

## **C-A Unreviewed Safety Issue (USI) Form**

Title of USI: Water Storage Tankers

Description of USI (use attachments if necessary):

Radioactive water drained or collected from the various radioactive cooling water systems is transferred to one of three 7000-gallon tanker trailers, which are usually located south of Building 919. They can be moved by truck throughout the site to facilitate transferring of water for later use, or as waste. The tankers are stainless steel and are parked inside secondary containments when not being used to transfer water.

Steam or electric heat can be supplied to the tankers to heat the water to prevent freezing in the winter and to slowly evaporate the water throughout the year. The heat is also used to keep the tanker sterile in order to prevent algae blooms or bacterial growth and prevents the use of chemical additives. The vapors contain low-levels of tritium oxide from the activated cooling water systems from which it was drained. A NESHAPs Assessment was conducted for this air release. The first evaluation (Attachment 1) was conducted in 10/00, by BNL ESD as part of the C-A Department's implementation of the IS014001 EMS requirements. In that evaluation, only releases during the cold weather were considered. The second NESHAPs evaluation (see Attachment 2) was completed in 6/01 in order to leave open the option to maintain tanker heating throughout the year. That option is no longer considered workable due to concerns that the process could be misrepresented as wastewater treatment process instead of cooling-water recycling process. However, even this later NESHAPs evaluation, shows the airborne emission causes an insignificant annual dose to the MEI (0.0000864 mrem/yr). This release has no adverse public or environmental effects. It is noted that the MEI dose is directly proportional to the volume of water released, so even if the release were 50,000 gallons/yr, the MEI dose would only be 0.0001728 mrem/yr.

The BNL NEPA Coordinator determined that there was no reason to modify the 1993 AGS EA because of this evaporation process. See Attachment 3. Additionally, this recycling process is described in the AGS Cooling Water System Process Assessment, [C-A-AGS-004-CWS](#).

Title and Date of Relevant SAD: AGS Safety Analysis Report, 8-11-93

Committee Chair or ESHQ Division Head must initial all items. Leave no blanks:

ITEM	APPLIES	DOES NOT APPLY
<p>Decision to not revise the current SAD and/or ASE at this time:</p> <p>The hazard associated with the proposed work or event is covered within an existing SAD and/or ASE.</p> <p>SAD Title and Date: <u>AGS SAD 8-11-93</u>.</p> <p>This Form and attachments, if necessary, shall be used to document the USI until the next revision of the appropriate SAD.</p>	<p>ETZ</p> <p>ETZ</p>	
<p>Decision to submit a revised SAD and/or ASE to the BNL ESH Committee:</p> <p>The hazard associated with the proposed work is not appropriately included in an SAD.</p>		<p>ETZ</p> <p>ETZ</p>

Ray Karol  
Signature of C-A Committee Chair or C-A ESHQ Division Head

4-9-02  
Date

Edward T Lissard  
Signature of C-A Associate Chair for ESHQ

4-9-02  
Date

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managed by Brookhaven Science Associates  
for the U.S. Department of Energy

## Memo

*date:*            *October 10, 2000*

*to:*                *P. Callegari*

*from:*            *G. Schroeder*

*subject:*        *Heating of C-AD Liquid Radiological Waste Tankers*

Currently, there are two tankers within the C-A Department which are being used for the storage of liquid radioactive waste. The first tanker, containing water drained from the AGS South and C sumps, is located at Bldg. 911 and was most recently sampled and analyzed for radiological parameters under COC 20092011. The second tanker, containing SEM water, is located at Bldg. 919 and was sampled and analyzed under COC 20100409. The Waste Management Division has been contacted regarding disposal of the contents of both tankers.

With the start of the cold weather season, heating of the tanker contents is required to prevent the liquid waste from freezing. It is known from past experience that a substantial amount of the liquid will evaporate from the tankers during heating. Since the waste in both tankers is known to contain radionuclides, this raises a radiological air emission compliance issue. In order to assess the compliance ramifications of the heating, a worst case scenario was examined in which it is assumed that both tankers are filled to capacity (7,000 gallons each), the full contents of tankers are allowed to become airborne, and the maximum concentration detected in either tanker is present in both. Using the CAP88-PC dose modeling code, the annual dose to the maximally exposed member of the public is estimated to be 1.8E-6 mrem. This is far below the allowable annual dose limit of 10 mrem under 40 CFR 61, Subpart H. Heating of the tankers may proceed as planned. If you have any questions regarding this review, please contact me at ext. 7045.

Attachment

EM60ER.00

Cc: R. Karol  
E. Lessard  
J. Scott

Clean Air Act Assessment Package - 1988

SYNOPSIS REPORT

Non-Radon Population Assessment  
Oct 10, 2000 04:34 pm

Facility: Collider-Accelerator Department  
Address: Brookhaven National Laboratory  
City: Upton  
State: NY Zip: 11973

Source Category: Point  
Source Type: Stack  
Emission Year: 2000

Comments: Evaluation of radionuclide emissions from heated  
liquid waste tankers.

Effective Dose Equivalent  
(mrem/year)

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1.83E-06

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At This Location: 3000 Meters Northeast

Dataset Name: Heating C-A tank  
Dataset Date: Oct 10, 2000 04:34 pm  
Wind File: C:\CAP88PC2\WNDFILES\BNL8089A.WND  
Population File: C:\CAP88PC2\POPFILES\BNL98A.POP

Oct 10, 2000 04:34 pm

SYNOPSIS  
Page 2

## RADIONUCLIDE EMISSIONS DURING THE YEAR 2000

Nuclide	Class	Size	Source #1 Ci/y	TOTAL Ci/y
H-3	*	0.00	1.1E-03	1.1E-03
CO-60	Y	1.00	1.5E-06	1.5E-06
BA-137M	D	1.00	2.1E-06	2.1E-06
MN-54	W	1.00	2.4E-06	2.4E-06

## SITE INFORMATION

Temperature: 10 degrees C  
Precipitation: 110 cm/y  
Mixing Height: 2000 m

Oct 10, 2000 04:34 pm

SYNOPSIS  
Page 3

## SOURCE INFORMATION

Source Number: 1

Stack Height (m): 4.  
Diameter (m): 1.

Plume Rise Pasquill Cat:	A	B	C	D	E	F	G
Zero:	0.	0.	0.	0.	0.	0.	0.

## AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.076	0.000	0.000
Fraction From Assessment Area:	0.000	0.000	0.000
Fraction Imported:	0.924	1.000	1.000
Beef Cattle Density:	1.00E-04		
Milk Cattle Density:	1.00E-04		
Land Fraction Cultivated for Vegetable Crops:	1.88E-02		

Environmental Services Division



Building 535A  
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for the U.S. Department of Energy

## Memo

*Date:* October 24, 2001  
*To:* Paul Lang  
*From:* Benny Hooda   
*Subject:* NESHAPs Assessment for Tritiated Water from Storage Tankers

The Collider-Accelerator department uses three tankers with capacity of 7,000 gallons each to store radiological liquid waste from the Special Experimental Magnets (SEM). The tankers would be heated in a building with two sides open and a roof venting into the environment. It is anticipated that a substantial amount of tritiated water will evaporate during the heating and venting of the tankers, and could be a potential diffuse source for radiological airborne emissions. Therefore, a NESHAPs evaluation was conducted to assess dose impact to the members of the public and the environment. Attachment I, the Facility/Process Radionuclide NESHAP Evaluation report has the source term information. Attachment II, the synopsis report from CAP88-PC, version 2.0, modeling program provides a conservative estimate of effective dose equivalent of 2.30E-04 mrem/year to the Maximally Exposed Individual (MEI) at the west southwest location.

The MEI dose was well below the 10 mrem/year annual limit as specified in the 40 CFR 61, subparts H, and below the 0.1mrem/ yr. limit, which requires continuous monitoring for air emissions. Therefore, continuous monitoring would not be required for air emissions from this source; however, an annual process evaluation would be required to validate that the quantity and type of radionuclides have not changed in the liquid effluent.

Please contact me at 8107, if you have any questions regarding this NESHAPs assessment.

BH: rt  
Attachments

Distribution: L. Cunniff  
R. Grandinetti  
R. Lee  
E. Lessard  
J. Mills  
R. Karol

EC72ER.01

## ATTACHMENT I

## FACILITY/ PROCESS RADIONUCLIDE NESHAP EVALUATION

Prepared by  
Benny Hooda  
October 24, 2001

## 1. SOURCE NAME AND LOCATION

Name(s): Tritiated Water Storage Tankers  
Location: North of Thompson Road/ north of Bldg. 912  
Brookhaven National Laboratory  
Upton, NY 11973  
Latitude: N 40° 52'  
Longitude: W 72° 53'

The Collider-Accelerator (C-A) department uses three tankers for storage of radioactive liquid effluent waste from the Special Experimental Magnets (SEM). The three tankers will be located in a building partially enclosed on both sides and 50 % vented at the roof. The building would be located on the north side of Thompson Road and north of Bldg. 912 at the Brookhaven National Laboratory (BNL) site. BNL is a multidisciplinary scientific research organization in the center of Long Island, Suffolk County, New York.

## 2. RELEASE POINT INFORMATION

Location: North of Bldg. 912/ north of Thompson Road  
Release height (m): 10 meters above ground level  
Source Area (m<sup>2</sup>): Diffuse Source  
Total volume (m<sup>3</sup>): 80  
Exhaust velocity (m/sec): N/A  
Exhaust temp. (°F): Ambient

## 3. TECHNICAL INFORMATION ABOUT THE SOURCE

## a. Overview of the Project

The tankers are used to store tritiated water effluent from the Special Experimental Magnets (SEM). The tankers are heated and the lid opening at top of the tankers with a diameter of 0.5 meters is vented to the environment. It is anticipated that a substantial amount of the liquid will evaporate during the heating and venting of the tankers. So, the tankers could be a potential source of radiological airborne emissions and thus regulatory compliance concern. Therefore, a NESHAPs evaluation was conducted to assess dose impact to the members of the public. Also, it was assumed that 4.38 E-5 m<sup>3</sup>/second was the emission rate of tritiated vapor from the tankers.

## Attachment 2

### b. Systems Description

No stacks, containment structures, and HEPA filters have been dedicated to the tankers for engineering controls.

### c. Source Term Development

The source term was developed based on the information provided on the NESHAPs Assessment form, process knowledge, and SEM system water activity reported.

Emission rate =  $4.38 \text{ E-5 m}^3/\text{second}$

Average tritium concentration =  $2.7 \text{ E6 pCi/L}$ .

Radionuclide	Concentration (Ci)/year
H-3	3.8

### d. Dose Assessment

The radiological dose and risk assessment to the maximally exposed individual (MEI) was estimated using the Clean Air Act Code CAP88-PC, version 2.0 modeling program to show compliance with 40CFR 61.93 (a). The meteorological data (temperature, precipitation, wind speed, and mixing height) used in the modeling program was site specific.

The dose estimates in CAP88-PC are applicable to low-levels of chronic exposures and not for short term or acute exposures; therefore, it was assumed that the low-level emissions are continuous over the course of year. The plume rise momentum was assumed to be zero meters/sec (exit velocity) as it was diffuse source and not a stack emission.

The agricultural assumptions were that 100 percent of vegetables were imported. Because Suffolk County does not have any dairy and cattle farms, 100 percent of milk and meat was imported from outside of the assessment area.

The total dose to the MEI resulting from this operation was estimated at  $2.30\text{E-}04$  mrem/ year. The potential dose was below the 10 mrem/year annual limit as specified in the 40 CFR 61, subpart H, and well below the 0.1mrem/ yr. limit, which requires the NESHAPs continuous monitoring. Therefore, the dose impact from air emissions was miniscule to the members of the public and the environment, and continuous air monitoring would not be required.

Attachment 2

Version 2.00

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Population Assessment  
Oct 24, 2001 09:43 am

Facility: Tanker Storage Facility (AGS)  
Address: Brookhaven National Laboratory  
City: Upton  
State: NY Zip: 11973

Source Category: Diffuse  
Source Type: Area  
Emission Year: 2001

Comments: Tritium Evaporation project

Effective Dose Equivalent  
(mrem/year)

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2.30E-04

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At This Location: 2000 Meters West Southwest  
Dataset Name: AGS\_tankers  
Dataset Date: Oct 24, 2001 09:43 am  
Wind File: C:\CAP88PC2\WINDFILES\STAR10~1.WND  
Population File: C:\CAP88PC2\POPPFILES\BNL98A.POP

Environmental Services Division

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for the U.S. Department of Energy

## Memo

**Date:** June 28, 2001  
**To:** E. Lessard  
**From:** M. Davis, NEPA/NHPA Coordinator   
**Subject:** NEPA and AGS Cooling Water Discharges

As discussed in our previous communications regarding current AGS cooling water discharges, it has been determined that an amendment to the 1993 AGS Environmental Assessment (EA) is **not** warranted. It is acknowledged that cooling water systems discharge into permitted basin HO, in addition to basins HN and HT that were identified in the EA. If radionuclide presence in cooling water requires an alternate path to discharge, the water is collected in tankers built for this purpose and heated until the water evaporates. A NESHAPs analysis of the maximum impact of airborne radioactivity from this process indicates that it results in no significant impact. The NESHAPs evaluation shows the maximum exposed individual off-site might receive up to  $8.64E-5$  mrem per year (Hooda 2001). In addition to evaporation the waste water may also be disposed via Waste Management. If there are any questions regarding this issue, please do not hesitate to contact me at extension 2165.

### Reference:

B. Hooda, "NESHAPs Assessment for Radiological Liquid Effluent Storage Tanks", June 25, 2001.

cc: L. Cunniff (electronic copy)  
G. Goode (electronic copy)  
G. Granzen  
T. Green (electronic copy)  
✓ R. Karol  
P. Lang (electronic copy)  
R. Lee (electronic copy)

ESD-EC50ER.01



## Department of Energy

Brookhaven Area Office

P. O. Box 5000

Upton, New York 11973

**JAN - 2 2003**

Mr. Thomas R. Sheridan  
Brookhaven Science Associates, LLC  
Brookhaven National Laboratory  
Upton, New York 11973

Dear Mr. Sheridan:

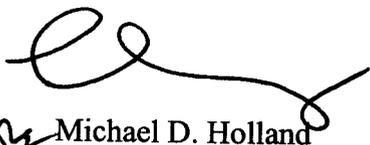
**SUBJECT: REQUEST FOR PERMISSION TO PERFORM WASTE TREATMENT NOT DESCRIBED IN THE RADIOACTIVE WASTE MANAGEMENT BASIS DOCUMENT (RWMB)**

Reference: Letter from T. Sheridan, BNL, to M. Holland, BAO, Subject: "Permission To Treat Liquid in Collider Accelerator Division (C-AD) Tankers" dated December 19, 2002

The Brookhaven Area Office (BAO) has reviewed your request to perform a waste treatment process that is not currently described in the approved Radioactive Waste Management Basis (RWMB) for Brookhaven National Laboratory (BNL). Approval is granted for the evaporation of low-level radioactive waste liquid from the C-AD tankers. It is understood that this process will be described in the next update of the BNL RWMB due to this office by December 31, 2002.

If you should have any questions, please contact Gail Penny or Terri Kneitel, of my staff, at extension 3429 or 2112, respectively.

Sincerely,



Michael D. Holland  
Area Manager

cc: Y. Collazo, PMO, CH      P. Jones, OMD, BAO      E. Lessard, BNL  
A. Bindokas, PMO, CH      T. Kneitel, PMD, BAO      D. Rocco, BNL  
G. Penny, PMD, BAO      P. Kelley, OMD, BAO      K. Brog, BNL