charles river

18 OCT 2023

Laura Cender
U.S. Nuclear Regulatory Commission
Materials Licensing Branch
NRC Region III Material Licensing Branch
2443 Warrenville Road, Suite 210
Lisle, IL 60532

RE: Materials License 21-11315-04
Request to amend license for removal of barrel Delay System..

The original Production License application included a description of the delay system to increase transit time of gas phase radioactive exhaust to the building exhaust. The GE manufactured shielded delay system appears to be sufficient to reduce activity of emissions, and the additional unshielded barrels are of limited value. We performed some experiments using a Fluke 451 ion chamber to measure dose rates at the line entering the barrel delay system and the line exiting the delay system to assess utility. Measurements were taken at varying time increments following 10 min, 60 μA [^{11}C]-CO_2 production (Runs 1 and 2) or a 21 min, 60 μA [^{11}C]-CO_2 production using a Siemens Eclispe RDS 111 cyclotron and delivery (via hot cell) to the delay system and then the barrels. Summary table shows overall dose reduction from the barrels. There was only one measurable reduction in dose rate at 1 h post-delivery in the first of three replicates, which was not reproduced in subsequent measurements. Additionally, the transit time of the primary delay system is approximately 6 h, so it is unlikely that the measured dose was exhaust from the [^{11}C]-CO_2 production being used to test the system.

We propose that the additional barrels are superfluous for reductions in dose rate in exhaust. These measurements were conducted using approximately 750 mCi and 1000 mCi of activity released to the exhaust systems to represent a worst-case scenario for the delay systems. Overall, the GE manufactured shielded delay system appears to be entirely sufficient to reduce dose in exhaust.

Table 1. Summary Table of Dose Reductions Attributable to Barrel System

Run #	Measurement Time Post-Production	Dose Reduction from Barrels (mR/hr)
1	1 h	0.26
1	3 h	0
1	6 h	0
2	1 h	0.03
2	3 h	0
3	1 h	0
3	3 h	0

charles river

Table 2. Decay-corrected Measurements of Dose Rates of Exhaust Lines Entering and Exiting Barrel Delay System

Run #	Measurement Time Post-Production	Location	Dose Rate (mr/hr)[1]
1	1 h	Before barrels	0.27
1	1 h	After barrels	0.01
1	3 h	Before barrels	0
1	3 h	After barrels	0
1	6 h	Before barrels	0.01
1	6 h	After barrels	0
2	1 h	Before barrels	0.03
2	1 h	After barrels	0.00
2	3 h	Before barrels	0
2	3 h	After barrels	0
3	1 h	Before barrels	0.06
3	1 h	After barrels	0.14
3	3 h	Before barrels	0.00
3	3 h	After barrels	0.01

[1] Dose rates are decay-corrected and background subtracted. Outcomes where the apparent dose rate was negative after back-ground subtraction are reported as "0"

All raw data (no decay correction) are reported below:

Date	Measurement Time	Read information	Location	Dose Rate (mr/hr)	Notes
20APR2023	Pre-cyclotron productions	Before cyclotron production, no activity	Before barrels	0.01	
20APR2023	Pre-cyclotron productions	Before cyclotron production, no activity	After barrels	0.07	
20APR2023	11:03	Following 10 min, 60 μA [^{11}C]-CO_2 production (10:05 delivery)	Before barrels	0.30	Background
20APR2023	11:04	Following 10 min, 60 μA [^{11}C]-CO_2 production (10:05 delivery)	Before barrels	0.57	Exhaust
20APR2023	11:05	Following 10 min, 60 μA [^{11}C]-CO_2 production (10:05 delivery)	After barrels	0.13	Background
20APR2023	11:06	Following 10 min, 60 μA [^{11}C]-CO_2 production (10:05 delivery)	After barrels	0.14	Exhaust
20APR2023	13:18	Following 10 min, 60 μA [^{11}C]-CO_2 production (10:05 delivery)	Before barrels	0.06	Background
20APR2023	13:18	Following 10 min, 60 μA [^{11}C]-CO_2 production (10:05 delivery)	Before barrels	0.05	Exhaust
20APR2023	13:19	Following 10 min, 60 μA [^{11}C]-CO_2 production (10:05 delivery)	After barrels	0.08	Background
20APR2023	13:19	Following 10 min, 60 μA [^{11}C]-CO_2 production (10:05 delivery)	After barrels	0.06	Exhaust
20APR2023	15:59	Following 10 min, 60 μA [^{11}C]-CO_2 production (10:05 delivery)	Before barrels	0.05	Background

charles river

20APR2023	15:59	Following 10 min, 60 µA [^{11}C]-CO_2 production (10:05 delivery)	Before barrels	0.06	Exhaust
20APR2023	16:00	Following 10 min, 60 µA [^{11}C]-CO_2 production (10:05 delivery)	After barrels	0.07	Background
20APR2023	16:01	Following 10 min, 60 µA [^{11}C]-CO_2 production (10:05 delivery)	After barrels	0.04	Exhaust

Date	Measurement Time	Read information	Location	Dose Rate (mr/hr)	Notes
21APR2023	12:05	Following 10 min, 60 µA [^{11}C]-CO_2 production (11:09 delivery)	Before barrels	0.27	Background
21APR2023	12:05	Following 10 min, 60 µA [^{11}C]-CO_2 production (11:09 delivery)	Before barrels	0.30	Exhaust
21APR2023	12:05	Following 10 min, 60 µA [^{11}C]-CO_2 production (11:09 delivery)	After barrels	0.12	Background
21APR2023	12:05	Following 10 min, 60 µA [^{11}C]-CO_2 production (11:09 delivery)	After barrels	0.12	Exhaust
21APR2023	14:33	Following 10 min, 60 µA [^{11}C]-CO_2 production (11:09 delivery)	Before barrels	0.05	Background
21APR2023	14:33	Following 10 min, 60 µA [^{11}C]-CO_2 production (11:09 delivery)	Before barrels	0.03	Exhaust
21APR2023	14:34	Following 10 min, 60 µA [^{11}C]-CO_2 production (11:09 delivery)	After barrels	0.04	Background
21APR2023	14:34	Following 10 min, 60 µA [^{11}C]-CO_2 production (11:09 delivery)	After barrels	0.03	Exhaust

Date	Measurement Time	Read information	Location	Dose Rate (mr/hr)	Notes
22APR2023	12:10	Following 21 min, 60 µA [^{11}C]-CO_2 production (11:15 delivery)	Before barrels	0.94	Background
22APR2023	12:11	Following 21 min, 60 µA [^{11}C]-CO_2 production (11:15 delivery)	Before barrels	0.97	Exhaust
22APR2023	12:12	Following 21 min, 60 µA [^{11}C]-CO_2 production (11:15 delivery)	After barrels	0.40	Background
22APR2023	12:12	Following 21 min, 60 µA [^{11}C]-CO_2 production (11:15 delivery)	After barrels	0.54	Exhaust
22APR2023	14:28	Following 21 min, 60 µA [^{11}C]-CO_2 production (11:15 delivery)	Before barrels	0.04	Background
22APR2023	14:28	Following 21 min, 60 µA [^{11}C]-CO_2 production (11:15 delivery)	Before barrels	0.04	Exhaust
22APR2023	14:28	Following 21 min, 60 µA [^{11}C]-CO_2 production (11:15 delivery)	After barrels	0.03	Background
22APR2023	14:29	Following 21 min, 60 µA [^{11}C]-CO_2 production (11:15 delivery)	After barrels	0.03	Exhaust

charles river

Please contact me at 269-250-2136 if there are any questions, or if further information is required.

Best Regards,

Aura Kozminske
Radiation Safety Officer/ Senior Manager EHS&S at Charles River
54943 North Main Street • Mattawan, MI 49071
P:.269.250.2136 | M: 269-598-8010
Aura.Kozminske@crl.com • www.criver.com
LinkedIn | Twitter | Facebook | Eureka

Martha Pavon

From: Laura Cender
Sent: Wednesday, October 18, 2023 4:13 PM
To: Tammy Tomczak
Cc: Martha Pavon; Sandy Pavon
Subject: FW: Materials License: 21-11315-04
Attachments: 0820_001.pdf

Hello Tammy,

Could you please process this in as a new license amendment request for Charles River Laboratories?

License No. 21-11315-04
Docket No. 030-38755

Thank you,
Laura

From: Kozminske, Aura <Aura.Kozminske@crl.com>
Sent: Wednesday, October 18, 2023 2:55 PM
To: Laura Cender <Laura.Cender@nrc.gov>
Subject: [External_Sender] Materials License: 21-11315-04

Hi Laura please see attachment,

Thank you,

Aura Kozminske
Radiation Safety Officer/ Senior Manager EHS&S at Charles River
54943 North Main Street • Mattawan, MI 49071
P:.269.250.2136 x2136 | M: 269-598-8010
Aura.Kozminske@crl.com • www.criver.com
LinkedIn | Twitter | Facebook | Eureka