SEQUOYAH FUELS
A GENERAL ATOMICS COMPANY

RE: 1611-N

April 26, 2016

Certified Mail 7011 0110 0000 0858 4893
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
Washington, D.C. 20852-2738

RE: License No. SUB-1010; Docket No. 40-8027
Ammonium Nitrate Fertilizer Program
2015 Completion Report

Dear Mr. Kalman:

Please find enclosed one (1) copy of the 2015 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: Angie Radcliffe (ODEQ)

AMMONIUM NITRATE
FERTILIZER APPLICATION PROGRAM

2015 Completion Report

License SUB-1010; Docket 40-8027

April 26, 2016

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ADDENDA

2015 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 2015 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 2015 Fertilizer Application Program included oversight by Mr. Brian C. Pugh, Area Agronomist, Northeast District, Cooperative Extension Service, Oklahoma State University. Mr. Pugh provided recommendations to ensure maximum plant nutrient utilization and forage production while limiting impact to the environment. Additionally, Mr. Pugh assisted in investigations of anomalous monitoring data.

Fertilizer application began in July 2015 and concluded in October 2015. Start of the land application program was delayed due to very heavy early summer rainfall. A total of 14.2 million gallons of ammonium nitrate fertilizer was applied. Application amounts ranged from 54 to 70 lbs-N/acre. The 2016 schedule for the Ammonium Nitrate Fertilizer Program is provided in Table 1.

2.0 APPLICATION AREA

In 2015, 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. Mr. Pugh 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 July and continued until October. A total of 14.2 million gallons was applied utilizing Kifco Ag-Rain A-Series irrigation system. The 2015 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 Clarifier Basin 3A, Monitor Well MW095A Collection Trench, Monitor Well MW095A Collection Pit, Catchment No. 3, Pond No. 2 and Ditch West Pond No. 2, are included in Table 4.

4.0 PROGRAM MONITORING RESULTS

4.1 Soil

The 2015 pre-, mid- and post-growing season soil samples for the fertilizer application areas were collected in March, August and December, respectively. The analysis results for 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 2015 pre-season soil profiles, and the top six inch soil composite, provided the basis for recommended application rates for the 2015 Fertilizer Program.

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 6. Figure 1 shows the location of each fertilizer application site. The analyses of post season samples collected on December 3, 2015, 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 2015 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 2015. Hay yields and harvest were dependent upon the weather and forage growing conditions. A total of approximately 968 round bales were produced from the SFC property. Round hay bales average approximately 1040 pounds.

Brian Pugh and Tony Yates from the Oklahoma State University Extension Service continue to provide oversight of the land application program.

TABLES

Table 1

Sequoyah Fuels Corporation

Projected 2016 Ammonium Nitrate Fertilizer Application

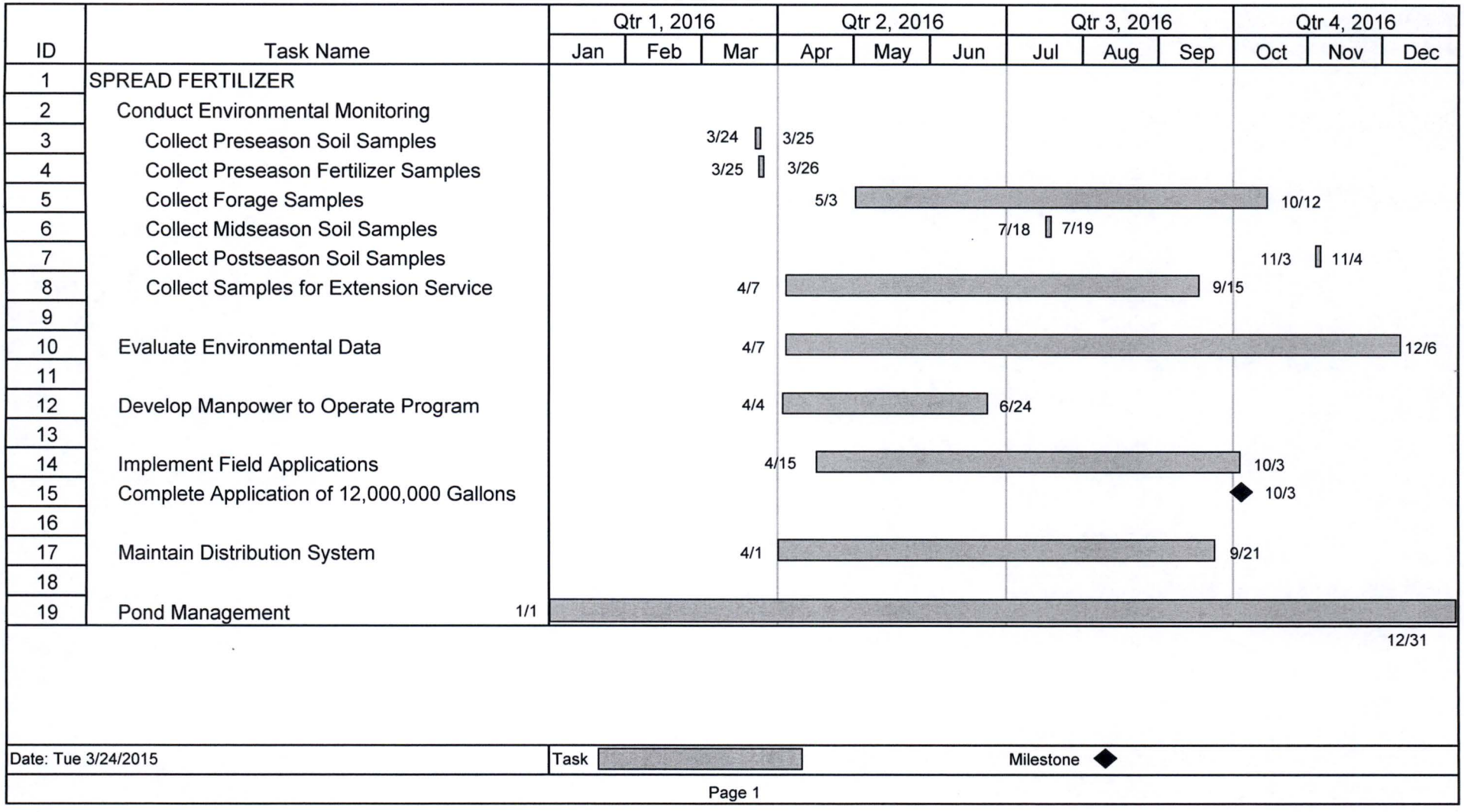

TABLE 2

2015 Fertilizer Application Data

LOCATION	APPL	CONC g/l N	GALS APPLIED	Acres Applied To	LBS/ ACRE
Agland No. 1 (XVII (AGLAND))	1	0.084	2,370,400	57	29.1
	2	0.068	2,367,000	57	23.5
	3	0.067	1,797,500	50	17.6
TOTAL			6,534,900		70.3
Agland No. 3 (160A Province 5)	1	0.084	613,500	16.2	26.5
	2	0.068	561,800	16.2	19.7
	3	0.067	321,500	8.2	11.1
TOTAL			1,496,800		57.3
Agland No. 2 (XVII (South))	1	0.084	256,100	8.2	21.9
	2	0.068	235,600	8.2	16.3
	3	0.067	244,000	8.2	16.6
TOTAL			735,700		54.8
Pond / Timber / Meadow Areas	1	0.084	1,796,500	61.5	20.5
	2	0.069	1,793,000	61.5	16.5
	3	0.067	1,845,493	61.5	16.8
TOTAL			5,434,993		53.7

Notes: Total Volume Applied to All Areas: 14,202,393 gallons

N = Total Nitrogen

TABLE 3

2015 Fertilizer Composite Analyses

Element		Composite
As	mg/l	0.0634
Ba	mg/l	0.0339
B	mg/l	< 0.2
Cd	mg/l	< 0.002
Co	mg/l	< 0.01
Cr	mg/l	< 0.01
Cu	mg/l	< 0.01
Fe	mg/l	< 0.1
Mg	mg/l	20.9
Mn	mg/l	0.278
Mo	mg/l	0.754
Ni	mg/l	0.0504
Pb	mg/l	< 0.005
Se	mg/l	< 0.01
V	mg/l	< 0.02
Zn	mg/l	< 0.05
Hg	mg/l	< 0.0002
$NO_3(N)$	mg/l	59.8
$NH_3(N)$	mg/l	4.98
U	ug/l	7.82
Ra226	pCi/l	0.052 ± 0.048
Th230	pCi/l	0.166 ± 0.361

Table 4
2015 Fertilzer Source Analyses

Parameter	Clarifier Basin 3A	MW095A Coll. Trench	MW095A Coll. Pit	Catchment No. 3	Pond No. 2	Ditch West Pond No. 2
Inorganic Analyses						
Ammonia (as N), mg/l	0.3	0.3	< 0.2	159	50.5	21.1
Nitrate (as N), mg/l	13.8	546	6.8	696	95	58.3
TKN, mg/l	< 0.3	< 0.3	1.2	176	52	22.8
Radiochemical Analyses						
Radium-226 pCi/l	0.119 ± 0.087	0.087 ± 0.071	0.166 ± 0.088	0.560 ± 0.130	0.218 ± 0.092	0.047 ± 0.048
Uranium, µg/l	69.3	< 1	< 1	9.89	< 1	2.4
Metals Analyses						
Arsenic, mg/l	0.045	0.031	0.010	0.256	0.02	0.028
Cadmium, mg/l	< 0.0006	0.0014	< 0.0006	0.0013	< 0.0006	< 0.0006
Chromium, mg/l	0.005	0.014	< 0.004	< 0.004	< 0.005	0.018
Copper, mg/l	< 0.003	0.046	0.006	< 0.003	< 0.003	< 0.003
Lead, mg/l	0.006	0.005	< 0.005	0.010	< 0.005	< 0.005
Mercury, mg/l	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Molybdenum, mg/l	0.081	0.001	< 0.001	< 0.001	< 0.001	< 0.001
Nickel, mg/l	0.003	0.005	< 0.002	0.375	0.049	0.013
Phosphorus, mg/l	1.33	0.278	0.355	< 0.170	< 0.170	0.277
Potassium, mg/l	4.7	5.46	2.13	19.9	4.67	9.96
Selenium, mg/l	0.007	0.004	< 0.003	< 0.003	0.005	< 0.003
Zinc, mg/l	< 0.003	3.73	0.026	0.037	< 0.003	0.006

TABLE 5

Soil Nitrate Analyses (mg/kg)

Sequoyah Acreage

	Pre-Season Results (Collected on 03/24/2015)							
Location	0-6C"	6-12"	12-18"	18-24"	24-30"	30-36"	36-42"	42-48"
Agland	6.0	7.2	4.4	4.1	4.1	4.3	3.6	3.4
	Mid-Season Results (Collected on 08/26/2015)							
Location	0-6C"	6-12"	12-18"	18-24"	24-30"	30-36"	36-42"	42-48"
Agland	16.2	7.5	5.5	4.8	5.3	5.4	4.9	4.8
	Post-Season Results (Collected on 12/03/2015)							
Location	0-6C"	6-12"	12-18"	18-24"	24-30"	30-36"	36-42"	42-48"
Agland	1.82	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Table 6
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 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
Inorganic Analyses						
Ammonia (as N), mg/kg	< 5.0	8.45	< 5.0	< 5.0	6.0	< 5.0
Nitrate (as N), mg/kg	1.82	< 1.0	3.13	2.15	1.84	1.06
TKN, mg/kg	940	1230	584	758	1250	800
pH	6.4	6.3	6.9	6.9	6.0	6.1
Radiochemical Analyses						
Radium-226 pCi/g	0.655 ± 0.192	0.326 ± 0.119	0.325 ± 0.122	0.563 ± 0.148	0.587 ± 0.154	0.551 ± 0.155
Uranium, µg/g	1.93	2.08	2.15	2.40	8.48	5.81
Metals Analyses						
Arsenic, mg/kg	2.89	2.49	3.00	8.57	5.84	4.58
Cadmium, mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chromium, mg/kg	6.94	6.54	11.4	27.5	13.0	15.0
Copper, mg/kg	4.11	2.98	3.53	9.04	3.34	2.91
Lead, mg/kg	8.87	9.72	9.22	23.2	24.3	13.6
Mercury, mg/kg	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Molybdenum, mg/kg	15.1	5.03	8.35	4.54	10.5	2.32
Nickel, mg/kg	5.07	3.09	4.26	22.9	5.68	4.18
Phosphorus, mg/kg	320	162	137	213	175	161
Potassium, mg/kg	1010	450	684	2130	664	590
Selenium, mg/kg	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Zinc, mg/kg	15.2	8.22	11	54.6	17.5	15.3

Parameter	S. Meadow Composite					
Inorganic Analyses						
Ammonia (as N), mg/kg	7.75					
Nitrate (as N), mg/kg	2.12					
TKN, mg/kg	1010					
pH	6.2					
Radiochemical Analyses						
Radium-226 pCi/g	0.495 ± 0.144					
Uranium, µg/g	2.69					
Metals Analyses						
Arsenic, mg/kg	3.82					
Cadmium, mg/kg	< 0.5					
Chromium, mg/kg	11.7					
Copper, mg/kg	3.48					
Lead, mg/kg	15.3					
Mercury, mg/kg	< 0.02					
Molybdenum, mg/kg	4.32					
Nickel, mg/kg	2.99					
Phosphorus, mg/kg	180					
Potassium, mg/kg	5.61					
Selenium, mg/kg	< 2.0					
Zinc, mg/kg	15.8					

TABLE 8

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	NO3-N mg/kg
Sequoyah Acreage																
Agland (1st)	7/1/15	< 1.06	9.93	< 2.89	9.33	97.9	207	164	0.794	< 0.615	< 0.115	38.5	0.014	0.012±0.009	0.012 ± 0.007	255
Agland (2nd)	10/2/15	< 2.00	< 10.0	< 1.0	6.24	112	30.3	86.1	< 2.00	< 0.500	< 2.0	24.2	<0.008	0.001±0.016	0.024 ± 0.012	2.89
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