulted in a broad set of well-considered corrective actions, DOE determined that partial (rather than full) corrective action mitigation was warranted for the fire protection violation associated with this event.

Pursuant to 10 C.F.R. § 851.42, *Preliminary Notice of Violation*, you are obligated to submit a written reply within 30 calendar days of receipt of the enclosed PNOV, and to follow the instructions specified in the PNOV when preparing your response. If no reply is submitted within 30 days, in accordance with 10 C.F.R. § 851.42(d)(2), this PNOV will constitute a final order. You may also request that the Director, Office of Enforcement, convene an enforcement conference to discuss this PNOV, but such a request does not alter your obligation

to submit a written reply within 30 calendar days. After reviewing your response to the PNOV, including any proposed additional corrective actions entered into the Noncompliance Tracking System, DOE will determine whether further enforcement action is necessary to ensure compliance with DOE worker safety and health requirements. DOE will continue to monitor the completion of corrective actions until these matters are resolved.

Sincerely,



Arnold E. Guevara

Director

Office of Enforcement

Office of Health, Safety and Security

Enclosure

cc: Al Wagner, BEA
Richard Azzaro, DNFSB

Preliminary Notice of Violation

Battelle Energy Alliance, LLC
Idaho National Laboratory

WEA-2008-01

As a result of a Department of Energy (DOE) investigation into two worker safety and health events involving Battelle Energy Alliance, LLC (BEA) at the Idaho National Laboratory (INL), DOE identified multiple violations of DOE worker safety and health requirements. The events included: (1) the June 12, 2007, fume hood fire that occurred in Laboratory 98 of building TRA-668 at the Reactor Technology Complex; and (2) the July 14, 2007, electrical shock of two firefighters during the response to a wildland fire.

The violations involved deficiencies in hazard identification and evaluation, hazard prevention and abatement, training and information, adherence to procedures, and fire safety and emergency response. The associated violations have been grouped and categorized as four Severity Level I violations and one Severity Level II violation. As agreed to by the Director, Office of Enforcement, the Idaho Operations Office reduced BEA's earned fee by \$250,000 in accordance with 10 C.F.R. § 851.5(b) as the remedy for these violations.

In accordance with 10 C.F.R. Part 851, Appendix B, *General Statement of Enforcement Policy*, the violations are listed below.

VIOLATIONS

I. Reactor Technology Complex, Building TRA-668, Laboratory 98 – Fume Hood Fire

A. Hazard Identification and Assessment

Title 10 C.F.R. § 851.21(a) requires that “[c]ontractors must establish procedures to identify existing and potential workplace hazards and assess the risk of associated workers injury and illness” and that procedures must include methods to “(5) [e]valuate operations, procedures, and facilities to identify workplace hazards.”

Title 10 C.F.R. § 851.24 requires that “(a) [c]ontractors must have a structured approach to their worker safety and health program which at a minimum, include provisions for ... fire protection” and that “(b) ... contractors must comply with the applicable standards and provisions in Appendix A of this part, entitled Worker Safety and Health Functional Areas.” Appendix A, section 2, Fire Protection, states that “(a) [c]ontractors must implement a

comprehensive fire safety and emergency response program to protect workers commensurate with the nature of the work that is performed,” and that “(b) [a]n acceptable fire protection program ... includes meeting applicable building codes and National Fire Protection Association [NFPA] codes and standards.” NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals*, 2004 edition, governs laboratory operations involving hazardous chemicals.

NFPA 45, section 12.1.1.1 requires that “[b]efore laboratory tests or chemical reactions are begun, evaluations shall be made for hazards that can be encountered or generated during the course of the work.” Paragraph 12.1.1.2 requires that “[e]valuations shall include the hazards associated with the properties and the reactivity of the materials used and any intermediate and end products that can be formed, hazards associated with the operation of the equipment at the operating conditions, and hazards associated with the proposed reactions.”

Contrary to the above, BEA failed to adequately evaluate Portable Isotopic Neutron Spectroscopy (PINS) simulant activities to identify the hazards in accordance with 10 C.F.R. Part 851 hazard identification and assessment requirements. Specific examples include the following:

1. BEA did not incorporate the fire hazards identified in version 1.4 of the Sigma-Aldrich material safety data sheet (MSDS) for red phosphorus, dated September 8, 2004, into Independent Hazard Review (IHR) Number 1117-05-RTC, dated June 6, 2005, which was the governing IHR for the PINS simulant chemical operations project. The MSDS identified the following characteristics and precautions related to red phosphorus:

- A flammability rating of 3
- An autoignition temperature of 260 degrees C
- Capable of creating a dust explosion
- Explosive when mixed with oxidizing substances
- Emits toxic fumes under fire conditions
- Use non-sparking tools
- Avoid shock and friction
- Avoid raising dust
- Avoid sulfur, oxidizing agents, oxygen.

Section G of the IHR, Hazard Assessment and Mitigation Plan, lists the task of working with phosphorus and identifies the only associated hazard as spilling the chemical and ingesting or inhaling it. Section G also identifies the task of working with high-temperature sources and surfaces as the only task with an associated hazard of thermal burns or fire. The IHR did not address the fire or explosion hazards associated with operations involving red phosphorus, flammable solids, finely divided powders or dusts, or metals or reactive non-metals, such as red phosphorus, with similar autoignition temperatures. The IHR also did not identify the toxic compounds that could be generated in the event of a fire, even though the MSDS warned that thermal decomposition of red phosphorus might produce toxic fumes (phosphorus oxides and/or phosphine), and that toxic fumes could be emitted under fire conditions.

2. Sulfur was identified on the red phosphorus MSDS as a material to avoid, but the PINS simulant formulation for "VX" nerve agent identified a chemical composition that included both red phosphorus and sulfur. BEA did not consider the combination of these chemicals as a potential hazard.
3. Historically, BEA had transferred 100 percent red phosphorus into wide mouth canisters. The fire occurred when, for the first time, 100 percent red phosphorus was transferred into a canister with a reduced opening (1/4-inch National Pipe Thread inlet). The filling procedure had been changed due to the reduced size of the canister opening. BEA did not recognize that this change required a modification to the IHR, in accordance with procedure MCP-3571, Independent Hazard Review, dated September 18, 2006.

Collectively, these deficiencies constitute a Severity Level I violation. As explained in 10 C.F.R. Part 851, appendix B, section VI(b)(1), "[a] Severity Level I violation is a serious violation. A serious violation shall be deemed to exist in a place of employment if there is a potential that death or serious physical harm could result from a condition which exists, or from one or more practices, means, methods, operations, or processes which have been adopted or are in use in such place of employment."

B. Hazard Prevention and Abatement

Title 10 C.F.R. § 851.22(a) requires that "[c]ontractors must establish and implement a hazard prevention and abatement process to ensure that all identified and potential hazards are prevented or abated in a timely manner;" that "(1) [f]or hazards identified either in the facility design or during the development of procedures, controls must be incorporated in the appropriate facility design or procedure;" and that contractors must "(2) . . . (iii) protect workers from dangerous safety and health conditions."

Title 10 C.F.R. § 851.23, *Safety and Health Standards*, requires compliance with 29 C.F.R. Part 1910, *Occupational Safety and Health Standards*, which includes 29 C.F.R. § 1910.1200, *Hazard Communication*, and 29 C.F.R. § 1910.1450, *Occupational Exposure to Hazardous Chemicals in Laboratories*.

Title 10 C.F.R. § 851.24 requires that "(a) [c]ontractors must have a structured approach to their worker safety and health program which at a minimum, include provisions for . . . fire protection" and that "(b) . . . contractors must comply with the applicable standards and provisions in Appendix A of this part, entitled Worker Safety and Health Functional Areas." Appendix A, section 2, Fire Protection, states that "(a) [c]ontractors must implement a comprehensive fire safety and emergency response program to protect workers commensurate with the nature of the work that is performed," and that "(b) [a]n acceptable fire protection program . . . includes meeting applicable building codes and National Fire Protection Association [NFPA] codes and standards." NFPA 10, *Standard for Portable Fire Extinguishers*, 2007 edition, governs the selection, installation, inspection, maintenance, and testing of portable extinguishing equipment; and NFPA 45, *Standard on Fire Protection for*

Laboratories Using Chemicals, 2004 edition, governs laboratory operations involving hazardous chemicals.

Contrary to the above, BEA failed to establish and implement controls in accordance with 10 C.F.R. Part 851 hazard prevention and abatement requirements to eliminate or abate the hazards associated with PINS simulant activities. Specific examples include the following:

1. NFPA 45, section 12.1.5.1 requires that “[m]ixing, grinding, stirring, and agitating operations involving flammable or combustible materials shall require the same precautions against fire as set forth in [section] 12.1.4,” which requires that such operations “shall be protected from ignition sources and shall be provided with ventilation that prevents the accumulation of an ignitable concentration of vapors in the work area.” Title 29 C.F.R. § 1910.1450, *Occupational Exposure to Hazardous Chemicals in Laboratories*, requires contractors to “(e)(1) . . . develop and carry out provisions of a written Chemical Hygiene Plan” that “(e)(3) . . . indicate[s] specific measures that the employer will take to ensure laboratory employee protection” including “(e)(3)(i) [s]tandard operating procedures relevant to safety and health considerations to be followed when laboratory work involves the use of hazardous chemicals.”

BEA’s Chemical Hygiene Plan, dated May 31, 2007, contains precautions for handling specific categories of chemicals, including finely divided metal powders, but does not include hazard controls for reactive non-metals, such as red phosphorus, in powder form. The hazard controls identified in the Chemical Hygiene Plan for finely divided metal powders could have been used for the PINS operations involving red phosphorus (which has flammability characteristics similar to finely divided metal powders), but were not listed in the IHR or implemented in the laboratory. The only engineering control identified in the IHR for working with phosphorus was to “[w]ork in hood if the chemical is more than an irritant.”

2. NFPA 45, section 9.3.2 states that “[h]andling of the materials shall conform to the manufacturer’s recommendations” and section 12.1.5.1 requires “[m]ixing, grinding, stirring, and agitating operations involving flammable or combustible materials shall require the same precautions against fire as set forth in [section] 12.1.4,” which requires that such operations “shall be protected from ignition sources and shall be provided with ventilation that prevents the accumulation of an ignitable concentration of vapors in the work area.”

The IHR does not contain any related hazard controls, even though the red phosphorus MSDS warns against using spark-producing tools, raising dust, and causing shock and friction. The chemist performing the PINS operations used a screwdriver, which is a tool capable of producing sparks, to tap the side of the funnel and canister, and red phosphorus dust was generated during transfer and filling operations. BEA did not employ bonding or grounding controls, which could have minimized, reduced, or eliminated separated charge accumulation.

3. NFPA 10, section 6.5.1 requires that "[f]ire extinguishers or extinguishing agents with Class D ratings shall be provided for fires involving combustible metals" and section 6.5.2 requires that "[f]ire extinguishers or extinguishing agents (media) shall be located not more than 75 [feet] (23 m) of travel distance from the Class D hazard."

Neither Class D fire extinguishers nor appropriate extinguishing agents were available at or near the laboratory where the work was being performed, even though the PINS project involved work with combustible metals, such as titanium sponge; the Sigma-Aldrich titanium sponge MSDS dated November 12, 2002, states "[u]se approved class D extinguishers or smother with dry sand, dry ground limestone or dry clay."

4. Title 29 C.F.R. § 1910.1200(g) requires that "(1) [c]hemical manufacturers and importers shall obtain or develop a [MSDS] for each hazardous chemical they produce," and that "(2) [e]ach [MSDS]... shall contain at least the following information: (i) [t]he identity used on the label, and . . . (C) [i]f the hazardous chemical is a mixture that has not been tested as a whole: . . . (3) [t]he chemical and common name(s) of all ingredients which have been determined to present a physical hazard when present in the mixture;" and "(xii) [t]he name, address and telephone number of the chemical manufacturer, importer, employer or other responsible party preparing or distributing the [MSDS], who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary."

BEA shipped PINS simulants to offsite users with MSDSs that did not match the labels on the PINS simulant canisters or contain the required information. While it is acceptable for BEA to provide an MSDS for each chemical constituent of a PINS simulant, these MSDSs are considered supplemental. BEA must produce a superordinate MSDS that identifies BEA as the manufacturer and contains the information identified in the above paragraph, beginning with 29 C.F.R. § 1910.1200(g)(2).

Collectively, these deficiencies constitute a Severity Level I violation. See 10 C.F.R. Part 851, appendix B section VI(b)(1).

C. Training and Information

Title 10 C.F.R. § 851.25(b) requires that "[t]he contractor must provide (1) [t]raining and information for new workers, before or at the time of initial assignment to a job involving exposure to a hazard; (2) [p]eriodic training as often as necessary to ensure that workers are adequately trained and informed; and (3) [a]dditional training when safety and health information or a change in workplace conditions indicates that a new or increased hazard exists."

Title 10 C.F.R. § 851.23, *Safety and Health Standards*, requires compliance with 29 C.F.R. Part 1910, *Occupational Safety and Health Standards*, which includes 29 C.F.R. § 1910.1450, *Occupational Exposure to Hazardous Chemicals in Laboratories*.

Contrary to the above, BEA failed to provide adequate training and information to its employees to fulfill 10 C.F.R. Part 851 training and information requirements. Specific examples include the following:

1. Title 29 C.F.R. § 1910.1450(f) states that “(1) [t]he employer shall provide employees with information and training to ensure that they are apprised of the hazards of chemicals present in their work area” and that “(4)(i) [e]mployee training shall include: . . . (B) the physical and health hazards of chemicals in the work area; and (C) the measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.”

The hazard identification and control training provided to the Lab 100 laboratory space coordinator/custodian (LSC) was ineffective in that the LSC, who was also a co-principal investigator on the 1997 PINS project IHR, failed to identify to the IHR review group the hazards of flammable solids and finely divided powders associated with the PINS chemicals.

The chemist performing the PINS operations was not effectively trained regarding measures to ensure protection from the physical hazards present in the workplace, including specific procedures; work practices and equipment necessary for proper bonding and grounding; and associated personal protective equipment, such as fire retardant gloves.

2. Title 29 C.F.R. § 1910.1450(f) states that “(1) [t]he employer shall provide employees with information and training to ensure that they are apprised of the hazards of chemicals present in their work area” and that “(2) [s]uch information shall be provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations.”

BEA procedure MCP-3571, Independent Hazard Review, identifies Form 361.25, Group Read and Sign Training Roster, as the mechanism used by the principal investigator to ensure the research team reviews and documents their understanding of the IHR.

Prior to the start of work, the intern assisting with the PINS project did not read and sign the IHR, which is the document that is intended to identify the processes, procedures, chemicals, and hazards associated with PINS operations and to communicate them to the workers.

Collectively, these deficiencies constitute a Severity Level II violation. As explained in 10 C.F.R. Part 851, appendix B, section VI(b)(2), “[a] Severity Level II violation is an other-than-serious violation . . . where the most serious injury or illness that would potentially result from a hazardous condition cannot reasonably be predicted to cause death or serious physical harm to employees but does have a direct relationship to their safety and health.”

D. General Requirements

Title 10 C.F.R. § 851.10 states that “(a) With respect to a covered workplace for which a contractor is responsible, the contractor must: . . . (2) [e]nsure that work is performed in accordance with: (i) [a]ll applicable requirements of this part; and (ii) [w]ith [sic] the worker safety and health program for that workplace.”

Contrary to the above, BEA failed to follow applicable general requirements in 10 C.F.R. Part 851, which include performing work in compliance with BEA’s approved Worker Safety and Health Program, dated May 25, 2007, and associated implementing procedures. Specific examples include the following:

1. The governing IHR for PINS operations required work to be conducted in a chemical fume hood, and authorized work to be performed only in Lab 100.

On June 11, 2007, the chemist filled five containers with titanium sponge on a benchtop in Lab 100 rather than in a fume hood as required.

On June 12, 2007, the intern filled a canister in Lab 100 on a benchtop rather than in a chemical fume hood as required.

On June 12, 2007, the chemist used Lab 98 to conduct the red phosphorus canister fill without permission or approval.

2. BEA procedure LWP-9500, Laboratory Excellence Program Organization and Administration, revision 1, dated March 29, 2007, identifies the responsibilities of laboratory managers (LM) and LSCs. LM responsibilities include: “[m]anage resources to maintain safe and compliant workspaces and conduct of [research and development] work;” “[h]ave general knowledge of research and related work being performed in assigned laboratory spaces with specific understanding of work hazards and expected mitigations;” and “[e]nsure supervision and observations are being conducted on adherence to established requirements in work control documents.” LSC responsibilities include: “[r]egularly observe work activities in their assigned space and act to correct any deficiencies observed (e.g., failure to follow procedures, practices, postings, and permits);” “[h]ave general knowledge of research and related work being performed in assigned laboratory spaces with specific understanding of work hazards and expected mitigations;” “[v]erify that prerequisites for start of work, such as training, are complete before authorizing work to start;” “[p]articipate in development of work control documents for the assigned laboratory space . . . ;” and “[l]imit laboratory work to that reviewed and authorized through INL work control processes.”

PINS operations have been conducted twice a year, on average, over the past 7 years. The Lab 100 LM and LSC failed to carry out their responsibilities by allowing the unauthorized use of Lab 98 to perform PINS project operations, failing to have a specific understanding of the hazards and hazard controls to be implemented, and not ensuring workers’ adherence to procedures.

Although the chemist routinely used Lab 98 for performing some PINS operations, the LSC for Lab 98 did not know that the work was being performed in Lab 98 and did not ensure that procedures were being followed.

3. LWP-9500 identifies the responsibilities of principal investigators (PIs), which include: "[r]egularly observe work activities in assigned work and act to correct any deficiencies observed (e.g., failure to follow procedures, practices, postings, and permits);" "[h]ave specific knowledge of work being performed in research and development projects, including the work hazards and expected mitigations;" "[d]evelop, initiate and/or participate in development of work control documents for the assigned laboratory space for new or modified work, engaging [subject matter experts] in the development of hazard mitigation;" "[e]nsure all involved project personnel are knowledgeable of the content and requirements of the approved work control documents, before work begins;" "[i]dentify and evaluate scope changes to research and development activities against scope approved by existing work control documents. If existing work control documents need modification, ensure new scope has been reviewed and approved prior to conducting the activity;" "[s]upervise and/or perform the conduct of laboratory work, ensure project personnel are following the established requirements in work control documents and other applicable requirements. Make corrections as necessary to work performance;" and "[s]top work upon observing a noncompliant condition, unsafe condition, or at-risk behavior or action associated with an item or work process that if not corrected, poses a threat to public or personnel safety, facility or process operations, quality or the environment."

The PI for the PINS project did not effectively implement these responsibilities. For example, the PI did not have specific knowledge of the flammability, toxicity, and static electricity hazards associated with red phosphorus and the associated hazard controls. The PI did not consider the change in canisters as a change in equipment that should have triggered an IHR review. The PI did not ensure that the chemist and intern followed procedures as established in work control documents, resulting in some filling operations being performed on benchtops instead of inside chemical fume hoods as required.

Collectively, these deficiencies constitute a Severity Level I violation. *See* 10 C.F.R. Part 851, appendix B, section VI(b)(1).

II. Firefighter Electrical Shock Event

A. Fire Protection

Title 10 C.F.R. § 851.24 requires that "(a) [c]ontractors must have a structured approach to their worker safety and health program which at a minimum, include provisions for ... fire protection" and that "(b) ... contractors must comply with the applicable standards and provisions in Appendix A of this part, entitled Worker Safety and Health Functional Areas." Appendix A, section 2, Fire Protection, states that "(a) [c]ontractors must implement a comprehensive fire safety and emergency response program to protect workers

commensurate with the nature of the work that is performed,” and that “(b) [a]n acceptable fire protection program ... includes meeting applicable building codes and National Fire Protection Association [NFPA] codes and standards.” The following NFPA codes and standards are applicable to fire department operations at INL and are identified as such in the BEA Worker Safety and Health Program, dated May 25, 2007:

- NFPA 1143, *Standard for Wildland Fire Management*, 2003 edition. NFPA 1143, Section 6.2.4.3 requires that all fireline actions comply with the National Wildfire Coordinating Group (NWCG) Incident Response Pocket Guide (IRPG), including the 10 “Standard Fire Orders” and 18 “Watch Out Situations.”
- NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 2007 edition.
- NFPA 1561, *Standard on Emergency Services Incident Management System*, 2005 edition.
- NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*, 2004 edition.

Contrary to the above, BEA failed to comply with 10 C.F.R. Part 851, appendix A, section 2 fire protection functional area requirements. Specific examples include the following:

1. NFPA 1143, chapter 6, addresses size-up operations. Section 6.3.2.1 requires that “[u]pon arrival at a fire incident, the IC [Incident Commander] shall determine the extent of the fire and its potential for becoming a major event.” Section 6.3.2.3 states “[t]he following conditions shall be addressed: (1) [s]pecial or unusual hazards or potential hazards.” The NWCG IRPG, 2006 edition, states on page 12, under Power Line Safety for Wildland Fires, that “[f]ire activity close to high voltage electrical transmission/distribution lines can cause multiple hazards which can electrocute or seriously injure firefighters. It is the responsibility of the IC and line supervisors to be aware of and communicate power line hazards to all resources. Contact power companies when power lines are threatened or involved.” The NWCG IRPG also warns at page 13 that “[h]eavy smoke and flames can cause arcs to ground.” NFPA 1500, section 8.3.3, states “[t]he incident commander shall evaluate the risk to members with respect to the purpose and potential results of their actions in each situation.” NFPA 1561, section 7.1.8, states “[t]he incident commander shall continually conduct a thorough situation evaluation,” and section 7.1.17 states “[t]he incident commander shall evaluate the risk to responders with respect to the purpose and potential results of their actions in each situation. In situations where the risk to emergency service responders is excessive, as defined in [section] 7.1.18, activities shall be limited to defensive operations.” Section 7.1.18 states “[t]he following risk management principles shall be utilized by the incident commander: (1) [a]ctivities that present a significant risk to the safety of responders shall be limited to situations where there is a potential to save endangered lives,” ... and “(3) [n]o risk to the safety of responders shall be acceptable

where there is no possibility to save lives or property.” Section 7.17.5 states “[s]upervisors shall be alert to recognize conditions and actions that create a hazard within their spans of control.” Section 7.17.9 states “[a]ll supervisors shall maintain a constant awareness of the position and function of all responders assigned to operate under their supervision.” IRPG Standard Fire Order #10 states “[f]ight fire aggressively, having provided for safety first,” and Watch Out Situation #1 cautions against “[f]ire not scouted and sized up.”

As Wildland Unit No. 1 arrived on scene, the Captain sized up the fire and reported approximately two to three acres of grass and sagebrush burning with heavy smoke and flame. All of the firefighters were aware of the power lines. The Captain and driver discussed how to approach the fire and reported their decision to the Battalion Chief, who arrived shortly thereafter and assumed command. However, these initial actions were insufficient in that the Captain and Battalion Chief did not adequately size up the fire prior to engagement. Although the location of the power lines with respect to the fire would suggest that they represented a potential hazard, BEA did not adequately consider the possible safety implications of the power lines during their response to the fire. The size-up did not fully consider uneven terrain, the presence of smoke between the road and the power lines, the existence of two sets of power lines, or potential arcing through smoke, all of which could have impacted firefighter safety.

2. NFPA 1143, section 6.3.3.1, states “[t]he IC shall deploy personnel and equipment to the incident according to strategic and tactical plans, within the priorities established for the incident, and with consideration for the safety of civilians and fire-fighting personnel.” In addition, NFPA 1561, section 7.1.2, states “[t]he incident commander shall ensure that adequate safety measures are in place.” IRPG Standard Fire Order #8 states “[g]ive clear instructions and insure they are understood.” BEA procedure MCP-4130, Wildland Fire Response, dated January 2, 2007, establishes instructions for the on-scene commander (in section 4.3.1.11) to “[b]rief all firefighters using the briefing checklist in the NWCG IRPG.”

BEA failed to provide a briefing, required prior to engaging the fire, using the NWCG IRPG checklist; therefore, clear instructions on how to fight the fire were not given or acknowledged as understood.

The Battalion Chief and Captain failed to mitigate the hazards posed by the power transmission line by not considering that the heavy smoke could cause arcing and reduced visibility; the two sets of power lines and uneven terrain made perspective difficult; and the location of the fire and the direction of burn could have been indicators of the source of the fire.

3. The Ground Tactics section of the NWCG IRPG, on page 13, states that “[n]ormal tactics apply when fire is more than 100 [feet] from power lines” and that “[h]eavy smoke and flames can cause arcs to ground.” It also states that “[d]irect attack must be abandoned within 100' of transmission lines.” Standard Fire Order #10 states “[f]ight fire

aggressively, having provided for safety first." Watch Out #5 states do not be "[u]ninformed on strategy, tactics, and hazards."

Tactical direction was given to directly attack the east and west flanks of the fire less than 100 feet from the power line, without full consideration of the safety of firefighting personnel.

4. NFPA 1710, section 5.7.6.1.2, requires that "[p]rior to the initiation of any wildland fire attack, the fire department shall have the capacity to establish a lookout(s), communications with all crew members, escape route(s), and safety zone(s) for vehicles and personnel." In addition, section 6.4.1 requires that "[t]he fire department shall have a reliable communications system to facilitate prompt delivery of public fire suppression, emergency medical services, and special operations." NFPA 1561, section 7.1.9, states "[t]he incident commander shall be responsible for controlling communications on the tactical, command, and designated emergency traffic channels for that incident." In addition, the IRPG requires the following precautions and response actions: Standard Fire Order #7 states "[m]aintain prompt communications with your forces, your supervisor and adjoining forces;" Standard Fire Order #9 states "[m]aintain control of your forces at all times;" and Watch Out #7 warns against having "[n]o communication link with crew members or supervisor."

During the fire, BEA did not have a reliable communications system and did not maintain prompt communications between supervisors and forces. Functional narrowband radio communications were not confirmed prior to engaging the fire and were not available immediately before and after the shock event. Inadequate means of communication also prevented the IC from maintaining control of forces.

Collectively, these deficiencies constitute a Severity Level I violation. See 10 C.F.R. Part 851, appendix B, section VI(b)(1).

REPLY

Pursuant to the provisions of 10 C.F.R. § 851.42, BEA is hereby obligated, within 30 calendar days of receipt of this Preliminary Notice of Violation (PNOV), to submit a written reply. Please send such reply by overnight carrier to the following address:

Director, Office of Enforcement
 Attention: Office of the Docketing Clerk
 270 Corporate Square Building
 U.S. Department of Energy
 19901 Germantown Road
 Germantown, MD 20874-1290

Copies should also be sent to the Assistant Secretary for Nuclear Energy and the Manager of the Idaho Operations Office. This reply should be clearly marked as a "Reply to a Preliminary Notice of Violation" and must include the following for each violation: (1) any facts,

explanations, and arguments which support a denial that the violation has occurred as alleged; (2) any extenuating circumstances or the reason why a proposed remedy should not be imposed or should be mitigated; and (3) a discussion of the relevant authorities that support the position asserted, including rulings, regulations, interpretations, and previous decisions issued by DOE. Copies of all relevant documents shall be submitted with the reply. Corrective actions that have been or will be taken to avoid further violations should be delineated with target and completion dates in DOE's Noncompliance Tracking System. Pursuant to 10 C.F.R. § 851.42(d), if BEA does not submit a written reply within 30 calendar days of receipt of this PNOV, BEA relinquishes any right to appeal any matter in this Notice and this PNOV will constitute a Final Order. You may be required to post a copy of this Notice in accordance with 10 C.F.R. § 851.42(e).



Arnold E. Guevara
Director
Office of Enforcement
Office of Health, Safety and Security

Washington, DC
this 20th day of March 2008