

LA-UR- 02-5093



Approved for public release;
distribution is unlimited.

Title: "Observation Challenges in a Glovebox Environment:
Behavior Based Safety at a Pluonium Facility"

Author(s): Maryrose L. Montalvo, NMT-DO

Submitted to: 15th Annual Glovebox Conference, August 19-21, 2002
Orlando, Florida



Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by the University of California for the U.S. Department of Energy under contract W-7405-ENG-36. By acceptance of this article, the publisher recognizes that the U.S. Government retains a nonexclusive, royalty-free license to publish or reproduce the published form s contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify  this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.

Form 836 (8/00)

Los Alamos National Laboratory

Nuclear Materials Technology Division

Maryrose L. Montalvo

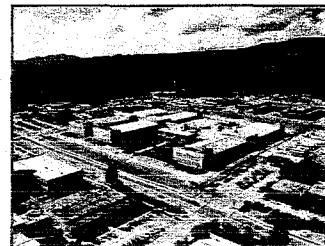


Observation Challenges in a Glovebox Environment: Behavior Based Safety in a Plutonium Facility

History

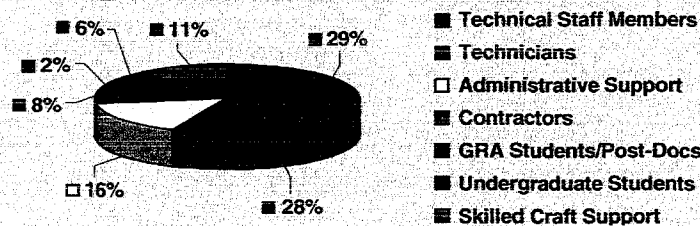
Los Alamos National Laboratory (LANL) is one of the Nation's leading scientific and defense laboratories, owned by the Department of Energy and managed by the University of California. LANL is one of the original weapons complex labs dating back to the days of the Manhattan Project during World War II. Since then, radioactive materials research has continued at LANL's Plutonium Facility, and remains a primary responsibility of the Laboratory.

The Nuclear Materials Technology Division (NMT) is a multidisciplinary organization responsible for daily operations of the Plutonium Facility and the Chemistry Research Metallurgy Facility. NMT Division is responsible for the science, engineering and technology of plutonium and other actinides in support of the Nation's nuclear weapons stockpile, nuclear materials disposition, and nuclear energy programs. A wide array of activities are performed within NMT Division, such as analytical chemistry, metallurgical operations, actinide processes, waste operations, radioactive materials research and related administrative tasks.



NMT boasts an impressive yet diverse workforce, consisting of approximately 1200 employees within both facilities, TA-55 and the CMR Building. NMT Division is internationally recognized as one of the leading organizations for actinide science and technology in the world.

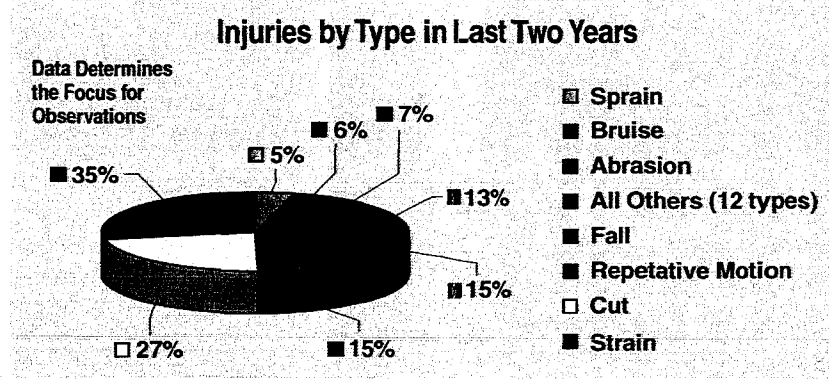
NMT's Diverse Workforce



The ATOMICS Safety Process

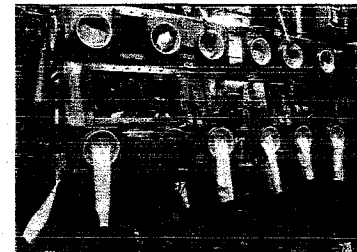
The ATOMICS Safety Process - The ATOMICS Steering Team is comprised of technical staff members, technicians, administrative and craft support, and one process facilitator. ATOMICS is working diligently to introduce the NMT workforce to a unique peer-to-peer observation process where safe and at-risk work behaviors are tracked to enhance safety awareness while identifying root causes for injuries. The process demands a highly interactive safety practice within NMT Division. Because behaviors are observable, the ATOMICS Process trains NMT personnel to observe critical behaviors in the workplace and helps to determine whether that work is being done safely or in a manner that puts the worker at risk for injury. The tool for observations is the CBI® (Critical Behaviors Inventory) developed by the Steering Team as a guide for safe behaviors. It helps tell observers what to look for and how to determine whether the work they are observing is safe or at-risk.

Observations provide a standard that is measureable and can be tracked on a daily basis to help prevent future accidents in NMT Division. By training employees in data collection, the ATOMICS Team presents data and tabular reports to division managers monthly for their review. During 2001 and 2002 the ATOMICS Team worked hard to integrate the ATOMICS Process into the daily work routines of the NMT workforce. The Team held sixteen Ownership Meetings within the Division and has trained over 400 observers, with minimal disruption to work activities.



Glovebox Challenges

Within LANL, NMT Division is the foundation for maintaining the nuclear materials production mission. Plutonium research and production competencies reside in a suitably skilled and well-trained work force. Due to the unique chemical and physical properties of the actinide elements, specialized training, expert knowledge, and unique procedures are mandatory to the performance of NMT's mission. Safety is critical to NMT's continued success. As a leader in the science of radioactive materials for the DOE complex, the ATOMICS Team trains NMT workers to establish and maintain safe work behaviors within the division. Observer data in recent months has identified ergonomics and radiation worker safety as top division priorities. Responding to the challenges set forth from the data provided by the workers, radiation protection and ergonomics have prompted the coordination of action planning for the Steering Team.



Observation Challenges: Radiation Protection

Plutonium research and production work demands highly specialized skills operating in confined settings such as gloveboxes. Work environments of this nature often require unspecified amounts of time where the worker must consider production and the potential for exposure simultaneously. Consequently, the worker is forced to adapt to the work environment with several goals in mind:

- Contribute to the science and technology of plutonium and other actinides in support of the Nation's nuclear weapons stockpile
- Carry out work activities with the highest degree of personnel safety and with minimal impact on the environment.
- In so doing, eliminate, control or reduce health hazards such as radiation exposure. Several observable barriers make the elimination of radiation exposure difficult.
 - Production Pressure - We're under the gun to get this done.
 - Personal factors - I've always worked this way.
 - Perceptions - I don't think it's at risk.



During his open hood tasks, Jeff monitors frequently for radiation protection. In the background, Amanda performs an observation without having to enter the FCA.



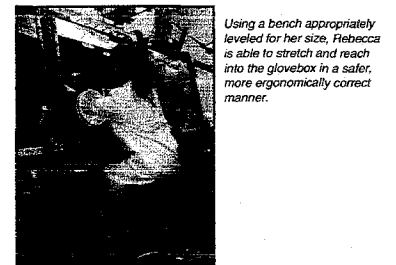
A team of staff members and technicians perform work in a confined space under a glovebox, while wearing Level II personal protection: anti-cis, coveralls, booties and respiratory protection.

Observation Challenges: Glovebox Ergonomics

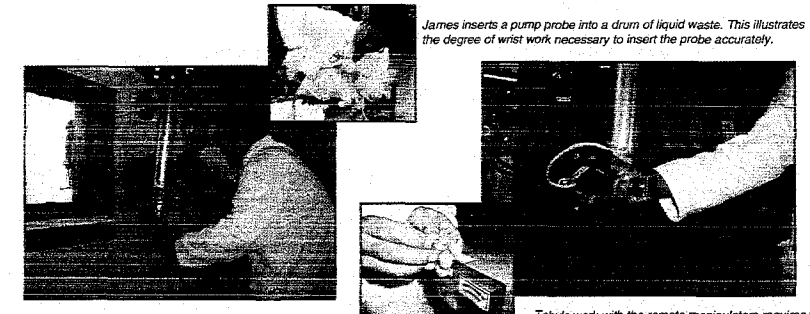
Work in a glovebox environment also calls for unique, often strenuous situations where the worker must position him or herself accordingly in a close knit, tight and often difficult body configuration to fit the task at hand. The worker may be forced to assume an awkward or uncomfortable position for extended amounts of time, due largely to the scope of work, and the standard "one-size fits all" design of the glovebox.

Several other barriers contribute to glovebox ergonomics issues.

- Disagreement on safe practices - I've always done it this way, there is no other way to do it.
- Facilities and Equipment - The design of the cell or glovebox requires that I stand all day. I can't get my work done in any other position.
- Scope of Work - The project I am working on is so specialized, it requires repetitive motion in both hands, indefinitely.



Using a bench appropriately leveled for her size, Rebecca is able to stretch and reach into the glovebox in a safer, more ergonomically correct manner.

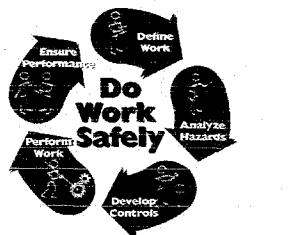


James inserts a pump probe into a drum of liquid waste. This illustrates the degree of wrist work necessary to insert the probe accurately.

ATOMICS Action

The ATOMICS Steering Team has worked attentively to respond to the ergonomics and radiation protection target areas currently considered priority safety concerns. Team recommendations include:

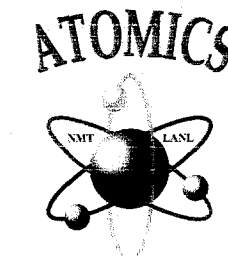
- Observations Feedback to the Worker
- Helping to deal with observation resistance
- Deal with facility requirements (respirator, work, etc.)
- Help to identify root causes
- Help to identify larger issues, such as tools and equipment
- Make constructive recommendations for safer work practices
- Make referrals based on observer/observee discussion



In addition, the ATOMICS Observation Process compliments existing LANL safety training in several ways:

- Consistently encourages peer to peer observations in both areas,
- Raises the general awareness of hazards in both target areas in regular Observer Training,
- Encourages the NMT workforce to initiate referrals for further evaluations by NMT and ESH safety representatives.
- Emphasizes the significance data from both categories in bi-monthly Management Meetings
- Includes NMT ESH Team to help determine focus areas based on Accident and Injury Updates

NMT Division has recently raised the bar on observations to 3000 in number for 2002-2003 year, but will emphasize the development and continuity of a .25 contact rate. As with any expanded implementation, changes are inevitable, and hurdles arise without warning. In 2002, the ATOMICS Steering Team will continue its quest to fulfill the vision and mission of the process, support the mission and vision of the Nuclear Weapons Directorate, and will focus on establishing a firmer ownership of the process in both division facilities. ATOMICS will strive to paint a clear picture of safety success for the Nuclear Materials Technology Division and Los Alamos National Laboratory.



Allowing Timely Observations Measures Increased Commitment to Safety