



**Missouri Baptist**  
MEDICAL CENTER

3015 N. Ballas Road  
St. Louis, Missouri 63131

314-996-5000  
www.missouribaptist.org

November 7, 2018

Nuclear Regulatory Commission  
Region III  
License Review, Attention: Colleen Casey  
2443 Warrenville Road, Suite 210  
Lisle, IL 600532-4352

Dear Colleen Casey,

**Ref: Control Number 609962: Letter dated September 12, 2018, Deletion from License 24-111228-02 sources no longer in possession.**

On September 26 we discussed the sources on the phone. You requested the leak test report and manifest for the cesium-137 and radium-226 sources. You also requested the nominal activity, the final activity and the leak test of the gadolinium-153.

See attached manifest for the Cesium-137 and Radium-226 sources which were transferred to Bionomics on June 11, 2015. See the leak test report dated June 2, 2015.

The two Gadolinium-153 sources were disposed of incorrectly this is in violation of 10 CFR 35.92. The violation occurred because of a lack of understanding of the regulation as they applied to the situation. The hospital was inspected October 9 and the hospital was issued a Level IV Violation pending NRC review. In the future, a source with a half-life over 120 days will be transferred to an authorized licensee who is authorized to receive the source. The original activity in each gadolinium source was 250 mCi on August 1, 1998. A decay table is attached to show the source strength in 2014. Attached is the Note to File: Removal of ADAC Gadolinium sources from Inventory document. It states wipe testing of the apparatuses is no detectable removable activity. The actual record of the data is not maintained. The final sources were less than 100 uCi and were exempt from semiannual leak testing requirements, reference 10 CFR 35.67. There are no other leak testing reports for these sources. Regrettably there is nothing to provide for a leak test report.



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If you should have more questions please phone my office at 314-996-5397.

Thank you.

Thomas Moenster, RSO  
Missouri Baptist Medical Center  
3015 N. Ballas Road  
St. Louis, MO 63131  
Phone: 314-996-5397  
Fax: 314-996-5643  
Email: [Thomas.Moenster@bjc.org](mailto:Thomas.Moenster@bjc.org)

Enclosures:

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER Cs-137  
UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER Ra-226  
REPORT OF SEALS SOURCE INVENTORY, LEAK TEST, AND AREA SURVEY Date: June 2, 2015  
Gd-153 schedule for decay table  
Note to File: Removal of ADAC Gadolinium sources from inventory

NRC FORM 540					
UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER					
BIONOMICS, INC.		S. SHIPPER NAME AND FACILITY BIONOMICS, INC. ON BEHALF OF: Missouri Baptist Medical Center 3015 Bates Road Saint Louis, MO 63131			
1. EMERGENCY TELEPHONE NUMBER (Include Area Code)  (865) 220-8520		USER PERMIT NUMBER		SHIPMENT NUMBER	
ORGANIZATION BIONOMICS, INC.		CONTACT Mary Wojcik		GENERATOR TYPE (Specify) X M	
2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST EPA MANIFEST NUMBER		TELEPHONE NUMBER (Including Area Code) (314) 986-5189	
4. DOES EPA REGULATE WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? If "Yes" provide Manifest Number _____ <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		5. CARRIER - Name and Address Bionomics, Inc. 1550 Bear Creek Rd. Oak Ridge, TN 37830		EPA I.D. NUMBER TND982116493	
		CONTACT John McCormick		SHIPPING DATE 6/11/2015	
		SIGNATURE - Authorized carrier acknowledging waste receipt <i>[Signature]</i>		DATE 6/11/2015	
11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (including proper shipping name, hazard class, UN ID number, and any additional information)		12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES
UN2916, Radioactive Material, Type A Package, 7 (Sealed Sources)	Yellow III	2.0	Solid / Oxides	Ce-137	TOTAL PACKAGE ACTIVITY IN MBq
					26174.5400
					N/A
					0.12
					MB-D1
BIONOMICS, INC.					
Generator Certification Statement A) Certification is hereby made by Bionomics that this shipment of low-level radioactive materials has been prepared in accordance with a radioactive waste management program approved by the Nuclear Regulatory Commission or an Agreement State regulatory Agency. B) Data. Generator hereby represents and warrants that all data set forth in this Manifest are true and correct in all respects and in accordance with all applicable governmental laws, rules and regulations. SIGNATURE <i>[Signature]</i> for MBMC					

[illegible]



**REPORT OF SEALED SOURCE INVENTORY, LEAK TEST, AND AREA SURVEY**  
Nuclear Medicine, PET/CT, CVD, OCTC  
Missouri Baptist Medical Center  
3015 North Ballas Road  
St. Louis, MO 63131

Date: June 2, 2015

**PART I: SEALED SOURCE INVENTORY**

All activity listed in (µCi). Yellow highlight indicates that a leak test is required for the sealed source because current activity A is:  
(a) greater than 100 µCi (beta and gamma emitters) or (b) greater than 10 µCi (alpha emitters).

Criteria for leak test is <0.005µCi removable contamination.

Sources leak tested \* stuck sources, unable to verify SN

Well Chamber: Capintec CRC-15W sn 17142

Efficiency	28.9
Background	777.0

<0.005µCi

Ave CPM	DFM	uCi	Pass/Fail
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129.0	4	2.0107E-05	Pass
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Location	Source model	Source serial number	Radionuclide	Activity (mCi)	Measured cpm
				original	current
drawer 1	6D6C-CA	0340*	Cs-137	12.7	5.3
		0341*	Cs-137	12.7	5.3
Top LT		0342*	Cs-137	12.7	5.3
		0344*	Cs-137	12.4	5.2
		0345*	Cs-137	12.4	5.2
		2667*	Cs-137	25.8	10.7
		2668*	Cs-137	26.1	10.8
		2672*	Cs-137	26.5	11

70.3	2	1.0963E-05	Pass
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drawer 2	6D6C-CA	2676*	Cs-137	26.3	10.9
		2677*	Cs-137	26.3	10.9
Top Mid		2678*	Cs-137	26.5	11
		2679*	Cs-137	25.6	10.6
		2680*	Cs-137	26.1	10.6
		2681*	Cs-137	25.8	10.7
		2683*	Cs-137	26.3	10.9

63.3	2	9.8715E-06	Pass
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drawer 3	6D6C-CA	1033*	Cs-137	51.9	21.5
		1045*	Cs-137	51.9	21.5
Top RT		1052*	Cs-137	51.4	21.3
		1054*	Cs-137	51.9	21.5
		1064*	Cs-137	51.6	21.4
		1076*	Cs-137	52.1	21.6

Measured cpm

drawer 4	CDCS.J	ET 275	Cs-137	27.8	17.8
		ET 276	Cs-137	27.8	17.7
Bot LT					30

64.7	2	1.0079E-05	Pass
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drawer 5	6D6C-CA	158	Cs-137	80	38.7
		185	Cs-137	79	38.2
Bot		4067	Cs-137	52.6	29.1
Mid		4079	Cs-137	52.6	29.1
		4085	Cs-137	52.3	28.9
		4087	Cs-137	52.6	28.7

56.0	2	8.7285E-06	Pass
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Measured cpm

drawer 6	CDCS.J	ET 197	Cs-137	52.8	33.6
Bot RT		ET 202	Cs-137	53.1	33.8
		EU827	Cs-137	55	35.5

81.3	3	1.2677E-05	Pass
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Floor pig	67-612	GI 960	Cs-137	26.9	11.5
		GI 961	Cs-137	26.9	11.5
		GI 962	Cs-137	26.9	11.5
		GI 963	Cs-137	26.7	11.4
		GI 964	Cs-137	26.7	11.4
		GI 965	Cs-137	26.4	11.3
		GI 966	Cs-137	26.4	11.3
		GI 967	Cs-137	26.2	11.2
		GI 968	Cs-137	26.7	11.4
		GI 969	Cs-137	26.7	11.4

109.3	4	1.7041E-05	Pass
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Radium box (inside box)				Waste	47, 47, 59
Radium box (outside bag)				Waste	107, 100, 42

83.0	3	1.2937E-05	Pass
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51.0	2	7.9491E-06	Pass
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Original copy was reviewed, signed and dated 6/11/2014

Thomas J. Moenster

**Gd-153 schedule for decay**,  $T/2 = 240.4$  days. Souce calibrated for August 1, 1998.

	<b>mCi Amount</b>	<b>Date</b>	
Half-life	250	8/1/1998	
1	125	3/29/1999	
2	62.5	11/24/1999	
3	31.25	7/22/2000	
4	15.625	3/19/2001	
5	7.8125	11/15/2001	
6	3.90625	7/13/2002	
7	1.953125	3/10/2003	
8	0.9765625	11/6/2003	
9	0.48828125	7/3/2004	
10	0.244140625	3/1/2005	
11	0.122070313	10/27/2005	
12	0.061035156	6/24/2006	
13	0.030517578	2/20/2007	
14	0.015258789	10/18/2007	
15	0.007629395	6/15/2008	
16	0.003814697	2/10/2009	
17	0.001907349	10/8/2009	
18	0.000953674	6/6/2010	
19	0.000476837	2/1/2011	
20	0.000238419	9/30/2011	
21	0.000119209	5/27/2012	
22	5.96046E-05	1/22/2013	
23	2.98023E-05	9/20/2013	
24	5.88979E-05	5/12/2014	

**.015 uCi**

**or 0.000015 mCi**

Figure

236 days for last peroid.

May 12, 2014

Note to File: Removal of ADAC Gadolinium sources from Inventory.

Two old ADAC Gadolinium-153 sources have been in decay-in-storage for nearly 16 years. The sources were calibrated for August 1, 1998, 250 mCi each. The half-life is 240.4 days. The residual activity is calculated to be .0122 uCi as of March 1, 2014. The residual activity is below the threshold of regulatory concern. The sources have gone through more than 20 half-lives. The regulatory requirement is 10 half-lives for decay-in-storage. The residual radioactivity is now an exempt quantity.

Measurements with a GM survey meter indicate no activity at the surface of the apparatuses. Wipe testing of the apparatuses is no detectable removable activity. The plastic radioactive symbol on the apparatuses was removed. The items were removed from the quarterly list of radioactive materials. The two apparatuses were disposed of as normal hospital waste.

A handwritten signature in blue ink, reading "Thomas Moenster". The signature is fluid and cursive, with a long horizontal stroke extending from the end.

Tom Moenster, Radiation Safety Officer



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3015 N. Ballas Road  
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BCH HealthCare

Tom Moenster

Hasler

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AUTO

11/09/2018

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Nuclear Regulatory Commission  
Region III  
License Review, Attention: Colleen Casey  
2443 Warrenville Road, Suite 210  
Lisle, IL 600532-4352

JGDCEAB 60532

