

# BROOKHAVEN NATIONAL LABORATORY

## Sealed Source Leak and Off-Site Contamination

October 7, 2011



# Cesium (Cs-137) Source Failure

- ❖ On September 28<sup>th</sup> @ ~1600 contamination of two Radiological Control Technicians (RCTs), several on-site locations, and a personal vehicle.
- ❖ Source of contamination was a Cs-137 (265 microcurie) source used to test area radiation monitors.
- ❖ Areas visited by the contaminated RCT
  - ✓ Bldg 923 Office and hall areas
  - ✓ Parking lot area of Bldg 923
  - ✓ Berkner Hall (no contamination found)
  - ✓ Passenger side of a personal vehicle owned by another lab employee
- ❖ Source is required to be leak checked semi-annually. Was last leak checked July 22, 2011 (passed with no leakage)

# Cs-137 Sealed Source and Lead Pig



**Leaking Sealed Source and Lead Pig**

# Personal Vehicle and Source



# Overview of Extent of Contamination

## ➤ Personnel Contaminations

- Radiological Control Technician (RCT) #1 – Direct frisk found 2,000 dpm to 60,000 dpm on his hands, shirt and shoes. The individual was decontaminated and clothing dispositioned
- RCT #2 – 3,000 dpm on left shoe

## ➤ Pavement Outside of Building 923

- Six spots located and isolated. Contamination ranged from 3,000 dpm to 200,000 dpm

## ➤ Laboratory Vehicle (w/ source and pig)

- Upon discovery, outside of the passenger side door radiation reading 50 micro-rem/hour. The vehicle was decontaminated and will be released by close of business.

## ■ Personal Vehicle (left off-site)

- On the passenger side two contamination spots were identified. On the floor mat 10,000 dpm and 3,000 dpm on the rug. A survey of the entire vehicle was completed, no other contamination identified. The personal vehicle owner was immediately notified, returned to the laboratory, surveyed and no contamination was identified. The contamination from the vehicle was removed and vehicle released.

# Cesium (Cs-137) Source Failure

## ❖ Immediate Actions Taken

### ❑ September 28<sup>th</sup>

- ✓ Decontaminated two RCD Technicians
- ✓ Isolated and secured Laboratory Vehicle
- ✓ Six locations Bldg 923 parking lot and inside Bldg 923 either decontaminated or access controlled.
- ✓ Recalled all workers housed in Bldg 923 for surveying (all clean).
- ✓ Surveyed Berkner hall and all locations technicians traversed (Areas decontaminated or surveyed clean)
- ✓ Attempted to call in AC Technician and Personal Vehicle contaminated individual entered.

# Cesium (Cs-137) Source Failure

## ❖ Immediate Actions Taken

### ❑ September 29<sup>th</sup>

- ✓ Initially categorized as a Management Concern – while bounding and determining the extent of contamination.
- ✓ Determined that personal vehicle left the site and potential for off-site contamination.
- ✓ AC Technician and personal vehicle surveys indicate personal vehicle passenger side contaminated
- ✓ Comprehensive review of BNL Sealed Source Database to identify sources of similar construction (Cs-137) and use across the site (none identified)
- ✓ Interviewed AC Technician on the use and locations visited off-site (vehicle locked and secured at place of residence, no other individuals entered vehicle)

# Cesium (Cs-137) Source Failure

## ❖ Immediate Actions Taken

### ❑ September 30<sup>th</sup>

- ✓ Continue with Surveying and Bounding the extent of contamination
- ✓ Conducted a meeting to discuss data gathered and investigation with DOE-BHSO, RCD Management, ES&H Director, Quality Management Office, Collider Department Chief Operating Officer (DCOO) – Decision made to re-categorize as a Group 6 Subgroup B – Spread of Radioactive Contamination, Identification of off-site radioactive contamination...
- ✓ Investigation team charged with analyzing the event
- ✓ Surveying and decontamination efforts continue through the weekend (10/1 & 10/2)

# Cesium (Cs-137) Source Failure

## ❖ Immediate Actions Taken

### ❑ **October 3<sup>rd</sup>**

- ✓ ORPS Notification report submitted but was not updated to include updated information that a contaminated vehicle left the site.
- ✓ Bounding of the event completed. Finalizing survey data and information gathered

### ❑ **October 4<sup>th</sup>**

- ✓ Fact finding, investigation and analysis of the event
- ✓ Worst case internal and skin dose determined (0.68 mrem and 3.6 mrem respectively)

### ❑ **October 5<sup>th</sup>**

- ✓ Laboratory Director directs ES&H Director to prepare for a stand down of radiological operations
- ✓ Whole body counts and TLDs read (confirm worse case)

# Cesium (Cs-137) Source Failure

## ❖ Immediate Actions Taken

### ❑ **October 6<sup>th</sup>**

- ✓ Performed survey verification and validation that personal vehicle employee driveway and home were free of contamination.
- ✓ Stand down criteria established, including and inventory and leak check of sealed sources >10% of 10CFR835 Appendix E values.

### ❑ **October 7<sup>th</sup> – Present**

- ✓ Rolling Radiological Operations Stand Down
- ✓ Investigation team charged with delivering a final report to DOE by 10/14/2011