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November 12, 2009

B-09075-0149-1730
REPA4-1730-007

Mr. Aaron Zimmerman
US EPA Region 7
901 North 5th Street
Kansas City, KS 66101

Subject: EPA Contract No. EP-W-07-020; Task Order 030 (Regional TO R720-11); Draft Cost Estimate Analysis for Farmland Industries, Lawrence, KS (KSD007128507).

Dear Mr. Zimmerman:

In response to Task Order 030, Task 2, under contract No. EP-W-07-020, Booz Allen hereby submits the Draft Cost Estimate Analysis for Farmland Industries, Lawrence, KS (KSD007128507). This estimate accounted for operations and maintenance of quarterly groundwater monitoring, land application, excavation, operations and maintenance of detention basin, closure of several ponds, production well plugging and abandonment, and cap maintenance. This draft package includes a comparison to the cost estimate included in the Remedial Action Plan dated May 2009. A hard copy of the Cost Estimate Analysis, as well as an electronic copy on compact disc (CD), will be delivered to the EPA TOCOR.

Should you have any questions regarding this deliverable, please contact me at (816) 448-3253 or Christopher Weesner at (913) 383-9474.

Sincerely,

BOOZ ALLEN HAMILTON

John Dixon
Regional Manager

Enclosures

cc: Andrea Stone, EPA TOCOR & Project Manager
Evelyn Stanley, EPA CO (letter only)
Anita Felton, EPA CS (letter only)
REPA4_Zone 3 Deliverables

DRAFT COST ESTIMATE ANALYSIS
RCRA Enforcement, Permitting, and Assistance (REPA), Zone III
Contract No. EP-W-07-020
November 12, 2009

Task Order: R1730, Analyzing Cost Estimates at Non-Iowa RCRA Corrective Action Facilities

Task 2: Draft Cost Estimate Analysis

Deliverable: REPA4-1730-007

Site: Former Farmland Industries, Lawrence, KS
EPA RCRA ID – KSD007128507

APPROACH

This cost estimate analysis was prepared by Booz Allen Hamilton (Booz Allen), based on information provided by the United States Environmental Protection Agency (EPA) Region 7. Specifically, per technical direction from the EPA Task Order Contracting Officer Representative (TOCOR), Andrea Stone, Booz Allen prepared a draft cost estimate analysis based on the Reference Document listed below.

Booz Allen reviewed the Remedial Action Plan, Draft Corrective Action Decision, and a letter following a meeting between KDHE and EPA regarding the Farmland Industries site, and prepared a cost estimate incorporating operations and maintenance of groundwater monitoring, land application, soil excavation, and closure activities.

Booz Allen prepared this draft cost estimate deliverable using Remedial Action Cost Engineering Requirements (RACER™) 2009 software, Version 10.2. General comparisons were made between the RACER™ cost estimates and the cost estimate submitted by Shaw Environmental Services, Inc. for Farmland Industries. These comparisons are shown in Table 1.

REFERENCE DOCUMENTS

The following documents were reviewed and used in the development of this analysis:

- Letter re: Former Farmland Nitrogen Facility, July 2, 2008.
- Remedial Action Plan, Shaw Environmental, Inc., May 22, 2009.
- Draft Corrective Action Decision, KDHE, September 2009.

PROJECT SUMMARY

Site Background

Farmland Industries, located at 1608 N. 1400 Rd in Lawrence, Kansas, began operations in 1954. The plant produced a wide variety of fertilizers, including nitrogen-based, anhydrous ammonia, nitric acid, granular urea, ammonium nitrate, and urea ammonium nitrate solution. Plant operations ceased in 2001 due to the economic downturn of the fertilizer market. Farmland Industries went bankrupt in 2002. The remediation efforts for the site are now funded by the FI Kansas Remediation Trust, managed by SELS Administrative Services, LLC and Shaw Environmental and Infrastructure, Inc.

Site History and Investigation

In the 1970's, Farmland Industries performed remedial action in the form of groundwater interception trenches to address contaminated soil and groundwater related to the ponds on the northern end of the facility. In the 1980's a Chrome Reduction System surface impoundment was identified as a hazardous waste management unit. The system was taken out of service and contaminated soil was removed in 1987. This area is still undergoing groundwater cleanup under a KDHE permit.

In September 1990, a RCRA Facility Assessment was completed to identify specific areas of concern. On January 27, 1993, Farmland Industries and KDHE entered into a Consent Agreement to conduct a Comprehensive Investigation/Corrective Action Study. The CI report was submitted in October of 1994. In 1997, a Corrective Action Plan was approved by KDHE, including requests to install a French Drain system and recovery wells, and reusing/recycling contaminated groundwater in plant processes. Following the closure of the plant in 2001, KDHE requested that additional investigations and a modified remedy be implemented.

A comprehensive Site Characterization was conducted in 2005 to identify the lateral and vertical extent of contamination. Additional investigations were conducted in March 2006, August through October 2007, and October 2008. Following these efforts, KDHE authorized the Trust to prepare a Remedial Action Plan.

ESTIMATE

A number of general and task-specific assumptions were made during development and preparation of the RACER™ cost estimate. In general, basic default RACER™ templates were utilized as shown below. The assumptions made during the preparation of the RACER™ estimate are described below.

General

- One draft estimate was prepared. This estimate accounted for operations and maintenance of quarterly groundwater monitoring, land application, excavation, operations and maintenance of detention basin, closure of several ponds, production well plugging and abandonment, and cap maintenance.
- The geographic localization factor for the RACER™ cost estimate is Lawrence, KS.

The following are the parameter values used to create the RACER™ cost estimate and the sources and assumptions that form the basis of each value.

Primary Remedial Priorities.

This estimate includes costs for quarterly groundwater monitoring, land application, and land use restrictions. Per information contained in the Remedial Action Plan, this includes sampling of 57 monitoring wells, land application of water and soil, and land use restrictions. Costs are estimated using the RACER™ Monitoring technology. Assumptions were based on the Remedial Action Plan, with details noted below:

RACER™ Monitoring Technology

System Definition

- Assumed groundwater sampling
- Site distance of 40 miles
- Safety level D

Groundwater

- Average sample depth of 25 ft.
- Assumed 57samples
- Assumed sampling quarterly for 30 years
- Assumed the following analytical template: System Water PCBs (PCBs was used because ammonia/nitrate was not an immediately available option; see assembly level changes)
- Turnaround time 21 days (RACER™ default)
- Stage 1 QC (RACER™ default)
- Sampling method low-flow pumps (RACER™ default)
- 8 wells sampled/day (RACER™ default)
- Contain purge water (RACER™ default)

QA/QC

- QA/QC sampling – accepted RACER™ defaults, except zeroed out split samples

Data Management

- Assumed standard monitoring plan (RACER™ default)

- Stage 1 Lab Data Review (RACER™ default)
- Assumed submitting data electronically (RACER™ default)
- Assumed abbreviated monitoring reports (RACER™ default)

Assembly level changes
- Added line item of Nitrogen, Nitrate & Nitrite for 267 samples
- Changed PCB samples from 267 to 0

RACER™ Residual Waste Management Technology
- Disposal of 178,530 gallons of purge water by truck in 1 mile (on-site application of water)

Assembly level changes
- Zeroed out Waste Stream Evaluation Fee
- Zeroed out Commercial RCRA Landfills

RACER™ Operations & Maintenance Technology
System Definition
- Infiltration Gallery
- Flow Rate of 45 GPM

Labor
- System O&M Labor – Minimum
- Professional Labor – Minimum

RACER™ Long Term Monitoring Technology
System Definition
- Monitoring and Enforcement
- Type of Site – Private

Monitoring and Enforcement
- Duration – 30 years
- Reports and Certifications
- Number of Site Visits Annually – 1
- Duration 1 day
- Number of Personnel – 2

Primary Development
This estimate includes excavation costs for the East and West Effluent Ponds, installation of a detention basin, and O&M of detention basin.

RACER™ Excavation Technology
System Definition

- Estimated by volume/depth
- Volume at 43,000 BCY
- Depth at 4.0 ft
- Soil - Silty/Silty-Clay Mixture
- Safety level D

Excavation

- Existing Cover - Soil/Gravel
- Replacement Cover - Soil/Stone
- Source of additional backfill - None

Analytical

- Analytical Template - System Soils PCBs
- Number of Sampling Points - 1
- Number of Composites - 1
- No Sampling Reports

Assembly level changes

- Zeroed out Disposable Materials per sample
- Zeroed out PCBs in soil

RACER™ Excavation Technology
System Definition

- Estimated by volume/depth
- Volume at 31,300 BCY
- Depth at 5.0 ft
- Soil - Silty/Silty-Clay Mixture
- Safety level D

Excavation

- Existing Cover - Soil/Gravel
- Replacement Cover - Soil/Stone
- Source of additional backfill - None

Analytical

- Analytical Template - System Soils PCBs
- Number of Sampling Points - 1
- Number of Composites - 1
- No Sampling Reports

Assembly level changes

- Zeroed out Disposable Materials per sample
- Zeroed out PCBs in soil

RACER™ Monitoring Technology
System Definition

- Assumed subsurface soil sampling
- Site distance of 40 miles, one-way
- Safety level D

Subsurface Soil

- Average sample depth of 9 ft.
- Assumed 6 samples
- Assumed 1 event
- Assumed the following analytical template: System Soils PCBs
- Turnaround time 21 days (RACER™ default)
- Data package/QC Stage 1 (RACER™ default)
- Sampling method of direct push
- Number of samples per day 15 (RACER™ default)

QA/QC

- QA/QC sampling - accepted RACER defaults except zeroed out split samples

Data Management

- Assumed abbreviated monitoring plan
- Stage 1 Lab Data Review (RACER™ default)
- Assumed submitting data electronically (RACER™ default)
- Assumed abbreviated monitoring reports (RACER™ default)

Assembly Level Changes

- Added line item for testing soil & sediment analysis, nitrogen for 60 samples (3 site locations x 1 foot interval samples x 9 feet of sampling x 2 sites + 6 QA/QC samples)
- Zeroed out PCBs in Soil
- Changed Disposable Materials per Sample to 60
- Changed Decontamination per Sample to 60

RACER™ Load and Haul Technology
System Definition

- Truck type - Off Highway
- Volume - 74,300 CY
- One-way Haul Distance - 2500 ft.

- Dump charge - $0.00
- Safety Level D

RACER™ Passive Water Treatment Technology
System Definition
- Type – Runoff Detention Pond
- Drainage 6.0 acres
- Safety level D

RACER™ Operations & Maintenance Technology
System Definition
- Passive Water Treatment
- 8 Acres
- 2 Ponds

Labor
- System O&M Labor – Minimum
- Professional Labor – Minimum

Secondary Priorities
This estimate includes costs for excavation of the Sandstone Hill, Central Ponds, Dam Pond, Western Pond, capping and closure of the all ponds, cap maintenance, Production well abandonment, and for the remedial design document.

RACER™ Excavation Technology
System Definition
- Estimated by volume/depth
- Volume at 13,500 BCY
- Depth at 2.0 ft
- Soil – Silty/Silty-Clay Mixture
- Safety level D

Excavation
- Existing Cover – Soil/Gravel
- Replacement Cover – Soil/Stone
- Source of additional backfill – None

Analytical
- Analytical Template – System Soils PCBs
- Number of Sampling Points – 1
- Number of Composites – 1
- No Sampling Reports

Assembly level changes

- Zeroed out Disposable Materials per sample
- Zeroed out PCBs in soil

RACER™ Excavation Technology
System Definition

- Estimated by volume/depth
- Volume at 2,500 BCY
- Depth at 3.0 ft
- Soil - Silty/Silty-Clay Mixture
- Safety level D

Excavation

- Existing Cover - Soil/Gravel
- Replacement Cover - Soil/Stone
- Source of additional backfill - None

Analytical

- Analytical Template - System Soils PCBs
- Number of Sampling Points - 1
- Number of Composites - 1
- No Sampling Reports

Assembly level changes

- Zeroed out Disposable Materials per sample
- Zeroed out PCBs in soil

RACER™ Excavation Technology
System Definition

- Estimated by length/width/depth
- Length 90 ft.
- Width 50 ft.
- Depth at 2.0 ft.
- Soil - Silty/Silty-Clay Mixture
- Safety level D

Excavation

- Existing Cover - Soil/Gravel
- Replacement Cover - Soil/Stone
- Source of additional backfill - None

Analytical

- Analytical Template – System Soils PCBs
- Number of Sampling Points – 1
- Number of Composites – 1
- No Sampling Reports

Assembly level changes

- Zeroed out Disposable Materials per sample
- Zeroed out PCBs in soil

RACER™ Load and Haul Technology
System Definition

- Truck type – Off Highway
- Volume – 44,150 CY
- One-way Haul Distance – 2500 ft.
- Dump charge - $0.00
- Safety Level D

RACER™ Excavation Technology
System Definition

- Estimated by volume/depth
- Volume at 12,800 BCY
- Depth at 20.0 ft
- Soil – Silty/Silty-Clay Mixture
- Safety level D

Excavation

- Existing Cover – Soil/Gravel
- Replacement Cover – Soil/Stone
- Source of additional backfill – None

Analytical

- Analytical Template – System Soils PCBs
- Number of Sampling Points – 1
- Number of Composites – 1
- No Sampling Reports

Assembly level changes

- Zeroed out Disposable Materials per sample
- Zeroed out PCBs in soil

RACER™ Capping Technology
System Definition

- Dermal Cover
- 8.03 acres
- Safety level D

General

- Side slope of cap 3:1 (RACER default)
- Horizontal Projection of side slope 105 ft. (RACER default)
- Horizontal Projection of top slope 105 ft. (RACER default)

Dermal Cover

- Accepted RACER defaults except changed borrow source to On-Site

RACER™ Capping Technology
System Definition

- Dermal Cover
- 2.87 acres
- Safety level D

General

- Side slope of cap 3:1 (RACER default)
- Horizontal Projection of side slope 105 ft. (RACER default)
- Horizontal Projection of top slope 105 ft. (RACER default)

Dermal Cover

- Accepted RACER defaults except changed borrow source to On-Site

RACER™ Capping Technology
System Definition

- Dermal Cover
- 5.51 acres
- Safety level D

General

- Side slope of cap 3:1 (RACER default)
- Horizontal Projection of side slope 105 ft. (RACER default)
- Horizontal Projection of top slope 105 ft. (RACER default)

Dermal Cover

- Accepted RACER defaults except changed borrow source to On-Site

RACER™ Excavation Technology
System Definition

- Estimated by volume/depth
- Volume at 5,000 BCY
- Depth at 2.0 ft
- Soil - Silty/Silty-Clay Mixture
- Safety level D

Excavation

- Existing Cover - Soil/Gravel
- Replacement Cover - Soil/Stone
- Source of additional backfill - None

Analytical

- Analytical Template - System Soils PCBs
- Number of Sampling Points - 1
- Number of Composites - 1
- No Sampling Reports

Assembly level changes

- Zeroed out Disposable Materials per sample
- Zeroed out PCBs in soil

RACER™ Excavation Technology
System Definition

- Estimated by volume/depth
- Volume at 10,000 BCY
- Depth at 2.0 ft
- Soil - Silty/Silty-Clay Mixture
- Safety level D

Excavation

- Existing Cover - Soil/Gravel
- Replacement Cover - Soil/Stone
- Source of additional backfill - None

Analytical

- Analytical Template - System Soils PCBs
- Number of Sampling Points - 1
- Number of Composites - 1

- No Sampling Reports

Assembly level changes

- Zeroed out Disposable Materials per sample
- Zeroed out PCBs in soil

RACER™ Well Abandonment Technology
System Definition

- Number of Wells - 7
- Depth of Wells - 50 ft
- Diameter of Wells - 6 in
- Unconsolidated structure
- Abandon in place

RACER™ Operations & Maintenance Technology
System Definition

- Passive Water Treatment
- 66Acres
- 5 Ponds
- Capping 8 acres
- Capping 3 acres
- Capping 6 acres

Labor

- System O&M Labor - Minimum
- Professional Labor - Minimum

RACER™ Remedial Design Technology
System Definition

- Project Approach - Ex situ removal - Performance-Based On-Site Treatment or Removal
- Low Complexity
- Included all tasks
- Site distance - 40 miles one way
- Moderate Level of RD Detail

Project Planning

- Accepted all RACER defaults

Treatability or Other Studies

- Accepted all RACER defaults

Preliminary design

- Accepted all RACER defaults

Intermediate design

- Accepted all RACER defaults

Prefinal design

- Accepted all RACER defaults

Final design

- Accepted all RACER defaults

Bid documents

- Accepted all RACER defaults

ESTIMATE COMPARISON

The Former Farmland Industries Cost Estimate presents a total cost of $13,231,402. These costs are presented in Table 1 below.

The facility's estimate includes a contingency of $2,121,900 and a KDHE oversight of $500,000 that are not included in this estimate. The total estimates are similar in costs, but there are several differences. The facility's estimate for the O&M of the detention basin and O&M of the cap are significantly less than RACER's costs. Soil excavation is higher in the facility's estimate. The facility's estimate is higher for closure of ponds as well.

One RACER™ cost estimate was prepared. For the purposes of analysis, the costs generated in the estimate are divided into costs for Primary Remedial Priorities, Primary Development Priorities, and Secondary Priorities.

The assumptions used to create the RACER™ cost estimate for the above scope at the Farmland Industries facility are provided in the sections above. Based on the results of this cost analysis and taking into account the assumptions described, the estimated RACER™ costs are lower than the facility's estimated costs. The facility's total estimated costs are $13,231,402 (including contingency and KDHE oversight) whereas, the costs estimated by RACER™ are $11,824,700.

CONCLUSIONS

A cost comparison breakout of the RACER™ estimates and comparison with the facility estimate is provided in Table 1 below. The first column presents the Farmland Industries financial assurance for 2009. The second column presents the 2009 RACER™ estimate.

TABLE 1

Item	Shaw's Estimate for Former Farmland Industries	RACER™ 2009 Estimate
Primary Remedial Priorities	**$5,116,105**	**$5,435,726**
Groundwater Monitoring	$2,483,355	$4,324,877
Land Application	$2,078,600	$641,446
Misc. activities	$554,150	$469,403
Primary Development	**$1,822,612**	**$1,671,689**
Desludge East and West Effluent Ponds	$1,015,412	$870,277
Re-route Drainage Channel and Construction of the Detention Basin (Option A)	$531,200	$174,665
O&M of Detention Basin	$156,000	$626,746
Annual Permit Fees	$120,000	-
Secondary Priorities	**$3,670,784**	**$4,717,285**
Soil Excavation from Sandstone Hill	$281,550	$104,104
Soil Excavation from Central Ponds	$52,800	$13,505
Sediment Excavation from Dam Pond	$6,000	$2,286
Maintenance on Remaining Ponds	$30,000	$106,836
Final Closure of Ponds (Except Overflow Pond)	$1,086,500	$240,713
Overflow Pond	$1,000,000	$121,633

Closure		
Cap Maintenance	$826,000	$3,886,261
Soil Excavation from Urea Plant Area	$93,500	$27,733
Soil Excavation from Northeast Production Area	$46,750	$14,028
Production Water Well Plugging and Abandonment	$36,400	$8,692
Remedial Design Document	$211,284	$95,054
Load & Haul	-	$96,440
Subtotal	**$10,609,501**	**$11,824,700**
Contingency	**$2,121,900**	-
KDHE Oversight	**$500,000**	-
Total Estimated Costs	**$13,231,402**	**$11,824,700**

Minor discrepancies within this table and between this table and the RACER cost attachments may occur due to rounding.