Carberry Environmental Service

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March 25, 2013

Iowa Department of Natural Resources
Attn: Matt Culp, Contaminated Sites Section
Wallace Building
Des Moines, Iowa 50319

RE: Final Groundwater Monitoring Report for Agriland FS - Knoxville, Iowa

This report is provided as a summary of the final groundwater monitoring round at the Agriland FS former bulk petroleum storage facility located at 1101 North Lincoln Street, Knoxville, Iowa. The Department, by letter dated September 21, 2012, recommended termination of routine groundwater monitoring and free product recovery requirements at the site. This recommendation was based on nearly ten years of monitoring data documenting decreasing contaminant levels in samples from onsite wells. Closure sampling was conducted at the site on November 1, 2012. Split samples were also collected for analysis by the Department. The split sample analytical results will not be addressed here.

Groundwater samples were collected from four (4) monitoring wells, MW-16 and MW-18, each located adjacent to the former above-ground storage tanks, and MW-22 and MW-23, both located east of the site in the adjacent Iowa National Guard Armory parking lot. Wells MW-22 and MW-23 are the most downgradient of the wells at the site, based on the observed northeasterly groundwater flow direction.

Prior to sample collection each of the wells were purged of standing water using dedicated polyethylene bailers and nylon cord to ensure representative groundwater samples. Prior to purging, the water surface in the four wells to be sampled, along with MW-15, was inspected for the presence of free product.

Free product was observed only at MW-15, at a depth of approximately 2 inches. Measurable free product (greater than 1/16 inch in thickness) had not been encountered at the site since April 2011, when approximately 1/4 inch was observed in MW-15. The recent increase is likely due to the suspension of free product recovery efforts following the Department's letter of September 21, 2012, notifying Agriland FS of pending termination of monitoring and free product recovery requirements. Manual free product recovery from MW-15 had been performed by Agriland staff on a weekly basis since August 2010, after being been conducted twice-weekly since 2005. From 2005 through March 2009 several inches of free product at MW-15 was routinely observed.

The groundwater samples were submitted for laboratory analysis for dissolved petroleum hydrocarbons, using Iowa Test Methods OA-1 and OA-2 for select volatile and extractable petroleum hydrocarbons. These analytical results are summarized in the following table, which also shows pertinent State action levels for groundwater contaminants per Iowa Administrative Code (IAC) 567-135.14 and IAC 567-135.18(4). Hydrocarbons exceeding State action levels in samples collected at the site are indicated by bold-faced type.

The analytical results were generally consistent with previous findings, with elevated levels of petroleum hydrocarbons detected only in samples from onsite wells MW-16 and MW-18. The State action levels for benzene and extractable hydrocarbons were exceeded in both the MW-16 and MW-18 samples. The action level for ethylbenzene was exceeded only in the MW-18 sample. No hydrocarbons

were detected in MW-22 or MW-23 samples, as expected. Pertinent sections of the analytical report from TestAmerica, Inc. are attached.

Final Groundwater Monitoring Summary - November 2012
Former Bulk Fuel AST Site - Agriland FS, Knoxville, IA

Petroleum Hydrocarbons			***Sample***			
Volatile Compounds	units	Action Level	MW-16	MW-18	MW-22	MW-23
Benzene	ug/L	*5*	**465**	**2,380**	<2	<2
Toluene	ug/L	*1,000*	19	91	<2	<2
Ethylbenzene	ug/L	*700*	201	**824**	<2	<2
Xylenes, Total	ug/L	*10,000*	653	2,140	<3	<3
Extractable Compounds						
Total Extractable Compounds	ug/L	*n/a*	23,400	20,200	<300	<300
Diesel	ug/L	*1,200*	**14,500**	**7,800**	<300	<300
Gasoline	ug/L	*1,200*	**7,470**	**11,300**	<300	<300
Motor Oil	ug/L	*400*	**1,400**	**1,130**	<300	<300

ug/L - units of concentration are micrograms per liter (ug/L), equivalent to parts per billion (ppb) in aqueous solutions.
<2 - indicates compound not detected above indicated laboratory reporting limit.
n/a - No State action level has been set for total extractable hydrocarbons.
Volatile compound results may be rounded for clarity. See analytical report for precise concentrations.

Historical analytical results to date for wells included in the routine semiannual monitoring schedule are tabulated in the attached Historical Groundwater Monitoring Summary.

As indicated in the historical summary, the November 2012 analytical results were generally consistent with previous findings. Although levels of extractable hydrocarbons in the MW-16 sample were higher than those seen in nearly 2 years, and diesel and motor oil levels in the MW-18 sample were slightly higher than in 2011, the general decreasing trends observed in samples from the wells at the site since 2004 remain evident.

If you have any questions or require additional information, feel free to contact this office.

William E. Carberry

Encl.

Copy: Brett Hafner, Operations Manager
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Historical Groundwater Monitoring Summary
Former Bulk Fuel AST Site - Agriland FS, Knoxville, IA

well	sampling date	volatile hydrocarbons* (ug/L) benzene	toluene	ethylbenzene	total xylenes	sampling date	extractable hydrocarbons (ug/L) TEH	as diesel	as gasoline	as motor oil
MW-16	Jun-04	1,370	<200	534	2,930	Jun-04	36,600	14,460	21,300	924
	Jun-07	925	83	389	1,930	Jun-07	89,900	26,400	63,000	450
	May-08	948	67	413	2,370	May-08	24,600	12,700	11,900	<370
	Nov-08	705	60	371	1,590	Nov-08	75,600	46,200	28,000	1,350
	Mar-09	626	49	314	1,160	Mar-09	19,000	8,530	9,890	594
	Nov-09	590	47	337	1,440	Nov-09	17,400	7,910	8,940	542
	Aug-10	445	32	312	1,200	Aug-10	51,500	29,000	21,200	1,290
	Dec-10	471	32	304	1,080	Dec-10	35,900	20,800	14,200	903
	Apr-11	482	21	237	897	Apr-11	22,000	12,400	9,000	572
	Oct-11	381	<20	213	269	Oct-11	17,100	9,350	7,800	<361
	Jun-12	306	15	308	896	Jun-12	10,700	5,930	4,270	489
	Nov-12	465	19	201	653	Nov-12	23,400	14,500	7,470	1,400
MW-18	Jun-04	4,220	1,900	1,250	4,280	Jun-04	28,600	7,070	20,900	679
	Dec-04	2,930	618	1,080	3,160	Dec-04	19,100	4,630	13,700	802
	Mar-05	3,070	681	1,090	3,300	Mar-05	27,200	6,570	20,000	592
	Jun-05	3,180	1,270	1,170	3,860	Jun-05	24,700	3,910	20,200	546
	Sep-05	330	35	110	330	Sep-05	22,600	4,850	17,700	<481
	Jan-06	3,520	384	1,120	3,490	Jan-06	23,100	5,080	17,500	532
	Jun-06	3,590	418	1,140	3,300	Jun-06	19,400	4,670	14,100	631
	Aug-06	3,610	308	1,180	3,820	Aug-06	25,200	3,940	21,300	<375
	Dec-06	3,420	329	1,130	3,710	Dec-06	25,900	5,740	20,200	<380
	Jun-07	3,250	992	1,430	4,430	Jun-07	31,000	3,390	27,600	<390
	May-08	3,360	733	1,480	5,150	May-08	23,800	5,890	17,900	<370
	Nov-08	3,080	440	1,280	4,340	Nov-08	33,200	8,930	23,400	865
	Mar-09	2,660	797	1,210	4,200	Mar-09	22,200	4,320	17,300	533
	Nov-09	2,980	619	1,370	5,070	Nov-09	23,400	7,570	15,100	718
	Dec-10	2,530	191	1,100	3,200	Dec-10	28,600	11,600	16,300	791
	Apr-11	2,190	275	1,060	3,090	Apr-11	22,700	6,900	15,200	570
	Oct-11	2,680	152	975	2,560	Oct-11	19,100	6,180	12,000	897
	Nov-12	2,380	91	824	2,140	Nov-12	20,200	7,800	11,300	1,130
MW-22	Dec-06	<2	<2	<2	<3	Dec-06	**303**	**303**	<300	<300
	Jun-07	<2	<2	<2	<3	Jun-07	<395	<395	<395	<395
	May-08	<2	<2	<2	<3	May-08	<400	<400	<400	<400
	Nov-08	<2	<2	<2	<3	Nov-08	<400	<400	<400	<400
	Mar-09	<2	<2	<2	<3	Mar-09	<405	<405	<405	<405
	Nov-09	<2	<2	<2	<3	Nov-09	<390	<390	<390	<390
	Aug-10	<2	<2	<2	**3.25**	Aug-10	<370	<370	<370	<370
	Dec-10	<2	<2	<2	**3.31**	Dec-10	<349	<349	<349	<349
	Apr-11	<2	<2	<2	<3	Apr-11	<484	<484	<484	<484
	Oct-11	<2	<2	<2	<3	Oct-11	<349	<349	<349	<349
	Jun-12	<2	<2	<2	<3	Jun-12	<577	<577	<577	**134**
	Nov-12	<2	<2	<2	<3	Nov-12	<300	<300	<300	<300
MW-23	Dec-06	**4.44**	<2	<2	<3	Dec-06	<333	<333	<333	<333
	Jun-07	<2	<2	<2	<3	Jun-07	<400	<400	<400	<400
	May-08	<2	<2	<2	<3	May-08	<361	<361	<361	<361
	Nov-08	<2	<2	<2	<3	Nov-08	<500	<500	<500	**180**
	Mar-09	<2	<2	<2	<3	Mar-09	<380	<380	<380	<380
	Nov-09	<2	<2	<2	<3	Nov-09	<353	<353	<353	<353
	Aug-10	<2	<2	<2	<3	Aug-10	<370	<370	<370	<370
	Dec-10	<2	<2	<2	<3	Dec-10	<345	<345	<345	<345
	Apr-11	<2	<2	<2	<3	Apr-11	<400	<400	<400	<400
	Oct-11	<2	<2	<2	<3	Oct-11	<353	<353	<353	<353
	Jun-12	<2	<2	<2	<3	Jun-12	<714	<714	<714	**102**
	Nov-12	<2	<2	<2	<3	Nov-12	<300	<300	<300	<300
State Action Levels:		*5*	*1,000*	*700*	*10,000*		*none*	*1,200*	*1,200*	*400*

AST - above-ground storage tank.
TEH - total extractable hydrocarbons (diesel, gasoline motor oil)
ug/L - units of concentration are micrograms per liter.

< indicates compound not detected above laboratory reporting limit, as shown.
State action levels per Iowa Administrative Code 567-135.14 and 135.18(4).
*Concentrations <100 ug/L may be rounded for clarity.