



RE: 1909-N

April 8, 2019

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Return Receipt Requested

Ken Kalman, Project Manager
Fuel Cycle Facilities Branch
Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Material Safety
U.S. Nuclear Regulatory Commission
Two White Flint North, Mail Stop T8F5
Rockville, MD 20852-2738

RE: License No. SUB-1010; Docket No. 40-8027
Ammonium Nitrate Fertilizer Program
2018 Completion Report

Dear Mr. Kalman:

Please find enclosed one (1) copy of the 2018 Completion Report for the Ammonium Nitrate Fertilizer Program conducted by Sequoyah Fuels Corporation (SFC).

In accordance with License No. SUB-1010 requirements, the report describes the application of facility produced ammonium nitrate fertilizer on SFC lands near Gore, Oklahoma, and the results obtained from comprehensive soil and vegetation monitoring programs. During 2018 no ammonium nitrate fertilizer was applied; however pre-season soil, post-season soil and vegetation monitoring was completed.

Should you require further information, please contact me at 918-489-5511. (Ext. 226)

Sincerely,

John H. Ellis
President

Enclosure

cc: Lynzie Cheatwood (ODEQ)

**AMMONIUM NITRATE
FERTILIZER APPLICATION PROGRAM**

2018 Completion Report

License SUB-1010; Docket 40-8027

April 1, 2019

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2018 FERTILIZER PROGRAM COMPLETION REPORT

**Sequoyah Fuels Corporation
Gore, Oklahoma**

1.0 INTRODUCTION

Source Material License SUB-1010, issued to Sequoyah Fuels Corporation (SFC), authorizes the application of fertilizer onto SFC owned or controlled lands for the production of forage, utilized by cattle for grazing, or for growing crops that are not used directly as human food, such as hay or seed production. On October 1, 2015 a new Oklahoma Pollution Discharge Elimination System (OPDES) permit became effective. This new OPDES permit includes sampling and application requirements for the fertilizer program. In accordance with license and permit requirements, this completion report describes the 2018 Fertilizer Application Program.

Fertilizer was not applied during 2018. Therefore, some of the monitoring typically completed was not done. The 2019 schedule for the Ammonium Nitrate Fertilizer Program is provided in Table 1.

2.0 APPLICATION AREA

In 2018, SFC's did not apply ammonium nitrate fertilizer. Figure 1 shows the location of the fertilizer application sites.

3.0 AMMONIUM NITRATE APPLICATION

Ammonium nitrate fertilizer was not applied during 2018.

4.0 PROGRAM MONITORING RESULTS

4.1 Soil

The 2018 pre- and post-growing season soil samples for the fertilizer application areas were collected in April and November, respectively. Since there was no application of ammonium nitrate fertilizer no mid-season soil samples were collected. The analysis results for these sampling events are provided in Table 2. The top six inches of soil was characterized for nitrate content by collecting and compositing at least twenty samples from different locations in the Agland tract (one-inch diameter cores). In addition, profile samples were collected from one location in the Agland tract at six inch increments from surface to 48".

Soil samples were also collected as required by the OPDES permit. This permit requires that background soil samples be collected from each land application site and be analyzed for soil pH; the nutrients Total Kjeldahl Nitrogen, nitrogen, ammonia, nitrate, potassium and phosphorus; and the metals included in 40 CFR 503, "Standards for the Use or Disposal of Sewage Sludge." The analyses for background sampling are included in Table 3. Figure 1 shows the location of each fertilizer application site. The analyses of post season samples collected on November 28, 2018, from each land application site that typically receives fertilizer solution are included in Table 4.

4.2 Vegetation

Forage samples were collected and analyzed from the Agland area only. Analytical data for the forage cuttings from the Agland is provided in Table 5.

Forage collected during 2018 had elevated molybdenum concentrations. SFC determined that use of the hay should be restricted.

5.0 FORAGE MANAGEMENT PROGRAM

Hay was harvested three times during 2018. Hay yields and harvest were dependent upon the weather and forage growing conditions. A total of approximately 969 round bales were produced from the SFC property. Round hay bales average approximately 1040 pounds.

The Oklahoma State University Extension Service continues to provide oversight of the land application program.

TABLES

Table 1

Date: Tue 4/4/2017

TABLE 2
Soil Nitrate Analyses (mg/kg)

Sequoia Acreage	
1990	1,000
2000	1,000
2010	1,000
2020	1,000
2030	1,000
2040	1,000
2050	1,000
2060	1,000
2070	1,000
2080	1,000
2090	1,000
2100	1,000

[illegible]

Table 3
Background Soil Analyses - Fertilizer Application Sites

Parameter	Agland # 1	Agland # 2	Agland # 3	Agland # 4	North Meadow	South Meadow
Inorganic Analyses						
Ammonia (as N), mg/kg	6.6	3.9	3.6	4.5	3.1	2.2
Nitrate (as N), mg/kg	28.2	33.1	31.6	17.4	15.4	26
TKN, mg/kg	1790	1880	1640	1740	1500	2340
pH	4.34	5.83	6.32	5.18	6.02	6.33
Radiochemical Analyses						
Radium-226 pCi/g	0.779 ± 0.142	1.42 ± 0.221	0.730 ± 0.144	1.07 ± 0.202	1.28 ± 0.197	1.73 ± 0.219
Uranium, µg/g	1.92	1.99	1.93	3.26	9.55	2.47
Metals Analyses						
Arsenic, mg/kg	2.39	1.62	1.53	2.25	2.62	2.2
Cadmium, mg/kg	0.728	0.505	0.612	0.819	0.805	0.838
Chromium, mg/kg	1.14	2.02	3.57	4.09	7.55	5.45
Copper, mg/kg	6.24	3.13	1.02	2.05	2.21	1.36
Lead, mg/kg	8.65	7.09	5.54	7.38	10.7	10.1
Mercury, mg/kg	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24
Molybdenum, mg/kg	21.9	12.7	5.3	< 0.716	2.42	1.57
Nickel, mg/kg	5.72	3.43	5.61	1.33	0.906	1.57
Phosphorus, mg/kg	274	55.9	139	221	207	221
Potassium, mg/kg	731	268	324	453	293	298
Selenium, mg/kg	< 0.520	< 0.505	< 0.510	< 0.512	< 0.503	< 0.524
Zinc, mg/kg	19.8	9.19	7.95	13.9	13.3	11

Parameter	Pond Area	Timber North # 1	Timber North # 2	Timber South # 1	Timber South # 2	Timber South # 3
Inorganic Analyses						
Ammonia (as N), mg/kg	2.1	2.7	3.7	3.0	1.8	1.8
Nitrate (as N), mg/kg	14.2	9.6	22.3	27.4	25.5	13.2
TKN, mg/kg	2020	2470	1850	2290	2090	1740
pH	6.35	5.4	4.9	5.28	5.2	5.5
Radiochemical Analyses						
Radium-226 pCi/g	1.04 ± 0.163	1.57 ± 0.249	1.07 ± 0.188	1.58 ± 0.243	1.29 ± 0.189	1.27 ± 0.201
Uranium, µg/g	2.41	5.24	16.8	12.2	9.78	2.12
Metals Analyses						
Arsenic, mg/kg	2.94	1.2	3.85	1.98	4.33	2.81
Cadmium, mg/kg	1.01	< 0.502	1.77	0.991	1.54	1.35
Chromium, mg/kg	6.9	< 0.703	11.4	4.46	6.8	11.2
Copper, mg/kg	0.913	< 0.602	3.02	2.78	1.54	1.04
Lead, mg/kg	9.66	< 0.390	15.1	14.8	13.6	10.7
Mercury, mg/kg	< 0.24	< 0.24	< 0.23	< 0.24	< 0.24	< 0.24
Molybdenum, mg/kg	< 0.710	< 0.703	1.14	< 0.694	< 0.721	< 0.729
Nickel, mg/kg	< 0.710	< 0.703	8.94	0.892	< 0.721	16.9
Phosphorus, mg/kg	< 10.1	192	282	280	224	168
Potassium, mg/kg	326	17.3	564	574	381	542
Selenium, mg/kg	< 0.507	< 0.502	< 0.520	< 0.496	< 0.515	< 0.521
Zinc, mg/kg	12.4	< 0.703	37.8	23.3	17.1	14.2

Note: Samples collected during August 2005.

Table 4
Annual Post-Season Soil Analyses - Fertilizer Application Sites

Page 1 of 1

Parameter	Agland #1 Composite	Agland #2 Composite	Agland #3 Composite	Pond Area Composite	N. Meadow Composite	Timber S#2 Composite
Inorganic Analyses						
Ammonia (as N), mg/kg	6.75	7.35	14.1	28.4	< 5.0	< 5.0
Nitrate (as N), mg/kg	< 2.0	2.79	2.10	< 2.0	< 2.0	< 2.0
TKN, mg/kg	1060	796	716	1250	1310	834
pH	6.5	6.6	6.6	7.3	5.8	5.6
Radiochemical Analyses						
Radium-226 pCi/g	0.368 ± 0.125	0.398 ± 0.148	0.443 ± 0.161	0.741 ± 0.206	0.565 ± 0.202	0.698 ± 0.236
Uranium, µg/g	1.60	2.13	1.96	2.51	9.09	4.49
Metals Analyses						
Arsenic, mg/kg	2.05	< 2.0	< 2.0	8.96	< 2.0	< 2.0
Cadmium, mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chromium, mg/kg	5.60	5.50	7.86	40.7	7.00	8.05
Copper, mg/kg	4.16	2.23	2.50	6.93	2.50	2.30
Lead, mg/kg	5.83	5.20	4.16	13.0	7.47	6.26
Mercury, mg/kg	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Molybdenum, mg/kg	15.9	5.35	7.18	4.60	7.27	6.06
Nickel, mg/kg	4.81	3.51	4.09	11.0	3.42	3.42
Phosphorus, mg/kg	168	121	110	183	145	141
Potassium, mg/kg	747	348	512	1030	403	445
Selenium, mg/kg	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Zinc, mg/kg	14.0	7.40	9.24	26.3	10.7	10.1

Parameter	S. Meadow Composite					
Inorganic Analyses						
Ammonia (as N), mg/kg	< 5.0					
Nitrate (as N), mg/kg	2.36					
TKN, mg/kg	1320					
pH	6.1					
Radiochemical Analyses						
Radium-226 pCi/g	0.809 ± 0.211					
Uranium, µg/g	2.81					
Metals Analyses						
Arsenic, mg/kg	< 2.0					
Cadmium, mg/kg	< 0.5					
Chromium, mg/kg	6.71					
Copper, mg/kg	2.04					
Lead, mg/kg	6.59					
Mercury, mg/kg	< 0.02					
Molybdenum, mg/kg	4.70					
Nickel, mg/kg	3.48					
Phosphorus, mg/kg	151					
Potassium, mg/kg	336					
Selenium, mg/kg	< 2.0					
Zinc, mg/kg	8.68					

TABLE 5

Forage Analyses

Location (Cutting)	Sample Date	As mg/kg	B mg/kg	Co mg/kg	Cu mg/kg	Fe mg/kg	Mn mg/kg	Mo mg/kg	Ni mg/kg	Pb mg/kg	V mg/kg	Zn mg/kg	U mg/kg	Th-230 pCi/g	Ra-226 pCi/g	NO ₃ -N mg/kg
Sequoiah Acreage																
Agland (1 st)	6/18/18	< 2.0	< 10.0	< 1.0	5.58	88.6	121	163	< 2.0	< 0.5	< 2.0	23.5	< 0.2	-0.114±0.017	0.009 ± 0.013	12.5
Agland (2 nd)	8/30/18	< 2.0	< 10.0	< 1.0	5.31	57.3	93.6	11.3	< 2.0	< 0.5	< 2.0	14.0	0.049	-0.078±0.025	0.008 ± 0.006	4.84
Agland (3 rd)	11/02/18	< 2.0	< 10.0	< 1.0	4.49	173	51.0	63.1	< 2.0	< 0.5	< 2.0	22.7	< 0.02	0±0.011	0.142±0.015	80.9
Caution Levels ¹		100	150	10	100	1000	1000	20	50	30	50	500	-	-	-	2800

¹ Caution Levels do not mean that forage with higher concentrations cannot be safely fed to livestock, but that certain precautions and additional treatments and supplements may be prudent.

Figure 1

**Fertilizer Application Sites
Background Soil Sample Locations
Collected on 04 Aug 2005**

