



RE: 1112-N

April 26, 2011

Certified Mail 7008 1140 0000 4060 8353  
Return Receipt Requested

U.S. Nuclear Regulatory Commission  
ATTN: Mr. Gary Janosko, Chief  
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Division of Fuel Cycle Safety and Safeguards  
11545 Rockville Pike  
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Washington, D.C. 20852-2738

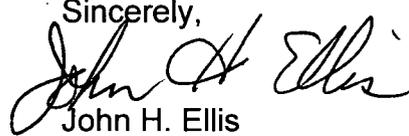
RE: License No. SUB-1010; Docket No. 40-8027  
Ammonium Nitrate Fertilizer Program  
2008 Completion Report

Dear Mr. Janosko:

Please find enclosed one (1) copy of the 2010 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.

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

Sincerely,  
  
John H. Ellis  
President

Enclosure

cc: Ken Kalman (NRC)  
Roshini Nambiar (ODEQ)

FSME20

*AMMONIUM NITRATE  
FERTILIZER APPLICATION PROGRAM*

*2010 Completion Report*

*License SUB-1010; Docket 40-8027*

*April 28, 2011*

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## ADDENDA

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### DESCRIPTION

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3	2010 Fertilizer Composite Analyses
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### DESCRIPTION

1	Fertilizer Application Sites
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# 2010 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 July 1, 2005 a new Oklahoma Pollution Discharge Elimination System (OPDES) permit became effective. This new OPDES permit includes additional sampling and application requirements for the fertilizer program. In accordance with license and permit requirements, this completion report describes the 2010 Fertilizer Application Program.

SFC monitors a control plot as specified in the license in order to implement good programmatic control and ensure that the program is being operated in accordance with best agricultural practices. In September 1996, an NRC License Amendment which changed the fertilizer program control plot was approved. This report contains the fertilizer program monitoring results as described in the amended license.

The 2010 Fertilizer Application Program included oversight by Dr. Billy Tucker, Ph.D., Agronomist and Soil Scientist, Extension Agronomist Emeritus, Oklahoma State University. Dr. Tucker provided recommendations to ensure maximum plant nutrient utilization and forage production while limiting impact to the environment. Additionally, Dr. Tucker assisted in investigations of anomalous monitoring data.

Fertilizer application began in May 2010 and concluded in September 2010. A total of 12.8 million gallons of ammonium nitrate fertilizer was applied. Application amounts ranged from 234 to 275 lbs-N/acre. The 2011 schedule for the Ammonium Nitrate Fertilizer Program is provided in Table 1.

## 2.0 APPLICATION AREA

In 2010, SFC's ammonium nitrate fertilizer was applied to the control plot which is located within the facility boundary. This application area is referred to as Agland #1 (Previously identified as Agland XVII) and is comprised of approximately 91 acres of which approximately 60 acres were utilized for application. Fertilizer was also applied to an 8 acre field located immediately

south of the Agland #1 site, referred to as Agland #2 (Previously identified as Agland XVII South). In addition, ammonium nitrate fertilizer was applied to a 20 acre portion of the field located immediately east of the Agland #1 site. This area has been identified as Agland #3 (Previously identified as Province 5 of Area160A). Other areas where ammonium nitrate fertilizer was applied included the Pond Area, North Meadow, Timber South #2 and South Meadow. Figure 1 shows the location of the fertilizer application sites.

### 3.0 AMMONIUM NITRATE APPLICATION

Pre-growing season soil samples were collected early in the year prior to implementation of fertilizer application. Nitrate analysis of these samples provided a basis for application rates and scheduling. Dr. Tucker reviewed this information and provided SFC with application rate recommendations.

Application rates were monitored based upon monthly nitrate analysis of the fertilizer solution. Application began in May and continued until September. A total of 12.8 million gallons was applied utilizing Kifco Ag-Rain A-Series irrigation system. The 2010 fertilizer application summary is presented in Table 2.

Analytical results of a representative composite of the fertilizer solution are provided in Table 3. In addition, samples were also collected from fertilizer sources as they were being transferred to the fertilizer storage ponds. These analytical results for these sources, which include Outfall 008, Clarifier Basin 3A, Monitor Well MW095A Collection Trench, Monitor Well MW095A Collection Pit and Catchment No. 3, are included in Table 4.

### 4.0 PROGRAM MONITORING RESULTS

#### 4.1 Soil

The 2010 pre-, mid- and post-growing season soil samples for the fertilizer application areas were collected in March, July and October, respectively. However, the mid- and post-growing season samples were not analyzed for the correct parameters. Therefore, additional post season samples were collected during January 2011 and analyzed for the required parameters. The samples collected during March 2010 and January 2011 were analyzed for nitrate content. The analysis results for the these sampling events are provided in Table 5. 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". Review of the 2010 pre-season soil profiles, and the top six inch soil composite, provided the basis for Dr. Tucker's recommendation of application rates for the 2010 Fertilizer Program.

Soil samples were also collected as required by the new OPDES permit that became effective on July 1, 2005. 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 6. Figure 1 shows the location of each fertilizer application site. The analyses of post season samples collected on January 28, 2011, from each land application site that received fertilizer solution are included in Table 7.

#### 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 8.

Forage collected during 2010 had elevated molybdenum concentrations. SFC determined that use of the hay should be restricted.

#### 5.0 FORAGE MANAGEMENT PROGRAM

Hay was harvested two times during 2010. Hay yields and harvest were dependent upon the weather and forage growing conditions. A total of approximately 704 round bales were produced from the SFC property. Round hay bales average approximately 1250 pounds. None of the hay harvesting acreage was over seeded during 2010.

## TABLES

**Table 1**  
**Sequoyah Fuels Corporation**  
**Projected 2011 Ammonium Nitrate Fertilizer Application**

ID	Task Name	Qtr 1, 2011			Qtr 2, 2011			Qtr 3, 2011			Qtr 4, 2011		
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	SPREAD FERTILIZER												
2	Conduct Environmental Monitoring												
3	Collect Preseason Soil Samples			3/7									
4	Collect Preseason Fertilizer Samples			3/8									
5	Collect Forage Samples												
6	Collect Midseason Soil Samples												
7	Collect Postseason Soil Samples												
8	Perform Follow-up / Re-sample												
9													
10	Evaluate Environmental Data												
11													
12	Develop Manpower to Operate Program												
13													
14	Implement Field Applications												
15	Complete Application of 15,000,000 Gallons												
16													
17	Maintain Distribution System												
18													
19	Pond Management												

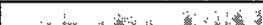
Date: Fri 4/8/2011	Task 	Milestone 
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TABLE 2

2010 Fertilizer Application Data

LOCATION	APPL	CONC g/l N	GALS APPLIED	Acres Applied To	LBS/ ACRE
XVII (AGLAND )	1	0.299	3,376,100	57	148
	2	0.397	2,184,700	57	127
TOTAL			5,560,800		275
160A Province 5	1	0.393	521,700	16.2	106
	2	0.400	752,400	16.2	155
TOTAL			1,274,100		261
XVII (South)	1	0.400	277,400	8.2	113
	2	0.400	355,800	8.2	145
TOTAL			633,200		258
Pond / Timber / Meadow Areas	1	0.293	3,070,400	61.5	122
	2	0.367	2,238,300	61.5	112
TOTAL			5,308,700		234
Notes: Total Volume Applied to All Areas: 12,776,800 gallons					
N = Total Nitrogen					

**TABLE 3**  
**2010 Fertilizer Composite**  
**Analyses**

Element	Composite
As mg/l	0.039
Ba mg/l	0.074
B mg/l	0.209
Cd mg/l	0.004
Co mg/l	0.020
Cr mg/l	< 0.005
Cu mg/l	0.13
Fe mg/l	0.862
Mg mg/l	14.5
Mn mg/l	2.76
Mo mg/l	3.89
Ni mg/l	0.198
Pb mg/l	0.003
Se mg/l	0.013
V mg/l	0.015
Zn mg/l	0.126
Hg mg/l	< 0.0002
NO <sub>3</sub> (N) mg/l	202
NH <sub>3</sub> (N) mg/l	85.0
U ug/l	4.63
Ra226 pCi/l	0.085 ± 0.150
Th230 pCi/l	0 ± 0.246

**Table 4  
2010 Fertilizer Source Analyses**

<b>Parameter</b>	<b>Clarifier Basin 3A</b>	<b>MW095A Coll. Trench</b>	<b>MW095A Coll. Pit</b>	<b>Catchment No. 3</b>	<b>Outfall 008</b>
<b>Inorganic Analyses</b>					
Ammonia (as N), mg/l	181	0.2	0.2	240	1.8
Nitrate (as N), mg/l	210	212	139	544	6.1
TKN, mg/l	196	< 0.3	< 0.3	238	4.0
pH, SU	6.37	6.79	6.12	4.63	7.21
<b>Radiochemical Analyses</b>					
Radium-226 pCi/l	0.479 ± 0.141	0.154 ± 0.102	0.103 ± 0.060	0.140 ± 0.068	0.788 ± 0.286
Uranium, µg/l	59.0	2.85	< 1	14.6	31.7
<b>Metals Analyses</b>					
Arsenic, mg/l	0.042	0.021	0.011	0.197	0.010
Cadmium, mg/l	0.002	< 0.001	< 0.001	< 0.001	< 0.001
Chromium, mg/l	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Copper, mg/l	0.069	0.091	0.055	0.046	0.054
Lead, mg/l	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Mercury, mg/l	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Molybdenum, mg/l	4.31	< 0.010	< 0.010	< 0.010	0.017
Nickel, mg/l	0.382	< 0.010	< 0.010	0.442	0.022
Phosphorus, mg/l	0.136	0.035	0.126	0.028	0.148
Potassium, mg/l	17.9	7.56	2.67	17.8	5.41
Selenium, mg/l	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Zinc, mg/l	0.107	8.41	< 0.010	0.170	0.045

**TABLE 5**  
**Soil Nitrate Analyses (mg/kg)**

<b>Sequoyah Acreage</b>								
Pre-Season Results (Collected on 3/15/2010)								
Location	0-6C"	6-12"	12-18"	18-24"	24-30"	30-36"	36-42"	42-48"
Agland	17.4	7.9	7.8	8.0	9.0	6.8	6.9	7.0
Mid-Season Results (Collected on 7/7/2010)								
Location	0-6C"	6-12"	12-18"	18-24"	24-30"	30-36"	36-42"	42-48"
Agland	*	*	*	*	*	*	*	*
Post-Season Results (Collected on 1/28/2011*)								
Location	0-6C"	6-12"	12-18"	18-24"	24-30"	30-36"	36-42"	42-48"
Agland	6.9	2.8	< 2.5	< 2.5	2.7	2.6	2.5	< 2.5

\* Note: Mid-season and initial post-growing season soil samples collected on July 7, 2010 and October 14, 2010, respectively, were not analyzed for nitrate. Samples were collected but analyzed for the incorrect parameters. Post-growing season soil samples were re-collected on January 28, 2011 and analyzed for nitrate. This problem was not identified until January 2011. At that time discussions were held between the Manager, Environmental and technicians performing the sampling. The technicians completing the chain-of-custody apparently mis-read the required parameters from the procedure. Lack of attention to detail appears to be the reason for the missed analyses and failure to recognize the error earlier. Personnel had collected these samples for many years in accordance with the requirements.

**Table 6**  
**Background Soil Analyses - Fertilizer Application Sites**

Parameter	Agland # 1	Agland # 2	Agland # 3	Agland # 4	North Meadow	South Meadow
<b>Inorganic Analyses</b>						
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
<b>Radiochemical Analyses</b>						
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
<b>Metals Analyses</b>						
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
<b>Inorganic Analyses</b>						
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
<b>Radiochemical Analyses</b>						
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
<b>Metals Analyses</b>						
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

**Table 7**  
**Annual Post-Season Soil Analyses - Fertilizer Application Sites**

Parameter	Agland #1 Composite	Agland #2 Composite	Agland #3 Composite	Pond Area Composite	N. Meadow Composite	Timber S#2 Composite
<b>Inorganic Analyses</b>						
Ammonia (as N), mg/kg	9.5	8.5	7.0	8.4	3.6	6.3
Nitrate (as N), mg/kg	6.9	7.7	6.4	20.0	8.1	13.0
TKN, mg/kg	617	470	503	276	1160	699
pH	5.31	5.94	6.38	4.98	6.18	4.59
<b>Radiochemical Analyses</b>						
Radium-226 pCi/g	0.429 ± 0.151	0.515 ± 0.222	0.895 ± 0.201	0.791 ± 0.195	0.737 ± 0.192	0.976 ± 0.217
Uranium, µg/g	1.72	2.12	2.38	2.67	4.52	3.87
<b>Metals Analyses</b>						
Arsenic, mg/kg	2.62	2.35	3.10	6.54	3.00	3.94
Cadmium, mg/kg	0.15	0.13	0.12	0.37	0.14	0.21
Chromium, mg/kg	4.15	4.28	5.58	14.7	4.40	8.83
Copper, mg/kg	12.1	9.84	12.6	18.3	11.7	11.6
Lead, mg/kg	5.02	4.71	6.82	8.26	7.08	8.36
Mercury, mg/kg	< 0.08	< 0.07	< 0.08	< 0.08	< 0.08	< 0.08
Molybdenum, mg/kg	12.9	8.13	2.58	8.26	2.90	4.51
Nickel, mg/kg	5.46	3.85	4.86	13.8	4.51	4.04
Phosphorus, mg/kg	144	103	76.1	211	73.7	128
Potassium, mg/kg	466	153	182	457	156	229
Selenium, mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc, mg/kg	28.8	18.6	21.9	57.9	20.0	20.8

Parameter	S. Meadow Composite					
<b>Inorganic Analyses</b>						
Ammonia (as N), mg/kg	5.9					
Nitrate (as N), mg/kg	12.8					
TKN, mg/kg	885					
pH	6.18					
<b>Radiochemical Analyses</b>						
Radium-226 pCi/g	0.910 ± 0.187					
Uranium, µg/g	2.62					
<b>Metals Analyses</b>						
Arsenic, mg/kg	4.01					
Cadmium, mg/kg	0.22					
Chromium, mg/kg	6.60					
Copper, mg/kg	11.7					
Lead, mg/kg	7.54					
Mercury, mg/kg	< 0.08					
Molybdenum, mg/kg	7.66					
Nickel, mg/kg	4.48					
Phosphorus, mg/kg	179					
Potassium, mg/kg	164					
Selenium, mg/kg	< 1.0					
Zinc, mg/kg	19.4					

TABLE 8

## Forage Analyses

Location	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	NO3-N mg/kg
<b>Sequoyah Acreage</b>																
Agland I	6/17/10	1.09	< 10.0	< 1.00	7.99	117	127	78.7	1.64	< 1.00	< 1.00	35.6	0.027	0.045 ± 0.038	0.132 ± 0.020	410
Agland II	8/20/10	1.65	2.74	< 1.00	14.6	131	66.2	80.0	2.20	1.54	1.43	39.6	0.022	0 ± 0.026	0.010 ± 0.010	704
Agland III	9/21/10	1.03	5.17	< 0.50	12.5	91.5	98.2	56.9	2.69	1.34	< 1.00	28.6	0.026	0 ± 0.026	0.008 ± 0.008	1620
Caution Levels <sup>1</sup>		100	150	10	100	1000	1000	20	50	30	50	500	-	-	-	2800

<sup>1</sup> 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

