



Tennessee Valley Authority, Sequoyah Nuclear Plant, P.O. Box 2000, Soddy Daisy, TN 37384

November 12, 2020

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Subject: **Sequoyah Nuclear Plant, Discharge Monitoring Report (DMR), October 2020**

Attached is the October 2020 DMR for Sequoyah Nuclear Plant.

Respectfully,

A handwritten signature in black ink, appearing to read 'T.R. Markum', written in a cursive style.

Travis R. Markum
Environmental Scientist

DMR Copy of Record

Permit			
Permit #:	TN0026450	Permittee:	Tennessee Valley Authority (TVA)
Major:	Yes	Permittee Address:	Sequoyah Access Road, PO Box 2000 Soddy Daisy, TN 37379
Permitted Feature:	101 External Outfall	Discharge:	101-G (no description)
Facility:	TVA SEQUOYAH NUCLEAR PLANT (SQN)		
Facility Location:	SEQUOYAH ACCESS ROAD SODDY DAISY, TN 37379		

Report Dates & Status			
Monitoring Period:	From 10/01/20 to 10/31/20	DMR Due Date:	11/15/20
Status:	NetDMR Validated		

Considerations for Form Completion
Primary discharge from Diffuser Pond.

Principal Executive Officer			
First Name:	Scott	Title:	Interim Site Vice President
Last Name:	Hunnewell	Telephone:	423-843-7001

No Data Indicator (NODI)
Form NODI: --

Code	Parameter Name	Monitoring Location	Season #	Param. NODI	Quantity or Loading					Quality or Concentration					# of Ex.	Frequency of Analysis	Sample Type			
					Qualifier 1	Value 1	Qualifier 2	Value 2	Units	Qualifier 1	Value 1	Qualifier 2	Value 2	Qualifier 3				Value 3	Units	
00010	Temperature, water deg. centigrade	1 - Effluent Gross	0	--	Sample							=	36.8		04 - deg C	0	99/99 - Continuous	RC - Recorder (auto)		
					Permit Req.															
					Value NODI															
00010	Temperature, water deg. centigrade	Z - Instream Monitoring	0	--	Sample							=	23.3		04 - deg C	0	99/99 - Continuous	CA - CALCTD		
					Permit Req.															
					Value NODI															
00016	Temp. diff. between samp. & upstrm deg. C	1 - Effluent Gross	1	--	Sample							=	2.3		04 - deg C	0	99/99 - Continuous	CA - CALCTD		
					Permit Req.															
					Value NODI															
50050	Flow, in conduit or thru treatment plant	1 - Effluent Gross	0	--	Sample	=	1786.6	=	1915.5	03 - MGD							0	99/99 - Continuous	RC - Recorder (auto)	
					Permit Req.		Req Mon MO AVG		Req Mon DAILY MX	03 - MGD										
					Value NODI															
50060	Chlorine, total residual	1 - Effluent Gross	0	--	Sample															
					Permit Req.															
					Value NODI															
82234	Temperature rate of change deg. C/hr	Z - Instream Monitoring	0	--	Sample			=	0.9	62 - deg C/hr							0	99/99 - Continuous	CA - CALCTD	
					Permit Req.															
					Value NODI															
TRP3B	IC25 Static Renewal 7 Day Chronic Chrceriodaphnia	1 - Effluent Gross	0	--	Sample												0	01/30 - Monthly	CP - COMPOS	
					Permit Req.															
					Value NODI															
TRP6C	IC25 Static Renewal 7 Day Chronic Chrpimephales	1 - Effluent Gross	0	--	Sample												0	01/30 - Monthly	CP - COMPOS	
					Permit Req.															
					Value NODI															

Submission Note
If a parameter row does not contain any values for the Sample nor Effluent Trading, then none of the following fields will be submitted for that row: Units, Number of Excursions, Frequency of Analysis, and Sample Type.

Edit Check Errors
No errors.

Comments

Method Detection Limit for Total Residual Chlorine is 0.05 mg/L.

Attachments

Name	Type	Size
SQN_2020_October_WET_Report_for_DSN101.pdf	pdf	8415687.0

Report Last Saved By

Tennessee Valley Authority (TVA)

User: TRMARKUM
Name: Travis Markum
E-Mail: trmarkum@tva.gov
Date/Time: 2020-11-10 12:48 (Time Zone: -06:00)

Report Last Signed By

User: SWHUNNEW
Name: Scott Hunnewell
E-Mail: swhunnewell@tva.gov
Date/Time: 2020-11-12 11:08 (Time Zone: -06:00)

DMR Copy of Record

Permit		Permittee: Tennessee Valley Authority (TVA)		Facility: TVA SEQUOYAH NUCLEAR PLANT (SQN)	
Permit #: TN0026450	Major: Yes	Permittee Address: Sequoyah Access Road, PO Box 2000 Soddy Daisy, TN 37379	Facility Location: SEQUOYAH ACCESS ROAD SODDY DAISY, TN 37379		
Permitted Feature: 103 Internal Outfall	Discharge: 103-G (no description)				

Report Dates & Status		Monitoring Period: From 10/01/20 to 10/31/20	DMR Due Date: 11/15/20	Status: NetDMR Validated
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Considerations for Form Completion
Internal Monitoring Point for various flows from Low Volume Waste Treatment Pond to Diffuser Pond, which eventually discharges through Outfall 101.

Principal Executive Officer		Title: Interim Site Vice President	Telephone: 423-843-7001
First Name: Scott	Last Name: Hunnewell		

No Data Indicator (NODI)
Form NODI: --

Code	Parameter Name	Monitoring Location	Season #	Param. NODI	Quantity or Loading					Quality or Concentration					# of Ex.	Frequency of Analysis	Sample Type			
					Qualifier 1	Value 1	Qualifier 2	Value 2	Units	Qualifier 1	Value 1	Qualifier 2	Value 2	Qualifier 3				Value 3	Units	
00400	pH	IM - Internal Monitoring Point	0	--	Sample						=	7.4			=	7.4	12 - SU	0	01/30 - Monthly	GR - GRAB
					Permit Req.					>=	6.0 MINIMUM			<=	9.0 MAXIMUM	12 - SU				
					Value NODI															
00530	Solids, total suspended	IM - Internal Monitoring Point	0	--	Sample						=	13.8			=	13.8	19 - mg/L	0	01/30 - Monthly	GR - GRAB
					Permit Req.					<=	30.0 MO AVG			<=	100.0 DAILY MX	19 - mg/L				
					Value NODI															
00556	Oil & Grease	IM - Internal Monitoring Point	0	--	Sample						<	5.0			<	5.0	19 - mg/L	0	01/30 - Monthly	GR - GRAB
					Permit Req.					<=	15.0 MO AVG			<=	20.0 DAILY MX	19 - mg/L				
					Value NODI															
50050	Flow, in conduit or thru treatment plant	IM - Internal Monitoring Point	0	--	Sample	=	1.338	=	1.381	03 - MGD								0	01/30 - Monthly	IN - INSTAN
					Permit Req.		Req Mon MO AVG		Req Mon DAILY MX	03 - MGD										
					Value NODI															

Submission Note
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Edit Check Errors
No errors.
Comments

Attachments
No attachments.

Report Last Saved By
Tennessee Valley Authority (TVA)
User: TRMARKUM
Name: Travis Markum
E-Mail: trmarkum@tva.gov
Date/Time: 2020-11-10 12:21 (Time Zone: -06:00)

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User: SWHUNNEW
Name: Scott Hunnewell
E-Mail: swhunnewell@tva.gov
Date/Time: 2020-11-12 11:08 (Time Zone: -06:00)

DMR Copy of Record

Permit					
Permit #:	TN0026450	Permittee:	Tennessee Valley Authority (TVA)	Facility:	TVA SEQUOYAH NUCLEAR PLANT (SQN)
Major:	Yes	Permittee Address:	Sequoyah Access Road, PO Box 2000 Soddy Daisy, TN 37379	Facility Location:	SEQUOYAH ACCESS ROAD SODDY DAISY, TN 37379
Permitted Feature:	107 Internal Outfall	Discharge:	107-G (no description)		

Report Dates & Status					
Monitoring Period:	From 10/01/20 to 10/31/20	DMR Due Date:	11/15/20	Status:	NetDMR Validated

Considerations for Form Completion
Metal Cleaning Waste Pond discharge. No monitoring required for stormwater decanting. Daily monitoring required only during dewatering events.

Principal Executive Officer					
First Name:	Scott	Title:	Interim Site Vice President	Telephone:	423-843-7001
Last Name:	Hunnewell				

No Data Indicator (NODI)
Form NODI: --

Code	Parameter Name	Monitoring Location	Season #	Param. NODI	Quantity or Loading					Quality or Concentration				# of Ex.	Frequency of Analysis	Sample Type		
					Qualifier 1	Value 1	Qualifier 2	Value 2	Units	Qualifier 1	Value 1	Qualifier 2	Value 2				Qualifier 3	Value 3
00400	pH	IM - Internal Monitoring Point	0	--	Sample												01/01 - Daily	GR - GRAB
					Permit Req.					>=	6.0 MINIMUM			<=	9.0 MAXIMUM	12 - SU		
					Value NODI						C - No Discharge				C - No Discharge			
00530	Solids, total suspended	IM - Internal Monitoring Point	0	--	Sample											01/01 - Daily	CP - COMPOS	
					Permit Req.					<=	30.0 MO AVG			<=	100.0 DAILY MX			19 - mg/L
					Value NODI						C - No Discharge				C - No Discharge			
00556	Oil & Grease	IM - Internal Monitoring Point	0	--	Sample											01/01 - Daily	GR - GRAB	
					Permit Req.					<=	15.0 MO AVG			<=	20.0 DAILY MX			19 - mg/L
					Value NODI						C - No Discharge				C - No Discharge			
01042	Copper, total [as Cu]	IM - Internal Monitoring Point	0	--	Sample											01/01 - Daily	CP - COMPOS	
					Permit Req.					<=	1.0 MO AVG			<=	1.0 DAILY MX			19 - mg/L
					Value NODI						C - No Discharge				C - No Discharge			
01045	Iron, total [as Fe]	IM - Internal Monitoring Point	0	--	Sample											01/01 - Daily	CP - COMPOS	
					Permit Req.					<=	1.0 MO AVG			<=	1.0 DAILY MX			19 - mg/L
					Value NODI						C - No Discharge				C - No Discharge			

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Edit Check Errors
No errors.

Comments

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Date/Time: 2020-11-12 11:08 (Time Zone: -06:00)

DMR Copy of Record

Permit		Permittee: Tennessee Valley Authority (TVA)		Facility: TVA SEQUOYAH NUCLEAR PLANT (SQN)	
Permit #: TN0026450	Major: Yes	Permittee Address: Sequoyah Access Road, PO Box 2000 Soddy Daisy, TN 37379	Facility Location: SEQUOYAH ACCESS ROAD SODDY DAISY, TN 37379		
Permitted Feature: 110 External Outfall	Discharge: 110-G (no description)				

Report Dates & Status					
Monitoring Period: From 10/01/20 to 10/31/20	DMR Due Date: 11/15/20	Status: NetDMR Validated			

Considerations for Form Completion
Outfall 110 is closed. Only active in the event the plant goes into closed mode.

Principal Executive Officer					
First Name: Scott	Title: Interim Site Vice President	Telephone: 423-843-7001			
Last Name: Hunnewell					

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Form NODI: --

Code	Parameter Name	Monitoring Location	Season #	Param. NODI	Quantity or Loading					Quality or Concentration					# of Ex.	Frequency of Analysis	Sample Type	
					Qualifier 1	Value 1	Qualifier 2	Value 2	Units	Qualifier 1	Value 1	Qualifier 2	Value 2	Qualifier 3				Value 3
00010	Temperature, water deg. centigrade	1 - Effluent Gross	0	--	Sample Permit Req.			Req Mon DAILY MX	04 - deg C								99/99 - Continuous	CA - CALCTD
					Value NODI			C - No Discharge										
00010	Temperature, water deg. centigrade	Z - Instream Monitoring	0	--	Sample Permit Req.							<=	30.5 DAILY MX	04 - deg C			99/99 - Continuous	CA - CALCTD
					Value NODI									C - No Discharge				
00016	Temp. diff. between samp. & upstrm deg. C	1 - Effluent Gross	1	--	Sample Permit Req.							<=	3.0 DAILY MX	04 - deg C			99/99 - Continuous	CA - CALCTD
					Value NODI									C - No Discharge				
50050	Flow, in conduit or thru treatment plant	1 - Effluent Gross	0	--	Sample Permit Req.	Req Mon MO AVG		Req Mon DAILY MX	03 - MGD								99/99 - Continuous	RC - Recorder (auto)
					Value NODI	C - No Discharge		C - No Discharge										
50060	Chlorine, total residual	1 - Effluent Gross	0	--	Sample Permit Req.				<=	0.027 MO AVG		<=	0.047 DAILY MX	19 - mg/L			05/WK - Five Per Week	GR - GRAB
					Value NODI					C - No Discharge				C - No Discharge				
82234	Temperature rate of change deg. C/hr	Z - Instream Monitoring	0	--	Sample Permit Req.							<=	30.5 DAILY MX	62 - deg C/hr			99/99 - Continuous	CA - CALCTD
					Value NODI									C - No Discharge				
TRP3B	IC25 Static Renewal 7 Day Chronic Chrceriodaphnia	1 - Effluent Gross	0	--	Sample Permit Req.				>=	69.0 MINIMUM				23 - %			01/30 - Monthly	GR - GRAB
					Value NODI					C - No Discharge								
TRP6C	IC25 Static Renewal 7 Day Chronic Chrprimephales	1 - Effluent Gross	0	--	Sample Permit Req.				>=	69.0 MINIMUM				23 - %			01/30 - Monthly	GR - GRAB
					Value NODI					C - No Discharge								

Submission Note
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Date/Time:	2020-11-12 11:08 (Time Zone: -06:00)

DMR Copy of Record

Permit
Permit #: TN0026450 | **Permittee:** Tennessee Valley Authority (TVA) | **Facility:** TVA SEQUOYAH NUCLEAR PLANT (SQN)
Major: Yes | **Permittee Address:** Sequoyah Access Road, PO Box 2000 Soddy Daisy, TN 37379 | **Facility Location:** SEQUOYAH ACCESS ROAD SODDY DAISY, TN 37379
Permitted Feature: 118 External Outfall | **Discharge:** 118-G (no description)

Report Dates & Status
Monitoring Period: From 10/01/20 to 10/31/20 | **DMR Due Date:** 11/15/20 | **Status:** NetDMR Validated

Considerations for Form Completion

Principal Executive Officer
First Name: Scott | **Title:** Interim Site Vice President | **Telephone:** 423-843-7001
Last Name: Hunnewell

No Data Indicator (NODI)

Form NODI: --

Code	Parameter Name	Monitoring Location	Season #	Param. NODI	Quantity or Loading					Quality or Concentration					# of Ex.	Frequency of Analysis	Sample Type		
					Qualifier 1	Value 1	Qualifier 2	Value 2	Units	Qualifier 1	Value 1	Qualifier 2	Value 2	Qualifier 3				Value 3	Units
00300	Oxygen, dissolved [DO]	1 - Effluent Gross	0	--	Sample						>=	2.0 MINIMUM				19 - mg/L	02/07 - Twice Every Week	GR - GRAB	
					Permit Req.														
					Value NODI														
00530	Solids, total suspended	1 - Effluent Gross	0	--	Sample									<=	100.0 DAILY MX	19 - mg/L	02/07 - Twice Every Week	GR - GRAB	
					Permit Req.														
					Value NODI														
00545	Solids, settleable	1 - Effluent Gross	0	--	Sample									<=	1.0 DAILY MX	25 - mL/L	01/30 - Monthly	GR - GRAB	
					Permit Req.														
					Value NODI														
50050	Flow, in conduit or thru treatment plant	1 - Effluent Gross	0	--	Sample														
					Permit Req.	Req Mon MO AVG		Req Mon DAILY MX	03 - MGD									01/BA - Once Per Batch	ES - ESTIMA
					Value NODI	C - No Discharge		C - No Discharge											

Submission Note
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Edit Check Errors

No errors.

Comments

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User: TRMARKUM
Name: Travis Markum
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Date/Time: 2020-11-10 12:15 (Time Zone: -06:00)

Report Last Signed By

User: SWHUNNEW
Name: Scott Hunnewell
E-Mail: swhunnewell@tva.gov
Date/Time: 2020-11-12 11:08 (Time Zone: -06:00)

**TENNESSEE VALLEY AUTHORITY
TOXICITY TEST REPORT**

INTRODUCTION / EXECUTIVE SUMMARY

Report Date: November 06, 2020

1. Facility / Discharger: Sequoyah Nuclear Plant / TVA
2. County / State: Hamilton / Tennessee
3. NPDES Permit #: TN0026450
4. Type of Facility: Nuclear-Fueled Electric Generating Plant
5. Design Flow (MGD): 1,579
6. Receiving Stream: Tennessee River (TRM 483.6)
7. 1Q10: 2,456
8. Outfall Tested: 101
9. Dates Sampled: October 04 – 09, 2020
10. Average Flow on Days Sampled (MGD): 1791.13, 1770.618, 1783.065
11. Pertinent Site Conditions: Production / operation data will be provided upon request.
12. Test Dates: October 06 – 13, 2020
13. Test Type: Short-term Chronic Definitive
14. Test Species: Fathead Minnows (*Pimephales promelas*)
Daphnids (*Ceriodaphnia dubia*)
15. Concentrations Tested (%):
Pimephales promelas: UV treated Outfall 101: 17.25, 34.5, 69, 84.5, 100
UV treated Intake: 100

Ceriodaphnia dubia: Non-treated Outfall 101: 17.25, 34.5, 69, 84.5, 100
Non-treated Intake: 100
16. Permit Limit Endpoint (%): Outfall 101: IC₂₅ = 69%
17. Test Results: Outfall 101: *Pimephales promelas*: IC₂₅ > 100%
Ceriodaphnia dubia: IC₂₅ > 100%



18. Facility Contact: Travis Markum Phone #: (865) 748-3294

19. Consulting / Testing Lab: Environmental Testing Solutions, Inc.

20. Lab Contact: Jim Sumner Phone #: (828) 350-9364

21. TVA Contact: Rick Sherrard Phone #: (423) 876-6743

22. Notes: Exposures to samples collected October 04 – 09, 2020 from Outfall 101 resulted in no toxic effects to fathead minnows or daphnids. The resulting IC₂₅ values, for both species, were >100 percent. Exposure of daphnids to intake samples resulted in no significant difference from the control during this study period. Minnow growth in the intake samples was significantly lower than the control.



METHODS SUMMARY

Samples:

1. Sampling Point: Outfall 101, Intake
2. Sample Type: Composite
3. Sample Information:

Sample ID	Date (MM-DD-YY) Time (ET) Collected	Date (MM-DD-YY) Time (ET) Received	Arrival Temp. (°C)	Initial TRC* (mg/L)	Date (MM-DD-YY) Time (ET) Last Used By
101	10-04-20 / 0700 to 10-05-20 / 0600	10-05-20 / 1420	1.0	<0.10	10-06-20 / 0925 10-07-20 / 0853
Intake	10-04-20 / 0700 to 10-05-20 / 0600	10-05-20 / 1420	2.0	<0.10	10-06-20 / 0925 10-07-20 / 0853
101	10-06-20 / 0700 to 10-07-20 / 0600	10-07-20 / 1337	1.1	<0.10	10-08-20 / 0858 10-09-20 / 0857
Intake	10-06-20 / 0700 to 10-07-20 / 0600	10-07-20 / 1337	1.7	<0.10	10-08-20 / 0858 10-09-20 / 0857
101	10-08-20 / 0700 to 10-09-20 / 0600	10-09-20 / 1305	1.7, 2.1 [†]	<0.10	10-10-20 / 0907 10-11-20 / 0856 10-12-20 / 0828
Intake	10-08-20 / 0700 to 10-09-20 / 0600	10-09-20 / 1305	2.0	<0.10	10-10-20 / 0907 10-11-20 / 0856 10-12-20 / 0828

*TRC = Total Residual Chlorine

[†]Samples were collected in two 2.5 gallon cubitainers. Temperature was measured in each cubitainer upon arrival.

4. Sample Manipulation: Samples from Outfall 101 and intake were warmed to test temperature (25.0 ± 1.0°C) in a warm water bath.

Aliquots of Outfall 101 and Intake samples were UV-treated through a 40-watt Smart® UV Sterilizer (manufactured by Emperor Aquatics, Inc.) for 2 minutes.



	<i>Pimephales promelas</i>	<i>Ceriodaphnia dubia</i>
<u>Test Organisms:</u>		
1. Source:	<u>In-house Cultures</u>	<u>In-house Cultures</u>
2. Age:	<u>< 24-hours old</u>	<u>< 24-hours old</u>
<u>Test Method Summary:</u>		
1. Test Conditions:	<u>Static, Renewal</u>	<u>Static, Renewal</u>
2. Test Duration:	<u>7 days</u>	<u>Until at least 60% of control females have 3 broods</u>
3. Control / Dilution Water:	<u>Moderately Hard Synthetic</u>	<u>Moderately Hard Synthetic</u>
4. Number of Replicates:	<u>4</u>	<u>10</u>
5. Organisms per Replicate:	<u>10</u>	<u>1</u>
6. Test Initiation: (Date/Time):	<u>10-06-20 0823 ET</u>	<u>10-06-20 0925 ET</u>
7. Test Termination: (Date/Time):	<u>10-13-20 0732 ET</u>	<u>10-13-20 0837 ET</u>
8. Test Temperature: Outfall 101:	<u>Mean = 24.7°C</u> <u>(24.2 – 25.2°C)</u>	<u>Mean = 25.0°C</u> <u>(24.8 – 25.4°C)</u>
9. Physical / Chemical Measurements:	<u>Alkalinity, hardness, total residual chlorine, and conductivity were measured at the laboratory in each 100% sample. Daily temperatures were measured in one replicate for each test concentration. Pre- and post-exposure test solutions were analyzed daily for pH and dissolved oxygen.</u>	
10. Statistics:	<u>Statistics were performed according to methods prescribed by EPA using ToxCalc version 5.0 statistical software (Tidepool Scientific Software, McKinneyville, CA).</u>	



TOXICITY TEST RESULTS (see Appendix C for Bench Sheets)

1. Results of a *Pimephales promelas* Chronic/ 7-day Toxicity Test.
(Genus species) (Type / Duration)

Conducted October 06 – 13, 2020 using effluent from Outfall 101.

Test Solutions (% Effluent)	Percent Surviving (time interval used – days)						
	1	2	3	4	5	6	7
Control, UV-treated	100	100	100	100	100	100	100
17.25%	100	100	100	100	100	100	100
34.5%	100	100	100	100	100	100	100
69%	100	100	100	100	100	100	100
84.5%	100	100	100	100	100	100	100
100.0%	100	100	100	100	100	100	100
Intake	100	100	100	100	100	100	97.5
Control, Non-treated	100	100	100	100	100	100	100

Test Solutions (% Effluent)	Mean Dry Weight (mg) (replicate number)				
	1	2	3	4	Mean
Control, UV-treated	0.775	0.725	0.816	0.879	0.799
17.25%	0.737	0.729	0.745	0.803	0.754
34.5%	0.715	0.700	0.822	0.839	0.769
69%	0.810	0.769	0.761	0.787	0.782
84.5%	0.741	0.745	0.712	0.717	0.729
100.0%	0.765	0.751	0.722	0.757	0.749
Intake	0.634	0.687	0.670	0.701	0.673
Control, Non-treated	0.845	0.790	0.853	0.745	0.808

IC₂₅ Value: > 100%
Permit Limit: 69%

95% Confidence Limits:
Upper Limit: NA
Lower Limit: NA

Calculated TU Estimates: < 1.0 TUc*

Permit Limit: 1.4 TUc

*TUa = 100/LC₅₀; TUc = 100/ IC₂₅



TOXICITY TEST RESULTS (see Appendix C for Bench Sheets)

2. Results of a Ceriodaphnia dubia Chronic/ 7-day Toxicity Test.
 (Genus species) (Type / Duration)

Conducted October 06 – 13, 2020 using effluent from Outfall 101.

Test Solutions (% Effluent)	Percent Surviving (time interval used – days)						
	1	2	3	4	5	6	7
Control	100	100	100	100	100	100	100
17.25%	100	100	100	100	100	100	100
34.5%	100	100	100	100	100	100	100
69%	100	100	100	100	100	100	100
84.5%	100	100	100	100	100	100	100
100.0%	100	100	100	100	100	100	100

Test Solutions (% Effluent)	Reproduction (#young/female/7 days) Data (replicate number)										
	1	2	3	4	5	6	7	8	9	10	Mean
Control	29	30	31	28	30	32	32	28	30	33	30.3
17.25%	32	33	35	31	34	30	34	31	32	33	32.5
34.5%	34	33	34	33	35	37	30	32	32	33	33.3
69%	32	38	34	39	35	32	37	33	34	37	35.1
84.5%	40	36	35	35	35	36	34	34	39	35	35.9
100.0%	39	39	37	35	36	41	34	39	36	38	37.4

IC ₂₅ Value: <u>> 100%</u> Permit Limit: <u>69%</u> 95% Confidence Limits: Upper Limit: <u>NA</u> Lower Limit: <u>NA</u>	Calculated TU Estimates: <u>< 1.0 TUc*</u> Permit Limit: <u>1.4 TUc</u>
--	---

*TU_a = 100/LC₅₀; TU_c = 100/ IC₂₅



TOXICITY TEST RESULTS (see Appendix C for Bench Sheets)

2. Results of a *Ceriodaphnia dubia* Chronic/ 7-day Toxicity Test.
 (Genus species) (Type / Duration)

Conducted October 06 – 13, 2020 using water from Intake

Test Solutions (% Effluent)	Percent Surviving (time interval used – days)						
	1	2	3	4	5	6	7
Control	100	100	100	100	100	100	100
Intake	100	100	100	100	100	100	100

Test Solutions (% Effluent)	Reproduction (#young/female/7 days) Data (replicate number)										
	1	2	3	4	5	6	7	8	9	10	Mean
Control	30	26	29	31	32	32	32	29	29	32	30.2
Intake	35	36	32	36	36	35	36	35	35	33	34.9
IC ₂₅ Value: $\geq 100\%$ Permit Limit: <u>N/A</u>						Calculated TU Estimates: ≤ 1.0 TUc*					
95% Confidence Limits: Upper Limit: <u>NA</u> Lower Limit: <u>NA</u>						Permit Limit: <u>N/A</u>					

*TU_a = 100/LC₅₀; TU_c = 100/ IC₂₅

REFERENCE TOXICANT TEST RESULTS (see Appendix A and D)

Species	Date	Time	Duration	Toxicant	Results (IC ₂₅)
<i>Pimephales promelas</i>	October 06 – 13, 2020	0811	7 days	KCl	0.65 g/L
<i>Ceriodaphnia dubia</i>	October 06 – 13, 2020	0913	7 days	NaCl	1.09 g/L





PHYSICAL/CHEMICAL SUMMARY

Water Chemistry Mean Values and Ranges for UV-treated *Pimephales promelas* and Non-treated *Ceriodaphnia dubia*, Sequoyah Nuclear Plant (SQN), Effluent Outfall 101 and Intake performed October 06-13, 2020

Test	Sample ID	Temperature (°C)		Dissolved Oxygen (mg/L)		pH (S.U.)		Conductance (µmhos/cm)	Alkalinity (mg/L CaCO ₃)	Hardness (mg/L CaCO ₃)	*Total Residual Chlorine (mg/L)
		Initial	Final	Initial	Final	Initial	Final				
<i>Pimephales promelas</i>	Control, Non-treated	24.8 24.7 - 25.0	24.6 24.5 - 25.0	7.8 7.8 - 7.9	7.4 6.5 - 8.0	8.10 7.99 - 8.20	7.80 7.57 - 7.94	314 305 - 327	58 57 - 59	84 82 - 86	- -
	Control, UV-treated	24.8 24.7 - 24.9	24.6 24.3 - 24.7	7.9 7.8 - 8.0	7.3 6.6 - 7.9	8.09 7.99 - 8.18	7.79 7.59 - 7.94	306 293 - 314	60 59 - 60	82 80 - 84	- -
	17.25%	24.8 24.7 - 25.0	24.5 24.3 - 24.8	8.0 8.0 - 8.1	7.3 6.7 - 7.9	8.11 8.00 - 8.22	7.79 7.57 - 7.94	285 277 - 293	- -	- -	- -
	34.5%	24.9 24.7 - 25.0	24.5 24.3 - 24.6	8.1 8.0 - 8.1	7.3 6.6 - 7.9	8.11 8.01 - 8.19	7.79 7.58 - 7.94	256 241 - 262	- -	- -	- -
	69%	24.9 24.8 - 25.0	24.5 24.3 - 24.6	8.1 8.1 - 8.2	7.3 6.6 - 8.0	8.10 8.00 - 8.17	7.78 7.58 - 7.93	223 203 - 248	- -	- -	- -
	84.5%	24.9 24.9 - 25.0	24.5 24.3 - 24.7	8.1 8.1 - 8.2	7.3 6.6 - 8.0	8.10 8.00 - 8.17	7.81 7.64 - 7.97	179 173 - 184	- -	- -	- -
	100%	25.0 25.0 - 25.0	24.5 24.2 - 24.6	8.1 8.0 - 8.3	7.4 6.9 - 8.0	8.10 8.01 - 8.16	7.80 7.60 - 7.96	153 148 - 156	60 59 - 61	60 58 - 62	< 0.10 < 0.10 - < 0.10
	Intake	25.0 24.9 - 25.2	24.5 24.4 - 24.6	8.2 8.1 - 8.3	7.4 6.4 - 8.0	8.06 7.88 - 8.14	7.77 7.53 - 7.93	151 146 - 156	60 59 - 63	59 58 - 62	< 0.10 < 0.10 - < 0.10
<i>Ceriodaphnia dubia</i>	Control, Non-treated	24.8 24.8 - 24.9	25.1 24.9 - 25.2	7.8 7.8 - 7.9	8.0 7.8 - 8.2	8.10 7.99 - 8.20	8.05 7.98 - 8.10	314 305 - 327	58 57 - 59	84 82 - 86	- -
	17.25%	24.9 24.8 - 25.0	25.0 24.8 - 25.2	8.0 7.9 - 8.0	7.9 7.8 - 8.2	8.15 8.03 - 8.25	8.05 7.99 - 8.12	285 274 - 293	- -	- -	- -
	34.5%	24.9 24.8 - 25.0	24.9 24.8 - 25.3	8.0 7.9 - 8.1	8.0 7.8 - 8.2	8.15 8.04 - 8.23	8.05 7.99 - 8.12	260 252 - 267	- -	- -	- -
	69%	24.9 24.8 - 25.0	24.9 24.9 - 25.2	8.0 7.9 - 8.1	8.0 7.8 - 8.2	8.13 8.02 - 8.21	8.05 7.99 - 8.14	223 199 - 248	- -	- -	- -
	84.5%	25.0 24.9 - 25.0	25.0 24.8 - 25.2	8.0 7.9 - 8.1	8.1 7.9 - 8.3	8.12 8.02 - 8.22	8.06 7.99 - 8.15	179 173 - 184	- -	- -	- -
	100%	25.0 25.0 - 25.0	25.0 24.8 - 25.4	8.0 7.9 - 8.1	8.1 7.9 - 8.3	8.11 8.02 - 8.18	8.07 7.99 - 8.16	152 145 - 157	61 61 - 61	60 58 - 64	< 0.10 < 0.10 - < 0.10
	Intake	25.0 24.8 - 25.1	25.0 25.0 - 25.2	8.1 8.0 - 8.2	8.1 8.0 - 8.3	8.10 8.02 - 8.17	8.06 7.99 - 8.16	152 141 - 157	61 59 - 63	60 58 - 62	< 0.10 < 0.10 - < 0.10

*Note: Total residual chlorine was performed on non-treated Outfall 101 and Intake samples.

Overall temperature (°C)	Average	Minimum	Maximum
<i>Pimephales promelas</i>	24.7	24.2	25.2
<i>Ceriodaphnia dubia</i>	25.0	24.8	25.4

SUMMARY / CONCLUSIONS

Exposures to samples collected October 04 – 09, 2020 from Outfall 101 resulted in no toxic effects to fathead minnows or daphnids. The resulting IC₂₅ values, for both species, were >100 percent. Exposure of daphnids to intake samples resulted in no significant difference from the control during this study period. Minnow growth in the intake samples was significantly lower than the control.



Appendix A

ADDITIONAL TOXICITY TEST INFORMATION

SUMMARY OF METHODS

1. *Pimephales promelas*

Tests were conducted according to EPA-821-R-02-013 (October 2002) using four replicates, each containing ten test organisms, per treatment. Test vessels consisted of 500-mL plastic disposable cups, each containing 250-mL of test solution.

2. *Ceriodaphnia dubia*

Tests were conducted according to EPA-821-R-02-013 (October 2002) using ten replicates, each containing one test organism, per treatment. Test vessels consisted of 30-mL polypropylene cups, each containing 15-mL of test solution.

DEVIATIONS / MODIFICATIONS TO TEST PROTOCOL

1. *Pimephales promelas*

Samples used in the fathead minnow test were exposed to UV light for two minutes prior to introduction of test organisms. UV treatment is used to control interference of fish pathogens. This treatment method was approved on November 23, 2015 by the State of Tennessee in a letter from Jessica Murphy to Terry Cheek, Senior Manager of TVA Water Permits, Compliance, and Monitoring.

2. *Ceriodaphnia dubia*

None

DEVIATIONS / MODIFICATIONS TO PRETEST CULTURE OR HOLDING OF TEST ORGANISMS

1. *Pimephales promelas*

None

2. *Ceriodaphnia dubia*

None

PHYSICAL AND CHEMICAL METHODS

1. Reagents, Titrants, Buffers, etc.: All chemicals were certified products used before expiration dates (where applicable).
2. Instruments: All identification, service, and calibration information pertaining to laboratory instruments is recorded in calibration and maintenance logbooks.
3. Temperature was measured by SM 2550 B-2010.
4. Dissolved oxygen was measured by SM 4500-O G-2011.
5. The pH was measured by SM 4500-H+ B-2011.
6. Conductance was measured by SM 2510 B-2011.
7. Alkalinity was measured by SM 2320 B-2011.
8. Total hardness was measured by SM 2340 C-2011.
9. Total residual chlorine was measured by ORION 97-70-1977.

QUALITY ASSURANCE

Toxicity Test Methods: All phases of the study including, but not limited to, sample collection, handling and storage, glassware preparation, test organism culturing/acquisition and acclimation, test organism handling during test, and maintaining appropriate test conditions were conducted according to the protocol as described in this report and EPA-821-R-02-013. Any known deviations were noted during the study and are reported herein.

REFERENCE TOXICANT TESTS (See Appendix D for control chart information)

1. Test Type: 7-day chronic tests with results expressed as IC₂₅ values in g/L KCl or NaCl.
2. Standard Toxicant: Potassium Chloride (KCl crystalline) for *Pimephales promelas*.
Sodium Chloride (NaCl crystalline) for *Ceriodaphnia dubia*.
3. Dilution Water Used: Moderately hard synthetic water.
4. Statistics: ToxCalc software Version 5.0 was used for statistical analyses.

REFERENCES

1. NPDES Permit No. TN0026450.
2. USEPA. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013 (October 2002).
3. Standard Methods for the Examination of Water and Wastewater, 22nd Edition, 2012.
4. Quality Assurance Program: Standard Operating Procedures, Environmental Testing Solutions, Inc (most current version).

Sequoyah Nuclear Plant Biomonitoring
October 06 – 13, 2020

Appendix B

Diffuser Discharge Concentrations of Total Residual Chlorine,
Diffuser Discharge Concentrations of Chemicals Used to
Control Microbiologically Induced Corrosion and Mollusks
During Toxicity Test Sampling

Date	Sodium Hypochlorite mg/L TRC	Towerbrom mg/L TRC	PCL-222 mg/L Phosphate	PCL-401 mg/L Copolymer	CL-363 mg/L DMAD	Cuprostat-PF mg/L Azole	H-130M mg/L Quat	Nalco 73551 mg/L EO/PO	H-150M mg/L Quat
02/06/2005	-	<0.0042	0.028	0.010	-	-	-	-	-
02/07/2005	-	<0.0116	0.028	0.010	-	-	-	0.007	-
02/08/2005	-	<0.0080	0.028	0.010	-	-	-	-	-
02/09/2005	-	0.0199	0.028	0.010	-	-	-	-	-
02/10/2005	-	<0.0042	0.028	0.010	-	-	-	-	-
02/11/2005	-	0.0155	0.028	0.010	-	-	-	0.007	-
06/05/2005	-	0.0063	-	-	-	-	-	-	-
06/06/2005	-	0.0043	-	-	-	-	-	-	0.037
06/07/2005	-	0.0103	-	-	-	-	-	-	0.037
06/08/2005	-	0.0295	-	-	-	-	-	-	0.037
06/09/2005	-	0.0129	-	-	-	-	-	-	-
06/10/2005	-	0.0184	-	-	-	-	-	-	-
07/17/2005	-	0.0109	0.026	0.009	-	-	-	-	-
07/18/2005	-	0.0150	0.026	0.009	-	-	-	-	0.036
07/19/2005	-	0.0163	0.026	0.009	-	-	-	-	0.036
07/20/2005	-	0.0209	0.026	0.009	-	-	-	0.014	0.036
07/21/2005	-	0.0242	0.026	0.009	-	-	-	-	-
07/22/2005	-	0.0238	0.054	0.018	-	-	-	0.014	-
10/30/2005	-	0.0068	-	-	-	-	-	-	-
10/31/2005	-	0.0112	-	-	-	-	-	-	-
11/01/2005	-	0.0104	-	-	-	-	-	-	0.035
11/02/2005	-	0.0104	-	-	-	-	-	-	0.036
11/03/2005	-	0.0117	-	-	-	-	-	-	0.036
11/04/2005	-	0.0165	-	-	-	-	-	-	0.035
11/14/2005	-	0.0274	-	-	-	-	-	-	-
11/15/2005	-	0.0256	-	-	-	-	-	-	-
11/16/2005	-	0.0234	-	-	-	-	-	-	-
11/17/2005	-	0.0231	-	-	-	-	-	-	-
11/18/2005	-	0.0200	-	-	-	-	-	-	-
11/19/2005	-	0.0116	-	-	-	-	-	-	-

Date	Sodium Hypochlorite mg/L TRC	Towerbrom mg/L TRC	PCL-222 mg/L Phosphate	PCL-401 mg/L Copolymer	CL-363 mg/L DMAD	Cuprostat-PF mg/L Azole	H-130M mg/L Quat	Nalco 73551 mg/L EO/PO	H-150M mg/L Quat	MSW 101 mg/L Phosphate
11/12/2006	-	0.0055	-	-	-	-	-	-	-	-
11/13/2006	-	0.0068	-	-	-	-	-	-	0.037	-
11/14/2006	-	0.0143	-	-	-	-	-	-	0.037	-
11/15/2006	-	0.0068	-	-	-	-	-	-	0.037	-
11/16/2006	-	0.0267	-	-	-	-	-	-	0.037	-
11/17/2006	-	0.0222	-	-	-	-	-	-	-	-
11/26/2006	-	0.0188	-	-	-	-	-	-	-	-
11/27/2006	-	0.0138	-	-	-	-	-	-	-	-
11/28/2006	-	0.0120	-	-	-	-	-	-	-	-
11/29/2006	-	0.0288	-	-	-	-	-	-	-	-
11/30/2006	-	0.0376	-	-	-	-	-	-	-	-
12/01/2006	-	0.0187	-	-	-	-	-	-	-	-
05/28/07	-	-	-	-	-	-	-	-	-	0.015
05/29/07	-	-	-	-	-	-	-	-	0.036	0.015
05/30/07	-	0.0084	-	-	-	-	-	0.017	0.036	0.015
05/31/07	-	0.0103	-	-	-	-	-	-	0.036	0.015
06/01/07	-	0.0164	-	-	-	-	-	0.017	0.036	0.015
06/02/07	-	0.0305	-	-	-	-	-	-	-	0.015
12/02/07	-	0.0241	-	-	-	-	-	-	-	-
12/03/07	-	0.0128	-	-	-	-	-	-	-	-
12/04/07	-	0.0238	-	-	-	-	-	-	-	-
12/05/07	-	0.0158	-	-	-	-	-	-	-	-
12/06/07	-	0.0162	-	-	-	-	-	-	-	-
12/07/07	-	0.0175	-	-	-	-	-	-	-	-
04/13/08	-	0.0039	-	-	-	-	-	-	-	-
04/14/08	-	0.0124	-	-	-	-	-	-	-	-
04/15/08	-	0.0229	-	-	-	-	-	-	-	-
04/16/08	-	0.0143	-	-	-	-	-	-	-	-
04/17/08	-	0.0120	-	-	-	-	-	-	-	-
04/18/08	-	0.0149	-	-	-	-	-	-	-	-
10/26/08	-	0.0260	-	-	-	-	-	-	-	-
10/27/08	-	0.0151	-	-	-	-	-	0.017	-	-
10/28/08	-	0.0172	-	-	-	-	-	-	0.041	-
10/29/08	-	0.0154	-	-	-	-	-	0.018	0.041	0.030
10/30/08	-	-	-	-	-	-	-	-	0.041	0.030
10/31/08	-	0.0086	-	-	-	-	-	-	0.041	0.030

Date	Sodium Hypochlorite mg/L TRC	Towerbrom mg/L TRC	PCL-222 mg/L Phosphate	PCL-401 mg/L Copolymer	CL-363 mg/L DMAD	Cuprostat -PF mg/L Azole	H-130M mg/L Quat	Nalco 73551 mg/L EO/PO	Spectrus CT1300 mg/L Quat	H-150M mg/L Quat	MSW 101 mg/L Phosphate
02/08/09	-	0.0197	-	-	-	-	-	0.017	-	-	-
02/09/09	-	0.0237	-	-	-	-	-	0.017	-	-	-
02/10/09	-	0.0104	-	-	-	-	-	0.021	-	-	-
02/11/09	-	0.0155	-	-	-	-	-	0.017	-	-	-
02/12/09	-	0.0106	-	-	-	-	-	0.017	-	-	-
02/13/09	-	-	-	-	-	-	-	-	-	-	-
05/10/09	-	0.0129	-	-	-	-	-	-	-	-	-
05/11/09	-	0.0415	-	-	-	-	-	-	-	0.0446	-
05/12/09	-	0.0053	-	-	-	-	-	-	-	0.0396	-
05/13/09	-	0.0049	-	-	-	-	-	-	-	0.0396	-
05/14/09	-	<0.0141	-	-	-	-	-	-	-	0.0397	-
05/15/09	-	<0.0160	-	-	-	-	-	-	-	-	-
11/15/09	-	0.025	-	-	-	-	-	-	-	-	-
11/16/09	-	0.0152	-	-	-	-	-	-	-	-	-
11/17/09	-	0.0255	-	-	-	-	-	-	-	-	-
11/18/09	-	0.0306	-	-	-	-	-	-	-	-	-
11/19/09	-	0.0204	-	-	-	-	-	-	-	-	-
11/20/09	-	0.0093	-	-	-	-	-	-	-	-	-
05/09/10	-	0.0192	-	-	-	-	-	-	-	-	-
05/10/10	-	0.0055	-	-	-	-	-	-	-	-	-
05/11/10	-	0.0100	-	-	-	-	-	-	0.039	-	-
05/12/10	-	0.0171	-	-	-	-	-	-	0.039	-	-
05/13/10	-	0.0041	-	-	-	-	-	-	0.039	-	-
05/14/10	-	0.0099	-	-	-	-	-	-	0.039	-	-

Date	Sodium Hypochlorite mg/L TRC	Towerbron mg/L TRC	PCL-222 mg/L Phosphate	PCL-401 mg/L Copolymer	CL-363 mg/L DMAD	Cuprostat-PF mg/L Azole	H-130M mg/L Quat	Nalco 73551 mg/L EO/PO	Spectrus CT1300 mg/L Quat	H-150M mg/L Quat	MSW 101 mg/L Phosphate	Floguard MS6236 mg/L Phosphate
10/31/10	-	-	-	-	-	-	-	-	-	-	-	-
11/01/10	-	0.0122	-	-	-	-	-	-	-	-	-	-
11/02/10	-	0.0112	-	-	-	-	-	-	-	-	-	-
11/03/10	-	0.0163	-	-	-	-	-	-	-	-	-	-
11/04/10	-	0.0107	-	-	-	-	-	-	-	-	-	-
11/05/10	-	0.0132	-	-	-	-	-	-	-	-	-	-
05/01/2011	-	-	-	-	-	-	-	-	-	-	-	-
05/02/2011	-	-	-	-	-	-	-	-	0.04	-	-	-
05/03/2011	-	-	-	-	-	-	-	-	0.04	-	-	-
05/04/2011	-	0.0155	-	-	-	-	-	-	0.04	-	-	-
05/05/2011	-	0.0179	-	-	-	-	-	-	0.04	-	-	-
05/06/2011	-	0.0089	-	-	-	-	-	-	-	-	-	-
11/06/2011	-	0.0168	-	-	-	-	-	-	-	-	-	-
11/07/2011	-	0.0225	-	-	-	-	-	-	-	-	-	-
11/08/2011	-	0.0141	-	-	-	-	-	-	-	-	-	-
11/09/2011	-	0.0239	-	-	-	-	-	-	-	-	-	-
11/10/2011	-	0.0242	-	-	-	-	-	-	-	-	-	-
11/11/2011	-	0.0231	-	-	-	-	-	-	-	-	-	-
05/06/2012	-	-	-	-	-	-	-	-	-	-	-	-
05/07/2012	-	-	-	-	-	-	-	-	-	-	-	-
05/08/2012	-	-	-	-	-	-	-	-	0.041	-	-	-
05/09/2012	-	0.0145	-	-	-	-	-	-	0.041	-	-	-
05/10/2012	-	0.0298	-	-	-	-	-	-	0.041	-	-	-
05/11/2012	-	0.0174	-	-	-	-	-	-	-	-	-	-
08/12/2012	-	-	-	-	-	-	-	-	-	-	-	0.029
08/13/2012	-	0.0256	-	-	-	-	-	0.028	0.037	-	-	0.029
08/14/2012	-	0.0209	-	-	-	-	-	-	0.037	-	-	0.029
08/15/2012	-	0.0279	-	-	-	-	-	0.028	-	-	-	0.029
08/16/2012	-	0.0076	-	-	-	-	-	-	-	-	-	0.029
08/17/2012	-	0.0446	-	-	-	-	-	-	-	-	-	0.032
05/12/2013	-	0.0099	-	-	-	-	-	-	-	-	-	-
05/13/2013	-	-	-	-	-	-	-	-	-	-	-	0.064
05/14/2013	-	0.0091	-	-	-	-	-	0.039	-	-	-	0.064
05/15/2013	-	0.0096	-	-	-	-	-	0.039	-	-	-	0.064
05/16/2013	-	0.0229	-	-	-	-	-	-	-	-	-	0.032
05/17/2013	-	0.0063	-	-	-	-	-	-	-	-	-	0.032
09/15/2013	-	-	-	-	-	-	-	-	-	-	-	0.03
09/16/2013	-	0.0072	-	-	-	-	-	-	0.0379	-	-	0.03
09/17/2013	-	0.0107	-	-	-	-	-	0.036	0.0379	-	-	0.03
09/18/2013	-	0.0217	-	-	-	-	-	0.036	0.0379	-	-	0.03
09/19/2013	-	0.0172	-	-	-	-	-	-	-	-	-	0.03
09/20/2013	-	0.0173	-	-	-	-	-	-	-	-	-	0.03

Date	Sodium Hypochlorite mg/L TRC	Towerbron mg/L TRC	PCL-222 mg/L Phosphate	PCL-401 mg/L Copolymer	CL-363 mg/L DMAD	Cuprostat-PF mg/L Azole	H-130M mg/L Quat	Nalco 73551 mg/L EO/PO	Spectrus CT1300 mg/L Quat	H-150M mg/L Quat	MSW 101 mg/L Phosphate	Floguard MS6236 mg/L Phosphate
05/04/2014	-	0.0118	-	-	-	-	-	-	-	-	-	-
05/05/2014	-	0.0112	-	-	-	-	-	-	-	-	-	-
05/06/2014	-	0.0096	-	-	-	-	-	-	-	-	-	-
05/07/2014	-	0.0164	-	-	-	-	-	-	-	-	-	-
05/08/2014	-	0.0235	-	-	-	-	-	-	-	-	-	-
05/09/2014	-	0.0110	-	-	-	-	-	-	-	-	-	-
09/07/2014	-	-	-	-	-	-	-	-	-	-	-	-
09/08/2014	-	-	-	-	-	-	-	-	0.04	-	-	-
09/09/2014	-	-	-	-	-	-	-	-	0.04	-	-	-
09/10/2014	-	-	-	-	-	-	-	-	0.04	-	-	-
09/11/2014	-	0.0070	-	-	-	-	-	-	-	-	-	-
09/12/2014	-	0.0074	-	-	-	-	-	-	-	-	-	-
08/09/2015		-							-			-
08/10/2015		0.0195							0.03			-
08/11/2015		0.0275							0.03			-
08/12/2015		0.0213							-			0.03
08/13/2015		0.0192							-			0.03
08/14/2015		0.0182							-			0.03
10/18/2015		0.0162										
10/19/2015		0.0125										
10/20/2015		0.0120										
10/21/2015		0.0130										
10/22/2015		0.0174										
10/23/2015		0.0156										
05/15/2016		-										
05/16/2016		0.0209										
05/17/2016		0.0210										
05/18/2016		0.0361										
05/19/2016		0.0254										
05/20/2016		0.0261										
07/31/2016		-							-			
08/01/2016		0.0091							0.03			
08/02/2016		0.0093							0.03			
08/03/2016		0.0209							0.03			
08/04/2016		-							-			
08/05/2016		-							-			
04/30/2017		-										
05/01/2017		0.0298										
05/02/2017		0.0218										
05/03/2017		0.0260										
05/04/2017		-										
05/05/2017		-										

Date	Towerbrom mg/L TRC	Floguard MS 6237 mg/L Phosphate/Zinc	Spectrus BD1500 mg/L Quat	Nalco 73551 mg/L EO/PO	Spectrus CT1300 mg/L Quat	Floguard MS6236 mg/L Phosphate
07/23/2017	-	-	-			
07/24/2017	0.0124	0.04/0.01	-			
07/25/2017	0.0081	0.04/0.01	-			
07/26/2017	0.0232	0.04/0.01	0.03			
07/27/2017	0.0179	-	-			
07/28/2017	0.0296	-	0.03			
5/13/2018						
5/14/2018						
5/15/2018	0.0229		0.030			0.0275
5/16/2018	0.0159		0.030			0.0275
5/17/2018	0.0133		0.030			0.0275
5/18/2018						
10/07/2018	-		-		-	-
10/08/2018	0.0221		-		-	0.02852
10/09/2018	0.0098		-		0.0332	0.02852
10/10/2018	0.0187		0.031		0.0332	0.02852
10/11/2018	0.0200		0.031		-	0.02852
10/12/2018	0.0187		0.031		-	0.02852
04/28/2019	-		-		-	--
04/29/2019	0.0069		0.047		-	-
04/30/2019	0.0109		0.047		-	-
05/01/2019	0.0196		-		-	-
05/02/2019	0.0341		-		-	-
05/03/2019	0.0281		0.047		-	-
08/04/2019	-		-		-	-
08/05/2019	0.0227		0.047		-	0.02852
08/06/2019	0.0071		-		0.0332	0.02852
08/07/2019	0.0117		0.047		0.0332	0.02852
08/08/2019	0.0142		-		0.0332	0.02852
08/09/2019	0.0078		0.047		-	0.02852
5/3/2020	-		-		-	
5/4/2020	-		-		-	
5/5/2020	-		-		-	
5/6/2020	0.0045		0.049		0.0332	
5/7/2020	0.0055		-		0.0332	
5/8/2020	0.0183		0.049		0.0332	
10/4/2020	-		-			-
10/5/2020	<0.05		0.046			0.02806
10/6/2020	<0.05		-			0.02814
10/7/2020	<0.05		0.046			0.02795
10/8/2020	<0.05		-			0.02797
10/9/2020	<0.05		0.046			0.02795

Sequoyah Nuclear Plant Biomonitoring
October 06 – 13, 2020

Appendix C

Chain of Custody Records and
Toxicity Test Bench Sheets

BIOMONITORING CHAIN OF CUSTODY RECORD

Client: TVA Project Name: Sequoyah NP Toxicity P.O. Number: N/A Facility Sampled: Sequoyah NP NPDES Number: TN0026450 Collected By: <i>Kelly Robinson</i> <i>2/10/20</i> <i>Kelly Robinson</i> <i>2/10/20</i>	Environmental Testing Solution, Inc. 351 Depot Street. Asheville, NC 28801 Phone: 828-350-9364 Fax: 828-350-9368	Delivered By (Circle One): FedEx UPS Bus Client _____ Other (specify): <i>Sonic</i> General Comments: <i>101 Bottle Comp @ 10720</i> <i>111 Bottle Comp @ 10745</i> <i>*ALL TIMES EASTERN</i> <i>(Call 10-15-20)</i>
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Field Identification / Sample Description	Grab/Comp	Collection Date/Time		Container Number & Volume Collected	Flow (MGD)	Rain Event? (Mark as Appropriate)				Laboratory Use					
		Date (mm/dd/yy)	* Time (hr:min)			Yes	If Yes, Inches	No	Trace	ETS Log Number	Arrival Temp. (°C)	By	Time ET	Appearance	
SQN-101-TOX	Comp	Start	<i>10-11-20</i>	<i>0700</i>	---						<i>201005.05</i>	<i>1.0°C</i>	<i>X</i>	<i>1420</i>	<i>*</i>
		End	<i>10-5-20</i>	<i>0600</i>											
SQN-INT-TOX	Comp	Start	<i>10-11-20</i>	<i>0700</i>							<i>201005.06</i>	<i>2.0°C</i>	<i>X</i>	<i>1420</i>	<i>*</i>
		End	<i>10-5-20</i>	<i>0600</i>											

Project # 15420

Sample Custody - Fill In From Top Down

Relinquished By (Signature):	Date/Time	Received By (Signature):	Date/Time
<i>Kelly Robinson</i>	<i>10-5-20 / 0908*</i>	<i>BR Shelton</i>	<i>10-05-20 - 1420*</i>
<i>BR Shelton</i> <i>Sonic Delivered</i>	<i>10-5-20 / 2:22 ET</i>	<i>ETS</i>	<i>10-05-20 / 1420 ET</i>



Whole Effluent Sample Receipt Log

*Sample temperature performed using verified General Use Thermometer SN: 170754920

Date Received	Time Received	Received by	Received from	*Sample Temp. (°C)	Project number	Sample number	Sample name and description	State	Comments
10-05-20	1327	J. Sumner	TVA Courier	2.6	15419	201005 .01	TVA - Watts Bar Nuclear, Outfall 101	TN	
10-05-20	1327	J. Sumner	TVA Courier	2.5	15419	201005 .02	TVA - Watts Bar Nuclear, Outfall 101 - Intake	TN	
10-05-20	1327	J. Sumner	TVA Courier	2.2	15419	201005 .03	TVA - Watts Bar Nuclear, Outfall 113	TN	
10-05-20	1327	J. Sumner	TVA Courier	3.0	15419	201005 .04	TVA - Watts Bar Nuclear, Outfall 113 - Intake	TN	
10-05-20	1420	J. Sumner	TVA Courier	1.0	15420	201005 .05	TVA - Sequoyah Nuclear, Outfall 101	TN	
10-05-20	1420	J. Sumner	TVA Courier	2.0	15420	201005 .06	TVA - Sequoyah Nuclear, Outfall 101 - Intake	TN	

BIOMONITORING CHAIN OF CUSTODY RECORD

Client: TVA	Environmental Testing Solution, Inc. 351 Depot Street. Asheville, NC 28801 Phone: 828-350-9364 Fax: 828-350-9368	Delivered By (Circle One): FedEx UPS Bus Client _____
Project Name: Sequoyah NP Toxicity		Other (specify): <u>SONIC</u>
P.O. Number: N/A		General Comments: 101 Bottle comp @ 07:25 <u>ALL TIMES EASTERN (MST 10-15-20)</u> INT Bottle comp @ 05:00 Flow is To Be Determined - Technical Issues obtaining Data. Email followup once flow is calculated. <u>(RZ)</u>
Facility Sampled: Sequoyah NP		
NPDES Number: TN0026450		
Collected By: <u>Kelly D. Plimette Lynn Williams</u> <u>1-600-867-1111</u>		

Field Identification / Sample Description	Grab/Comp	Collection Date/Time		Container Number & Volume Collected	Flow (MGD)	Rain Event? (Mark as Appropriate)				project #15420 Laboratory Use				
		Date (mm/dd/yy)	Time ^{EST} EST			Yes	If Yes, Inches	No	Trace	ETS Log Number	Arrival Temp. (°C)	By	Time ET	Appearance
SQN-101-TOX	Comp	Start 10-6-20	0700							20100722	1.1°C	X	1337	*
		End 10-7-20	0600	1 (2.5gal)	1770.618 7257 ^{1.17} ₁₀₋₁₅₋₂₀				✓					
SQN-INT-TOX	Comp	Start 10-7-20	0700							20100723	1.7°C	X	1337	*
		End 10-7-20	0600	1 (2.5 gal)	1770.618 7257 ^{1.17} ₁₀₋₁₅₋₂₀				✓	* CUSTODY SEALS INTACT. SAMPLES RECEIVED IN GOOD CONDITION. <u>JK</u>				

Sample Custody - Fill In From Top Down

Relinquished By (Signature):	Date/Time	Received By (Signature):	Date/Time
<u>Kelly Plimette</u>	10-7-20 / 09:20*	<u>BR Skiles</u>	10-07-20 / 09:20*
<u>BR Skiles</u> <u>SONIC DELIVERY</u>	10-07-20 / 13:37	<u>JK</u> <u>ETS</u>	10-07-20 / 1337 ET



Whole Effluent Sample Receipt Log

*Sample temperature performed using verified General Use Thermometer SN: 170754920

Date Received	Time Received	Received by	Received from	*Sample Temp. (°C)	Project number	Sample number	Sample name and description	State	Comments
10-07-20	1010	K. Keenan	UPS	2.6	15443	201007 .01	Camden County WTP	NC	
10-07-20	1014	K. Keenan	Fed - Ex	3.6	15444	201007 .02	Belews Creek SS - 006A	NC	
10-07-20	1014	K. Keenan	Fed - Ex	1.1	15445	201007 .03	Franklinton WTP	NC	
10-07-20	1014	K. Keenan	Fed - Ex	2.5	15446	201007 .04	Goldsboro WRF	NC	
10-07-20	1014	K. Keenan	Fed - Ex	1.1	15447	201007 .05	Hamlet WWTP	NC	
10-07-20	1014	K. Keenan	Fed - Ex	1.0	15448	201007 .06	IP - Rieglewood	NC	
10-07-20	1014	K. Keenan	Fed - Ex	4.4	15449	201007 .07	Monroe WTP	NC	
10-07-20	1014	K. Keenan	Fed - Ex	3.1	15450	201007 .08	Perdue, Inc.	NC	
10-07-20	1014	K. Keenan	Fed - Ex	3.0	15451	201007 .09	Ponzer WTP	NC	
10-07-20	1014	K. Keenan	Fed - Ex	1.4	15452	201007 .10	Buck CTCC - 007	NC	
10-07-20	1014	K. Keenan	Fed - Ex	2.3	15453	201007 .11	ALCOA - 005	NC	
10-07-20	1014	K. Keenan	Fed - Ex	2.3	15454	201007 .12	ALCOA - 013	NC	
10-07-20	1014	K. Keenan	Fed - Ex	2.1	15455	201007 .13	PCS Phosphate, Inc.	NC	
10-07-20	1014	K. Keenan	Fed - Ex	2.7	15456	201007 .14	Atlantic Beach WTP	NC	
10-07-20	1014	K. Keenan	Fed - Ex	2.7	15457	201007 .15	Dixon WTP	NC	
10-07-20	1014	K. Keenan	Fed - Ex	1.7	15458	201007 .16	New Hanover County WTP	NC	
10-07-20	1014	K. Keenan	Fed - Ex	2.3	15459	201007 .17	Washington WTP	NC	
10-07-20	1014	K. Keenan	Fed - Ex	3.3	15460	201007 .18	Richland Township WTP	NC	
10-07-20	1014	K. Keenan	Fed - Ex	2.2	15461	201007 .19	RWS	NC	
10-07-20	1014	K. Keenan	Fed - Ex	2.2	15462	201007 .20	Skyco WTP	NC	
10-07-20	1014	K. Keenan	Fed - Ex	2.2	15463	201007 .21	Stumpy Point WTP	NC	
10-07-20	1337	J. Sumner	TVA Courier	1.1	15420	201007 .22	TVA - Sequoyah Nuclear, Outfall 101	TN	
10-07-20	1337	J. Sumner	TVA Courier	1.7	15420	201007 .23	TVA - Sequoyah Nuclear, Outfall 101 - Intake	TN	
10-07-20	1459	J. Sumner	TVA Courier	1.8	15419	201007 .24	TVA - Watts Bar Nuclear, Outfall 101	TN	
10-07-20	1459	J. Sumner	TVA Courier	1.5	15419	201007 .25	TVA - Watts Bar Nuclear, Outfall 101 - Intake	TN	
10-07-20	1459	J. Sumner	TVA Courier	2.2	15419	201007 .26	TVA - Watts Bar Nuclear, Outfall 113	TN	
10-07-20	1459	J. Sumner	TVA Courier	2.0	15419	201007 .27	TVA - Watts Bar Nuclear, Outfall 113 - Intake	TN	