



COLLIDER-ACCELERATOR DEPARTMENT

Title: EMS Training For NASA Space Radiation Laboratory Operations

Prepared by: M. Van Essendelft

Group: ESH&Q

Approvals

_____ *Signature on File* _____ Date: _____

ESH&Q Division Head

_____ *Signature on File* _____ Date: _____

Collider-Accelerator Department Chairman

(Indicate additional signatures)

Y N
 x FS Representative: _____ Date: _____

x Radiological Control Coordinator: _____ Date: _____

x Chief ME: _____ Date: _____

x Chief EE: _____ Date: _____

x Environmental/P2 Coordinator: _____ Date: _____

x QA Manager: _____ Date: _____

x Other: _____ *Signature on File* _____ Date: _____

Environmental Training Package for the NASA Space Radiation Laboratory

This package has been designed to aid in the delivery of required job-specific training for the following activities related to the NASA Space Radiation Laboratory identified in the environmental process assessment:

- Regulated Medical Waste generation
- Atmospheric discharges
- Liquid discharges
- Soil activation
- Storage/use of radioactive material

Your position has been determined to have a significant potential to impact the environment. Thus, the C-A Department management has prepared the questions and answers on the following pages with the appropriate information for your specific work/processes.

This environmental material is incorporated into your current job and procedure training. If you have specific questions about the written answers after you read the material, then you should contact the C-A Department ESH&Q Division Head, Ray Karol (<mailto:rck@bnl.gov>).

You may keep this material as a handout and use it as a reference aid.

This specific training course is linked to your job-training assessment (JTA). You must read and acknowledge this material as part of the qualification to perform NASA Space Radiation Laboratory work. Please fill out the Read and Acknowledgement form and return it promptly.

[Read & Acknowledgement Form](#)

Environmental Process Evaluation Title: NASA Space Radiation Laboratory

Environmental Aspects: Regulated Medical Waste, Atmospheric Discharges, Liquid Discharges, Storage/Use of Radioactive Material, and Soil Activation

Contacts for Further ESHQ Information:

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Course Objective: Because your work activities have been identified as having a potential significant impact to the environment, this course has been designed to provide you with the job-specific information that you must know to protect the environment.

- 1) What potential impacts to the environment are associated with your activities?
 - Regulated Medical wastes are generated (Note: This is disposed of by the BNL Medical Department)
 - Regulated chemicals are discharged to recharge basins
 - Radioactive vapors and gasses are released within the target cave
 - Spills from certain coolant systems could result in the release of radioactive material (Engineered controls have been put in place to prevent such spills from reaching the environment)
 - Soil is activated during operations with beam

- 2) What consequences may result if your operations were to impact the environment?
 - Radioactive waste mismanagement could contaminate the environment and/or incur regulatory penalties.
 - Improper water discharges to recharge basins could contaminate groundwater and/or result in a violation of the BNL SPDES discharge permit.
 - Spills from coolant systems could contaminate groundwater
 - Unmonitored atmospheric discharges could contaminate the environment, create public radiation exposures and/or violate federal Clean Air Act regulations.
 - Improperly tuned proton beams could result in unexpected soil activation and/or groundwater contamination.
 - Improper release of radioactive materials to uncontrolled areas may result in enforcement actions under 10CFR835.
 - Improper handling of waste can create loss of regulator and public trust.

3) What benefits or positive effects would you notice with improved environmental performance?

- Safer, cleaner workplace.
- Clear roles and responsibilities.
- Improved relationship with regulators and the public.
- Control of disposal costs
- Reduced emissions and/or soil activation

4) What role and responsibility do you have for these potential impacts and environmental performance?

- To ensure Radioactive wastes are handled according to C-A procedures
- To ensure alarms, soil caps and other controls are tested and inspected as required
- To take action when alarms sound or when controls fail
- To report unexpected water releases
- To create and keep appropriate records relative to operational controls
- To contact supervision if unsure of how to perform the work or if the procedures are unclear or incorrect

5) What controls or procedures are implemented to reduce the potential for emergency?

- [C-A OPM 8.20](#), Handling and Disposing of Hazardous Waste
- [C-A OPM 8.20.2](#), Radioactive Waste Disposal
- [C-A OPM 8.22](#), Handling and Disposal of Non-Hazardous and Recyclable Solid Waste
- [C-A OPM 8.20.1](#), C-A Hazardous Waste Trailer (HWT) (90 Day Accumulation Area)
- [C-A OPM 1.15](#), Liquid, Airborne Effluents
- [C-A OPM 1.14](#), General Requirements for Liquid Storage
- [C-A OPM 2.28](#), Enhanced Work Planning
- Tier I program and self-assessments
- FES # A.13.0, FES RHIC Berm Tour After Rainstorm
- Soil caps
- Groundwater sampling
- Target box air filters for radionuclides
- FES Soil cap inspection procedure
- See also: [EMS Training Package for Cooling Water Systems](#)

6) How would you respond in an emergency to reduce the potential for environmental impact and what actions could be taken to mitigate the event?

- See [C-A OPM 3.0](#), Local Emergency Plan for the C-A Department
- See [C-A OPM Chapter 10](#), Occurrence Reporting
- Call Spill Response Hotline – X2222 or 911

7) What pollution prevention and waste minimization techniques have been or could be considered to reduce or eliminate the potential to impact the environment?

- Soil is capped with a water-impermeable membrane to prevent soil activation from becoming a leachate that can reach groundwater

- A sump and sump alarm are located in the beam line tunnel to capture cooling water should it leak
- All drain piping in the facility is connected to the BNL Sanitary Sewage System
- All cooling water systems have water make-up alarms
- There are no outdoor tritiated water piping or cooling systems
- An isolated closed cooling-water system was used to reduce the volume of tritiated water
- The domestic water supply is equipped with back-flow preventers to isolate the NASA Space Radiation Laboratory domestic water supply systems
- Air and short-lived airborne radioactivity are re-circulated to allow for decay in the Booster Applications Facility beam line during operations
- Groundwater quality will be verified downgradient of the Booster to BAF extraction point using two downgradient surveillance wells
- The target room will be ventilated to provide maximum protection to workers while minimally impacting the environment

8) Are there any key Environmental-specific Competency Requirements for this position?

- None

Additional Environmental Information:

Click on the items below to learn more about C-A NASA Space Radiation Laboratory Operations.

- [Process Assessment](#) for C-A Beam NASA Space Radiation Laboratory
- [Environmental Management Program](#) for C-A NASA Space Radiation Laboratory
- [Operational Control Form](#) for C-A NASA Space Radiation Laboratory