

**Savannah River Site
H Canyon Radiological Liquid Spill Report
Spill Event: July 4, 2022**

**Prepared by:
Savannah River Nuclear Solutions
Environmental Compliance**

August 10, 2022



U.S. Department of Energy
H Canyon Radiological Liquid Spill Report
Spill Event: July 4, 2022

Site Name: Savannah River Site

Site Location: Aiken, Barnwell, and Allendale Counties
Near Aiken, South Carolina


Site Information

Operator: Savannah River Nuclear Solutions, LLC
Savannah River Site, 730-4B
Aiken, South Carolina 29808

Site Environmental Protection Coordinator: Jason Shirley, 803-952-8228

Environmental Compliance Manager: Amy Meyer, 803-952-8660

Document Review Sheet



Jason Shirley 8/11/22
Date
Environmental Compliance, Site Environmental Protection Coordinator
Savannah River Nuclear Solutions



Amy Meyer 8/11/22
Date
Environmental Compliance, Manager
Savannah River Nuclear Solutions

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Executive Summary

This report contains information regarding the July 4, 2022, H Canyon radiological liquid spill event and response actions. Observations and data gathered support that there was no release offsite, to Waters of the State, or to the environment. Further data gathered supports that the amount of radiological liquid that spilled to paved areas of SRS did not contain any constituents of reportable quantity. As a U. S. Department of Energy (DOE) facility, the Savannah River Site (SRS) follows reporting protocol of releases to the environment as directed by Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S. Code Subchapter I) and the U.S Environmental Protection Agency (EPA) List of Lists (EPA 550-B-21-001). The list provides the names of chemicals and radionuclides subject to reporting requirements with the corresponding reportable quantity.

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1.0 Facility Information

The U.S. Department of Energy (DOE) Savannah River Site (SRS) was constructed during the early 1950s to produce the basic materials used in the fabrication of nuclear weapons, primarily tritium and plutonium-239, in support of our nation's defense programs. Five reactors were built to produce these materials. Also built were several support facilities including two chemical separations plants, a heavy water extraction plant, nuclear fuel and target fabrication facility, a tritium extraction facility, and waste management facilities.

Production of nuclear materials for national defense, other government programs, and some civilian programs continued until the early 1990s, when the major focus shifted to remediation and restoration. Presently, efforts to restore the environmental integrity and usability of the land area and resources continue, while looking to the future to acquire new missions that enhance national security, develop technological solutions, and provide clean energy capability.

1.1 Site Description

SRS is located in the western region of South Carolina and bordered by the Savannah River and Georgia on the western side (Figure 1-1). The site occupies approximately 310 square miles, principally in Aiken and Barnwell Counties. The site is located in a rural environment where the average population density in the surrounding counties is 107 people per square mile. The largest concentration of people is in the Augusta, Georgia metropolitan area, approximately 20 miles from the site. Based on 2010 U.S. Census Bureau data, the population within a 50-mile (80-kilometer) radius of SRS's H Area is approximately 803,370 people.

1.2 H Canyon Description

H Canyon is the only operating radiologically shielded chemical separations facility in the United States. Since 2003, H Canyon has recovered highly enriched uranium from various sites across the DOE complex and from foreign test reactors. DOE has previously used H Canyon to blend down highly enriched uranium into low enriched uranium fuel. H Canyon is now primarily focused on supporting the Accelerated Basin De-inventory which allows SRS to process all remaining spent nuclear fuel in L-Basin through H-Canyon without recovery of Highly Enriched Uranium and immobilize the resulting dissolved material to be disposed of at a future repository.

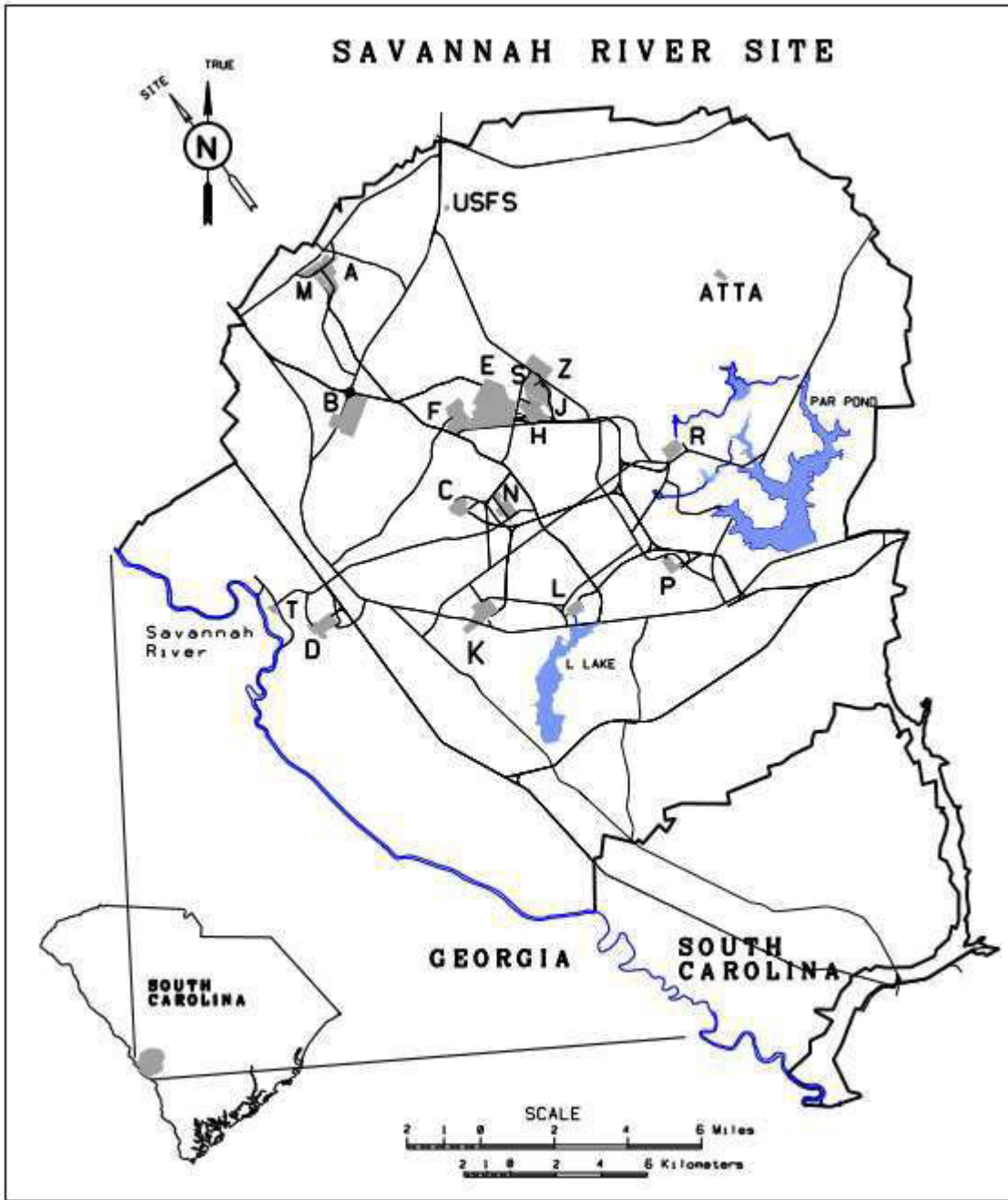


Figure 1 SRS Map

2.0 Spill Event Description

On the evening of July 4, 2022, SRS responded to a radiological liquid spill at H Canyon. At 19:47, during operator rounds, an outside facility operator noticed liquid on the ground outside of a containment dike for a stainless steel tank near the 294-H Sand Filter. No transfer was currently in progress. The temporary tank transfer system was being used to support dewatering 294-H Sand Filter sump of contaminated rainwater/condensation to support an upcoming inspection. Liquid was found to have spilled out of the tank, into the secondary containment, and onto the pavement. At 20:42, SRS Operations Center (SRSOC) received a call from H Canyon to notify that the spill had occurred. It was also noted that it was raining at H Canyon at the time.

At 21:02, SRSOC contacted the Site Environmental Protection Coordinator (SEPC) to inform him that a radiological liquid spill had been observed at a stainless steel tank. The tank is commonly referred to as a “tuff tank” by facility personnel and was reported as such during the initial response. The facility responded with immediate actions to contain the spill with sandbags and absorbent materials, surveys of the surrounding area, and operational notifications. At 21:14 as a precautionary measure, a Protective Action to “Remain Indoors” was implemented in H-Area. The “All Clear” was given for H-Area at 23:23, ending the Protective Action. At 23:30 SRSOC provided the SEPC an update that the sandbags had been placed, and the liquid had been contained. The SEPC was informed that the total amount of the spill was approximately 150 gallons and that it was no longer raining. Additional actions taken within the first 24 hours of the spill included tarping the spill area, pumping down radiological liquid in the temporary containment dike, surveying the area, and applying a coating to fix contamination to the asphalt.

On the morning of July 5, 2022, the SEPC and the Stormwater Subject Matter Expert (SME) visited the spill location and outfalls around the facility. A damp area was observed on the paved surface at the H-06 Industrial Stormwater Outfall. This outfall is paved and connects to a concrete ditch. Based on field observations, the SEPC and Stormwater SME concluded the spill did not reach the ground or Waters of the State. The facility conservatively estimated that 5 gallons reached this paved area. Surveys were performed for the paved surfaces and concrete ditch at the outfall on July 5, 2022. Initial surveys identified transferable and fixed contamination. The area was posted and barricaded for radiological concerns. More detailed surveys were performed on July 7, 2022 and are included in this report. On July 5, 2022, the SEPC made an Informative Notification to the South Carolina Department of Health and Environmental Control (SCDHEC) Aiken Emergency Response Team (ERT) member to provide information on the spill event. As requested, a summary of the discussion was emailed to the ERT member.

Additional rainfall data was gathered from the night of the spill. The rainfall total for the H-06 drainage basin for July 4, 2022, was 0.01 inches. Archived radar imagery and facility personnel reporting support rainfall occurred between 19:32 and 20:52 on July 4, 2022. Historical weather data gathered was provided by the Savannah River National Laboratory (SRNL) Atmospheric Technologies Group.

A site visit was conducted by SCDHEC Aiken ERT member on July 11, 2022, to observe the spill site. H Canyon personnel shared the spill response actions taken around the tank. The SCDHEC ERT member was able to view the barricaded paved area as well as the subsequent coating applied to fix contamination to the asphalt. After visiting the spill area at the tank, the SCDHEC ERT member was taken to the H-06 Outfall and was able to view the outfall with filtration bags in place. A combination of peat moss bags and sandbags were used in the facility structure to prevent contamination from leaving the concrete ditch. As of July 14, 2022, approximately 120 cubic feet (ft³) of low-level waste was generated from spill response. A summary of the SCDHEC Aiken ERT member visit and photo summary of the spill event was emailed to the ERT member. Attachment A provides the photo summary of the spill event.

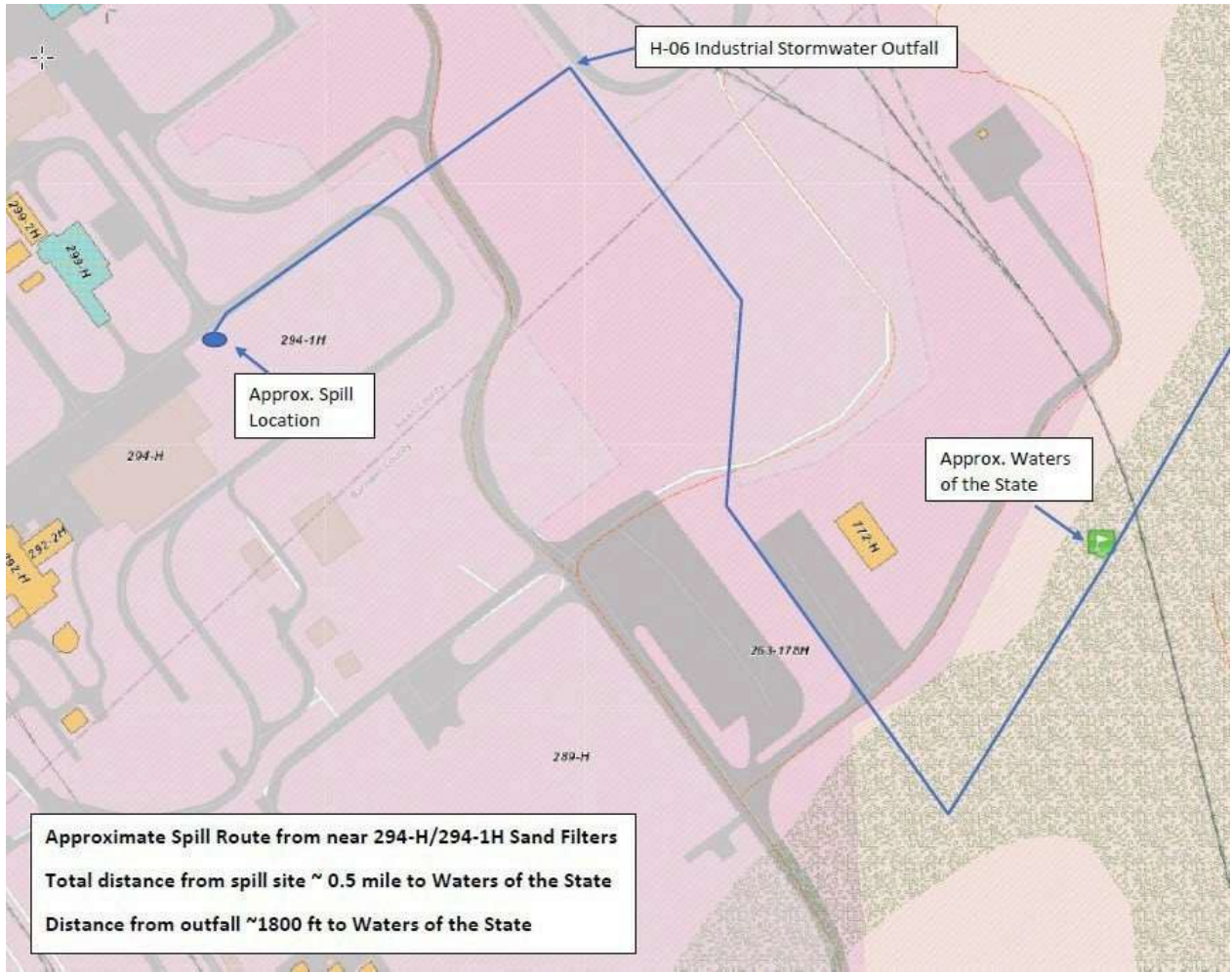


Figure 2 H-06 Outfall Area Map

3.0 Calculated Volume of Spill Summary

The facility initially estimated that up to 150 gallons had spilled from the stainless steel tank, into the secondary containment, and onto the asphalt during the night of the spill. The tank is a Transtore Tank that has a capacity of 550 gallons. After the spill event, the facility performed a calculation to determine the volume of radioactive solution that spilled from the tank onto the pavement, and into an adjacent culvert leading to the H-06 Outfall (referred to as H-6 Outfall in Attachment B). The spill volume that went onto the pavement and into the culvert is at least 38 gallons due to the tilt of the containment dike. Since the dike is constructed of flexible material held in place by metal struts that allow flexing of the material at the overflow point, it is reasonable to assume that the actual spill amount is greater than 38 gallons. An estimated spill volume of 100 gallons is more than double the calculated amount and should be reasonable for determining response actions. The facility maintains the conservative estimate that no more than 5 gallons of the spill reached the paved area at the H-06 Outfall. Attachment B provides a calculation summary of the spill event.

4.0 RPD Survey Summary

Subsequent data gathered supports the assertion that the spill stayed onsite and did not reach the environment. Radiological surveys within the concrete ditch have detected within clean limits before any stormwater reaches an earthen pathway to Waters of the State. On July 5, 2022, the Radiological Protection Department (RPD) initiated daily readings at the H-06 Outfall to monitor conditions. Based on survey results, RPD established a barricaded area at the H-06 Industrial Outfall. At the outfall there is a transition from a reinforced concrete pipe to a concrete ditch. This concrete ditch continues for approximately 1,130 feet before stormwater can reach ground. The distance from the beginning of the earthen pathway to Waters of the State is an additional 670 feet. In total, the distance from the H-06 Outfall to Waters of the State is 1,800 feet. RPD is currently monitoring the barricaded area at the outfall after every rain event. Attachment C provides RPD survey results.

5.0 Water Sampling Summary

Stream monitoring was conducted at McQueens Branch and Upper Three Runs. In relation to the spill site, the nearest sampling point for Waters of the State is McQueens Branch. Stream sampling conducted at the nearest sampling points on McQueens Branch has shown results within U.S. Environmental Protection Agency (EPA) drinking water standards.

Continuous sampling on Upper Three Runs composite samples indicates levels within EPA drinking water standards prior to reaching the Savannah River. SCDHEC was provided a split sample from July 8, 2022, at McQueens Branch. On July 13, 2022, SRS added an ISCO sampler to collect composite samples at McQueens Branch. SRS offered to provide SCDHEC split samples if requested. SCDHEC established a sample location at McQueens Branch on July 19, 2022.

The SRS liquid effluent outfalls are part of the Environmental As Low As Reasonably Achievable (E-ALARA) program, and results are compared to the DOE Derived Concentration Standards (DCS) (DOE-STD-1196-2011). The H-06 Outfall location is currently under the NPDES Stormwater Program and not in the Radiological Liquid Effluent Program requiring E-ALARA. This is due to there being no facility liquid effluents as radiological source contributors. The DCS is applicable when the average concentration at the outfall is greater than the DCS threshold for 12 months. At that point, DOE Order 458.1, Radiation Protection of the Public and the Environment, requires a Best Available Technology process to ensure the effluent source is reduced. The samples collected were compared to those DCS threshold levels. It is important to note all stream sampling results were less than 1 percent of the associated DCS values.

The stream surveillance program results are also compared to the EPA drinking water standards for recommended speciation and standard values for Sr-90 and the uranium isotopes. SRS compared the results to the EPA maximum contaminant levels (MCLs) and the control locations upstream of any SRS influence. Attachment D provides stream sampling data.

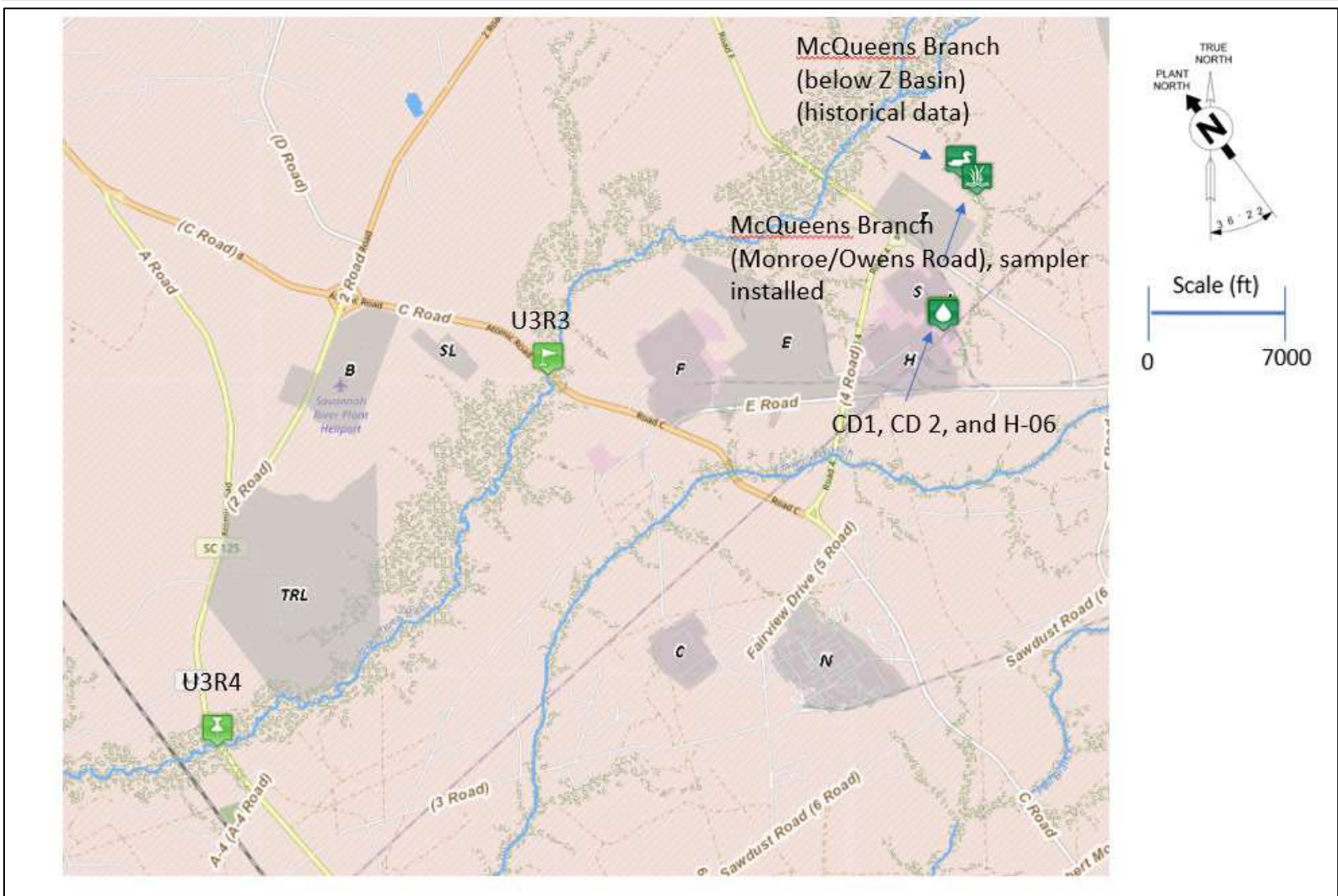


Figure 3 Water Sampling Map

6.0 Calculation of Radioactivity Summary

H Canyon RPD provided monitoring at the spill area around the tank. Calculated curie amounts of spilled radiological liquid onto paved surfaces indicates no Reportable Quantity (RQ) could have been met if the spill had reached the environment. Based on surveys, RPD confirmed the spill site was not an airborne contamination area. Additionally, the immediate action of applying a coating to the paved surface was undertaken to prevent any potential contamination from migrating from the spill area. The facility conducted a controlled flush with filtration bags in place on July 7, 2022, for any residual contamination that may lead to the outfall. Samples were collected of the tank/secondary containment on July 7, 2022 and analyzed by SRNL. The calculation for the estimated curie amount spilled to paved surfaces on July 4, 2022, is provided in Attachment E.



Above: Paved spill area tarped. Photo taken in the early morning hours of 7/5/22.



Above: Two tuff tanks (550 gallons each, one empty prior to spill). Temporary dike installed around tanks prior to spill. Photo taken 7/5/22.



Above: Sand Filter sump location that pumps to tuff tanks. Photo taken 7/5/22.

Attachment: A



Above: Tuff tanks to culvert by rear of tanker (from left to right). Photo taken 7/5/22.

Below: Rear of tanker and culvert to reinforced concrete pipe. Photo taken 7/5/22.





Above: Reinforced concrete pipe to H-06 Industrial Stormwater Outfall with damp paved area. Photo taken 7/5/22.



Above: H-06 Industrial Stormwater Outfall looking upstream of concrete ditch. Photo taken 7/5/22.



Above: Tuff tanks and area coated on 7/5/22 to fix contamination (coating colors have no specific meaning, facility used the colors that were available). Photo taken 7/7/22.



Above: Tanker and area that was coated on 7/5/22. Photo taken on 7/7/22.



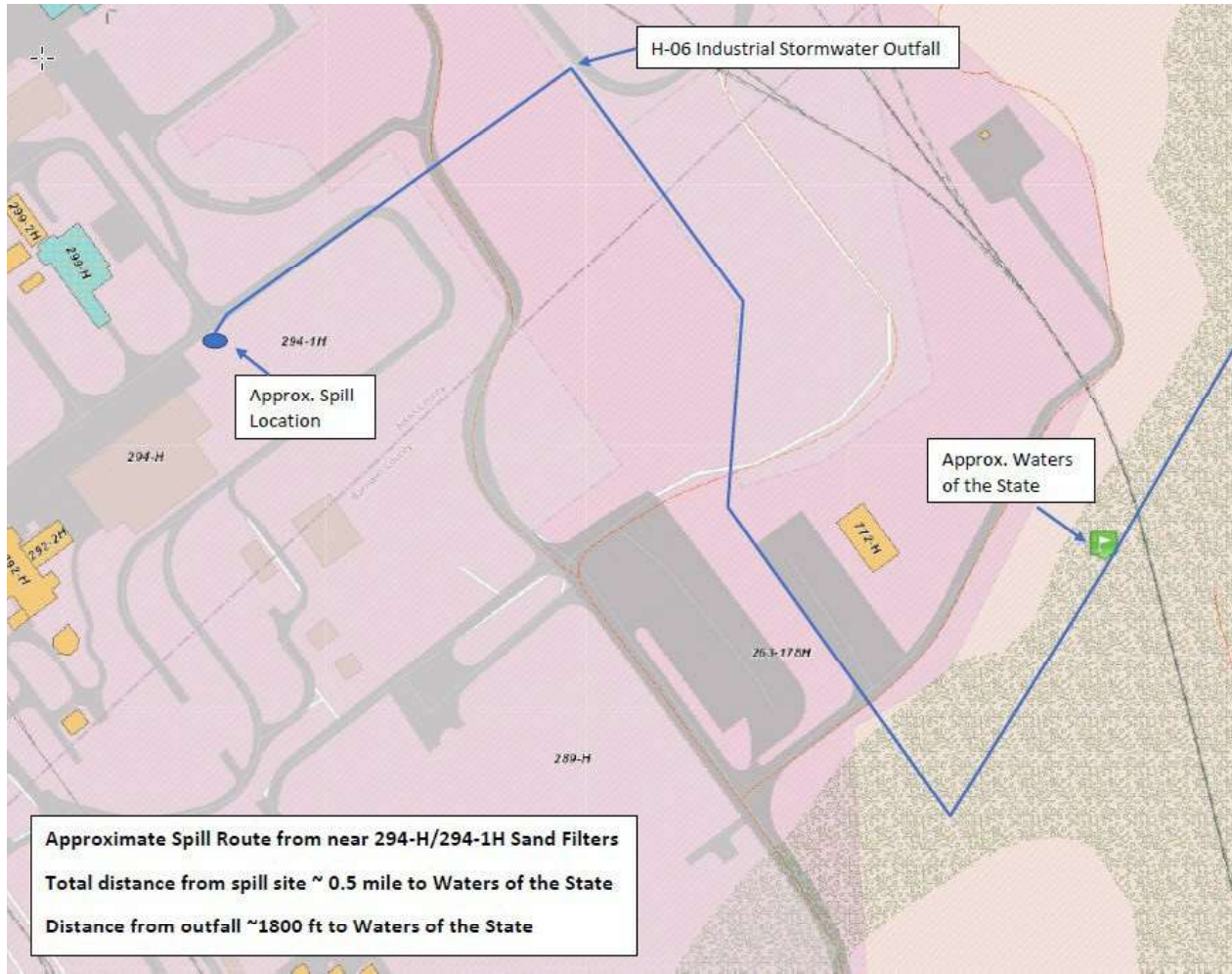
Above: Coating being applied to concrete at H-06 Industrial Stormwater Outfall on 7/7/22. Photo taken 7/7/22.

Below: Black permeable bags for filtration fabricated on site in response to spill. Installation of initial peat bags began on Thursday 7/7/22 followed by a controlled flush of the pipe leading to the outfall. Photo taken on 7/8/22.





Above: Picture at H-06 Industrial Stormwater Outfall of secondary peat bed system installed with reinforcement on top of concrete. The primary peat bag section (not shown) is located inside and at the exit of the pipe leading to the outfall. The primary peat configuration is held in place by a rigid grate, therefore both the primary and secondary bag systems are supported. Photo taken on 7/9/22.



Above: Map of area

Calculation Cover Sheet

Proc. Ref. E7, 2.31/2.31A

Project/Task H-Canyon Roadway Remediation		Calculation Number Q-CLC-H-00658	Project/Task Number N/A	
Title Calculation of Spill Volume from Transtore Container and Containment Dike		Functional Classification Environmental	Sheet 1 of 9	
		Discipline Environmental		
Calculation Type <input checked="" type="checkbox"/> Type 1 <input type="checkbox"/> Type 2		Type 1 Calc Status <input type="checkbox"/> Preliminary <input checked="" type="checkbox"/> Confirmed		
Computer Program No. N/A <input checked="" type="checkbox"/> N/A		Version/Release No. N/A		
Purpose The purpose of the calculation is to determine the volume of radioactive solution that spilled from a Transtore tank onto pavement and into an adjacent culvert leading to the H-6 outfall.		DC/RO Date <p style="color: red; font-weight: bold;">Reviewed and determined to be UNCLASSIFIED. This review does not constitute clearance for public release.</p> <p style="color: red; font-weight: bold;">Derivative Classifier: <u>A. T. Masterson, Principal Engineer</u> (Name/personal identifier and position title)</p> <p style="color: red; font-weight: bold;">Date: <u>7/25/2022</u></p>		
Summary of Conclusion The spill volume that went onto the pavement and into the culvert is at least 38 gallons due to the tilt of the containment dike. Since the dike is constructed of flexible material held in place by metal struts that allows flexing of the material at the overflow point, it is reasonable to assume that the actual spill amount is greater than 38 gallons. An estimated spill volume of 100 gallons is more than double the calculated amount and should be reasonable for determining response actions.				
Revisions				
Rev No.	Revision Description			
0	Initial Issue			
N/A	N/A			
N/A	N/A			
Sign Off				
Rev No.	Originator (Print) Sign/Date	Verification/Checking Method	Verifier/Checker (Print) Sign/Date	Manager (Print) Sign/Date
0	S. T. Veldman <small>Digitally signed by STEPHEN VELDMAN (Affiliate) Date: 2022.07.25 08:34:11 -04'00'</small>	<input type="checkbox"/> Design Check (GS/PS only) <input checked="" type="checkbox"/> Document Review <input type="checkbox"/> Qualification Testing <input type="checkbox"/> Alternate Calculation <input type="checkbox"/> Operational Testing	J. Tennant <small>Digitally signed by JARED TENNANT (Affiliate) Date: 2022.07.25 09:02:33 -04'00'</small>	A. M. Hudlow <small>Digitally signed by AVERY HUDLOW (Affiliate) Date: 2022.07.26 11:47:27 -04'00'</small>
Additional Reviewer (Print) Cecil Copeland, Outside Facilities Operations Manager		Signature CECIL COPELAND (Affiliate)		Date <small>Digitally signed by CECIL COPELAND (Affiliate) Date: 2022.07.25 10:00:50 -04'00'</small>
Design Authority (Print) N/A		Signature N/A		Date N/A
Release to Outside Agency – Design Authority (Print) N/A		Signature N/A		Date N/A
Security Classification of the Calculation Unclassified				

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1.0 INTRODUCTION

The purpose of this Engineering Calculation is to determine the volume of radioactive solution that spilled from a Transtore tank onto the pavement and into an adjacent culvert leading to the H-6 outfall.

2.0 OPEN ITEMS

There are no Open Items.

3.0 INPUTS

- 3.1. The capacity of the Transtore tank is 550 gallons. (Ref. 8.2, 8.3)
- 3.2. The dimensions of the tank that can hold liquid are 48 in. x 42 in. x 65 in. (Ref. 8.2)
- 3.3. 35.3145 ft³ equals 264.17 US gallons (gal). (Ref. 8.1)
- 3.4. The dimensions of the dike for spill containment are 10 ft. x 10 ft. x 1 ft. (Att. 1)
- 3.5. The difference in height of the dike wall between the north and south side is 3 inches (Att. 1)
- 3.6. The tilt angle of the plate under the dike is between 3-4 degrees (Att. 2)

4.0 ASSUMPTIONS

- 4.1 The level of liquid left in the tank is 3 inches deep. *Basis:* Radiation Protection personnel estimated the depth of liquid at 5 inches. This assumption is conservative to give a maximum possible spill volume and accounts for the rounded corners on the bottom of the tank.
- 4.2 The tilt angle of the plate for calculation purposes is 4.0 degrees. *Basis:* An edge-on photo of the steel plate under the tanks yielded a measured angle of 3-4 degrees using a protractor overlay (I-3.6) Since a higher tilt angle results in less dike capacity, 4.0 degrees is chosen as a conservative bounding value for maximum spill volume.

5.0 ANALYTICAL METHODS AND COMPUTATIONS

The maximum volume of liquid leaving the tank is simply the tank capacity minus the amount left in the tank after the spill. The volume of the dike that cannot hold liquid is calculated by trigonometry using the following equations, where θ is the tilt angle (radian), h is the north-south height difference (ft), FL is the length of the fill line in (ft), and V is the volume (ft³).
(I-3.4, 3.5)

Equation 1. Determination of Tilt Angle

$$\sin \theta = \frac{(h)}{10 \text{ ft}}$$

Equation 2. Determination of Fill Line Length

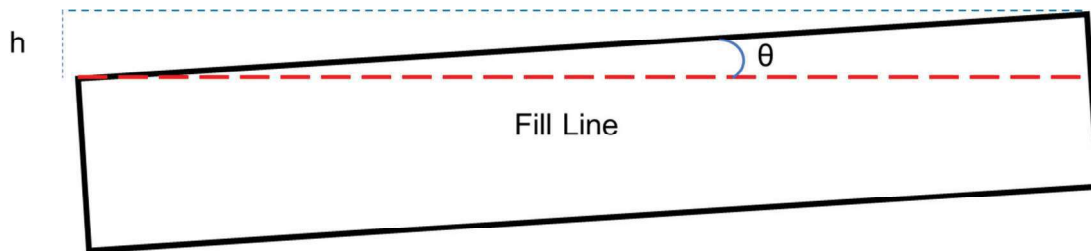
$$FL = [(10 \text{ ft}) \cos \theta] + [(h) \tan \theta]$$

Equation 3. Determination of Empty Volume

$$V = (1/2)(FL)(h)(10 \text{ ft})$$

A figure showing the dike arrangement is below.

Figure 1. Dike Arrangement



The volume of the spill is the maximum volume that left the tank minus the volume contained in the dike.

6.0 RESULTS

The amount of liquid left in the tank is 42 in. x 48 in. x 3 in. (I-3.2) (A-4.1) This is a volume of 6,048 in³. This equals 3.5 ft³ or 26.18 gal. (I-3.3)

The amount of liquid that left the tank is 550 gal – 26.18 gal which is 523.82 gal. (I-3.1)

The tilt angle is 0.025008 radians or 1.432 degrees from horizontal if calculated using a h of 3 inches. (I-3.5) Since the photo in Attachment 2 shows a higher angle of tilt the conservative value of 4.0 degrees is used for θ . (A-4.2) This results in less dike capacity and conservatively estimates the spill volume.

Using the measured tilt angle, the value of h is calculated to be 0.698 ft. Therefore, the length FL equals 10.02 ft. The resulting volume of the dike that cannot hold liquid is 35.0 ft³. The volume of the dike that can hold liquid is 100 ft³ – 35.0 ft³ which equals 65.0 ft³ or 486 gallons. *Note:* This value is rounded down for conservatism.

The spill volume is then calculated as 523.82 gal – 486 gal which is 38 gallons. The liquid clearly breached the dike containment and went onto the pavement and into the adjacent culvert as seen in photos taken after the event. (Att. 3)

7.0 CONCLUSIONS

The spill volume that went onto the pavement and into the culvert is at least 38 gallons due to the tilt of the containment dike. Since the dike is constructed of flexible material held in place by metal struts that allows flexing of the material at the overflow point, it is reasonable to assume that the actual spill amount is greater than 38 gallons. An estimated spill volume of 100 gallons is more than double the calculated amount and should be reasonable for determining response actions.

8.0 REFERENCES

- 8.1 Felder, Richard M; Rousseau, Ronald W.; *Elementary Principles of Chemical Processes, 2nd Edition*; John Wiley & Sons; New York; 1986.
- 8.2 Drawing 515987, R/11-7-2007, Custom Metalcraft, Inc.
- 8.3 William Blackburn, STAR Item 2018-CTS-001487.

9.0 ATTACHMENTS

ATTACHMENT 1: Shift Technical Engineer (STE) Email

From: Yun Tang <yun.tang@srs.gov>

Sent: Monday, July 18, 2022 5:02 AM

To: Kenneth Burrows <kenneth.burrows@srs.gov>

Cc: Mark Hudlow <mark.hudlow@srs.gov>; James Therrell <James.Therrell@srs.gov>; Stephen Veldman <Stephen.Veldman@srs.gov>; Amanda Barnes <amanda.barnes@srs.gov>; HCANSTE <HCANSTE@srs.gov>

Subject: RE: Spill Volume Estimate

I reviewed Nathan's spill volume estimation and concur with his numbers.

Spill length is 10'

Spill Width is 10'

Dike height is 1'

Dike angle is 3" (two sides)

Volume = $10' \times 10' \times (1' - ((0.25' + 0.25') / 2)) = 75 \text{ ft}^3$ or 561 gals.

Ken Tang

H-Canyon STE

208-3002

ATTACHMENT 2: Spill Photo for Tilt Angle Determination



ATTACHMENT 3: Spill Photo



Sample ID	pCi/gm Alpha	pCi/gm Beta-gamma
CL#0	91.77	143.55
CL#1	123.50	113.80
CL#1.5	51.77	97.39
CL#2	131.80	166.60
CL#3	136.50	112.50
CA#1	54.10	117.70
CA#2	222.40	351.10
CA#3	57.60	376.40
CA#4	108.10	78.80
CA#5	94.10	423.00
CL#4	44.41	144.45
CL#5	94.27	42.46
CL#6	40.00	40.17

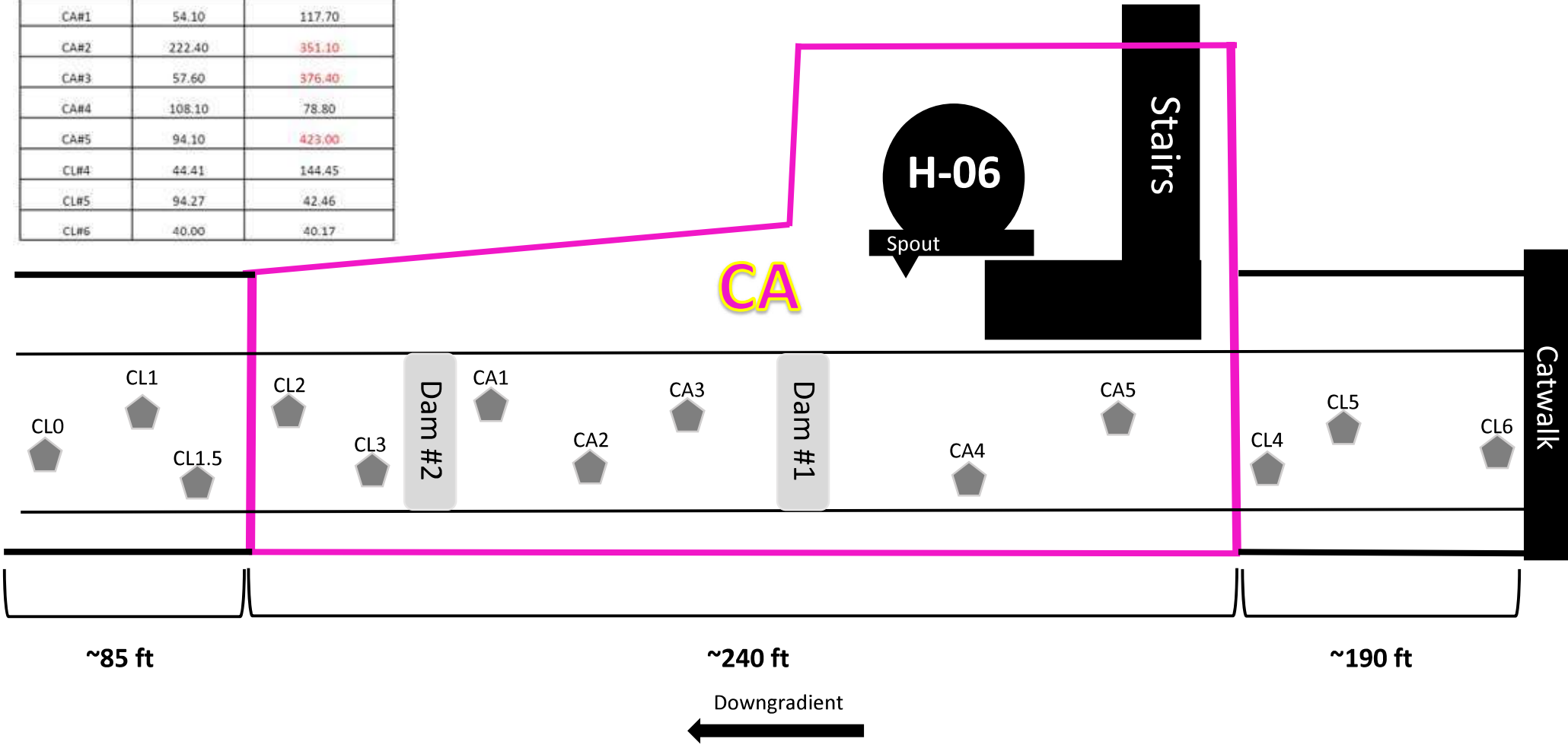


Diagram not drawn to scale

One sample was taken about every 25 ft. Approximate sample locations are marked with red survey flags on the bank

Contaminated soil: ≥ 1000 pCi/gm Alpha and/or ≥ 150 pCi/gm Beta-gamma

Type	Alpha	Beta-gamma
Probe 1	ND dpm/100cm2	150,000 dpm/100cm2
Large Area Swipe 1	ND dpm/wipe	10,000 dpm/wipe
100cm2 Smear 1	<200 dpm/100cm2	4,000 dpm/100cm2
Probe 2	ND dpm/100cm2	150,000 dpm/100cm2
Large Area Swipe 2	ND dpm/wipe	10,000 dpm/wipe
100cm2 Smear 2	<200 dpm/100cm2	4,000 dpm/100cm2
Probe 3	ND dpm/100cm2	60,000 dpm/100cm2
Large Area Swipe 3	ND dpm/wipe	ND dpm/wipe
100cm2 Smear 3	<200 dpm/100cm2	2,000 dpm/100cm2
Probe 4	ND dpm/100cm2	80,000 dpm/100cm2
Probe 5	ND dpm/100cm2	50,000 dpm/100cm2
Probe 6	ND dpm/100cm2	30,000 dpm/100cm2
Probe 7	ND dpm/100cm2	30,000 dpm/100cm2

-  = Probe
-  = Large Area Swipe
-  = 100cm2 Smear
-  = Natural Moss

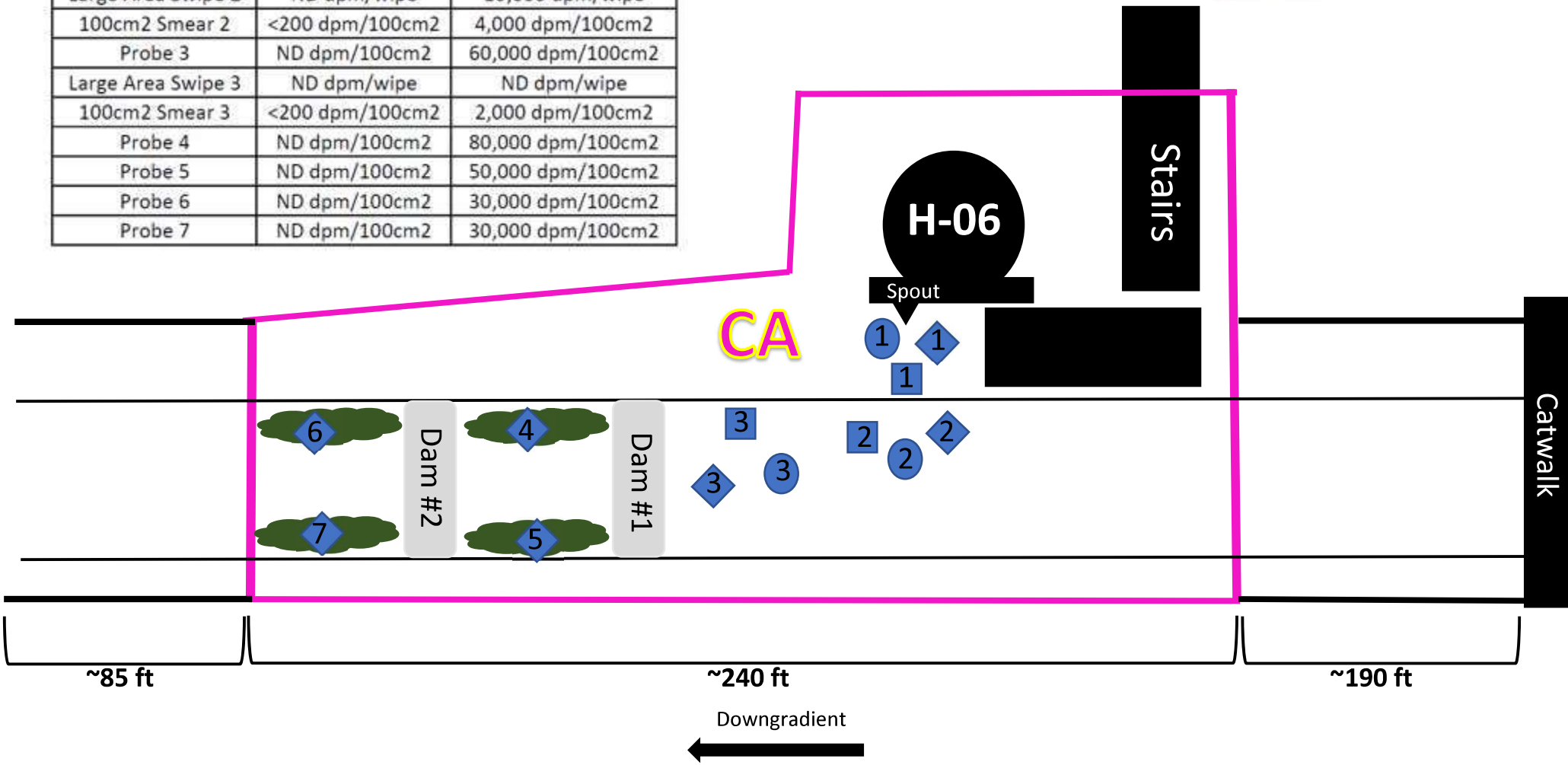


Diagram not drawn to scale


Smears levels considered contaminated using portable survey instrument: > 200 dpm/100cm2 Alpha and/or > 1000 dpm/100cm2 Beta-gamma

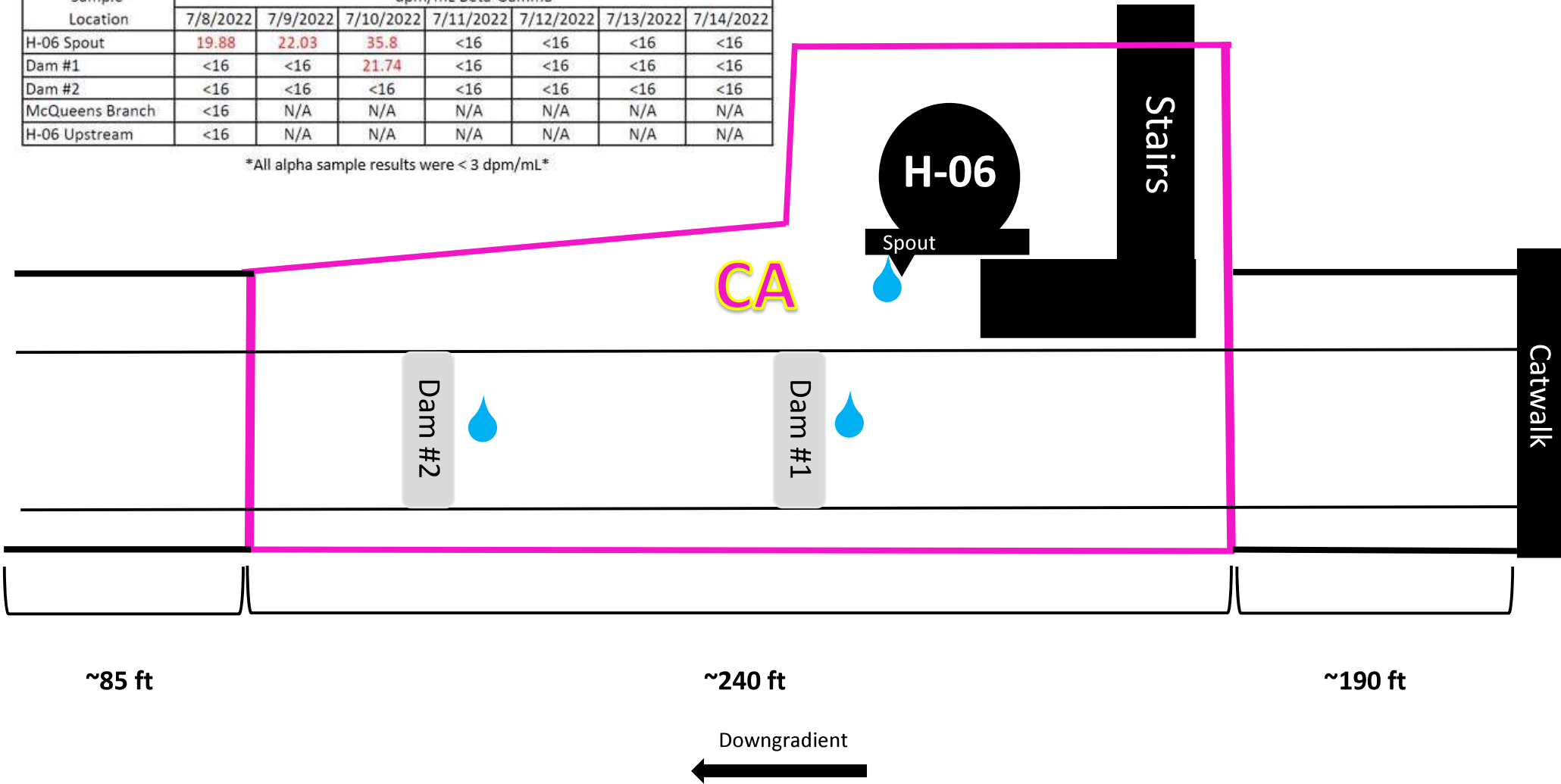
Probe levels considered contaminated using portable survey instruments: > 500 dpm/100cm2 Alpha and/or > 5000 dpm/100cm2 Beta-gamma

Water sample results ≥ 3 dpm/mL Alpha and/or ≥ 16 dpm/mL Beta-Gamma are considered contaminated

Sample Location	dpm/mL Beta-Gamma						
	7/8/2022	7/9/2022	7/10/2022	7/11/2022	7/12/2022	7/13/2022	7/14/2022
H-06 Spout	19.88	22.03	35.8	<16	<16	<16	<16
Dam #1	<16	<16	21.74	<16	<16	<16	<16
Dam #2	<16	<16	<16	<16	<16	<16	<16
McQueens Branch	<16	N/A	N/A	N/A	N/A	N/A	N/A
H-06 Upstream	<16	N/A	N/A	N/A	N/A	N/A	N/A

All alpha sample results were < 3 dpm/mL

 = Water sample locations



H-06 Outfall Upstream and McQueens Branch sample locations are not shown on above map

Diagram not drawn to scale

Water Sample Summary

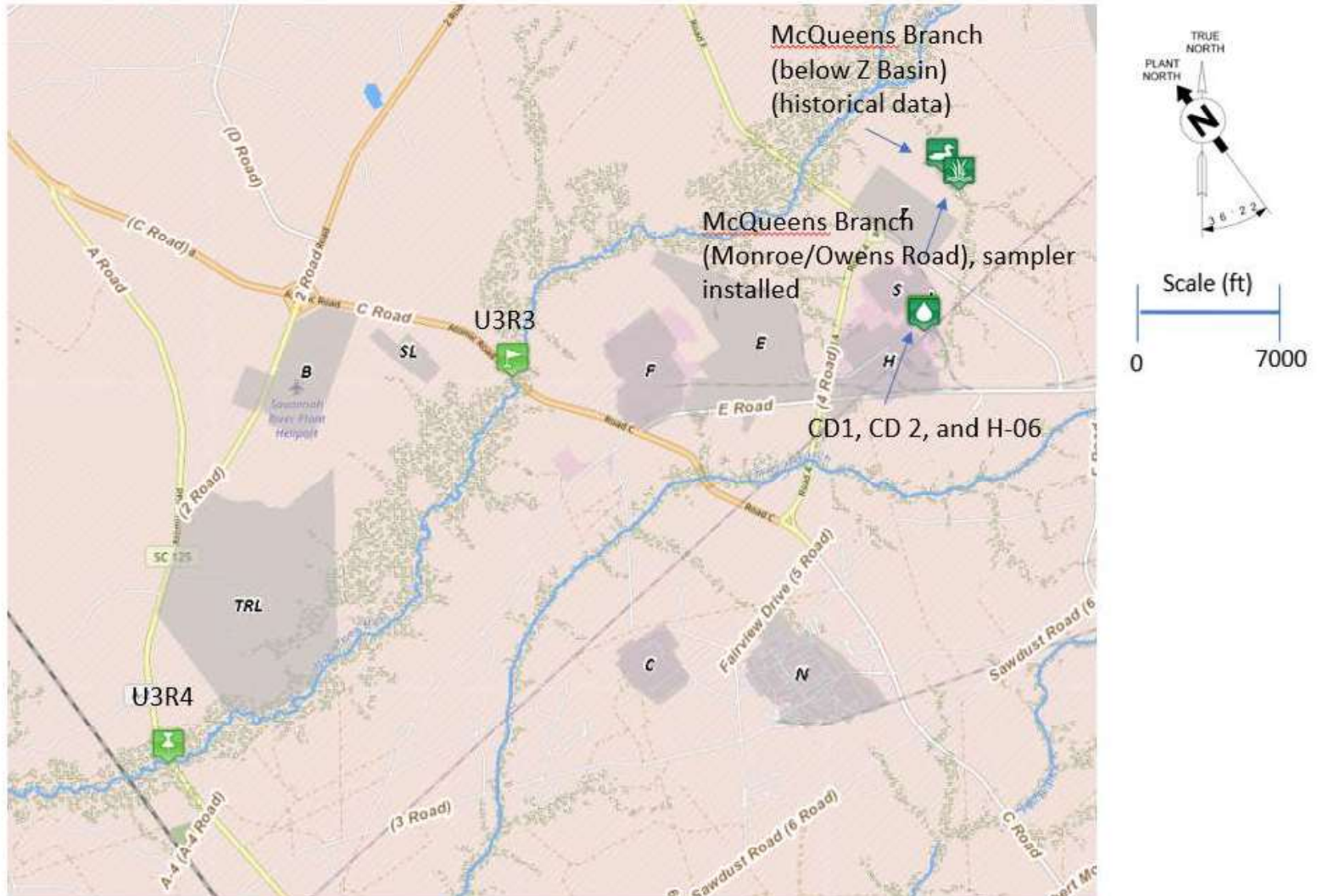
Sample Type	Location	Analyses	Sample ID	Start Date	Stop Date	Results (pCi/L)	Significant	RPD Limits	EPA speciation for gross alpha/gross beta OR EPA MCL for public water system	DCS (2011), Ingested Water (pCi/L)
Grab	Burial Ground North (Background Rainwater)	Gross A	HAREA-0000001	7-Jul-22	9-Jul-22	-1.82E-02	<MDC	<RPD Clean Limits (1.3E3 pCi/L)	< EPA Recommended Speciation level = 15pCi/L	N/A
Grab	Burial Ground North (Background Rainwater)	Gross B	HAREA-0000001	7-Jul-22	9-Jul-22	3.36E+00	yes	<RPD Clean Limits (7.2E3 pCi/L)	<EPA Recommended Speciation level = 50pCi/L	N/A
Grab	H-06 (Dam 2)	Co-60	HAREA-0000003	8-Jul-22	8-Jul-22	4.04E+00	<MDC	N/A	N/A (Not Waters of the State)	7.20E+03
Grab	H-06 (Dam 2)	Cs-137	HAREA-0000003	8-Jul-22	8-Jul-22	1.24E+02	yes	N/A	N/A (Not Waters of the State)	3.00E+03
Grab	H-06 (Dam 2)	Gross A	HAREA-0000003	8-Jul-22	8-Jul-22	3.84E+00	yes	<RPD Clean Limits (1.3E3 pCi/L)	N/A (Not Waters of the State)	N/A
Grab	H-06 (Dam 2)	Gross B	HAREA-0000003	8-Jul-22	8-Jul-22	2.73E+03	yes	<RPD Clean Limits (7.2E3 pCi/L)	N/A (Not Waters of the State)	N/A
Grab	H-06 (Dam 2)	Sr-89/90	HAREA-0000003	8-Jul-22	8-Jul-22	1.64E+03	yes	N/A	N/A (Not Waters of the State)	1.10E+03
Grab	H-06 (Dam 2)	Am-241	HAREA-0000003	8-Jul-22	8-Jul-22	3.20E-02	<MDC	N/A	N/A (Not Waters of the State)	1.70E+02
Grab	H-06 (Dam 2)	Cm-244	HAREA-0000003	8-Jul-22	8-Jul-22	.00E+00	<MDC	N/A	N/A (Not Waters of the State)	2.60E+02
Grab	H-06 (Dam 2)	U-234	HAREA-0000003	8-Jul-22	8-Jul-22	5.48E-01	yes	N/A	N/A (Not Waters of the State)	6.80E+02
Grab	H-06 (Dam 2)	U-235	HAREA-0000003	8-Jul-22	8-Jul-22	-9.85E-03	<MDC	N/A	N/A (Not Waters of the State)	7.20E+02
Grab	H-06 (Dam 2)	U-238	HAREA-0000003	8-Jul-22	8-Jul-22	4.31E-01	yes	N/A	N/A (Not Waters of the State)	7.50E+02
Grab	H-06 (Dam 2)	Pu-238	HAREA-0000003	8-Jul-22	8-Jul-22	8.37E-02	yes	N/A	N/A (Not Waters of the State)	1.50E+02
Grab	H-06 (Dam 2)	Pu-239	HAREA-0000003	8-Jul-22	8-Jul-22	2.70E-03	<MDC	N/A	N/A (Not Waters of the State)	1.40E+02
Grab	H-06 (Dam 2)	Gross Alpha Sum of Isotopics	HAREA-0000003	8-Jul-22	8-Jul-22	7.66E-02	yes	<RPD Clean Limits (1.3E3 pCi/L)	N/A (Not Waters of the State)	N/A
Grab	H-06 (Dam 2)	Gross Beta Sum of Isotopics	HAREA-0000003	8-Jul-22	8-Jul-22	1.76E+03	yes	<RPD Clean Limits (7.2E3 pCi/L)	N/A (Not Waters of the State)	N/A
Grab	McQueens Branch (Z Basin)	Cs-137	HAREA-0000004	8-Jul-22	8-Jul-22	2.26E-01	<MDC	N/A	<MDC	3.00E+03
Grab	McQueens Branch (Z Basin)	Gross A	HAREA-0000004	8-Jul-22	8-Jul-22	2.64E-01	yes	<RPD Clean Limits (1.3E3 pCi/L)	< EPA Recommended Speciation level = 15pCi/L	N/A
Grab	McQueens Branch (Z Basin)	Gross B	HAREA-0000004	8-Jul-22	8-Jul-22	1.91E+00	yes	<RPD Clean Limits (7.2E3 pCi/L)	<EPA Recommended Speciation level = 50pCi/L	N/A
Grab	McQueens Branch (Z Basin)	Sr-89/90	HAREA-0000004	8-Jul-22	8-Jul-22	6.00E+00	yes	N/A	<EPA Drinking Water Std = 8pCi/L	1.10E+03
Grab	McQueens Branch (Z Basin)	Am-241	HAREA-0000004	8-Jul-22	8-Jul-22	4.66E-02	yes	N/A	N/A	1.70E+02
Grab	McQueens Branch (Z Basin)	Cm-244	HAREA-0000004	8-Jul-22	8-Jul-22	-4.85E-03	<MDC	N/A	N/A	2.60E+02
Grab	McQueens Branch (Z Basin)	U-234	HAREA-0000004	8-Jul-22	8-Jul-22	1.37E-02	<MDC	N/A	<EPA Drinking Water Standard = 30 µg/L	6.80E+02

Grab	McQueens Branch (Z Basin)	U-235	HAREA-0000004	8-Jul-22	8-Jul-22	-4.76E-05	<MDC	N/A	<EPA Drinking Water Standard = 30 µg/L	7.20E+02
Grab	McQueens Branch (Z Basin)	U-238	HAREA-0000004	8-Jul-22	8-Jul-22	3.30E-02	<MDC	N/A	<EPA Drinking Water Standard = 30 µg/L	7.50E+02
Grab	McQueens Branch (Z Basin)	Gross Alpha Sum of Isotopics	HAREA-0000004	8-Jul-22	8-Jul-22	8.84E-02	yes	N/A	< EPA Recommended Speciation level = 15pCi/L	N/A
Grab	McQueens Branch (Z Basin)	Gross Beta Sum of Isotopics	HAREA-0000004	8-Jul-22	8-Jul-22	6.23E+00	yes	N/A	<EPA Recommended Speciation level = 50pCi/L	N/A
Grab	McQueens Branch (Monroe/Owens Rd)	Co-60	MCQBRSPEC-001	6-Jul-22	25-Jul-22	2.85E+00	<MDC	N/A	N/A	7.20E+03
Grab	McQueens Branch (Monroe/Owens Rd)	Cs-137	MCQBRSPEC-001	6-Jul-22	25-Jul-22	2.12E+00	<MDC	N/A	N/A	3.00E+03
Grab	McQueens Branch (Monroe/Owens Rd)	Gross A	MCQBRSPEC-001	6-Jul-22	25-Jul-22	5.06E-01	yes	<RPD Clean Limits (1.3E3 pCi/L)	< EPA Recommended Speciation level = 15pCi/L	N/A
Grab	McQueens Branch (Monroe/Owens Rd)	Gross B	MCQBRSPEC-001	6-Jul-22	25-Jul-22	9.99E-01	yes	<RPD Clean Limits (7.2E3 pCi/L)	<EPA Recommended Speciation level = 50pCi/L	N/A
Composite	U3R-3 at Road C	Co-60	STRMSUR-N-232	7-Jun-22	6-Jul-22	-3.99E-01	<MDC	N/A	N/A	7.20E+03
Composite	U3R-3 at Road C	Cs-137	STRMSUR-N-232	7-Jun-22	6-Jul-22	7.68E-02	<MDC	N/A	N/A	3.00E+03
Composite	U3R-3 at Road C	Gross A	STRMSUR-N-232	7-Jun-22	6-Jul-22	6.30E+01*	yes	<RPD Clean Limits (1.3E3 pCi/L)	> EPA Recommended Speciation level = 15pCi/L	N/A
Composite	U3R-3 at Road C	Gross B	STRMSUR-N-232	7-Jun-22	6-Jul-22	2.49E+01*	yes	<RPD Clean Limits (7.2E3 pCi/L)	<EPA Recommended Speciation level = 50pCi/L	N/A
Composite	U3R-3 at Road C	U-234	STRMSUR-N-232	7-Jun-22	6-Jul-22	3.42E+00	yes	N/A	<EPA Drinking Water Standard = 30 µg/L	6.80E+02
Composite	U3R-3 at Road C	U-235	STRMSUR-N-232	7-Jun-22	6-Jul-22	1.84E-01	yes	N/A	<EPA Drinking Water Standard = 30 µg/L	7.20E+02
Composite	U3R-3 at Road C	U-238	STRMSUR-N-232	7-Jun-22	6-Jul-22	4.07E+00	yes	N/A	<EPA Drinking Water Standard = 30 µg/L	7.50E+02
Composite	U3R-3 at Road C	Pu-238	STRMSUR-N-232	7-Jun-22	6-Jul-22	3.81E-03	<MDC	N/A	<MDC and < 15 pCi/L EPA Drinking Water Standard	1.50E+02
Composite	U3R-3 at Road C	Pu-239	STRMSUR-N-232	7-Jun-22	6-Jul-22	1.74E-03	<MDC	N/A	<MDC and < 15 pCi/L EPA Drinking Water Standard	1.40E+02
Composite	U3R-3 at Road C	Am-241	STRMSUR-N-232	7-Jun-22	6-Jul-22	5.22E-03	<MDC	N/A	<MDC and < 15 pCi/L EPA Drinking Water Standard	1.70E+02
Composite	U3R-3 at Road C	Sr-89/90	STRMSUR-N-232	7-Jun-22	6-Jul-22	1.51E-01	<MDC	N/A	<EPA Recommended Speciation level = 8pCi/L	1.10E+03
Composite	U3R-4 at Road A	Co-60	STRMSUR-S-167	7-Jun-22	6-Jul-22	1.89E+00	<MDC	N/A	N/A	7.20E+03

Composite	U3R-4 at Road A	Cs-137	STRMSUR-S-167	7-Jun-22	6-Jul-22	-3.05E-01	<MDC	N/A	N/A	3.00E+03
Composite	U3R-4 at Road A	Gross Alpha Sum of Isotopics	STRMSUR-S-167	7-Jun-22	6-Jul-22	7.68E+00	yes	N/A	< EPA Recommended Speciation level = 15pCi/L	N/A
Composite	U3R-4 at Road A	Gross Beta Sum of Isotopics	STRMSUR-S-167	7-Jun-22	6-Jul-22	1.51E-01	yes	N/A	<EPA Recommended Speciation level = 50pCi/L	N/A
Composite	U3R-4 at Road A	Gross A	STRMSUR-S-167	7-Jun-22	6-Jul-22	7.56E+00	yes	<RPD Clean Limits (1.3E3 pCi/L)	< EPA Recommended Speciation level = 15pCi/L	N/A
Composite	U3R-4 at Road A	Gross B	STRMSUR-S-167	7-Jun-22	6-Jul-22	2.84E+00	yes	<RPD Clean Limits (7.2E3 pCi/L)	<EPA Recommended Speciation level = 50pCi/L	N/A
Composite	U3R-3 at Road C	Gross A	STRMSUR-N-251	6-Jul-22	8-Jul-22	1.49E+00	yes	<RPD Clean Limits (1.3E3 pCi/L)	< EPA Recommended Speciation level = 15pCi/L	N/A
Composite	U3R-3 at Road C	Gross B	STRMSUR-N-251	6-Jul-22	8-Jul-22	1.44E+00	yes	<RPD Clean Limits (7.2E3 pCi/L)	<EPA Recommended Speciation level = 50pCi/L	N/A
Composite	U3R-3 at Road C	Co-60	STRMSUR-N-251	6-Jul-22	8-Jul-22	-1.48E+00	<MDC	N/A	NA	7.20E+03
Composite	U3R-3 at Road C	Cs-137	STRMSUR-N-251	6-Jul-22	8-Jul-22	-1.72E+00	<MDC	N/A	N/A	3.00E+03
Composite	U3R-4 at Road A	Co-60	STRMSUR-S-175	6-Jul-22	8-Jul-22	-9.00E-01	<MDC	N/A	N/A	7.20E+03
Composite	U3R-4 at Road A	Cs-137	STRMSUR-S-175	6-Jul-22	8-Jul-22	-2.40E+00	<MDC	N/A	N/A	3.00E+03
Composite	U3R-4 at Road A	Gross A	STRMSUR-S-175	6-Jul-22	8-Jul-22	2.00E+00	yes	<RPD Clean Limits (1.3E3 pCi/L)	< EPA Recommended Speciation level = 15pCi/L	N/A
Composite	U3R-4 at Road A	Gross B	STRMSUR-S-175	6-Jul-22	8-Jul-22	9.08E-01	yes	<RPD Clean Limits (7.2E3 pCi/L)	<EPA Recommended Speciation level = 50pCi/L	N/A

* Water sample contained suspended sediment

Map of Water Sample Points



McQueens Branch Water Samples

Location	Nuclide	Date	Sample Stop Date	Sample Conc. (pCi/L)
McQueens Branch	H-3	9-Sep-19	14-Oct-19	1.46E+03
McQueens Branch	H-3	14-Oct-19	11-Nov-19	1.36E+03
McQueens Branch	H-3	11-Nov-19	9-Dec-19	1.29E+03
McQueens Branch	H-3	9-Dec-19	13-Jan-20	1.26E+03
McQueens Branch	H-3	13-Jan-20	10-Feb-20	1.39E+03
McQueens Branch	H-3	10-Feb-20	9-Mar-20	1.06E+03
McQueens Branch	H-3	9-Mar-20	13-Apr-20	7.34E+02
McQueens Branch	H-3	13-Apr-20	11-May-20	1.35E+03
McQueens Branch	H-3	11-May-20	8-Jun-20	1.30E+03
McQueens Branch	H-3	8-Jun-20	13-Jul-20	1.24E+03
McQueens Branch	H-3	13-Jul-20	10-Aug-20	9.54E+02
McQueens Branch	H-3	10-Aug-20	9-Sep-20	1.25E+03
McQueens Branch	H-3	12-Oct-20	12-Oct-20	1.10E+03
McQueens Branch	H-3	12-Oct-20	9-Nov-20	1.05E+03
McQueens Branch	H-3	9-Nov-20	7-Dec-20	1.18E+03
McQueens Branch	H-3	7-Dec-20	11-Jan-21	1.10E+03
McQueens Branch	H-3	11-Jan-21	8-Feb-21	1.35E+03
McQueens Branch	H-3	8-Feb-21	8-Mar-21	5.38E+02
McQueens Branch	H-3	8-Mar-21	12-Apr-21	1.11E+03
McQueens Branch	H-3	12-Apr-21	10-May-21	1.21E+03
McQueens Branch	H-3	10-May-21	7-Jun-21	1.04E+03
McQueens Branch	H-3	7-Jun-21	19-Jul-21	1.05E+03
McQueens Branch	H-3	19-Jul-21	9-Aug-21	1.13E+03
McQueens Branch	H-3	9-Aug-21	13-Sep-21	1.27E+03
McQueens Branch	H-3	13-Sep-21	11-Oct-21	9.96E+02
McQueens Branch	H-3	11-Oct-21	8-Nov-21	1.05E+03
McQueens Branch	H-3	8-Nov-21	13-Dec-21	1.05E+03
McQueens Branch	H-3	13-Dec-21	10-Jan-22	1.29E+03
McQueens Branch	K-40	9-Sep-19	14-Oct-19	-7.08E+01
McQueens Branch	K-40	14-Oct-19	11-Nov-19	-8.98E+01
McQueens Branch	K-40	11-Nov-19	9-Dec-19	-6.19E+01

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McQueens Branch	K-40	9-Dec-19	13-Jan-20	-1.51E+02
McQueens Branch	K-40	13-Jan-20	10-Feb-20	8.04E+01
McQueens Branch	K-40	10-Feb-20	9-Mar-20	-5.77E+01
McQueens Branch	K-40	9-Mar-20	13-Apr-20	-5.20E+01
McQueens Branch	K-40	13-Apr-20	11-May-20	2.26E+01
McQueens Branch	K-40	11-May-20	8-Jun-20	-2.95E+01
McQueens Branch	K-40	8-Jun-20	13-Jul-20	6.23E+01
McQueens Branch	K-40	13-Jul-20	10-Aug-20	8.24E+01
McQueens Branch	K-40	10-Aug-20	9-Sep-20	-5.79E+01
McQueens Branch	K-40	12-Oct-20	12-Oct-20	-7.02E+01
McQueens Branch	K-40	12-Oct-20	9-Nov-20	3.32E+01
McQueens Branch	K-40	9-Nov-20	7-Dec-20	8.02E+00
McQueens Branch	K-40	7-Dec-20	11-Jan-21	1.15E+02
McQueens Branch	K-40	11-Jan-21	8-Feb-21	-4.32E+01
McQueens Branch	K-40	8-Feb-21	8-Mar-21	1.25E+01
McQueens Branch	K-40	8-Mar-21	12-Apr-21	1.37E+02
McQueens Branch	K-40	12-Apr-21	10-May-21	-8.18E+01
McQueens Branch	K-40	10-May-21	7-Jun-21	2.84E+01
McQueens Branch	K-40	7-Jun-21	19-Jul-21	-8.12E+00
McQueens Branch	K-40	19-Jul-21	9-Aug-21	7.39E+01
McQueens Branch	K-40	9-Aug-21	13-Sep-21	-1.60E+01
McQueens Branch	K-40	13-Sep-21	11-Oct-21	-2.15E+01
McQueens Branch	K-40	11-Oct-21	8-Nov-21	2.70E+01
McQueens Branch	K-40	8-Nov-21	13-Dec-21	2.94E+01
McQueens Branch	K-40	13-Dec-21	10-Jan-22	3.35E+01
McQueens Branch	Co-60	9-Sep-19	14-Oct-19	2.84E+00
McQueens Branch	Co-60	14-Oct-19	11-Nov-19	-2.31E+00
McQueens Branch	Co-60	11-Nov-19	9-Dec-19	-1.35E+00
McQueens Branch	Co-60	9-Dec-19	13-Jan-20	2.51E+00
McQueens Branch	Co-60	13-Jan-20	10-Feb-20	-3.05E+00
McQueens Branch	Co-60	10-Feb-20	9-Mar-20	-9.56E-01
McQueens Branch	Co-60	9-Mar-20	13-Apr-20	3.36E+00

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McQueens Branch	Co-60	13-Apr-20	11-May-20	-4.30E-01
McQueens Branch	Co-60	11-May-20	8-Jun-20	1.87E+00
McQueens Branch	Co-60	8-Jun-20	13-Jul-20	-6.28E-01
McQueens Branch	Co-60	13-Jul-20	10-Aug-20	1.00E+00
McQueens Branch	Co-60	10-Aug-20	9-Sep-20	2.92E+00
McQueens Branch	Co-60	12-Oct-20	12-Oct-20	4.79E-01
McQueens Branch	Co-60	12-Oct-20	9-Nov-20	-2.02E+00
McQueens Branch	Co-60	9-Nov-20	7-Dec-20	-5.10E-01
McQueens Branch	Co-60	7-Dec-20	11-Jan-21	-9.75E-01
McQueens Branch	Co-60	11-Jan-21	8-Feb-21	1.19E+00
McQueens Branch	Co-60	8-Feb-21	8-Mar-21	1.99E+00
McQueens Branch	Co-60	8-Mar-21	12-Apr-21	2.73E+00
McQueens Branch	Co-60	12-Apr-21	10-May-21	3.66E+00
McQueens Branch	Co-60	10-May-21	7-Jun-21	3.35E-01
McQueens Branch	Co-60	7-Jun-21	19-Jul-21	3.49E+00
McQueens Branch	Co-60	19-Jul-21	9-Aug-21	-8.64E-01
McQueens Branch	Co-60	9-Aug-21	13-Sep-21	-1.77E+00
McQueens Branch	Co-60	13-Sep-21	11-Oct-21	-5.51E-01
McQueens Branch	Co-60	11-Oct-21	8-Nov-21	1.85E+00
McQueens Branch	Co-60	8-Nov-21	13-Dec-21	-1.02E+00
McQueens Branch	Co-60	13-Dec-21	10-Jan-22	3.72E-01
McQueens Branch	Co-60	6-Jul-22	25-Jul-22	2.85E+00
McQueens Branch	Cs-137	9-Sep-19	14-Oct-19	-1.04E+00
McQueens Branch	Cs-137	14-Oct-19	11-Nov-19	-9.43E-01
McQueens Branch	Cs-137	11-Nov-19	9-Dec-19	-1.97E+00
McQueens Branch	Cs-137	9-Dec-19	13-Jan-20	1.12E+00
McQueens Branch	Cs-137	13-Jan-20	10-Feb-20	3.88E-01
McQueens Branch	Cs-137	10-Feb-20	9-Mar-20	5.44E+00
McQueens Branch	Cs-137	9-Mar-20	13-Apr-20	1.35E+00
McQueens Branch	Cs-137	13-Apr-20	11-May-20	-2.32E+00
McQueens Branch	Cs-137	11-May-20	8-Jun-20	-5.57E-01

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McQueens Branch	Cs-137	8-Jun-20	13-Jul-20	-2.36E+00
McQueens Branch	Cs-137	13-Jul-20	10-Aug-20	1.55E+00
McQueens Branch	Cs-137	10-Aug-20	9-Sep-20	3.76E+00
McQueens Branch	Cs-137	12-Oct-20	12-Oct-20	2.83E+00
McQueens Branch	Cs-137	12-Oct-20	9-Nov-20	2.92E+00
McQueens Branch	Cs-137	9-Nov-20	7-Dec-20	8.64E-01
McQueens Branch	Cs-137	7-Dec-20	11-Jan-21	1.15E+00
McQueens Branch	Cs-137	11-Jan-21	8-Feb-21	-2.91E-01
McQueens Branch	Cs-137	8-Feb-21	8-Mar-21	8.78E-01
McQueens Branch	Cs-137	8-Mar-21	12-Apr-21	-6.22E+00
McQueens Branch	Cs-137	12-Apr-21	10-May-21	-5.91E-01
McQueens Branch	Cs-137	10-May-21	7-Jun-21	2.67E+00
McQueens Branch	Cs-137	7-Jun-21	19-Jul-21	3.59E+00
McQueens Branch	Cs-137	19-Jul-21	9-Aug-21	-1.47E+00
McQueens Branch	Cs-137	9-Aug-21	13-Sep-21	1.12E+00
McQueens Branch	Cs-137	13-Sep-21	11-Oct-21	-1.26E+00
McQueens Branch	Cs-137	11-Oct-21	8-Nov-21	-4.23E+00
McQueens Branch	Cs-137	8-Nov-21	13-Dec-21	4.40E-01
McQueens Branch	Cs-137	13-Dec-21	10-Jan-22	1.59E+00
McQueens Branch	Cs-137	6-Jul-22	25-Jul-22	2.12E+00
McQueens Branch	Tl-208	9-Nov-20	7-Dec-20	1.12E+01
McQueens Branch	Pb-212	11-Nov-19	9-Dec-19	1.34E+01
McQueens Branch	Pb-212	11-May-20	8-Jun-20	2.18E+01
McQueens Branch	Gross B	9-Sep-19	14-Oct-19	2.56E+00
McQueens Branch	Gross B	14-Oct-19	11-Nov-19	8.45E+00
McQueens Branch	Gross B	11-Nov-19	9-Dec-19	3.22E+00
McQueens Branch	Gross B	9-Dec-19	13-Jan-20	4.53E+00
McQueens Branch	Gross B	13-Jan-20	10-Feb-20	1.03E+00

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McQueens Branch	Gross B	10-Feb-20	9-Mar-20	1.59E+00
McQueens Branch	Gross B	9-Mar-20	13-Apr-20	2.13E+00
McQueens Branch	Gross B	13-Apr-20	11-May-20	5.71E-01
McQueens Branch	Gross B	11-May-20	8-Jun-20	1.05E+00
McQueens Branch	Gross B	8-Jun-20	13-Jul-20	1.23E+00
McQueens Branch	Gross B	13-Jul-20	10-Aug-20	1.26E+00
McQueens Branch	Gross B	10-Aug-20	9-Sep-20	2.97E-01
McQueens Branch	Gross B	12-Oct-20	12-Oct-20	1.16E+00
McQueens Branch	Gross B	12-Oct-20	9-Nov-20	2.21E+00
McQueens Branch	Gross B	9-Nov-20	7-Dec-20	1.47E+00
McQueens Branch	Gross B	7-Dec-20	11-Jan-21	7.57E-01
McQueens Branch	Gross B	11-Jan-21	8-Feb-21	1.32E+00
McQueens Branch	Gross B	8-Feb-21	8-Mar-21	5.84E-01
McQueens Branch	Gross B	8-Mar-21	12-Apr-21	5.91E-01
McQueens Branch	Gross B	12-Apr-21	10-May-21	1.16E+00
McQueens Branch	Gross B	10-May-21	7-Jun-21	1.06E+00
McQueens Branch	Gross B	7-Jun-21	19-Jul-21	1.35E+00
McQueens Branch	Gross B	19-Jul-21	9-Aug-21	3.69E-01
McQueens Branch	Gross B	9-Aug-21	13-Sep-21	5.21E-01
McQueens Branch	Gross B	13-Sep-21	11-Oct-21	3.19E-01
McQueens Branch	Gross B	11-Oct-21	8-Nov-21	1.17E+00
McQueens Branch	Gross B	8-Nov-21	13-Dec-21	1.05E+00
McQueens Branch	Gross B	13-Dec-21	10-Jan-22	1.33E+00
McQueens Branch**	Gross B	8-Jul-22	8-Jul-22	1.91E+00
McQueens Branch	Gross B	6-Jul-22	25-Jul-22	9.99E-01
McQueens Branch	Gross A	9-Sep-19	14-Oct-19	2.10E+00
McQueens Branch	Gross A	14-Oct-19	11-Nov-19	7.55E+00
McQueens Branch	Gross A	11-Nov-19	9-Dec-19	3.10E+00
McQueens Branch	Gross A	9-Dec-19	13-Jan-20	3.88E+00
McQueens Branch	Gross A	13-Jan-20	10-Feb-20	5.08E-01
McQueens Branch	Gross A	10-Feb-20	9-Mar-20	5.86E-01
McQueens Branch	Gross A	9-Mar-20	13-Apr-20	1.04E+00

Attachment: D

McQueens Branch	Gross A	13-Apr-20	11-May-20	7.55E-01
McQueens Branch	Gross A	11-May-20	8-Jun-20	7.55E-01
McQueens Branch	Gross A	8-Jun-20	13-Jul-20	3.68E-01
McQueens Branch	Gross A	13-Jul-20	10-Aug-20	2.03E-01
McQueens Branch	Gross A	10-Aug-20	9-Sep-20	1.20E-01
McQueens Branch	Gross A	12-Oct-20	12-Oct-20	4.38E-01
McQueens Branch	Gross A	12-Oct-20	9-Nov-20	1.59E+00
McQueens Branch	Gross A	9-Nov-20	7-Dec-20	1.82E-01
McQueens Branch	Gross A	7-Dec-20	11-Jan-21	5.44E-01
McQueens Branch	Gross A	11-Jan-21	8-Feb-21	6.15E-01
McQueens Branch	Gross A	8-Feb-21	8-Mar-21	1.77E-01
McQueens Branch	Gross A	8-Mar-21	12-Apr-21	8.16E-01
McQueens Branch	Gross A	12-Apr-21	10-May-21	8.66E-01
McQueens Branch	Gross A	10-May-21	7-Jun-21	1.40E+00
McQueens Branch	Gross A	7-Jun-21	19-Jul-21	3.89E-01
McQueens Branch	Gross A	19-Jul-21	9-Aug-21	3.01E-01
McQueens Branch	Gross A	9-Aug-21	13-Sep-21	2.51E-01
McQueens Branch	Gross A	13-Sep-21	11-Oct-21	6.48E-01
McQueens Branch	Gross A	11-Oct-21	8-Nov-21	5.36E-01
McQueens Branch	Gross A	8-Nov-21	13-Dec-21	6.10E-01
McQueens Branch	Gross A	13-Dec-21	10-Jan-22	7.27E-01
McQueens Branch**	Gross A	8-Jul-22	8-Jul-22	2.64E-01
McQueens Branch	Gross A	6-Jul-22	25-Jul-22	5.06E-01

** = Grab Sample

Upper Three Runs Water Samples - Location #3

Location	Nuclide	Date	Sample Stop Date	Sample Conc. (pCi/L)
U3R-3 at Road C	H-3	4-Sep-19	8-Oct-19	7.30E+02
U3R-3 at Road C	H-3	8-Oct-19	5-Nov-19	2.69E+02
U3R-3 at Road C	H-3	5-Nov-19	3-Dec-19	3.85E+02
U3R-3 at Road C	H-3	3-Dec-19	7-Jan-20	7.89E+02
U3R-3 at Road C	H-3	7-Jan-20	4-Feb-20	3.86E+02
U3R-3 at Road C	H-3	4-Feb-20	4-Mar-20	4.65E+02
U3R-3 at Road C	H-3	4-Mar-20	7-Apr-20	5.43E+02
U3R-3 at Road C	H-3	7-Apr-20	5-May-20	3.89E+02
U3R-3 at Road C	H-3	5-May-20	2-Jun-20	2.99E+02
U3R-3 at Road C	H-3	2-Jun-20	7-Jul-20	5.34E+02
U3R-3 at Road C	H-3	7-Jul-20	4-Aug-20	1.82E+02
U3R-3 at Road C	H-3	4-Aug-20	2-Sep-20	5.97E+02
U3R-3 at Road C	H-3	2-Sep-20	6-Oct-20	4.31E+02
U3R-3 at Road C	H-3	6-Oct-20	3-Nov-20	3.10E+02
U3R-3 at Road C	H-3	3-Nov-20	1-Dec-20	1.14E+03
U3R-3 at Road C	H-3	1-Dec-20	5-Jan-21	6.28E+02
U3R-3 at Road C	H-3	5-Jan-21	2-Feb-21	3.02E+02
U3R-3 at Road C	H-3	2-Feb-21	2-Mar-21	7.05E+02
U3R-3 at Road C	H-3	2-Mar-21	6-Apr-21	4.19E+02
U3R-3 at Road C	H-3	6-Apr-21	4-May-21	7.78E+02
U3R-3 at Road C	H-3	4-May-21	8-Jun-21	6.32E+02
U3R-3 at Road C	H-3	8-Jun-21	13-Jul-21	9.64E+02
U3R-3 at Road C	H-3	13-Jul-21	3-Aug-21	5.14E+02
U3R-3 at Road C	H-3	3-Aug-21	1-Sep-21	4.35E+02
U3R-3 at Road C	H-3	1-Sep-21	5-Oct-21	1.14E+03
U3R-3 at Road C	H-3	5-Oct-21	2-Nov-21	6.61E+02
U3R-3 at Road C	H-3	2-Nov-21	7-Dec-21	2.72E+02
U3R-3 at Road C	H-3	7-Dec-21	4-Jan-22	5.17E+02
U3R-3 at Road C	H-3	4-Jan-22	2-Feb-22	3.00E+02
U3R-3 at Road C	H-3	2-Feb-22	2-Mar-22	7.19E+02
U3R-3 at Road C	H-3	2-Mar-22	5-Apr-22	5.04E+02
U3R-3 at Road C	H-3	5-Apr-22	3-May-22	5.54E+02
U3R-3 at Road C	H-3	3-May-22	7-Jun-22	2.32E+02

Attachment: D

U3R-3 at Road C	H-3	7-Jun-22	6-Jul-22	6.84E+02
U3R-3 at Road C	K-40	4-Sep-19	8-Oct-19	6.13E+01
U3R-3 at Road C	K-40	8-Oct-19	5-Nov-19	-5.59E+01
U3R-3 at Road C	K-40	5-Nov-19	3-Dec-19	-9.99E+00
U3R-3 at Road C	K-40	3-Dec-19	7-Jan-20	-4.46E+00
U3R-3 at Road C	K-40	7-Jan-20	4-Feb-20	7.69E+01
U3R-3 at Road C	K-40	4-Feb-20	4-Mar-20	-3.23E+01
U3R-3 at Road C	K-40	4-Mar-20	7-Apr-20	1.69E+01
U3R-3 at Road C	K-40	7-Apr-20	5-May-20	-1.10E+01
U3R-3 at Road C	K-40	5-May-20	2-Jun-20	-3.73E+01
U3R-3 at Road C	K-40	2-Jun-20	7-Jul-20	-6.15E+01
U3R-3 at Road C	K-40	7-Jul-20	4-Aug-20	-6.56E+01
U3R-3 at Road C	K-40	4-Aug-20	2-Sep-20	2.07E+01
U3R-3 at Road C	K-40	2-Sep-20	6-Oct-20	-3.48E+01
U3R-3 at Road C	K-40	6-Oct-20	3-Nov-20	6.45E+01
U3R-3 at Road C	K-40	3-Nov-20	1-Dec-20	-1.19E+01
U3R-3 at Road C	K-40	1-Dec-20	5-Jan-21	-4.77E+00
U3R-3 at Road C	K-40	5-Jan-21	2-Feb-21	-9.25E+01
U3R-3 at Road C	K-40	2-Feb-21	2-Mar-21	-7.01E+00
U3R-3 at Road C	K-40	2-Mar-21	6-Apr-21	-6.78E+01
U3R-3 at Road C	K-40	6-Apr-21	4-May-21	1.60E+02
U3R-3 at Road C	K-40	4-May-21	8-Jun-21	-8.67E+01
U3R-3 at Road C	K-40	8-Jun-21	13-Jul-21	8.51E+01
U3R-3 at Road C	K-40	13-Jul-21	3-Aug-21	-7.80E+01
U3R-3 at Road C	K-40	3-Aug-21	1-Sep-21	-1.70E+01
U3R-3 at Road C	K-40	1-Sep-21	5-Oct-21	-4.36E+01
U3R-3 at Road C	K-40	5-Oct-21	2-Nov-21	8.58E+00
U3R-3 at Road C	K-40	2-Nov-21	7-Dec-21	-2.60E+01
U3R-3 at Road C	K-40	7-Dec-21	4-Jan-22	-1.58E+01
U3R-3 at Road C	K-40	4-Jan-22	2-Feb-22	3.34E+01
U3R-3 at Road C	K-40	2-Feb-22	2-Mar-22	-3.73E+01
U3R-3 at Road C	K-40	2-Mar-22	5-Apr-22	4.07E+01
U3R-3 at Road C	K-40	5-Apr-22	3-May-22	-6.10E+01

Attachment: D

U3R-3 at Road C	K-40	3-May-22	7-Jun-22	-1.64E+01
U3R-3 at Road C	K-40	7-Jun-22	6-Jul-22	-4.25E+01
U3R-3 at Road C	K-40	6-Jul-22	8-Jul-22	1.57E+02
U3R-3 at Road C	Co-60	4-Sep-19	8-Oct-19	-6.03E-01
U3R-3 at Road C	Co-60	8-Oct-19	5-Nov-19	-8.23E-01
U3R-3 at Road C	Co-60	5-Nov-19	3-Dec-19	-2.52E+00
U3R-3 at Road C	Co-60	3-Dec-19	7-Jan-20	-1.80E+00
U3R-3 at Road C	Co-60	7-Jan-20	4-Feb-20	3.19E+00
U3R-3 at Road C	Co-60	4-Feb-20	4-Mar-20	-7.99E-01
U3R-3 at Road C	Co-60	4-Mar-20	7-Apr-20	6.07E-01
U3R-3 at Road C	Co-60	7-Apr-20	5-May-20	4.46E-01
U3R-3 at Road C	Co-60	5-May-20	2-Jun-20	1.46E+00
U3R-3 at Road C	Co-60	2-Jun-20	7-Jul-20	2.58E+00
U3R-3 at Road C	Co-60	7-Jul-20	4-Aug-20	-1.80E+00
U3R-3 at Road C	Co-60	4-Aug-20	2-Sep-20	-3.04E+00
U3R-3 at Road C	Co-60	2-Sep-20	6-Oct-20	-2.54E+00
U3R-3 at Road C	Co-60	6-Oct-20	3-Nov-20	-1.21E+00
U3R-3 at Road C	Co-60	3-Nov-20	1-Dec-20	8.95E-01
U3R-3 at Road C	Co-60	1-Dec-20	5-Jan-21	3.25E-01
U3R-3 at Road C	Co-60	5-Jan-21	2-Feb-21	-3.29E+00
U3R-3 at Road C	Co-60	2-Feb-21	2-Mar-21	8.76E-01
U3R-3 at Road C	Co-60	2-Mar-21	6-Apr-21	-2.80E-01
U3R-3 at Road C	Co-60	6-Apr-21	4-May-21	-1.83E-01
U3R-3 at Road C	Co-60	4-May-21	8-Jun-21	-2.87E+00
U3R-3 at Road C	Co-60	8-Jun-21	13-Jul-21	-1.78E+00
U3R-3 at Road C	Co-60	13-Jul-21	3-Aug-21	7.94E-01
U3R-3 at Road C	Co-60	3-Aug-21	1-Sep-21	2.17E+00
U3R-3 at Road C	Co-60	1-Sep-21	5-Oct-21	-9.37E-01
U3R-3 at Road C	Co-60	5-Oct-21	2-Nov-21	-3.84E+00
U3R-3 at Road C	Co-60	2-Nov-21	7-Dec-21	2.07E+00
U3R-3 at Road C	Co-60	7-Dec-21	4-Jan-22	-6.96E-01
U3R-3 at Road C	Co-60	4-Jan-22	2-Feb-22	2.08E+00
U3R-3 at Road C	Co-60	2-Feb-22	2-Mar-22	-2.14E+00

Attachment: D

U3R-3 at Road C	Co-60	2-Mar-22	5-Apr-22	2.61E+00
U3R-3 at Road C	Co-60	5-Apr-22	3-May-22	5.49E-01
U3R-3 at Road C	Co-60	3-May-22	7-Jun-22	8.55E-01
U3R-3 at Road C	Co-60	7-Jun-22	6-Jul-22	-3.99E-01
U3R-3 at Road C	Co-60	6-Jul-22	8-Jul-22	-1.48E+00
U3R-3 at Road C	Cs-137	4-Sep-19	8-Oct-19	6.22E-01
U3R-3 at Road C	Cs-137	8-Oct-19	5-Nov-19	1.83E+00
U3R-3 at Road C	Cs-137	5-Nov-19	3-Dec-19	3.75E+00
U3R-3 at Road C	Cs-137	3-Dec-19	7-Jan-20	-5.14E-01
U3R-3 at Road C	Cs-137	7-Jan-20	4-Feb-20	7.17E-01
U3R-3 at Road C	Cs-137	4-Feb-20	4-Mar-20	6.63E-01
U3R-3 at Road C	Cs-137	4-Mar-20	7-Apr-20	1.53E+00
U3R-3 at Road C	Cs-137	7-Apr-20	5-May-20	-1.22E+00
U3R-3 at Road C	Cs-137	5-May-20	2-Jun-20	3.47E+00
U3R-3 at Road C	Cs-137	2-Jun-20	7-Jul-20	3.00E+00
U3R-3 at Road C	Cs-137	7-Jul-20	4-Aug-20	2.23E-01
U3R-3 at Road C	Cs-137	4-Aug-20	2-Sep-20	-2.82E-01
U3R-3 at Road C	Cs-137	2-Sep-20	6-Oct-20	9.51E-01
U3R-3 at Road C	Cs-137	6-Oct-20	3-Nov-20	-9.62E-01
U3R-3 at Road C	Cs-137	3-Nov-20	1-Dec-20	-9.88E-01
U3R-3 at Road C	Cs-137	1-Dec-20	5-Jan-21	2.40E+00
U3R-3 at Road C	Cs-137	5-Jan-21	2-Feb-21	2.11E+00
U3R-3 at Road C	Cs-137	2-Feb-21	2-Mar-21	5.60E-01
U3R-3 at Road C	Cs-137	2-Mar-21	6-Apr-21	3.76E+00
U3R-3 at Road C	Cs-137	6-Apr-21	4-May-21	3.31E-02
U3R-3 at Road C	Cs-137	4-May-21	8-Jun-21	1.18E+00
U3R-3 at Road C	Cs-137	8-Jun-21	13-Jul-21	5.73E-01
U3R-3 at Road C	Cs-137	13-Jul-21	3-Aug-21	-3.36E+00
U3R-3 at Road C	Cs-137	3-Aug-21	1-Sep-21	-1.76E-01
U3R-3 at Road C	Cs-137	1-Sep-21	5-Oct-21	1.30E+00
U3R-3 at Road C	Cs-137	5-Oct-21	2-Nov-21	3.31E+00
U3R-3 at Road C	Cs-137	2-Nov-21	7-Dec-21	2.96E-01
U3R-3 at Road C	Cs-137	7-Dec-21	4-Jan-22	1.58E+00

Attachment: D

U3R-3 at Road C	Cs-137	4-Jan-22	2-Feb-22	-9.06E-01
U3R-3 at Road C	Cs-137	2-Feb-22	2-Mar-22	-5.20E-01
U3R-3 at Road C	Cs-137	2-Mar-22	5-Apr-22	1.84E+00
U3R-3 at Road C	Cs-137	5-Apr-22	3-May-22	-7.59E-01
U3R-3 at Road C	Cs-137	3-May-22	7-Jun-22	-6.80E-01
U3R-3 at Road C	Cs-137	7-Jun-22	6-Jul-22	7.68E-02
U3R-3 at Road C	Cs-137	6-Jul-22	8-Jul-22	-1.72E+00
U3R-3 at Road C	Pb-212	4-Feb-20	4-Mar-20	1.12E+01
U3R-3 at Road C	Pb-214	2-Sep-20	6-Oct-20	2.00E+01
U3R-3 at Road C	Pb-214	3-May-22	7-Jun-22	3.92E+01
U3R-3 at Road C	Pb-214	7-Jun-22	6-Jul-22	3.60E+01
U3R-3 at Road C	Bi-214	7-Dec-21	4-Jan-22	2.05E+01
U3R-3 at Road C	Bi-214	7-Jun-22	6-Jul-22	3.17E+01
U3R-3 at Road C	U-234	2-Sep-20	6-Oct-20	4.05E-01
U3R-3 at Road C	U-234	6-Oct-20	3-Nov-20	1.75E+00
U3R-3 at Road C	U-234	7-Jun-22	6-Jul-22	3.42E+00
U3R-3 at Road C	U-235	2-Sep-20	6-Oct-20	3.76E-02
U3R-3 at Road C	U-235	6-Oct-20	3-Nov-20	1.00E-01
U3R-3 at Road C	U-235	7-Jun-22	6-Jul-22	1.84E-01
U3R-3 at Road C	U-238	2-Sep-20	6-Oct-20	4.37E-01
U3R-3 at Road C	U-238	6-Oct-20	3-Nov-20	2.06E+00
U3R-3 at Road C	U-238	7-Jun-22	6-Jul-22	4.07E+00
U3R-3 at Road C	Np-237	2-Sep-20	6-Oct-20	3.72E-03
U3R-3 at Road C	Np-237	6-Oct-20	3-Nov-20	2.41E-03
U3R-3 at Road C	Pu-238	2-Sep-20	6-Oct-20	1.10E-02
U3R-3 at Road C	Pu-238	6-Oct-20	3-Nov-20	3.57E-03
U3R-3 at Road C	Pu-238	7-Jun-22	6-Jul-22	3.81E-03

Attachment: D

U3R-3 at Road C	Pu-239	2-Sep-20	6-Oct-20	2.76E-03
U3R-3 at Road C	Pu-239	6-Oct-20	3-Nov-20	1.19E-03
U3R-3 at Road C	Pu-239	7-Jun-22	6-Jul-22	1.74E-03
U3R-3 at Road C	Am-241	2-Sep-20	6-Oct-20	4.76E-03
U3R-3 at Road C	Am-241	6-Oct-20	3-Nov-20	1.21E-02
U3R-3 at Road C	Am-241	7-Jun-22	6-Jul-22	5.22E-03
U3R-3 at Road C	Cm-244	2-Sep-20	6-Oct-20	0.00E+00
U3R-3 at Road C	Cm-244	6-Oct-20	3-Nov-20	2.29E-03
U3R-3 at Road C	Sr-89/90	2-Sep-20	6-Oct-20	2.88E-01
U3R-3 at Road C	Sr-89/90	6-Oct-20	3-Nov-20	3.59E-01
U3R-3 at Road C	Sr-89/90	7-Jun-22	6-Jul-22	1.51E-01
U3R-3 at Road C	Gross B	4-Sep-19	8-Oct-19	1.53E+00
U3R-3 at Road C	Gross B	8-Oct-19	5-Nov-19	1.41E+00
U3R-3 at Road C	Gross B	5-Nov-19	3-Dec-19	1.66E+00
U3R-3 at Road C	Gross B	3-Dec-19	7-Jan-20	1.61E+00
U3R-3 at Road C	Gross B	7-Jan-20	4-Feb-20	1.32E+00
U3R-3 at Road C	Gross B	4-Feb-20	4-Mar-20	9.40E-01
U3R-3 at Road C	Gross B	4-Mar-20	7-Apr-20	1.61E+00
U3R-3 at Road C	Gross B	7-Apr-20	5-May-20	6.75E-01
U3R-3 at Road C	Gross B	5-May-20	2-Jun-20	1.36E+00
U3R-3 at Road C	Gross B	2-Jun-20	7-Jul-20	1.92E+00
U3R-3 at Road C	Gross B	7-Jul-20	4-Aug-20	1.26E+00
U3R-3 at Road C	Gross B	4-Aug-20	2-Sep-20	3.54E+00
U3R-3 at Road C	Gross B	2-Sep-20	6-Oct-20	1.18E+01
U3R-3 at Road C	Gross B	6-Oct-20	3-Nov-20	2.66E+01
U3R-3 at Road C	Gross B	3-Nov-20	1-Dec-20	3.16E+00
U3R-3 at Road C	Gross B	1-Dec-20	5-Jan-21	1.12E+00
U3R-3 at Road C	Gross B	5-Jan-21	2-Feb-21	1.52E+00

Attachment: D

U3R-3 at Road C	Gross B	2-Feb-21	2-Mar-21	1.05E+00
U3R-3 at Road C	Gross B	2-Mar-21	6-Apr-21	2.65E+00
U3R-3 at Road C	Gross B	6-Apr-21	4-May-21	3.91E+00
U3R-3 at Road C	Gross B	4-May-21	8-Jun-21	1.65E+00
U3R-3 at Road C	Gross B	8-Jun-21	13-Jul-21	2.21E+00
U3R-3 at Road C	Gross B	13-Jul-21	3-Aug-21	1.18E+00
U3R-3 at Road C	Gross B	3-Aug-21	1-Sep-21	2.14E+00
U3R-3 at Road C	Gross B	1-Sep-21	5-Oct-21	1.15E+00
U3R-3 at Road C	Gross B	5-Oct-21	2-Nov-21	2.60E+00
U3R-3 at Road C	Gross B	2-Nov-21	7-Dec-21	2.79E+00
U3R-3 at Road C	Gross B	7-Dec-21	4-Jan-22	5.99E+00
U3R-3 at Road C	Gross B	4-Jan-22	2-Feb-22	1.60E+00
U3R-3 at Road C	Gross B	2-Feb-22	2-Mar-22	1.34E+00
U3R-3 at Road C	Gross B	2-Mar-22	5-Apr-22	1.37E+00
U3R-3 at Road C	Gross B	5-Apr-22	3-May-22	2.06E+00
U3R-3 at Road C	Gross B	3-May-22	7-Jun-22	2.50E+01
U3R-3 at Road C	Gross B	7-Jun-22	6-Jul-22	2.49E+01
U3R-3 at Road C	Gross B	6-Jul-22	8-Jul-22	1.44E+00
U3R-3 at Road C	Gross A	4-Sep-19	8-Oct-19	2.08E+00
U3R-3 at Road C	Gross A	8-Oct-19	5-Nov-19	2.21E+00
U3R-3 at Road C	Gross A	5-Nov-19	3-Dec-19	2.43E+00
U3R-3 at Road C	Gross A	3-Dec-19	7-Jan-20	2.12E+00
U3R-3 at Road C	Gross A	7-Jan-20	4-Feb-20	1.43E+00
U3R-3 at Road C	Gross A	4-Feb-20	4-Mar-20	1.53E+00
U3R-3 at Road C	Gross A	4-Mar-20	7-Apr-20	2.55E+00
U3R-3 at Road C	Gross A	7-Apr-20	5-May-20	8.55E-01
U3R-3 at Road C	Gross A	5-May-20	2-Jun-20	2.08E+00
U3R-3 at Road C	Gross A	2-Jun-20	7-Jul-20	3.31E+00
U3R-3 at Road C	Gross A	7-Jul-20	4-Aug-20	2.15E+00
U3R-3 at Road C	Gross A	4-Aug-20	2-Sep-20	6.17E+00
U3R-3 at Road C	Gross A	2-Sep-20	6-Oct-20	1.89E+01
U3R-3 at Road C	Gross A	6-Oct-20	3-Nov-20	5.26E+01
U3R-3 at Road C	Gross A	3-Nov-20	1-Dec-20	4.83E+00

Attachment: D

U3R-3 at Road C	Gross A	1-Dec-20	5-Jan-21	1.86E+00
U3R-3 at Road C	Gross A	5-Jan-21	2-Feb-21	2.15E+00
U3R-3 at Road C	Gross A	2-Feb-21	2-Mar-21	2.28E+00
U3R-3 at Road C	Gross A	2-Mar-21	6-Apr-21	3.36E+00
U3R-3 at Road C	Gross A	6-Apr-21	4-May-21	6.10E+00
U3R-3 at Road C	Gross A	4-May-21	8-Jun-21	1.34E+00
U3R-3 at Road C	Gross A	8-Jun-21	13-Jul-21	3.90E+00
U3R-3 at Road C	Gross A	13-Jul-21	3-Aug-21	1.42E+00
U3R-3 at Road C	Gross A	3-Aug-21	1-Sep-21	4.05E+00
U3R-3 at Road C	Gross A	1-Sep-21	5-Oct-21	2.17E+00
U3R-3 at Road C	Gross A	5-Oct-21	2-Nov-21	3.21E+00
U3R-3 at Road C	Gross A	2-Nov-21	7-Dec-21	4.47E+00
U3R-3 at Road C	Gross A	7-Dec-21	4-Jan-22	9.94E+00
U3R-3 at Road C	Gross A	4-Jan-22	2-Feb-22	1.88E+00
U3R-3 at Road C	Gross A	2-Feb-22	2-Mar-22	2.39E+00
U3R-3 at Road C	Gross A	2-Mar-22	5-Apr-22	1.93E+00
U3R-3 at Road C	Gross A	5-Apr-22	3-May-22	3.47E+00
U3R-3 at Road C	Gross A	3-May-22	7-Jun-22	4.95E+01
U3R-3 at Road C	Gross A	7-Jun-22	6-Jul-22	6.30E+01
U3R-3 at Road C	Gross A	6-Jul-22	8-Jul-22	1.49E+00

Upper Three Runs Water Samples - Location #4

Location	Nuclide	Date	Sample Stop Date	Sample Conc. (pCi/L)
U3R-4 at Road A	H-3	4-Sep-19	8-Oct-19	8.88E+02
U3R-4 at Road A	H-3	8-Oct-19	5-Nov-19	3.90E+02
U3R-4 at Road A	H-3	5-Nov-19	3-Dec-19	6.15E+02
U3R-4 at Road A	H-3	3-Dec-19	7-Jan-20	3.50E+02
U3R-4 at Road A	H-3	7-Jan-20	4-Feb-20	5.86E+02
U3R-4 at Road A	H-3	4-Feb-20	4-Mar-20	4.78E+02
U3R-4 at Road A	H-3	4-Mar-20	7-Apr-20	3.86E+02
U3R-4 at Road A	H-3	7-Apr-20	5-May-20	4.03E+02
U3R-4 at Road A	H-3	5-May-20	2-Jun-20	5.06E+02
U3R-4 at Road A	H-3	2-Jun-20	7-Jul-20	6.62E+02
U3R-4 at Road A	H-3	7-Jul-20	4-Aug-20	3.28E+02
U3R-4 at Road A	H-3	4-Aug-20	2-Sep-20	7.55E+02
U3R-4 at Road A	H-3	2-Sep-20	6-Oct-20	1.37E+02
U3R-4 at Road A	H-3	6-Oct-20	3-Nov-20	1.65E+02
U3R-4 at Road A	H-3	3-Nov-20	1-Dec-20	2.25E+02
U3R-4 at Road A	H-3	1-Dec-20	5-Jan-21	5.03E+02
U3R-4 at Road A	H-3	5-Jan-21	2-Feb-21	2.27E+02
U3R-4 at Road A	H-3	2-Feb-21	2-Mar-21	7.03E+02
U3R-4 at Road A	H-3	2-Mar-21	6-Apr-21	5.77E+02
U3R-4 at Road A	H-3	6-Apr-21	4-May-21	6.34E+02
U3R-4 at Road A	H-3	4-May-21	8-Jun-21	2.16E+03
U3R-4 at Road A	H-3	8-Jun-21	13-Jul-21	1.22E+03
U3R-4 at Road A	H-3	13-Jul-21	3-Aug-21	7.75E+02
U3R-4 at Road A	H-3	3-Aug-21	1-Sep-21	2.64E+02
U3R-4 at Road A	H-3	1-Sep-21	5-Oct-21	8.01E+02
U3R-4 at Road A	H-3	5-Oct-21	2-Nov-21	1.96E+02
U3R-4 at Road A	H-3	2-Nov-21	7-Dec-21	7.11E+02
U3R-4 at Road A	H-3	7-Dec-21	4-Jan-22	6.03E+02
U3R-4 at Road A	H-3	4-Jan-22	2-Feb-22	3.71E+02
U3R-4 at Road A	H-3	2-Feb-22	2-Mar-22	4.81E+02
U3R-4 at Road A	H-3	2-Mar-22	5-Apr-22	5.47E+02
U3R-4 at Road A	H-3	5-Apr-22	3-May-22	4.79E+02
U3R-4 at Road A	H-3	3-May-22	7-Jun-22	3.06E+02

Attachment: D

U3R-4 at Road A	H-3	7-Jun-22	6-Jul-22	7.74E+02
U3R-4 at Road A	K-40	4-Sep-19	8-Oct-19	-1.34E+02
U3R-4 at Road A	K-40	8-Oct-19	5-Nov-19	-5.64E+01
U3R-4 at Road A	K-40	5-Nov-19	3-Dec-19	-1.16E+02
U3R-4 at Road A	K-40	3-Dec-19	7-Jan-20	-3.14E+01
U3R-4 at Road A	K-40	7-Jan-20	4-Feb-20	-8.92E+01
U3R-4 at Road A	K-40	4-Feb-20	4-Mar-20	-3.98E+01
U3R-4 at Road A	K-40	4-Mar-20	7-Apr-20	-2.76E+01
U3R-4 at Road A	K-40	7-Apr-20	5-May-20	2.44E+01
U3R-4 at Road A	K-40	5-May-20	2-Jun-20	-3.76E+01
U3R-4 at Road A	K-40	2-Jun-20	7-Jul-20	6.98E+01
U3R-4 at Road A	K-40	7-Jul-20	4-Aug-20	1.47E+02
U3R-4 at Road A	K-40	4-Aug-20	2-Sep-20	8.61E+01
U3R-4 at Road A	K-40	2-Sep-20	6-Oct-20	8.41E+01
U3R-4 at Road A	K-40	6-Oct-20	3-Nov-20	1.18E+02
U3R-4 at Road A	K-40	3-Nov-20	1-Dec-20	8.08E+01
U3R-4 at Road A	K-40	1-Dec-20	5-Jan-21	9.23E+01
U3R-4 at Road A	K-40	5-Jan-21	2-Feb-21	-8.18E+01
U3R-4 at Road A	K-40	2-Feb-21	2-Mar-21	-5.96E+01
U3R-4 at Road A	K-40	2-Mar-21	6-Apr-21	8.78E+00
U3R-4 at Road A	K-40	6-Apr-21	4-May-21	-4.44E+00
U3R-4 at Road A	K-40	4-May-21	8-Jun-21	1.65E+01
U3R-4 at Road A	K-40	8-Jun-21	13-Jul-21	9.70E+00
U3R-4 at Road A	K-40	13-Jul-21	3-Aug-21	-3.07E+00
U3R-4 at Road A	K-40	3-Aug-21	1-Sep-21	-7.76E+01
U3R-4 at Road A	K-40	1-Sep-21	5-Oct-21	-5.88E+01
U3R-4 at Road A	K-40	5-Oct-21	2-Nov-21	9.03E+01
U3R-4 at Road A	K-40	2-Nov-21	7-Dec-21	1.14E+02
U3R-4 at Road A	K-40	7-Dec-21	4-Jan-22	-9.52E+00
U3R-4 at Road A	K-40	4-Jan-22	2-Feb-22	-5.84E+00
U3R-4 at Road A	K-40	2-Feb-22	2-Mar-22	7.39E+01
U3R-4 at Road A	K-40	2-Mar-22	5-Apr-22	-2.60E+01
U3R-4 at Road A	K-40	5-Apr-22	3-May-22	1.13E+01

Attachment: D

U3R-4 at Road A	K-40	3-May-22	7-Jun-22	-1.67E-01
U3R-4 at Road A	K-40	7-Jun-22	6-Jul-22	-4.04E+01
U3R-4 at Road A	K-40	6-Jul-22	8-Jul-22	6.80E+01
U3R-4 at Road A	Co-60	4-Sep-19	8-Oct-19	1.52E+00
U3R-4 at Road A	Co-60	8-Oct-19	5-Nov-19	8.53E-01
U3R-4 at Road A	Co-60	5-Nov-19	3-Dec-19	5.70E-01
U3R-4 at Road A	Co-60	3-Dec-19	7-Jan-20	1.01E+00
U3R-4 at Road A	Co-60	7-Jan-20	4-Feb-20	1.46E-01
U3R-4 at Road A	Co-60	4-Feb-20	4-Mar-20	8.57E-01
U3R-4 at Road A	Co-60	4-Mar-20	7-Apr-20	5.10E-01
U3R-4 at Road A	Co-60	7-Apr-20	5-May-20	2.79E+00
U3R-4 at Road A	Co-60	5-May-20	2-Jun-20	3.52E-01
U3R-4 at Road A	Co-60	2-Jun-20	7-Jul-20	-1.64E+00
U3R-4 at Road A	Co-60	7-Jul-20	4-Aug-20	6.94E-01
U3R-4 at Road A	Co-60	4-Aug-20	2-Sep-20	1.26E+00
U3R-4 at Road A	Co-60	2-Sep-20	6-Oct-20	-8.65E-01
U3R-4 at Road A	Co-60	6-Oct-20	3-Nov-20	-2.10E-01
U3R-4 at Road A	Co-60	3-Nov-20	1-Dec-20	-2.28E-01
U3R-4 at Road A	Co-60	1-Dec-20	5-Jan-21	2.50E-01
U3R-4 at Road A	Co-60	5-Jan-21	2-Feb-21	2.41E+00
U3R-4 at Road A	Co-60	2-Feb-21	2-Mar-21	3.93E+00
U3R-4 at Road A	Co-60	2-Mar-21	6-Apr-21	-9.45E-01
U3R-4 at Road A	Co-60	6-Apr-21	4-May-21	-3.36E-01
U3R-4 at Road A	Co-60	4-May-21	8-Jun-21	2.47E+00
U3R-4 at Road A	Co-60	8-Jun-21	13-Jul-21	2.01E+00
U3R-4 at Road A	Co-60	13-Jul-21	3-Aug-21	5.53E-01
U3R-4 at Road A	Co-60	3-Aug-21	1-Sep-21	-3.38E-01
U3R-4 at Road A	Co-60	1-Sep-21	5-Oct-21	-8.07E-01
U3R-4 at Road A	Co-60	5-Oct-21	2-Nov-21	-6.31E-01
U3R-4 at Road A	Co-60	2-Nov-21	7-Dec-21	2.11E-01
U3R-4 at Road A	Co-60	7-Dec-21	4-Jan-22	-2.41E-01
U3R-4 at Road A	Co-60	4-Jan-22	2-Feb-22	1.90E+00
U3R-4 at Road A	Co-60	2-Feb-22	2-Mar-22	-2.50E+00

Attachment: D

U3R-4 at Road A	Co-60	2-Mar-22	5-Apr-22	8.36E-02
U3R-4 at Road A	Co-60	5-Apr-22	3-May-22	4.97E+00
U3R-4 at Road A	Co-60	3-May-22	7-Jun-22	-1.27E+00
U3R-4 at Road A	Co-60	7-Jun-22	6-Jul-22	1.89E+00
U3R-4 at Road A	Co-60	6-Jul-22	8-Jul-22	-9.00E-01
U3R-4 at Road A	Cs-137	4-Sep-19	8-Oct-19	7.33E-01
U3R-4 at Road A	Cs-137	8-Oct-19	5-Nov-19	1.89E-01
U3R-4 at Road A	Cs-137	5-Nov-19	3-Dec-19	1.54E+00
U3R-4 at Road A	Cs-137	3-Dec-19	7-Jan-20	3.47E+00
U3R-4 at Road A	Cs-137	7-Jan-20	4-Feb-20	-2.00E-01
U3R-4 at Road A	Cs-137	4-Feb-20	4-Mar-20	-1.02E-02
U3R-4 at Road A	Cs-137	4-Mar-20	7-Apr-20	8.14E+00
U3R-4 at Road A	Cs-137	7-Apr-20	5-May-20	9.32E-01
U3R-4 at Road A	Cs-137	5-May-20	2-Jun-20	3.12E+00
U3R-4 at Road A	Cs-137	2-Jun-20	7-Jul-20	2.76E+00
U3R-4 at Road A	Cs-137	7-Jul-20	4-Aug-20	1.83E+00
U3R-4 at Road A	Cs-137	4-Aug-20	2-Sep-20	1.03E+00
U3R-4 at Road A	Cs-137	2-Sep-20	6-Oct-20	2.13E+00
U3R-4 at Road A	Cs-137	6-Oct-20	3-Nov-20	1.47E+00
U3R-4 at Road A	Cs-137	3-Nov-20	1-Dec-20	-1.19E+00
U3R-4 at Road A	Cs-137	1-Dec-20	5-Jan-21	2.23E+00
U3R-4 at Road A	Cs-137	5-Jan-21	2-Feb-21	1.47E+00
U3R-4 at Road A	Cs-137	2-Feb-21	2-Mar-21	1.32E+00
U3R-4 at Road A	Cs-137	2-Mar-21	6-Apr-21	3.46E+00
U3R-4 at Road A	Cs-137	6-Apr-21	4-May-21	8.51E-01
U3R-4 at Road A	Cs-137	4-May-21	8-Jun-21	2.13E-01
U3R-4 at Road A	Cs-137	8-Jun-21	13-Jul-21	1.77E+00
U3R-4 at Road A	Cs-137	13-Jul-21	3-Aug-21	2.99E+00
U3R-4 at Road A	Cs-137	3-Aug-21	1-Sep-21	1.04E+00
U3R-4 at Road A	Cs-137	1-Sep-21	5-Oct-21	-4.15E+00
U3R-4 at Road A	Cs-137	5-Oct-21	2-Nov-21	9.36E-01
U3R-4 at Road A	Cs-137	2-Nov-21	7-Dec-21	4.23E-01
U3R-4 at Road A	Cs-137	7-Dec-21	4-Jan-22	-1.92E+00

Attachment: D

U3R-4 at Road A	Cs-137	4-Jan-22	2-Feb-22	-2.13E+00
U3R-4 at Road A	Cs-137	2-Feb-22	2-Mar-22	-2.75E-01
U3R-4 at Road A	Cs-137	2-Mar-22	5-Apr-22	-3.72E+00
U3R-4 at Road A	Cs-137	5-Apr-22	3-May-22	-1.64E+00
U3R-4 at Road A	Cs-137	3-May-22	7-Jun-22	-5.04E+00
U3R-4 at Road A	Cs-137	7-Jun-22	6-Jul-22	-3.05E-01
U3R-4 at Road A	Cs-137	6-Jul-22	8-Jul-22	-2.40E+00
U3R-4 at Road A	U-234	4-Sep-19	8-Oct-19	2.67E-02
U3R-4 at Road A	U-234	8-Oct-19	5-Nov-19	4.01E-02
U3R-4 at Road A	U-234	5-Nov-19	3-Dec-19	1.11E-01
U3R-4 at Road A	U-234	3-Dec-19	7-Jan-20	3.94E-02
U3R-4 at Road A	U-234	7-Jan-20	4-Feb-20	6.65E-02
U3R-4 at Road A	U-234	4-Feb-20	4-Mar-20	8.54E-02
U3R-4 at Road A	U-234	4-Mar-20	7-Apr-20	3.58E-02
U3R-4 at Road A	U-234	7-Apr-20	5-May-20	1.27E-01
U3R-4 at Road A	U-234	5-May-20	2-Jun-20	3.72E-02
U3R-4 at Road A	U-234	2-Jun-20	7-Jul-20	3.26E-02
U3R-4 at Road A	U-234	7-Jul-20	4-Aug-20	1.23E-01
U3R-4 at Road A	U-234	4-Aug-20	2-Sep-20	6.94E-02
U3R-4 at Road A	U-234	2-Sep-20	6-Oct-20	2.84E-01
U3R-4 at Road A	U-234	6-Oct-20	3-Nov-20	7.92E-02
U3R-4 at Road A	U-234	3-Nov-20	1-Dec-20	2.98E-01
U3R-4 at Road A	U-234	1-Dec-20	5-Jan-21	1.84E-01
U3R-4 at Road A	U-234	5-Jan-21	2-Feb-21	2.50E-01
U3R-4 at Road A	U-234	2-Feb-21	2-Mar-21	2.15E-01
U3R-4 at Road A	U-234	2-Mar-21	6-Apr-21	4.13E-02
U3R-4 at Road A	U-234	6-Apr-21	4-May-21	5.17E-01
U3R-4 at Road A	U-234	4-May-21	8-Jun-21	1.16E-01
U3R-4 at Road A	U-234	8-Jun-21	13-Jul-21	2.35E-02
U3R-4 at Road A	U-234	13-Jul-21	3-Aug-21	3.45E-01
U3R-4 at Road A	U-234	3-Aug-21	1-Sep-21	3.99E-02
U3R-4 at Road A	U-234	1-Sep-21	5-Oct-21	9.52E-02
U3R-4 at Road A	U-234	5-Oct-21	2-Nov-21	2.50E-01

Attachment: D

U3R-4 at Road A	U-234	2-Nov-21	7-Dec-21	2.27E-01
U3R-4 at Road A	U-234	7-Dec-21	4-Jan-22	1.29E-01
U3R-4 at Road A	U-234	4-Jan-22	2-Feb-22	1.24E-01
U3R-4 at Road A	U-234	2-Feb-22	2-Mar-22	2.17E-01
U3R-4 at Road A	U-234	2-Mar-22	5-Apr-22	4.34E-01
U3R-4 at Road A	U-234	5-Apr-22	3-May-22	7.57E-01
U3R-4 at Road A	U-234	3-May-22	7-Jun-22	7.23E-01
U3R-4 at Road A	U-235	4-Sep-19	8-Oct-19	-1.93E-05
U3R-4 at Road A	U-235	8-Oct-19	5-Nov-19	-5.36E-03
U3R-4 at Road A	U-235	5-Nov-19	3-Dec-19	9.14E-03
U3R-4 at Road A	U-235	3-Dec-19	7-Jan-20	-1.43E-03
U3R-4 at Road A	U-235	7-Jan-20	4-Feb-20	-2.73E-03
U3R-4 at Road A	U-235	4-Feb-20	4-Mar-20	3.61E-03
U3R-4 at Road A	U-235	4-Mar-20	7-Apr-20	8.03E-03
U3R-4 at Road A	U-235	7-Apr-20	5-May-20	1.57E-02
U3R-4 at Road A	U-235	5-May-20	2-Jun-20	8.34E-03
U3R-4 at Road A	U-235	2-Jun-20	7-Jul-20	4.46E-03
U3R-4 at Road A	U-235	7-Jul-20	4-Aug-20	9.08E-03
U3R-4 at Road A	U-235	4-Aug-20	2-Sep-20	4.43E-03
U3R-4 at Road A	U-235	2-Sep-20	6-Oct-20	2.27E-02
U3R-4 at Road A	U-235	6-Oct-20	3-Nov-20	4.35E-03
U3R-4 at Road A	U-235	3-Nov-20	1-Dec-20	3.94E-02
U3R-4 at Road A	U-235	1-Dec-20	5-Jan-21	1.35E-02
U3R-4 at Road A	U-235	5-Jan-21	2-Feb-21	4.39E-03
U3R-4 at Road A	U-235	2-Feb-21	2-Mar-21	1.10E-02
U3R-4 at Road A	U-235	2-Mar-21	6-Apr-21	-4.07E-03
U3R-4 at Road A	U-235	6-Apr-21	4-May-21	1.97E-02
U3R-4 at Road A	U-235	4-May-21	8-Jun-21	1.69E-02
U3R-4 at Road A	U-235	8-Jun-21	13-Jul-21	1.51E-02
U3R-4 at Road A	U-235	13-Jul-21	3-Aug-21	1.14E-02
U3R-4 at Road A	U-235	3-Aug-21	1-Sep-21	8.70E-03
U3R-4 at Road A	U-235	1-Sep-21	5-Oct-21	1.45E-03
U3R-4 at Road A	U-235	5-Oct-21	2-Nov-21	1.72E-02

Attachment: D

U3R-4 at Road A	U-235	2-Nov-21	7-Dec-21	1.27E-02
U3R-4 at Road A	U-235	7-Dec-21	4-Jan-22	1.22E-02
U3R-4 at Road A	U-235	4-Jan-22	2-Feb-22	1.39E-03
U3R-4 at Road A	U-235	2-Feb-22	2-Mar-22	1.47E-02
U3R-4 at Road A	U-235	2-Mar-22	5-Apr-22	4.19E-02
U3R-4 at Road A	U-235	5-Apr-22	3-May-22	3.86E-02
U3R-4 at Road A	U-235	3-May-22	7-Jun-22	4.67E-02
U3R-4 at Road A	U-238	4-Sep-19	8-Oct-19	5.69E-02
U3R-4 at Road A	U-238	8-Oct-19	5-Nov-19	8.35E-02
U3R-4 at Road A	U-238	5-Nov-19	3-Dec-19	1.08E-01
U3R-4 at Road A	U-238	3-Dec-19	7-Jan-20	7.63E-02
U3R-4 at Road A	U-238	7-Jan-20	4-Feb-20	6.96E-02
U3R-4 at Road A	U-238	4-Feb-20	4-Mar-20	7.44E-02
U3R-4 at Road A	U-238	4-Mar-20	7-Apr-20	2.60E-02
U3R-4 at Road A	U-238	7-Apr-20	5-May-20	1.81E-01
U3R-4 at Road A	U-238	5-May-20	2-Jun-20	5.40E-02
U3R-4 at Road A	U-238	2-Jun-20	7-Jul-20	3.13E-02
U3R-4 at Road A	U-238	7-Jul-20	4-Aug-20	1.36E-01
U3R-4 at Road A	U-238	4-Aug-20	2-Sep-20	5.85E-02
U3R-4 at Road A	U-238	2-Sep-20	6-Oct-20	3.17E-01
U3R-4 at Road A	U-238	6-Oct-20	3-Nov-20	1.12E-01
U3R-4 at Road A	U-238	3-Nov-20	1-Dec-20	3.86E-01
U3R-4 at Road A	U-238	1-Dec-20	5-Jan-21	2.56E-01
U3R-4 at Road A	U-238	5-Jan-21	2-Feb-21	1.80E-01
U3R-4 at Road A	U-238	2-Feb-21	2-Mar-21	2.22E-01
U3R-4 at Road A	U-238	2-Mar-21	6-Apr-21	6.59E-02
U3R-4 at Road A	U-238	6-Apr-21	4-May-21	5.13E-01
U3R-4 at Road A	U-238	4-May-21	8-Jun-21	8.42E-02
U3R-4 at Road A	U-238	8-Jun-21	13-Jul-21	3.06E-02
U3R-4 at Road A	U-238	13-Jul-21	3-Aug-21	3.90E-01
U3R-4 at Road A	U-238	3-Aug-21	1-Sep-21	4.57E-02
U3R-4 at Road A	U-238	1-Sep-21	5-Oct-21	9.51E-02
U3R-4 at Road A	U-238	5-Oct-21	2-Nov-21	2.51E-01

Attachment: D

U3R-4 at Road A	U-238	2-Nov-21	7-Dec-21	2.24E-01
U3R-4 at Road A	U-238	7-Dec-21	4-Jan-22	1.59E-01
U3R-4 at Road A	U-238	4-Jan-22	2-Feb-22	1.58E-01
U3R-4 at Road A	U-238	2-Feb-22	2-Mar-22	2.47E-01
U3R-4 at Road A	U-238	2-Mar-22	5-Apr-22	5.62E-01
U3R-4 at Road A	U-238	5-Apr-22	3-May-22	8.18E-01
U3R-4 at Road A	U-238	3-May-22	7-Jun-22	7.83E-01
U3R-4 at Road A	Gross B	4-Sep-19	8-Oct-19	2.38E+00
U3R-4 at Road A	Gross B	8-Oct-19	5-Nov-19	3.88E+00
U3R-4 at Road A	Gross B	5-Nov-19	3-Dec-19	3.58E+00
U3R-4 at Road A	Gross B	3-Dec-19	7-Jan-20	2.62E+00
U3R-4 at Road A	Gross B	7-Jan-20	4-Feb-20	1.68E+00
U3R-4 at Road A	Gross B	4-Feb-20	4-Mar-20	1.19E+00
U3R-4 at Road A	Gross B	4-Mar-20	7-Apr-20	1.26E+00
U3R-4 at Road A	Gross B	7-Apr-20	5-May-20	1.95E+00
U3R-4 at Road A	Gross B	5-May-20	2-Jun-20	1.37E+00
U3R-4 at Road A	Gross B	2-Jun-20	7-Jul-20	9.20E-01
U3R-4 at Road A	Gross B	7-Jul-20	4-Aug-20	4.46E+00
U3R-4 at Road A	Gross B	4-Aug-20	2-Sep-20	1.12E+00
U3R-4 at Road A	Gross B	2-Sep-20	6-Oct-20	3.63E+00
U3R-4 at Road A	Gross B	6-Oct-20	3-Nov-20	4.81E+00
U3R-4 at Road A	Gross B	3-Nov-20	1-Dec-20	8.54E+00
U3R-4 at Road A	Gross B	1-Dec-20	5-Jan-21	4.83E+00
U3R-4 at Road A	Gross B	5-Jan-21	2-Feb-21	4.72E+00
U3R-4 at Road A	Gross B	2-Feb-21	2-Mar-21	3.32E+00
U3R-4 at Road A	Gross B	2-Mar-21	6-Apr-21	1.51E+00
U3R-4 at Road A	Gross B	6-Apr-21	4-May-21	6.10E+00
U3R-4 at Road A	Gross B	4-May-21	8-Jun-21	2.41E+00
U3R-4 at Road A	Gross B	8-Jun-21	13-Jul-21	1.80E+00
U3R-4 at Road A	Gross B	13-Jul-21	3-Aug-21	2.60E+00
U3R-4 at Road A	Gross B	3-Aug-21	1-Sep-21	2.12E+00
U3R-4 at Road A	Gross B	1-Sep-21	5-Oct-21	2.27E+00
U3R-4 at Road A	Gross B	5-Oct-21	2-Nov-21	3.88E+00

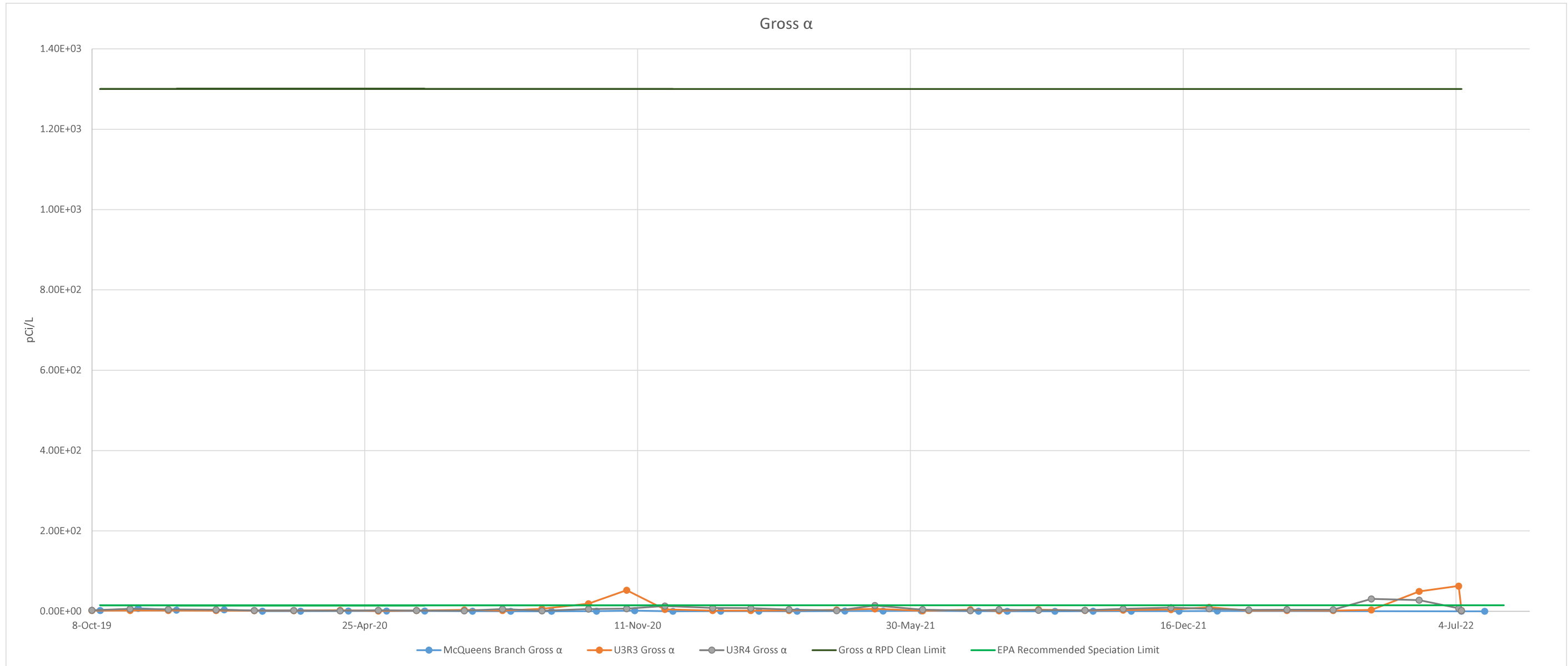
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U3R-4 at Road A	Gross B	2-Nov-21	7-Dec-21	6.10E+00
U3R-4 at Road A	Gross B	7-Dec-21	4-Jan-22	4.47E+00
U3R-4 at Road A	Gross B	4-Jan-22	2-Feb-22	2.28E+00
U3R-4 at Road A	Gross B	2-Feb-22	2-Mar-22	2.61E+00
U3R-4 at Road A	Gross B	2-Mar-22	5-Apr-22	2.28E+00
U3R-4 at Road A	Gross B	5-Apr-22	3-May-22	1.78E+01
U3R-4 at Road A	Gross B	3-May-22	7-Jun-22	1.35E+01
U3R-4 at Road A	Gross B	7-Jun-22	6-Jul-22	2.84E+00
U3R-4 at Road A	Gross B	6-Jul-22	8-Jul-22	9.08E-01
U3R-4 at Road A	Gross A	4-Sep-19	8-Oct-19	2.88E+00
U3R-4 at Road A	Gross A	8-Oct-19	5-Nov-19	5.83E+00
U3R-4 at Road A	Gross A	5-Nov-19	3-Dec-19	4.73E+00
U3R-4 at Road A	Gross A	3-Dec-19	7-Jan-20	3.80E+00
U3R-4 at Road A	Gross A	7-Jan-20	4-Feb-20	2.25E+00
U3R-4 at Road A	Gross A	4-Feb-20	4-Mar-20	2.19E+00
U3R-4 at Road A	Gross A	4-Mar-20	7-Apr-20	1.35E+00
U3R-4 at Road A	Gross A	7-Apr-20	5-May-20	2.58E+00
U3R-4 at Road A	Gross A	5-May-20	2-Jun-20	2.00E+00
U3R-4 at Road A	Gross A	2-Jun-20	7-Jul-20	1.12E+00
U3R-4 at Road A	Gross A	7-Jul-20	4-Aug-20	5.66E+00
U3R-4 at Road A	Gross A	4-Aug-20	2-Sep-20	1.17E+00
U3R-4 at Road A	Gross A	2-Sep-20	6-Oct-20	5.51E+00
U3R-4 at Road A	Gross A	6-Oct-20	3-Nov-20	6.86E+00
U3R-4 at Road A	Gross A	3-Nov-20	1-Dec-20	1.34E+01
U3R-4 at Road A	Gross A	1-Dec-20	5-Jan-21	8.25E+00
U3R-4 at Road A	Gross A	5-Jan-21	2-Feb-21	7.93E+00
U3R-4 at Road A	Gross A	2-Feb-21	2-Mar-21	4.51E+00
U3R-4 at Road A	Gross A	2-Mar-21	6-Apr-21	1.57E+00
U3R-4 at Road A	Gross A	6-Apr-21	4-May-21	1.44E+01
U3R-4 at Road A	Gross A	4-May-21	8-Jun-21	4.18E+00
U3R-4 at Road A	Gross A	8-Jun-21	13-Jul-21	1.65E+00
U3R-4 at Road A	Gross A	13-Jul-21	3-Aug-21	4.36E+00
U3R-4 at Road A	Gross A	3-Aug-21	1-Sep-21	2.68E+00

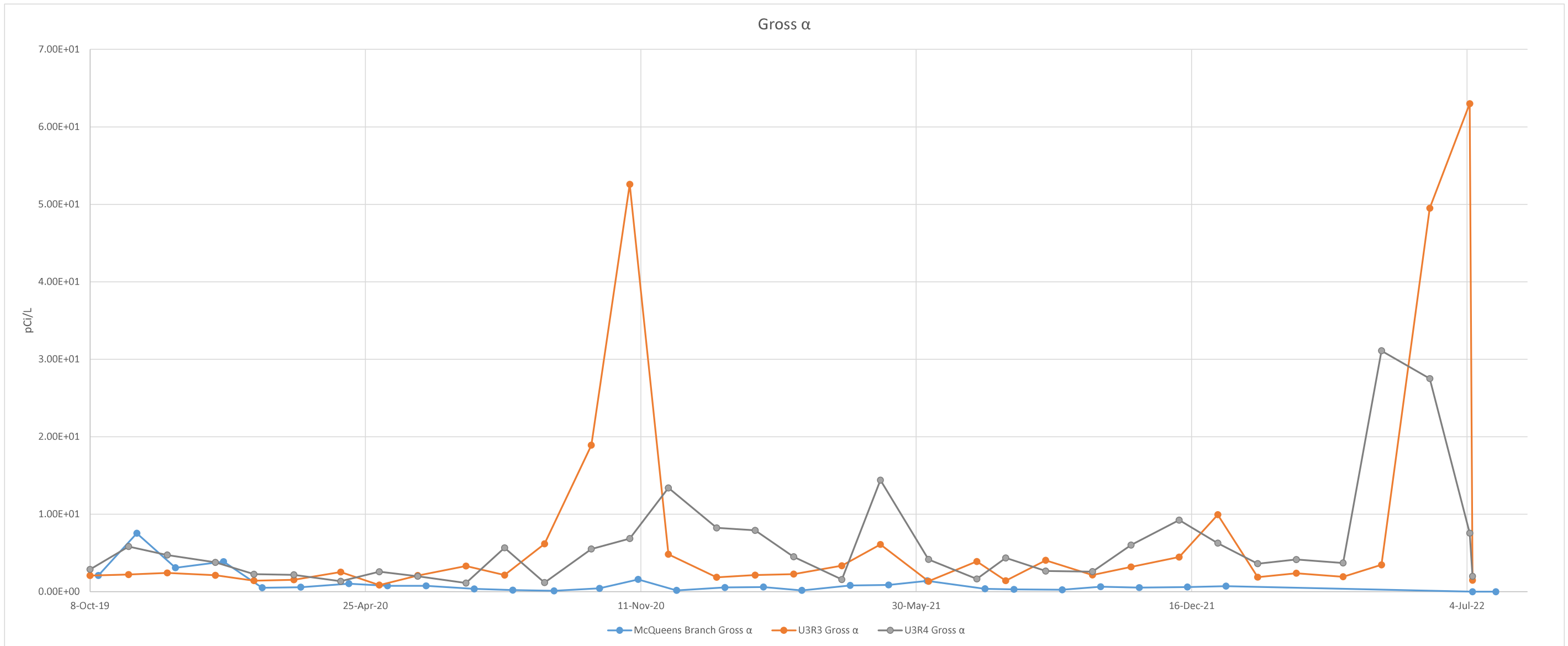
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U3R-4 at Road A	Gross A	1-Sep-21	5-Oct-21	2.59E+00
U3R-4 at Road A	Gross A	5-Oct-21	2-Nov-21	6.02E+00
U3R-4 at Road A	Gross A	2-Nov-21	7-Dec-21	9.24E+00
U3R-4 at Road A	Gross A	7-Dec-21	4-Jan-22	6.28E+00
U3R-4 at Road A	Gross A	4-Jan-22	2-Feb-22	3.62E+00
U3R-4 at Road A	Gross A	2-Feb-22	2-Mar-22	4.15E+00
U3R-4 at Road A	Gross A	2-Mar-22	5-Apr-22	3.71E+00
U3R-4 at Road A	Gross A	5-Apr-22	3-May-22	3.11E+01
U3R-4 at Road A	Gross A	3-May-22	7-Jun-22	2.75E+01
U3R-4 at Road A	Gross A	7-Jun-22	6-Jul-22	7.56E+00
U3R-4 at Road A	Gross A	6-Jul-22	8-Jul-22	2.00E+00

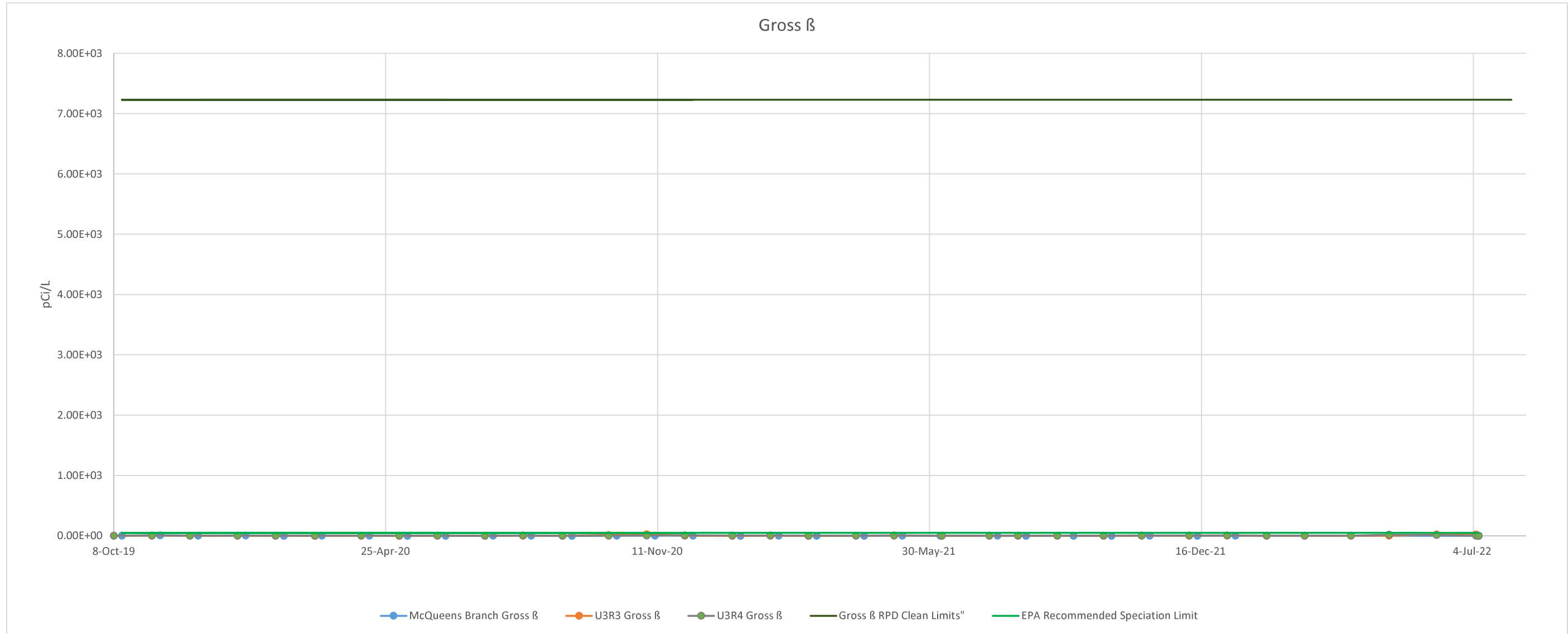
Gross Alpha Stream Data Plotting

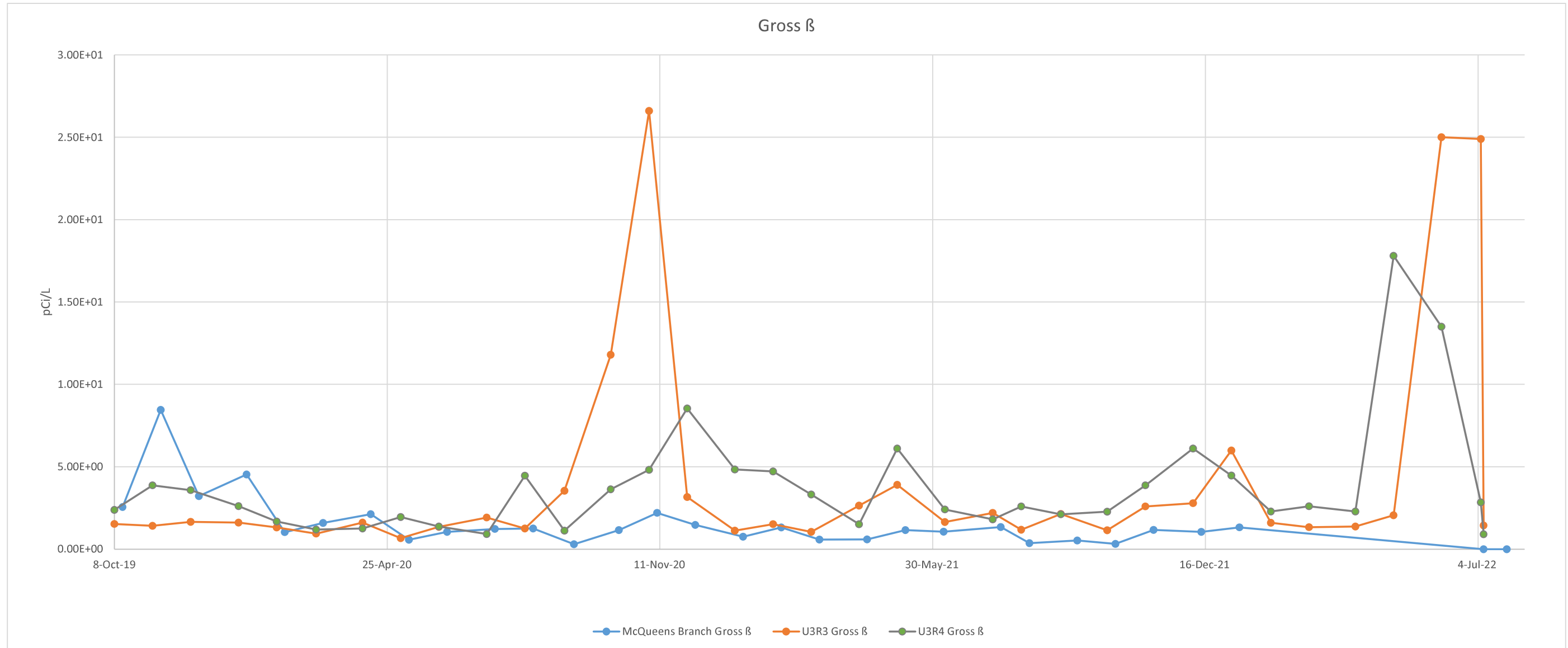


Gross α



Gross Beta Stream Data Plotting





Calculation Cover Sheet

Proc. Ref. E7.2.31/2.31A

Project/Task H-Canyon Roadway Remediation		Calculation Number Q-CLC-H-00659		Project/Task Number N/A	
Title Calculation of Radioactivity from Transtore Container and Containment Dike		Functional Classification Environmental		Sheet 1 of 14	
		Discipline Environmental			
Calculation Type <input checked="" type="checkbox"/> Type 1 <input type="checkbox"/> Type 2		Type 1 Calc Status <input type="checkbox"/> Preliminary <input checked="" type="checkbox"/> Confirmed			
Computer Program No. Microsoft Excel for Microsoft 365 MSO <input type="checkbox"/> N/A		Version/Release No. 16.0.14326.21046 32-bit			
Purpose The purpose of the calculation is to determine the radioactivity present in liquid from the H-Canyon Northeast Sump that escaped a Transtore tank and the associated secondary containment dike near the 294-H Sand Filter on July 4, 2022. This activity calculation is required for associated spill response actions.		DC/RO Date REVIEWED AND DETERMINED TO BE UNCLASSIFIED. THIS REVIEW DOES NOT CONSTITUTE CLEARANCE FOR PUBLIC RELEASE. A.T. MASTERSON, DERIVATIVE CLASSIFIER: <u>PRINCIPAL ENGR</u> (NAME/PERSONAL IDENTIFIER AND POSITION TITLE) DATE: <u>08/01/2022</u>			
Summary of Conclusion The maximum activity for each radionuclide was successfully calculated for the liquid pumped out of the northeast sump into the Transtore tanks and tanker using the liquid sample analytical results and current Facility waste stream distribution. The activities were calculated based on a full Transtore tank of 550 gallons of liquid and the approximate spill volume of 100 gallons.					
Revisions					
Rev No.	Revision Description				
0	Initial Issue				
N/A	N/A				
N/A	N/A				
Sign Off					
Rev No.	Originator (Print) Sign/Date	Verification/Checking Method	Verifier/Checker (Print) Sign/Date	Manager (Print) Sign/Date	
0	S. T. Veldman 8/1/22 <i>Stephen T Veldman</i>	<input type="checkbox"/> Design Check (GS/PS only) <input checked="" type="checkbox"/> Document Review <input type="checkbox"/> Qualification Testing <input type="checkbox"/> Alternate Calculation <input type="checkbox"/> Operational Testing	B. N. Owensby 8/1/22 <i>Stephen T Veldman for B. N. Owensby</i>	S. J. Brown 8/1/22 <i>S. J. Brown</i>	
Additional Reviewer (Print) Cecil Copeland, Outside Facilities Operations Manager		Signature <i>Cecil Copeland</i>		Date 8/01/2022	
Design Authority (Print) N/A		Signature N/A		Date N/A	
Release to Outside Agency – Design Authority (Print) N/A		Signature N/A		Date N/A	
Security Classification of the Calculation Unclassified					

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2.0 INTRODUCTION

The purpose of this Engineering Calculation is to determine the radioactivity present in liquid from the H-Canyon Northeast Sump that escaped a Transtore tank and the associated secondary containment dike near the 294-H Sand Filter on July 4, 2022. This activity calculation is required for associated spill response actions.

3.0 OPEN ITEMS

There are no Open Items.

4.0 INPUTS

- 4.1. The capacity of the Transtore tank is 550 gallons. (Ref. 8.2)
- 4.2. The current radionuclide distribution of low-level waste (LLW) generated at the H-Canyon Facility is given in the table below. The distribution includes all radionuclides that contribute >1% of the total activity, all transuranic (TRU) nuclides, all fissile nuclides, and the performance assessment nuclides for E-area at SRS as defined in the 1S Manual – (H-3, C-14, Sr-90, Tc-99, I-129, U-234, U-235, and Np-237). The distribution is revalidated every 2 years per the 1S Manual requirements. (Ref. 8.1, 8.3, 8.4)

Table 4-1 HCA Facility Waste Stream Distribution

Radionuclides	Ci %	Ci Fraction
Am-241	1.61E+00	1.61E-02
Am-242m	7.56E-01	7.56E-03
Am-243	2.24E-02	2.24E-04
Ba-137m	4.24E+00	4.24E-02
C-14	5.82E-02	5.82E-04
Ce-144	1.11E+00	1.11E-02
Cm-244	3.05E+00	3.05E-02
Cs-134	8.02E-01	8.02E-03
Cs-137	4.48E+00	4.48E-02
H-3	5.99E-01	5.99E-03
I-129	6.47E-07	6.47E-09
Np-237	5.76E-02	5.76E-04
Pm-147	3.08E+00	3.08E-02
Pr-144	1.11E+00	1.11E-02
Pu-238	2.29E+01	2.29E-01
Pu-239	1.44E+00	1.44E-02
Pu-240	1.42E+00	1.42E-02
Pu-241	2.72E+01	2.72E-01
Pu-242	5.13E-03	5.13E-05
Sr-90	1.03E+01	1.03E-01
Tc-99	4.10E-04	4.10E-06
U-233	4.25E-01	4.25E-03
U-234	4.98E+00	4.98E-02
U-235	1.24E-02	1.24E-04
Y-90	1.03E+01	1.03E-01
Total	1.00E+02	1.00E+00

- 4.3. The solution from the containment dike was sampled after the event and the following results were recorded. (Att. 1) Results preceded by a less-than sign (<) indicate that the result is below the minimum detectable activity (MDA) for the analyte.

Table 4-2 Dike Sample Results

Analyte	Result (dpm/mL)
Cs-137	3.14E+03
Co-60	<1.49E+01
Ru-106	<1.09E+02
Sb-125	<5.18E+01
Sb-126	<2.39E+01
Ce-144	<1.61E+02
Eu-154	<4.16E+01
Am-241	<6.44E+01
Pu-238	<4.78E+00
Pu-239/240	<4.78E+00
Sr-90	1.21E+04
Total Alpha	<8.81E+02
Total Beta-Gamma	3.54E+04

- 4.4. The solution from the tanker was sampled after the event and the following results were recorded. (Att. 2) Results preceded by a less-than sign (<) indicate that the result is below the minimum detectable activity (MDA) for the analyte.

Table 4-3 Tanker Sample Results

Analyte	Result (dpm/mL)
Pu-238	4.81E+00
Pu-239/240	6.13E+00
Pu	1.09E+01
Total Alpha	<1.00E+03
Total Beta-Gamma	1.93E+04

- 4.5. The maximum spill volume for spill response purposes is 100 gallons. (Ref. 8.5)
- 4.6. One US gallon equals 3.78533 Liters. (Ref. 8.6)
- 4.7. One Curie is equal to 3.7E10 disintegrations per second (dps). (Ref. 8.8)

5.0 ASSUMPTIONS

- 5.1 The solutions from the Transtore tank and tanker have the same radionuclide distribution. *Basis:* The solution was pumped from the H-Canyon Northeast Sump into the Transtore tanks in multiple batches until at least one tank was full, and then solution was pumped from the full tank into the tanker. This method of liquid transfer agitated the solution during transfers from the sump to the tanks and the residence time in the tanks allowed for thorough mixing before transfer to the tanker. The results for total alpha and beta-gamma counts in the lab samples also support this assumption since they are in the same order of magnitude for samples pulled from the dike and tanker. (Att. 1 & 2)
- 5.2 The activity for non-measured nuclides in the liquid can be calculated by scaling to measured values. *Basis:* The facility waste stream is based on a conservative weighted average of all waste from the H-Canyon facility based on sample results specifically taken for waste characterization. The H-Canyon facility mission over the past few decades has been relatively constant with the dissolution of spent nuclear fuel followed by removal of fission products and processing of plutonium and uranium. This results in relatively constant ratios between β - γ emitting nuclides in the fuel fission products and the α -emitting nuclides in the actinides. In addition, the waste stream distribution is re-validated every 2 years. Based on these facts, there is no reason to suspect a radical change in the radionuclide distribution for the purposes of this calculation. (Ref. 8.1, 8.3, 8.4)

6.0 ANALYTICAL METHODS AND COMPUTATIONS

One of the laboratory analyses requested included a rad screen (gross α and β - γ analysis). The first step in the analysis is identifying each nuclide in the Facility waste distribution as an α emitter or a β - γ emitter since there are laboratory results for both total α counts and total β - γ counts. This is accomplished using the Chart of the Nuclides as a reference. (Ref. 8.7) Once done, the percentages of each emitter type are summed to determine the total percentage of each emitter type in the distribution. (I-4.2) The results are in Table 6-1 below.

Table 6-1 Emitter Identification and Emitter Percentages

Radionuclides	Ci %	Emitter Type
Am-241	1.61E+00	α
Am-242m	7.56E-01	α
Am-243	2.24E-02	α
Ba-137m	4.24E+00	β-γ
C-14	5.82E-02	β-γ
Ce-144	1.11E+00	β-γ
Cm-244	3.05E+00	α
Cs-134	8.02E-01	β-γ
Cs-137	4.48E+00	β-γ
H-3	5.99E-01	β-γ
I-129	6.47E-07	β-γ
Np-237	5.76E-02	α
Pm-147	3.08E+00	β-γ
Pr-144	1.11E+00	β-γ
Pu-238	2.29E+01	α
Pu-239	1.44E+00	α
Pu-240	1.42E+00	α
Pu-241	2.72E+01	β-γ
Pu-242	5.13E-03	α
Sr-90	1.03E+01	β-γ
Tc-99	4.10E-04	β-γ
U-233	4.25E-01	α
U-234	4.98E+00	α
U-235	1.24E-02	α
Y-90	1.03E+01	β-γ
Total	1.00E+02	N/A
Total α	3.67E+01	α
Total β-γ	6.33E+01	β-γ

The next step in the analysis is to calculate the total activity concentration of the solution based on the solution laboratory sample results for activity concentration. This can be done using the following equation where r_i is the laboratory result for the analyte (dpm/mL), f_i is the activity percentage of the analyte in the distribution, and C_{TOT} is the total activity concentration (dpm/mL) of the solution.

Equation 1. Total Activity Determination

$$c_{\text{TOT}} = \frac{(100)(r_i)}{(f_i)}$$

Once a total activity concentration is calculated for each measured result, a bounding value is picked and then the activity concentration of each nuclide is determined by applying the activity distribution to the total activity concentration as shown by the equation below where c_i is the activity concentration for each nuclide.

Equation 2. Determination of Nuclide Activities

$$c_i = \frac{f_i}{100}(c_{\text{TOT}})$$

The resulting activity concentrations are expressed in units of dpm/mL. The final step is to multiply the concentrations by volume to determine the activity of the nuclide in an amount of solution. The unit conversion of dpm to Curie and gallons to mL is also done. (I-4.6, I-4.7) The equation below is used to obtain the activities where a_i is the activity for a nuclide, v is the volume in gallons.

Equation 3. Nuclide Activity

$$a_i = (c_i) \left(\frac{1 \text{ Ci}}{3.7\text{E}10 \text{ dps}} \right) \left(\frac{1 \text{ dps}}{60 \text{ dpm}} \right) (v) \left(\frac{3.78533 \text{ L}}{1 \text{ gal}} \right) \left(\frac{1000 \text{ mL}}{1 \text{ L}} \right)$$

The resulting activities are bounding maximums for each radionuclide present in the liquid.

7.0 RESULTS

The calculated total activity concentration of the solution based on the sample laboratory results is given in Table 7-1 using Equation 1. If results for an analyte were obtained from both samples, the higher value is used to calculate a total activity concentration. Since all total alpha count results are below MDA, the lowest MDA is used as a bounding value for total alpha activity. The activity percentage used for Pu-239/240 is the sum of the Pu-239 and Pu-240 percentages. (I-4.3, I-4.4, A-5.1)

Table 7-1 Total Activity Concentrations vs. Lab Results

Analyte	Result (dpm/mL)	Total Activity Conc. (dpm/mL)
Total β - γ	3.54E+04	5.59E+04
Total α	8.81E+02	2.40E+03
Cs-137	3.14E+03	7.01E+04
Sr-90	1.21E+04	1.17E+05
Pu-238	4.81E+00	2.10E+01
Pu-239/240	6.13E+00	2.14E+02

The bounding activity concentration for the β - γ emitters is from the Sr-90 result, 1.17E+05 dpm/mL. The resulting total activity concentrations based on the gross β - γ rad screen analysis and the Cs-137 result from the Gamma Pulse Height Analysis (PHA) are within the same order of magnitude. Therefore, scaling all the β - γ emitters from the Sr-90 using the H-Canyon facility waste stream is bounding for the β - γ emitters. The β - γ nuclide concentrations are then calculated using the total activity concentration from Sr-90. (A-5.2)

The overall α counts as well as the plutonium activity indicate that the gross alpha activity in the liquid is 2-3 orders of magnitude lower than the total calculated activity based on the β - γ activity. Therefore, the α nuclide concentrations are calculated using the bounding total activity concentration from the gross α MDA from the rad screen. The calculation is done using Equation 2. (A-5.2)

Table 7-2 Activity Concentrations

Radionuclides	Activity Concentration (dpm/mL)
Am-241	3.87E+01
Am-242m	1.82E+01
Am-243	5.38E-01
Ba-137m	4.98E+03
C-14	6.84E+01
Ce-144	1.30E+03
Cm-244	7.33E+01
Cs-134	9.42E+02
Cs-137	5.26E+03
H-3	7.04E+02
I-129	7.60E-04
Np-237	1.38E+00
Pm-147	3.62E+03
Pr-144	1.30E+03
Pu-238	5.50E+02
Pu-239	3.46E+01
Pu-240	3.41E+01
Pu-241	3.20E+04
Pu-242	1.23E-01
Sr-90	1.21E+04
Tc-99	4.82E-01
U-233	1.02E+01
U-234	1.20E+02
U-235	2.98E-01
Y-90	1.21E+04
Total	7.52E+04

The activity for each radionuclide in the volume of liquid in a full Transtore tank (550 gal) and the volume of spilled liquid (100 gal) are calculated below using Equation 3. (I-4.1, I-4.5, I-4.6)

Table 7-3 Liquid Activities

Radionuclides	Activity in Full Tank @ 550 Gallons (Ci)	Activity in Spilled Liquid @ 100 Gallons (Ci)
Am-241	3.63E-05	6.59E-06
Am-242m	1.70E-05	3.10E-06
Am-243	5.05E-07	9.17E-08
Ba-137m	4.67E-03	8.49E-04
C-14	6.41E-05	1.17E-05
Ce-144	1.22E-03	2.22E-04
Cm-244	6.87E-05	1.25E-05
Cs-134	8.84E-04	1.61E-04
Cs-137	4.94E-03	8.97E-04
H-3	6.60E-04	1.20E-04
I-129	7.13E-10	1.30E-10
Np-237	1.30E-06	2.36E-07
Pm-147	3.39E-03	6.17E-04
Pr-144	1.22E-03	2.22E-04
Pu-238	5.16E-04	9.38E-05
Pu-239	3.24E-05	5.90E-06
Pu-240	3.20E-05	5.82E-06
Pu-241	3.00E-02	5.45E-03
Pu-242	1.16E-07	2.10E-08
Sr-90	1.13E-02	2.06E-03
Tc-99	4.52E-07	8.21E-08
U-233	9.57E-06	1.74E-06
U-234	1.12E-04	2.04E-05
U-235	2.79E-07	5.08E-03
Y-90	1.13E-02	2.06E-03
Total	7.05E-02	1.28E-02

8.0 CONCLUSIONS

The maximum activity for each radionuclide was successfully calculated for the liquid pumped out of the northeast sump into the Transtore tanks and tanker using the liquid sample analytical results and current Facility waste stream distribution. The activities were calculated based on a full Transtore tank of 550 gallons of liquid and the approximate spill volume of 100 gallons.

9.0 REFERENCES

- 8.1 William Blackburn, "2015 Revalidation of H-Canyon Solid Low Level Waste Streams," Q-CLC-H-00262, Rev. 6, December 28, 2015.
- 8.2 Drawing 515987, R/11-7-2007, Custom Metalcraft, Inc.
- 8.3 William Blackburn, "EAV Low Level Waste Stream Characterization, OSR 29-82," WSCF-2020-00018, August 19, 2020.
- 8.4 Manual 1S, Chapter 3, "Waste Characterization Program," Revision 5, January 28, 2021.
- 8.5 S. T. Veldman, "Calculation of Spill Volume from Transtore Container and Containment Dike," Q-CLC-H-00658, Rev. 0, July 26, 2022.
- 8.6 Crane Co., "Flow of Fluids Through Valves, Fittings, and Pipe, Technical Paper 410," Crane Valves North America, The Woodlands, TX, 1988.
- 8.7 Josef R. Parrington, Harold D. Knox, Susan L. Breneman, Edward M. Baum, and Frank Feiner, *Nuclides and Isotopes – Chart of the Nuclides*, 15th ed., General Electric Co. & KAPL, Inc., 1996.
- 8.8 Manual 1S, Glossary, Rev. 12, November 22, 2021.

10.0 ATTACHMENTS

ATTACHMENT 1: Dike Liquid Sample Results



Project Results Report
 14-July-2022 10:28:10AM
 Page 1 of 1

LIMS Project ID	LW-AD-PROJ-220707-1	Status	AUTHORIZED	
Customer Name	CHAVOUS, TYLER DUSTIN			
Sample Number	27088	User Sample ID	H-Canyon 294-H NorthEast Sump	
Analysis	Rep	Description	Results (one sigma % unc)	Units
GAMMA_SPEC	1	GAMMA SPEC COMMENTS	NA	-
GAMMA_SPEC	1	Cs-137	3.14E03 (5.00%)	DPM/mL
GAMMA_SPEC_CS_REMOVED	1	GAMMA SPEC CS REMOVED COMMENTS	NA	-
GAMMA_SPEC_CS_REMOVED	1	Co-60	<1.49E01 (MDA)	DPM/mL
GAMMA_SPEC_CS_REMOVED	1	Ru-106	<1.09E02 (MDA)	DPM/mL
GAMMA_SPEC_CS_REMOVED	1	Sb-125	<5.18E01 (MDA)	DPM/mL
GAMMA_SPEC_CS_REMOVED	1	Sb-126	<2.39E01 (MDA)	DPM/mL
GAMMA_SPEC_CS_REMOVED	1	Ce-144	<1.61E02 (MDA)	DPM/mL
GAMMA_SPEC_CS_REMOVED	1	Eu-154	<4.16E01 (MDA)	DPM/mL
GAMMA_SPEC_CS_REMOVED	1	Am-241	<6.44E01 (MDA)	DPM/mL
RAD_SCREEN	1	ALPHA COUNT (dpm/mL)	<8.81e02 (MDA)	DPM/mL
RAD_SCREEN	1	BETA COUNT (dpm/mL)	3.54e04 (11%)	DPM/mL
PU_TTA	1	PU-238 (dpm/mL)	<4.70e00 (MDA)	DPM/mL
PU_TTA	1	PU-239/240 (dpm/mL)	<4.78e00 (MDA)	DPM/mL
SR90_BETA_LIQ_SCINT	1	SR-90 (dpm/mL)	1.21e04 (17.1%)	DPM/mL

ATTACHMENT 2: Tanker Liquid Sample Results



Analytical Laboratories
Savannah River Site
Aiken, SC 29808

Customer Sample Report
7/25/2022 3:54 pm
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Sample ID: 40014266		Date Logged: 7/16/2022 9:59:02AM	
Product Name: SPECIAL		Date Sampled: 7/16/2022 9:58:08AM	
Lot/Run Number: 294-H NE Sump Tanker		Date Received: 7/16/2022 10:03:56AM	
Sample Class: SPECIAL			
Sample Comment: N/A			
60022313	PH	Condition: Authorized	
Test Comment: N/A			
pH	2.88	pH	IN
60022314	U_BY_CHEMCHK	Condition: Authorized	
Test Comment: N/A			
Uranium	<1.00E-4	g/L	IN
60022315	PUTTA_ANALYSIS	Condition: Authorized	
Test Comment: N/A			
Pu-238	4.81	dpm/mL	IN
Pu239/240	6.13	dpm/mL	IN
Plutonium	1.09E1	dpm/mL	IN
% Pu-238	43.97	ALPHA %	IN
% Pu-239/240	56.03	ALPHA %	IN
60022317	ALPHA_TOTAL	Condition: Authorized	
Test Comment: N/A			
Total Alpha	<1.00E3	dpm/mL	IN
60022319	CA_BETA-GAMMA_DPM-ML	Condition: Authorized	
Test Comment: N/A			
Beta-Gamma (Reported Value)	1.93E4	dpm/mL	IN