UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

September 30, 2009

EA-09-142

Richard F. Kayser, PhD
Special Assistant for Environment, Safety and Health
National Institute of Standards and Technology
Building 301, Room B111
Gaithersburg, MD 20899-1730

Dear Dr. Kayser,

On September 17, 2009, the NRC held a public exit meeting with the National Institute of Standards and Technology (NIST) in Boulder, Colorado, to discuss the apparent violations identified in the NRC special inspection of the plutonium contamination event that occurred on June 9, 2008. Ten apparent violations were discussed by the NRC representatives. The NRC's presentation and the meeting attendance list are enclosed.

During this meeting, NIST management discussed the following key areas, including actions taken to respond directly to the incident, actions taken to respond to issues identified by the city of Boulder and actions taken to strengthen safety at NIST-Boulder and at all NIST sites. A copy of your presentation is included as part of the meeting summary.

In addition, after the business session of the meeting, a city of Boulder representative discussed items proposed for inclusion into a Memorandum of Understanding between the City and NIST. These items were also outlined in a letter addressed to the NRC, copy enclosed.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

Should you have any questions concerning this matter, we will be pleased to discuss them with you.

Sincerely,

Vivian H. Campbell, Chief
Nuclear Materials Safety Branch A

Docket: 030-03732
License: 05-03166-05

Enclosures:
1. NRC's Presentation
2. NIST's Presentation
3. City of Boulder letter
4. Meeting Attendance List

Electronic distribution by RIV:
Regional Administrator (Elmo.Collins@nrc.gov)
Deputy Regional Administrator (Chuck.Casto@nrc.gov)
DNMS Director (Art.Howell@nrc.gov)
DNMS Deputy Director (Chuck.Cain@nrc.gov)
FSME (James.Luehman@nrc.gov)
FSME (Sami.Sherbini@nrc.gov)
Public Affairs Officer (Victor.Dricks@nrc.gov)
State Liaison Officer (Bill.Maier@nrc.gov)
Regional Counsel (Karla.Fuller@nrc.gov)
Congressional Affairs Officer (Jenny.Weil@nrc.gov)
OEDO RIV Coordinator (Leigh.Trocine@nrc.gov)
RITS Coordinator (Marisa.Herrera@nrc.gov)
NMSB-A (R4DNMSMS-A@nrc.gov)
RSFSB (Gerald.Schlapper@nrc.gov)
DRS-PSB2 (Michael.Vasquez@nrc.gov)
OEMail Resource (OEMAIL.Resource@nrc.gov)
ACES (Christi.Maier@nrc.gov)
ACES (Mark.Haire@nrc.gov)
ACES (William.Jones@nrc.gov)

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NIST-BOULDER PLUTONIUM CONTAMINATION EVENT

NRC SPECIAL INSPECTION

Public Exit Meeting

September 17, 2009

BRIEFING OUTLINE

- Background
- Radiological Consequences
- Independent Root Cause Analysis
- Apparent Violations
- Corrective Actions
- Next Steps
- Contact Information
- Break
- Comment/Question Period

BACKGROUND

Event Overview

- Source breach
- Prompt response to the event

NRC Response

- Special Inspection
- Confirmatory Action Letter

RADIOLOGICAL CONSEQUENCES

Radiological consequences were potentially very significant, but actual safety consequences were minimal

- No dose limits were exceeded
- Material potentially discharged to sewer did not exceed regulatory limits
- Contaminated areas of the NIST facility were cleaned

DIRECT CAUSE

Breakage of glass bottle containing plutonium on a hard surface led directly to the incident

- Marble top laboratory table
- Lead bricks
- Detector cryostat

CONTRIBUTING CAUSES

- Personnel were inexperienced and not properly trained
- An adequate hazard analysis was not performed
- Written operating procedures were not developed

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Protecting People and the Environment

CONTRIBUTING CAUSES

- Plutonium sources were used and stored in mixed-use laboratory
- The setup of the experiment was insufficient
- Direct oversight of work involving plutonium was inadequate
- The immediate emergency response to the event was inadequate

ROOT CAUSE

Inadequate management oversight and accountability to ensure that the Radiation Safety Program was sufficient to handle plutonium safely

APPARENT VIOLATIONS

Ten Apparent Violations of NRC Requirements

- Apparent violations are preliminary inspection findings
- The findings are subject to change

APPARENT VIOLATIONS

1) Did not provide complete and accurate information in all material respects to the NRC
   - Apparent Willfulness

APPARENT VIOLATIONS

2) Did not control and maintain constant surveillance of licensed material in a controlled area and not in storage

3) Did not secure from unauthorized removal or limit access to licensed materials stored in a controlled area

APPARENT VIOLATIONS

4) Did not provide radiation safety training for all individuals working in or frequenting the lab

5) Did not develop, document, and implement a radiation protection program sufficient to ensure that occupational doses and doses to the public were as low as reasonably achievable

6) Did not periodically audit the radiation protection program content and implementation

APPARENT VIOLATIONS

7) Did not demonstrate, by measurement or calculation that the total effective dose equivalent to individuals did not exceed the annual dose limit for members of the public

8) Did not monitor the occupational intake of plutonium by radiation workers

APPARENT VIOLATIONS

9) Did not limit receipt, possession and use of radioactive material authorized on the NRC license

10) Did not assure that removal of radioactive material from a device was performed by a person authorized to perform this activity

CORRECTIVE ACTIONS

- Short-Term and Intermediate Actions
  - Issued stop work order
  - Conducted event investigations
  - Cleaned the laboratory and affected areas
  - Developed a new training program and trained personnel
- Long Term Actions
  - Improved coordination with the city of Boulder
  - Implemented safety organization changes
  - Developed plan for strengthening safety

NEXT STEPS

NRC's ENFORCEMENT PROCESS

- Issue the Special Inspection Report
- Conduct Predecisional Enforcement Conference or Alternative Dispute Resolution
- Make decision on final Enforcement Action
- Issue an Agency Decision

CONTACT INFORMATION

- NRC WEB ADDRESS: http://www.nrc.gov/
- Vivian Campbell, Chief NMSB-A
  - Email: Vivian.Campbell@nrc.gov
  - Telephone: 817-860-8287
- Victor Dricks, Public Affairs Officer
  - Email: Victor.Dricks@nrc.gov
  - Telephone: 817-860-8128

Remarks of Dr. Richard F. Kayser
Special Assistant for Environment, Safety, and Health
National Institute of Standards and Technology

Nuclear Regulatory Commission Public Meeting
Boulder, Colorado
September 17, 2009

Good afternoon. I'd like to thank the Nuclear Regulatory Commission (NRC) for its inspection of the plutonium spill at NIST Boulder and for providing NIST with the opportunity to participate in this discussion.

As the NRC team has noted, the incident happened more than a year ago on June 9, 2008. NIST deeply regrets that this incident occurred and has worked hard since then to strengthen its safety program to help ensure that such an incident will not happen again.

I'd like to start by noting that the preliminary findings presented by the NRC team fully support NIST's own findings as detailed in two reports: NIST's internal investigation of the event and the initial report of the NIST Ionizing Radiation Safety Committee, which in addition to its own work considered reports from five external experts. NIST also commissioned Booz Allen Hamilton to conduct a formal root cause analysis of the incident. The results of the Booz Allen Hamilton analysis confirmed the work of the NIST Ionizing Radiation Safety Committee. That all of these findings are in such close agreement provides confidence that we understand what happened, why it happened, and what can be done to prevent such incidents in the future.

I'd like to address four key areas today:

- Actions NIST took to respond directly to the incident;
- Actions we've taken to respond to issues identified by the City of Boulder;
- Actions taken to strengthen safety at NIST Boulder; and
- Actions to strengthen safety at all NIST sites, including NIST headquarters in Gaithersburg, MD.

Actions in Response to the Incident

As you have heard today, laboratory personnel involved in the incident lacked the required training to handle safely the type of plutonium sample that was spilled on June 9, 2008. In addition, key information about the extent of the spill and about the fact that some of the plutonium had been washed down a sink connected to the sanitary sewer system was not immediately available to NIST officials. This resulted in delays in communicating this information to the City and the public. I want to stress that NIST provided this information as

soon as the facts of the event were available to us. Since June 9, NIST has issued 12 news releases and published the texts of several letters to the City of Boulder to describe fully our response to the incident.

I'd like to briefly describe several aspects of our response.

Our primary concern has consistently been the safety and health of our staff and the public. NIST made arrangements for comprehensive dose assessments for individuals potentially exposed to spilled plutonium. In the end, no individual received a radiation dose exceeding regulatory limits or expected by independent medical experts to result in a clinically significant health impact in either the short or long term. The unauthorized release of a small amount of plutonium to the City of Boulder sanitary sewer system did not exceed regulatory limits and was not detectable in the system or in sludge diverted from the system after the incident. We know of no adverse effects of the incident on our staff or the surrounding community.

Immediately following the incident, NIST stopped all research involving NRC specifically-licensed radioactive materials in Boulder. NIST has no plans to resume these activities. We have shipped all specifically-licensed radioactive materials offsite.

To clean up the spilled plutonium and remove contaminated materials, NIST contracted with an NRC-licensed service provider, Energy*Solutions*. We obtained the NRC's approval of the decontamination and final radiation survey plans and monitored the work of Energy*Solutions* from start to finish.

NIST removed the drain pipe leading from the contaminated sink to the sanitary sewer, excavating both inside and outside the laboratory in which the spill and discharge occurred. Surveys of the remaining pipes and of soil samples from the excavated trenches confirmed that all of the spilled plutonium had been removed.

In a letter dated July 24, 2009, the NRC confirmed that NIST had met the NRC's requirements for reopening the decontaminated spaces. The NRC based its conclusion on its review of NIST's final report on the cleanup, information collected through NRC inspections during the cleanup process, and confirmatory surveys by an independent NRC-contracted organization, including surveys of independent soil samples from the pipe excavation.

Lastly, NIST provided funding to the City of Boulder to survey the sanitary sewer system. The contractor hired by the City detected no plutonium-related radioactivity significantly different from natural background levels at several points within the sewer system, at the wastewater treatment facility, or in sludge diverted from the sewer system after the incident. NIST has worked with the City to dispose of the biosolids as non-hazardous fill material at a site in Utah owned by Energy*Solutions*.

Actions in Response to the City of Boulder

NIST has worked to rebuild its relationship with the City and people of Boulder through regular communications of progress on the cleanup project and in addressing issues identified by the City, especially with regard to the handling of hazardous materials.

For example, we have updated the inventory of chemicals at the NIST Boulder Laboratories and properly disposed of unused, excess, and legacy chemicals.

We have also developed an emergency notification checklist for reporting events to the City of Boulder and to other jurisdictions and agencies that regulate NIST Boulder's handling and disposal of hazardous materials.

To address the larger issue of strengthening our safety program, we have developed and implemented a worksite training program for the NIST Boulder staff in the prevention and reporting of accidental hazardous material releases to the environment. All employees and associates have taken the training, and all future employees and associates will be required to take the training as part of their beginning work at NIST.

Finally, we have broad agreement with the City of Boulder on the desirability of formalizing future reporting and coordination functions between the City and NIST Boulder through a new Memorandum of Understanding. We will be pursuing that in the near future.

Actions Taken to Strengthen Safety at NIST Boulder

We've taken a number of additional actions to strengthen safety at NIST Boulder.

We moved a senior-level research-director position previously located in Gaithersburg to Boulder to strengthen local line-management responsibility for the safety of all laboratory activities in Boulder. We immediately filled that position with an experienced laboratory manager.

We established a senior safety management position to oversee the safety organization in Boulder and filled that position with a highly qualified safety manager.

We established a new executive-level site-manager position in Boulder to coordinate safety, emergency preparedness, and security for the entire Department of Commerce Boulder campus, including NIST, the National Oceanic and Atmospheric Administration, and the National Telecommunications and Information Administration. We have selected an experienced executive who is expected to start in this position no later than November 2009.

Finally, we have established and filled a senior-level safety executive position to oversee the safety support organizations in both Gaithersburg and Boulder, and we are strengthening both of those organizations through additional staff and resources.

Actions Taken to Strengthen Safety at All NIST Sites

To strengthen safety at NIST overall, NIST and the Department of Commerce arranged for independent assessments of safety management performance at NIST. In addition to the initial report of the Ionizing Radiation Safety Committee, these included a special review of safety at the NIST Boulder Laboratories by the Department of Energy Office of Independent Oversight and an assessment of management and safety at NIST by a Blue Ribbon Commission. NIST has also had numerous discussions with high-performing safety organizations and outside safety experts and internal discussions of safety priorities.

Based on this input, NIST is currently focusing on four areas: Communicating individual and management responsibility for safety; providing staff with the tools needed to understand how to protect themselves and those around them; creating safer workplaces; and continually improving the safety culture. Examples of activities in these areas include:

- Articulating, communicating, and reinforcing a clear safety goal and message;
- Defining and communicating clear roles, responsibilities, and authorities;
- Providing managers and supervisors with training on their responsibility to provide staff with a safe and healthful working environment;
- Developing and implementing a NIST-wide policy on identifying and controlling hazards; and
- Developing and implementing uniform approaches to chemical inventory and labeling and hazard signage.

Conclusion

In conclusion, we take our responsibility to protect the health and safety of our staff and the surrounding community very seriously. We will forever regret the event of June 2008. We are grateful that there were no significant health or environmental consequences for the community or NIST staff. Going forward, we are committed to protecting our staff, the public, and the environment by integrating safety into our management and work practices at all levels, working

diligently with all staff to ensure that safety is a core value of NIST. Thank you for your attention.

CITY
OF
BOULDER

OFFICE OF THE CITY MANAGER

September 17, 2009

Arthur T. Howell III, Division Director
Region IV – Division of Nuclear Materials Safety
United States Nuclear Regulatory Commission
612 East Lamar Boulevard, Suite 400
Arlington, Texas 76011-4125

RE: September 17, 2009 Public Meeting with the National Institute of Standards and Technology; Docket No. 030-03732

Dear Mr. Howell:

On behalf of the City of Boulder, I want to thank the Nuclear Regulatory Commission for conducting a special inspection of the plutonium contamination event that occurred on June 9, 2008 at the National Institute of Standards and Technology (NIST) Boulder facility. We sincerely appreciate the Commission's efforts and thank you for hosting a public meeting on the matter in our community on September 17, 2009.

As indicated in correspondence dated July 14, 2008 to the Committee on Science and Technology, the City is the proud home of several federal laboratories which are valued members of our community. The situation of June 9, 2008, however, highlighted the need for enhanced communications, planning and reporting between the City and NIST. Since then, both the City and NIST have worked cooperatively in addressing a number of requests identified in the July 14, 2008 correspondence. In an effort to further improve communications and formalize long term responsibilities between the parties, the City and NIST have discussed and expressed support for the development and execution of a Memorandum of Understanding (MOU). As the parties continue to work jointly in developing an MOU, the City proposes that it address a number of items including, but not limited to the following:

1. The development of a long-term communications plan between the City and NIST regarding the regulation of activities conducted and materials stored at the Boulder facility. The plan will include regular meetings between the parties and the use of NIST's recently hired site manager to coordinate communication on NIST's behalf.
2. A requirement that NIST develop and submit annually to the City the following:
   a. appropriate security protocols pertaining to the physical security of the NIST Boulder facility including any and all hazardous materials and laboratories. NIST would be required to undergo an independent security audit on an annual basis with the findings submitted to and reviewed with the City.
   b. a rigorous safety training program which all NIST employees and researchers will be required to attend and complete on a regular and routine basis. NIST should submit to the City an annual

report that includes a listing of training programs implemented, type of training undertaken for NIST employee groups, and the proposed schedule for future training. The MOU should also address opportunities to integrate appropriate City employees into relevant NIST training programs.

3. A requirement that NIST annually report to the City a comprehensive list of any and all hazardous material and all radioactive licensed material (type and quantity) stored and used at the NIST facility.
4. A requirement that NIST devote additional resources to the Boulder facility to correct outdated laboratory spaces that do not meet current safety regulations or benchmarks for design and use, and that any laboratory equipment which does not meet current safety regulations or, where its condition is unknown, be immediately removed from the facility and decommissioned.
5. In correspondence dated July 22, 2008, NIST indicated the following:

> NIST suspended use of all radioactive materials at its Boulder facility. We will not be reapplying to the Nuclear Regulatory Commission for permission to use plutonium or any other special nuclear materials at any time in the foreseeable future. In the future, should NIST demonstrate to the NRC's satisfaction that it has the radiation safety programs, plans, controls, and auditing procedures in place to safely handle lower risk radiation sources, we will notify the City prior to restarting such work and will provide documentation of our safety practices, procedures, and training requirements.

This position was reiterated by NIST in correspondence dated July 30, 2009. It is the City's understanding that unless NIST receives permission to utilize radioactive materials by June 2010, it would need to commence the decommission process as it relates to that specific license. Recently we have learned that NIST may be planning to retain its license by continued use of radioactive material. The City respectfully requests that NIST immediately clarify its intentions in this regard and that the MOU outline the process through which the City will receive notification of any and all license requests, renewals and terminations.

As the Nuclear Regulatory Commission continues its Special Inspection process of this contamination event, the City requests that the Commission adopt findings that support these principles and the timely completion and execution of an MOU that encompasses these concerns.

We appreciate the efforts of the Commission and NIST during the process and look forward to working together as the process is completed and the Special Inspection report issued. Following completion of the report, we respectfully request the ability to submit supplemental comments to the Commission.

Sincerely,

Jane S. Brautigam

Jane S. Brautigam
City Manager

Cc: The Honorable Mark Udall
The Honorable Michael Bennet
The Honorable Jared Polis
The Honorable Bart Gordon, Chair, Committee of Science and Technology
Matt Appelbaum, Mayor
Crystal Gray, Deputy Mayor

Suzy Ageton, Council Member
Macon Cowles, Council Member
Angelique Espinoza, Council Member
Lisa Morzel, Council Member
Susan Osborne, Council Member
Ken Wilson, Council Member
Patrick Gallagher, Deputy Director, NIST
Richard F. Kayser, NIST Chief Scientist
Kent Rochford, NIST Boulder Chief Technical Representative
Paul J. Fetherston, Deputy City Manager
Maureen Rait, Executive Director, Public Works
Ned Williams, Director, Public Works/ Utilities
Patrick VonKeyserling, Communication Manager
Carl Castillo, Policy Advisor

NIST-BOULDER PLUTONIUM CONTAMINATION EVENT
SPECIAL INSPECTION PUBLIC EXIT MEETING
MILLENNIUM HARVEST HOUSE, BOULDER, COLORADO
SEPTEMBER 17, 2009 AT 2:00 P.M.

NAME	AFFILIATION
Gail Porter	NIST
Laura M. Orr	NIST
Lindsay Breyer	Walsh Environmental
John Guenther	U.S. Dept. of Commerce
TOM GROVE	NIST
DORA GROVE	
Duane Lyda	NIST
JUANITA MORGAN	NIST
Paul Heppler	
Deirdre Rothery	EPA R8
Norm Belgren	NIST
Jeff Guerrieri	NIST
Kate Remley	NIST
SONJA RINGEN	NIST
Steve Tarlton	CDPHE
Ned Williams	City of Boulder - Public Works
Patrick von Keyserling	City of Boulder - City Mgr's Office
DAN SCHMIDT	NIST
Bret Linenfelser	City of Boulder
Rich Kayser	NIST
DAVID RUDMAN	NIST
RICHARD E. HARRIS	SELF
Scott Prestidge	Senator Mark Udall
JIM BEALL	NIST
James S. Clark	NIST
Doug Walker	DOE - Region 6 RAP
Arthur T Howell III	NRC
Richard Leonardi	NRC
James Thompson	NRC
Gerald Schlapper, PhD	NRC
Karla Fuller	NRC
Michael Vasquez	NRC
William Maier	NRC
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Victor Dricks	NRC
Molly Bakeman	NRC
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