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BROOKHAVEN
NATIONAL LABORATORY

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 contacts 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 asses 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

C A P 8 8 - P C

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 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)
1.83E-06

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

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

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

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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 40^0 52'
Longitude:	W 72^0 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^2):	Diffuse Source
Total volume (m^3):	80
Exhaust velocity (m/sec):	N/A
Exhaust temp. (^oF):	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^3/second was the emission rate of tritiated vapor from the tankers.

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 E-5 m^3/second
Average tritium concentration = 2.7 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 2.30E-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.

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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)
2.30E-04

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

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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)

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