

R. M. WESTER and ASSOCIATES, INC

215 Indacom Drive
St. Peters, MO 63376
(636) 928-9628
www.rmwest.com

August 2, 2021

Mr. Zahid Sulaiman
US Nuclear Regulatory Commission – Region III
Division of Nuclear Materials Safety
2443 Warrenville Road, Suite 210
Lisle, IL 60532
Zahid.Sulaiman@nrc.gov

Mr. Sulaiman,

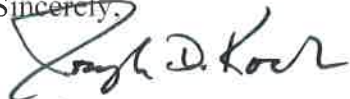
This is in response to the telephone conversation which occurred July 30, 2021 regarding the acceptance of the material from Confluence Discovery Technologies on June 17, 2019 to be ultimately disposed with Philotechnics, LTD on December 19, 2019. The question that arose was that we may have exceeded our license limit declared in 10 CFR 30.11, from amendment 30 which was issued on October 29, 2019. Attached is all off the transportation bills of lading and waste manifest as well as the waste logs from Confluence Discovery Technologies. I performed the decay calculations up to June 17, 2019 to show that we did not exceed our license limit nor the ratio. The following calculations were performed to show compliance.

Isotope	10 ³ (10,000) License limit	10 CFR 30 App. B limit (μCi)	Decayed corrected (μCi)	Ratio
P-32	10,000	1	0	0
P-33	1,000	0.1	26.61	0.02661
H-3	10,000,000	1,000	139,809	0.01398
I-125	10,000	1	3634.49	0.3634
Sum of the Ratios =				0.40399

Since the sum of the ratios is less than 1, there was no license exceedance.

Please let me know if you need any additional information.

Sincerely,



Joseph D. Koch, PhD, RPIH
Vice President, Operations, Safety, Quality/RSO

Enc.

Shipper's No. _____

Date: 06/17/2019

Carrier: West Star Industries, Inc

at Confluence Discovery Technologies

from 4320 Forest Park St. Louis MO

To:

Consignee: West Star Industries, Inc.

Shipper: Confluence Discovery Technologies

Street: 247 Indacom Drive

Street: 4320 Forest Park Suite 303

Destination: St. Peters, MO Zip 63376

Origin: St. Louis, MO Zip 63108

Route: major roads and highways

Number and Type of Packages	HM	I.D. Number	Description of Articles	Hazard Class	Pkg. Gp.	Total Quantity (mass, volume, or activity)	Weight (subject to correction)	Class or Rate
7 Fiber	X	UN2910	Radioactive Materials, Excepted Package	7		145.89 mCi	450 lbs	
4 metal			Limited Quantity of Material					
.1 poly								
drums			Contains 140 mCi H-3, 5 mCi - I-125, 0.75 mCi P-33, 14 mCi P-32					
<u>SOLID WASTE</u>			<u>LIQUID WASTE</u>					
			<u>5.1994 mCi ³H</u>			<u>134.6073 mCi ³H</u>		} NOTE: ACTIVITIES LISTED DO NOT ACCOUNT FOR DECAY
			<u>4.47465 mCi ¹²⁵I</u>			<u>0.52535 mCi ¹²⁵I</u>		
			<u>0.585 mCi ³³P</u>			<u>0.165 mCi ³³P ³³P</u>		
						<u>1.79 mCi ³²P</u>		

Shipper: Confluence Discovery Technologies

Carrier: West Star Industries

Per: Matt Caplan Date: 06/17/19

Per: Joseph Koch Date: 06/17/19

Signature: [Signature]

Signature: [Signature]

EMERGENCY RESPONSE TELEPHONE NUMBER: 636-928-9628

This is to certify that the above named materials are properly classified, packaged, described, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. Per above signature.

Estimated burden per response to comply with this information collection request: 45 minutes. This uniform manifest is required by NRC to meet reporting requirements of Federal and State Agencies for the safe transportation and disposal of low-level waste. Send comments regarding burden estimate to the Records and FOIA/Privacy Services Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to infocollect@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NE08-0164, Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FORM 540 UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER Energy Solutions/Bear Creek		5. SHIPPER - NAME AND FACILITY Philotechnics @ R.M. Wester And Associates Inc. 215 Indacom Drive St. Peters, MO 63376		SHIPMENT ID NUMBER 1634-121919EN X COLLECTOR PROCESSOR X GENERATOR TYPE (Specify) O		7. FORM 540 AND 540A PAGE 1 OF 2 PAGE(S) FORM 541 AND 541A 3 PAGE(S) FORM 542 AND 542A 1 PAGE(S) ADDITIONAL INFORMATION NONE PAGE(S)		8. MANIFEST NUMBER (Use this number on all continuation pages) 1634-121919EN											
1. EMERGENCY TELEPHONE NUMBER (Include Area Code) 800-424-9300 ORGANIZATION CHEMTREC #17253		USER PERMIT NUMBER T-TN024-L19 SHIPMENT NUMBER 1634-121919EN CONTACT Joe Koch		9. CONSIGNEE - Name and Facility Address Energy Solutions/Bear Creek Operated By Energy Solutions 1560 Bear Creek Road Oak Ridge, TN 37830 SIGNATURE - Authorized consignee acknowledging waste receipt		CONTACT Donnie Brackett TELEPHONE NUMBER (Include Area Code) (865) 220-1629 DATE													
2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST =====> 10 EPA MANIFEST NUMBER N/A		6. CARRIER - Name and Address Truck #: Philotechnics, Ltd 201 Renovare Blvd. Oak Ridge, TN 37830 Trailer #: CONTACT Justin Button SIGNATURE - Authorized carrier acknowledging waste receipt		EPA I.D. NUMBER TNR000030544 SHIPPING DATE 12/19/2019 TELEPHONE NUMBER (Include Area Code) (865) 466-4812 DATE 12/19/19		10. CERTIFICATION This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and in proper condition for transportation and disposal in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulation. AUTHORIZED SIGNATURE TITLE DATE <i>Justin Button</i> SHEPPER 12/19/19											
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		16. TOTAL PACKAGE ACTIVITY MBq mCi		17. LSA/SCO CLASS		18. TOTAL WEIGHT OR VOLUME (Use appropriate units)		19. IDENTIFICATION NUMBER OF PACKAGE			
NON-DOT REGULATED MATERIALS		NA		NA		SOLID/OXIDES		H-3		33.3000000000 (0.9000000000)		NA		3.00 ft ³		19-001995 (96)			
1 - CARDBOARD BOX		NA		NA		SOLID/OXIDES		H-3		129.5000000000 (3.5000000000)		NA		3.00 ft ³		19-001996 (98)			
NON-DOT REGULATED MATERIALS		NA		NA		SOLID/OXIDES		H-3		25.9000000000 (0.7000000000)		NA		3.00 ft ³		19-001997 (95)			
1 - CARDBOARD BOX		NA		NA		SOLID/OXIDES		H-3		74.0000000000 (2.0000000000)		NA		3.00 ft ³		19-001998 (84)			
NON-DOT REGULATED MATERIALS		NA		NA		SOLID/OXIDES		H-3		74.0000000000 (2.0000000000)		NA		5.20 ft ³		19-001999 (1)			
1 - 41 GAL FIBER		NA		NA		SOLID/OXIDES		H-3		74.0000000000 (2.0000000000)		NA		5.20 ft ³		19-002000 (2)			
NON-DOT REGULATED MATERIALS		NA		NA		SOLID/OXIDES		H-3		37.0000000000		NA		37.000000 lb		(2)			
1 - 41 GAL FIBER																			
FOR CONSIGNEE USE ONLY Tennessee "License For Delivery" No. _____ South Carolina Transport Permit No. _____ US Ecology Generator No. _____ US Ecology Permit No. _____				20. Generator Certification Statement A) Radioactive Materials: Certification is hereby made that this shipment of low-level radioactive waste has been prepared in accordance with a radioactive waste management program which has been approved by the Nuclear Regulatory Commission or an Agreement State regulatory agency and with the current revision of the site Material Acceptance Criteria. B) Hazardous Materials: Generator hereby certifies that this material does not contain a hazardous waste as defined in 40 CFR 261. C) Data: Generator hereby represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and site Radioactive Material Licenses. D) INFECTIOUS SUBSTANCE: Generator hereby certifies that this material does not contain an infectious substance as defined in 49CFR 173.124. <i>Joseph Koch</i> Print Name <i>Joseph Koch</i> Signature 12/19/19 Date															

201 Renovare Boulevard, Oak Ridge, TN 37830

OFFICE

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201 Renovare Boulevard, Oak Ridge, TN 37830

NRC FORM 540 (8-2010) U.S. NUCLEAR REGULATORY COMMISSION UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER		5. SHIPPER - NAME AND FACILITY Philotechnics @ R.M. Woster And Associates Inc. 215 Indecom Drive St. Peters, MO 63376		SHIPMENT ID NUMBER 1634-121919PH		7. FORM 540 AND 540A PAGE 1 OF 1 PAGE(S) FORM 541 AND 541A 2 PAGE(S) FORM 542 AND 542A 1 PAGE(S) ADDITIONAL INFORMATION NONE PAGE(S)		8. MANIFEST NUMBER (Use this number on all continuation pages) <u>1634-121919PH</u>	
1. EMERGENCY TELEPHONE NUMBER (Include Area Code) 800-424-9300		USER PERMIT NUMBER T-TN024-L19		SHIPMENT NUMBER 1634-121919PH		9. CONSIGNEE - Name and Facility Address Philotechnics, Ltd Operated By Philotechnics, Ltd 201 Renovare Blvd Oak Ridge, TN 37830		CONTACT Justin Button TELEPHONE NUMBER (Include Area Code) (865) 285-3027	
ORGANIZATION CHEMTREC #17253		CONTACT Joe Koch		TELEPHONE NUMBER (Include Area Code) (636) 928-9628		SIGNATURE - Authorized consignee acknowledging waste receipt		DATE	
2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST =====> 5		6. CARRIER - Name and Address Philotechnics, Ltd 201 Renovare Blvd. Oak Ridge, TN 37830		EPA I.D. NUMBER TNR000030544		10. CERTIFICATION This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and in proper condition for transportation and disposal in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulation.	
4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? If "Yes", provide Manifest Number =====>		EPA MANIFEST NUMBER N/A		CONTACT Justin Button		SHIPPING DATE 12/19/2019		TELEPHONE NUMBER (Include Area Code) (865) 466-4812	
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	
UN2910, Radioactive material, excepted package-limited quantity of material, 7 STORAGE FOR DECAY 1 - CARDBOARD BOX		NA		NA		SOLID/OXIDES		P-32	
UN2910, Radioactive material, excepted package-limited quantity of material, 7 STORAGE FOR DECAY 1 - CARDBOARD BOX		NA		NA		SOLID/OXIDES		I-125	
UN2910, Radioactive material, excepted package-limited quantity of material, 7 STORAGE FOR DECAY 1 - 5 GAL POLY DRUM		NA		NA		LIQUID/OXIDES		P-32	
UN2910, Radioactive material, excepted package-limited quantity of material, 7 STORAGE FOR DECAY 1 - 10 GAL POLY DRUM		NA		NA		LIQUID/OXIDES		I-125	
NON-DOT REGULATED MATERIALS STORAGE FOR DECAY 1 - 30 GAL DRUM		NA		NA		LIQUID/OXIDES		P-33	
16. TOTAL PACKAGE ACTIVITY Bq		17. LSA/SCO CLASS		18. TOTAL WEIGHT OR VOLUME (Use appropriate units)		19. IDENTIFICATION NUMBER OF PACKAGE			
18,500,000,000 (0.5000000000)		NA		3.00 ft ³ 15.00000 lb		19-002005 (97)			
166,500,000,000 (4.5000000000)		NA		3.00 ft ³ 29.00000 lb		19-002006 (6)			
7,400,000,000 (0.2000000000)		NA		0.68 ft ³ 5.00000 lb		19-002007 (L1)			
22,200,000,000 (0.6000000000)		NA		1.20 ft ³ 9.00000 lb		19-002008 (L-2)			
66,600,000,000 (1.8000000000)		NA		4.10 ft ³ 35.00000 lb		19-002009 (L-4)			
FOR CONSIGNEE USE ONLY				20. Generator Certification Statement					
				A) Radioactive Materials. Certification is hereby made that this shipment of low-level radioactive waste has been prepared in accordance with a radioactive waste management program which has been approved by the Nuclear Regulatory Commission or an Agreement State regulatory agency and with the current revision of the site Material Acceptance Criteria.					
				B) Hazardous Materials. Generator hereby certifies that this material does not contain a hazardous waste as defined in 40 CFR 261.					
				C) Data. Generator hereby represents and warrants that all data set forth in this UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations, and orders.					
				D) INFECTIOUS SUBSTANCE. Generator hereby certifies that this material does not contain an infectious substance as defined in 49CFR 173.134.					
				Joseph Karl Print Name		Joseph Karl Signature		12/19/19 Date	

@FILE

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1. EMERGENCY TELEPHONE NUMBER (Include Area Code) 800-424-9300		Philotechnics @ R.M. Wester And Associates Inc. 215 Indacom Drive St. Peters, MO 63376		1634-121919PH-1				1634-121919PH-1	
ORGANIZATION CHEMTREC #17253		USER PERMIT NUMBER T-TN024-L19		SHIPMENT NUMBER 1634-121919PH-1		9. CONSIGNEE - Name and Facility Address Philotechnics, Ltd Operated By Philotechnics, Ltd 201 Renovare Blvd Oak Ridge, TN 37830		CONTACT Justin Button TELEPHONE NUMBER (Include Area Code) (865) 285-3027	
2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST =====> 2		6. CARRIER - Name and Address Philotechnics, Ltd 201 Renovare Blvd. Oak Ridge, TN 37830		Truck #: Trailer #:		SIGNATURE - Authorized consignee acknowledging waste receipt	
4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? If "Yes", provide Manifest Number ==>		EPA MANIFEST NUMBER N/A		CONTACT Justin Button		EPA I.D. NUMBER TNR000030544		DATE	
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	
NON-DOT REGULATED MATERIALS DAW 1 - CARDBOARD BOX		NA		NA		SOLID/OXIDES H-3		0.3700000000 (0.0100000000)	
NON-DOT REGULATED MATERIALS DAW 1 - CARDBOARD BOX		NA		NA		SOLID/OXIDES H-3		0.3700000000 (0.0100000000)	
16. TOTAL PACKAGE ACTIVITY MBq mCi		17. LSA/SCO CLASS		18. TOTAL WEIGHT OR VOLUME (Use appropriate units)		19. IDENTIFICATION NUMBER OF PACKAGE			
		NA		3.00 ft ³ 15.00000 lb		19-002010 (100)			
		NA		3.00 ft ³ 15.00000 lb		19-002011 (99)			
FOR CONSIGNEE USE ONLY		20. Generator Certification Statement							
		<p>A) Radioactive Materials. Certification is hereby made that this shipment of low-level radioactive waste has been prepared in accordance with a radioactive waste management program which has been approved by the Nuclear Regulatory Commission or an Agreement State regulatory agency and with the current revision of the site Material Acceptance Criteria.</p> <p>B) Hazardous Materials. Generator hereby certifies that this material does not contain a hazardous waste as defined in 40 CFR 261.</p> <p>C) Data. Generator hereby represents and warrants that all data set forth in this UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST are true and correct in all respects, and in accordance with all applicable governmental laws, rules, regulations and site Radioactive Material Licenses.</p> <p>D) INFECTIOUS SUBSTANCE. Generator hereby certifies that this material does not contain an infectious substance as defined in 42CFR 173.134</p>							
		<p>Joseph Koch Print Name</p> <p>Joseph Koch Signature</p> <p>12/19/19 Date</p>							

017-336

And the following lab waste:

H-3 contaminated lab debris: 18 mCi
H-3 liquid (non-haz): 135.2 mCi in carboys
I-125 contaminated lab debris: 4.5 mCi
I-125 liquid (non-haz): 0.6 mCi
P-32 contaminated lab debris (decayed out but client need disposal record for NRC): 0.5 mCi
P-32 liquid (non-haz decayed out but client need disposal record for NRC): 0.2 mCi
P-33 liquid (non-haz): 1.8 mCi

Philotechnics can provide brokerage services to include manifesting, marking, labeling, milk run transportation, processing and disposal for as follows:

16 x SeeCoal sources: \$3,178.00 each x 16 = **\$50,848.00**

Pricing is a reflection of the A2 value of the Ra226 sources and the labor in cutting involved in containment to remove the source.

P32, P33 and I125 liquid – for disposal via solidification at Philotechnics: **\$150/ft3**

H3 contaminated Lab debris (packaged in readily incinerable containers with incinerable materials):
\$6.30 / lb.

Please note the high mCi surcharge for this H3 waste.

Any incinerable waste over 65 mCi of H3 will be charged at a rate of \$5.05 / mCi

P32 contaminated Lab debris for processing at Philotechnics: **\$5.95/lb.**

H3 liquid – for disposal via incineration at EnergySolutions,. Below are options based on packaging :

Option 1:

* All bulk liquids must be overpacked. The noted price is for an inner primary container being a 30 gallon size or greater. **\$5.25/lb. Thermal Treatment**

Option 2:

* All bulk liquids must be overpacked. The noted price is for an inner primary container being a less than a 30 gallon. **\$19.00/lb. Thermal Treatment**

Dedicated Transportation (occur before 12.31.19) / Onsite labor / Documentation fee **\$2,500.00**

Waived if picked up in accordance with other pickups in December 2019

Missouri Shipper Fee: **\$175.00**

Packaging supplies can be provided at cost + 15% (must know if need before arrival on site)

Philotechnics requests that the following be provided:

- Access for 16' – 48' Trailer
- Completed Waste Container Information Sheet (2) two weeks prior to pick up
- Completed Alaron/WCS generator certification and checklist.
- Work space for waste packaging as required
- Telephone/Fax access to Philotechnics staff
- Wipe test results for all pre-packaged waste

The transportation noted in the above charges allows for a (2) hour loading time. A \$120 per hour

This quotation contains privileged and confidential information intended only for the use of the specific entity named herein. Any unauthorized dissemination of this information is strictly prohibited.

FIBERPACK #97

33P

SOLID RADIOACTIVE WASTE LOG SHEET

ISOTOPE	AMOUNT (uCi or mCi)	DESCRIPTION OF WASTE (i.e. Gloves, Paper, Pipette tips, well plates)	NAME	DATE
33P	10 uCi	Pipettes, Pipette tips, well plates, gloves, tissues, paper towels, bench drape	W. Taylor	16-NOV-18 ✓
—	—	—	—	—
33P	Trace	Broken Vase Bottle Cap	W. Taylor	16-NOV-18 ✓
33P	31 uCi	Pipette Tips, Gloves, Plates	W. Taylor	20-NOV-18 ✓
33P	34 uCi	"	W. TAYLOR	18-DEC-18 ✓
33P	Trace	"	W. TAYLOR	19-DEC-18 ✓
33P	15 uCi	"	W. Taylor	21-DEC-18 ✓
33P	123 uCi	"	W. TAYLOR	22-JAN-19 ✓ 85.35
33P	56 uCi	"	M. HALL	27-FEB-19 ✓
33P	122 uCi	"	M. HALL	6-MAR-19 ✓
33P	194 uCi	"	M. HALL	6-MAR-19 ✓
	585 uCi	TOTAL		

Geiger Counter Serial Number 285310 Geiger Counter Expiration Date 10/22/19

Geiger Counter Background 0.02mR/hr

Geiger Counter Results of Package 0.02mR/hr

Survey Done Done by SAABYA

Date of Survey 13-Jun-2019

33P

C42BOT # 25

LIQUID RADIOACTIVE WASTE LOG SHEET

ISOTOPE	AMOUNT (uCi/liter or uCi/ mL)	DESCRIPTION OF WASTE (i.e. 85% water, 15% Ethanol)	NAME	DATE
³³ P	30 μ Ci / 600 mL	95% H ₂ O, 5% EtOH	W. TAYLOR	19-DEC-2018 ✓
³³ P	45 μ Ci / 600 mL	"	W. TAYLOR	21-DEC-2018 ✓
³³ P	90 μ Ci / 600 mL	"	W. TAYLOR	22-JAN-2019 ✓
³³P	150 μCi	"	W. TAYLOR	20-DEC-2018
	165 μ Ci	TOTAL		

Geiger Counter Serial Number 285310 Geiger Counter Expiration Date 10/22/19

Geiger Counter Background 0.02 mR/hr

Geiger Counter Results of Package 0.02 mR/hr

Survey Done Done by S. ANAYA

Date of Survey 13-JUN-2019

32 P

BOTTLE # 1

LIQUID RADIOACTIVE WASTE LOG SHEET

ISOTOPE	AMOUNT (uCi/liter or uCi/ mL)	DESCRIPTION OF WASTE (i.e. 85% water, 15% Ethanol)	NAME	DATE
P-32	130 uCi	Water + 5% TCA	Armstrong	2-19-16 ✓
³² P	190 uCi	Water*	Armstrong	2-23-16 ✓
³² P	315 uCi	Water + 5% TCA	Armstrong	2-26-16 ✓
³² P	350 uCi	Water + 5% TCA	Armstrong	3-10-16 ✓
³² P	265 uCi	Water + 5% TCA + EtOH	Armstrong	3-15-16 ✓
³² P	90 uCi	" " "	Armstrong	3-18-16 ✓
³² P	25 180 uCi	" "	Armstrong	4-1-16 ✓
³² P	135 uCi	" "	Armstrong	4-8-16 ✓
³² P	135 uCi	" "	Armstrong	4-15-16 ✓
TOTAL = 1790 uCi				
** BEGIN DECAY		2-MAY-2016	**	
				1/2 life = 14.3 days
28-Nov 2016	EXTERNAL SCAN OF BOTTLE < 0.1 uR/hr			
	100 µl ALIQUOT REMOVED AND COUNTED ON LIQUID SCINTILLATION			
	COUNTER (SEE ATTACHED RESULTS)			
18 DEC 2017 GEMER COUNTER (#285310) CAL DATE 30 OCT 2017				
- external scan of bottle 0.02 mR/hr				
- Geiger counter background = 0.02 mR/hr				
- 100 µl aliquot removed and counted on liquid scintillation				
counter (see attached results)				

W. J. Hall
18 Dec 2017

Decay Constant for
 $6/17/14 = 6.29 \times 10^{-22}$
 uCi - Decay rate

Cumulative Waste Log

Dumped 6/27/16

Date	Liquid Waste (uCi)	Solid Waste (uCi)	Total (uCi)
10.25.17	31.5 μ Ci	7.9 μ Ci	39.4 μ Ci
10.27.17	27 μ Ci	6.4 μ Ci	33.4 μ Ci
11.10.17	134 μ Ci	33 μ Ci	167 μ Ci
12.7.17	20.04 μ Ci	5.01 μ Ci	25.05 μ Ci
12.7.17	20.04 μ Ci	5.01 μ Ci	25.05 μ Ci
12.12.17	46.76 μ Ci	11.69 μ Ci	58.45 μ Ci
12.12.17	46.76 μ Ci	11.69 μ Ci	58.45 μ Ci
4.16.19	0 μ Ci	760.2 μ Ci	760.2 μ Ci
4.16.19	0 μ Ci	916.5 μ Ci	916.5 μ Ci
4.16.19	0 μ Ci	916.5 μ Ci	916.5 μ Ci
1/17/19	7.5 μ Ci	67.5 μ Ci	75 μ Ci
1/18/19	1.0 μ Ci	7.75 μ Ci	8.75 μ Ci
1/21/19	5.25 μ Ci	1.0 μ Ci	6.25 μ Ci
1/23/19	=	3.5 μ Ci	3.5 μ Ci
1/25/19	-	7.5 μ Ci	7.5 μ Ci
1/31/19	-	100 μ Ci	100 μ Ci
2/1/19	-	44 μ Ci	44 μ Ci
2/12/19	-	102 μ Ci	102 μ Ci
2/13/19	-	61 μ Ci	61 μ Ci
3/8/19	-	592 μ Ci	592 μ Ci
3/8/19	3.0 μ Ci	50 μ Ci	53 μ Ci
3/15/19	82.5 μ Ci	80 μ Ci	162.5 μ Ci
3/18/19	100 μ Ci	10 μ Ci	110 μ Ci
6/12/19	-	174.5 μ Ci	174.5 μ Ci
6/12/19	-	500 μ Ci	500 μ Ci
4/16/19	-	760.2 μ Ci	760.2 μ Ci
4/16/19	-	916.5 μ Ci	916.5 μ Ci
4/16/19	-	916.5 μ Ci	916.5 μ Ci

COMBINED INTO ONE ENTRY FOR FP#90 2/13/19

✓ 0.04
 ✓ 0.03
 ✓ 0.18
 ✓ 0.04
 ✓ 0.04
 ✓ 0.09
 ✓ 0.04
 ✓ 368.8
 ✓ 444.6
 ✓ 444.6
 ✓ 22.9
 ✓ 6.5
 ✓ 6.12
 ✓ 0.64
 ✓ 4.41
 ✓ 23.5
 ✓ 10.35
 ✓ 21.0
 ✓ 44.35
 ✓ 182.2
 ✓ 16.3
 ✓ 54.27
 ✓ 38.04
 ✓ 164.6
 ✓ 767
 ✓ 368.8
 ✓ 444.6
 ✓ 444.6

3634.44