TETRA TECH

July 15, 2011

Mr. Roy Crossland
START Project Officer
U.S. Environmental Protection Agency, Region 7
901 North 5th Street
Kansas City, Kansas 66101

Redactions-CBI

Subject: **Summary of Repairs to Soil Vapor Extraction and Groundwater Recovery Systems**
Garvey Elevator Site, Hastings, Nebraska
CERCLIS ID: NEN000704351
U.S. EPA Region 7 START, Contract No. EP-S7-06-01, Task Order No. 0108
Task Monitor: Randy Schademann, On-Scene Coordinator

Dear Mr. Crossland:

Tetra Tech EM Inc. is submitting the enclosed Summary of Repairs for the Garvey Elevator site in Hastings, Nebraska. This report summarizes significant repairs to the soil vapor extraction and groundwater recovery systems completed by START since the inception of this task order in May 2008. If you have any questions or comments regarding this submittal, please contact the project manager at (816) 412-1754.

Sincerely,

[redacted]. PG, CHMM
START Project Manager

Enclosures

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SUMMARY OF REPAIRS
TO THE SOIL VAPOR EXTRACTION AND GROUNDWATER RECOVERY SYSTEMS
GARVEY ELEVATOR SITE – HASTINGS, NEBRASKA

CERCLIS ID No. NEN000704351

Superfund Technical Assessment and Response Team (START) 3
Contract No. EP-S7-06-01, Task Order 0108

Prepared For:

U.S. Environmental Protection Agency
Region 7
901 North 5th Street
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July 15, 2011

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1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) Region 7 Superfund Division tasked Tetra Tech EM Inc., (Tetra Tech), under Superfund Technical Assessment and Response Team (START) 3 Contract No. EP-S7-06-01, Task Order No. 0108, to conduct operations and maintenance (O&M) activities at the Garvey Elevator site in Hastings, Nebraska. Under this task order, START was assigned to inspect existing soil vapor extraction (SVE) and groundwater recovery systems; conduct immediate repairs, as necessary, to resume operation of these systems; conduct routine O&M activities once the systems become operational; complete system modifications; conduct periodic sampling of SVE and groundwater recovery wells associated with these systems; and periodically sample monitoring wells and private wells located on and near the site.

This report focuses on significant repairs and modifications to the remedial systems completed by START since the inception of this task order in May 2008. Reports describing other tasks completed under this task order have been, and continue to be, submitted under separate cover.

2.0 SITE LOCATION/DESCRIPTION

The Garvey Elevators, Inc. (Garvey) facility is a large commercial grain elevator located to the southwest of Hastings, Adams County, Nebraska, in the NW 1/4 of Section 23, Township 7 North, Range 10 West. The Garvey site (located at 2315 West Highway 6) occupies approximately 106 acres of land, 22 of which are improved. The site is located to the west of a Burlington Northern and Santa Fe rail line and to the south of U.S. Highway 6. Surrounding land use is primarily agricultural, with a mixture of urban and industrial uses to the north and east. The approximate geographic coordinates of the site are 40.5642 degrees north latitude and 98.4142 degrees west longitude. The elevation at the site is approximately 1,925 feet above mean sea level. The topographic relief at the Garvey facility is flat, with a slight southern to southeastern slope. The nearest named surface water feature is Pawnee Creek, located approximately 1 mile south of the elevator. Pawnee Creek flows from northwest to southeast in a meandering channel.

On the site is an approximately 8-million-bushel-capacity grain elevator terminal. The elevator terminal consists of a concrete elevator head house with a total of 258 bins and 4,733,000 bushels of storage capacity. Also present at the site are a steel bin with a storage capacity of 818,000 bushels and a flat storage building with a capacity of approximately 2.5 million bushels (Nebraska Tax Equalization and Review Commission [NTERC] 2000). Other buildings at the site include an office building, maintenance shop, scale house and associated truck scale, chemical storage warehouse, two electrical rooms, and an

elevator baghouse. Garvey owned and operated the facility from its original construction in 1959 to 2008. From 1959 to 1993, Garvey operated the facility using its own employees. Beginning in 1994, Garvey operated the facility pursuant to an agreement with Ag Processing, Inc., (AGP) grain cooperative (Traster 2003). Garvey ceased all association with the site in 2008 upon declaring bankruptcy; however, AGP continues its operations at the elevator.

3.0 SITE HISTORY/INVESTIGATIONS

Throughout the elevator's operational history, a number of pesticides and other hazardous materials have been used for a variety of purposes, including insect control for stored grain (fumigants and insecticides), noxious weed control (herbicides) around the elevator complex, and dust suppression (Tetra Tech 2003). From 1959 until 1968, the only reported grain fumigant used at the elevator was 80-20 liquid (J-Fume 80-20) grain fumigant, which is a mixture of 80 percent carbon tetrachloride (CCl_4) and 20 percent carbon disulfide (also known as carbon bisulfide) by volume, or about 85 percent CCl_4 and 15 percent carbon disulfide by weight. The fumigant was applied in all upright grain storage areas. The liquid fumigant was stored in a 3,000-gallon aboveground storage tank (AST) located at the west end of the elevator; the AST had a delivery pipe that ran underground from the tank to the side of the elevator, and then up the elevator gallery (Tetra Tech 2003). Within the gallery, the pipe was routed to piping that ran over the various bins in the gallery and applied fumigant to the surface of the grain requiring treatment. The dosage usually varied from 1 to 2 gallons per 1,000 bushels of grain (Traster 2003). Use of the fumigant at the site was reportedly discontinued in 1985 (Tetra Tech 2003).

In the early 1990s, AGP offered to purchase 30 grain elevators from Garvey, subject to an Environmental Site Assessment (ESA) of each. The ESA at the Garvey site (in 1994) identified CCl_4 in the groundwater at 199 micrograms per liter (µg/L). Previous employees at the elevator reported that the underground pipe between the storage tank and the elevator had begun leaking, and had been repaired at a subsequent unknown date. Garvey has been unable to provide the exact date of the pipe repair and the exact amount of liquid fumigant lost through the leak. The leak was not reported to the State until August 9, 1994, some 9 years after use of the fumigant had been discontinued.

Since the 1994 discovery of CCl_4 in groundwater at the Garvey Elevator site, various consultants have conducted numerous environmental investigations at the site. An estimated area of 502,655 square feet of contaminated soil on site extended to the water table (IT Corporation 2002). To investigate and address the contamination, past investigations and remedial activities have included installations of permanent groundwater monitoring wells, two soil vapor extraction (SVE) systems, and a groundwater treatment

system (with groundwater recovery wells and an air stripper). Currently, 51 permanent monitoring wells are located at the site or on adjacent properties, along with eight SVE wells and eight groundwater recovery wells. Past remedial activities were conducted at the site under Nebraska's Remedial Action Plan Monitoring Act (RAPMA) voluntary cleanup program. The Garvey remedial systems are discussed below in this section.

Site investigations have also included sampling to determine the vertical and lateral extents of the off-site CCl_4 groundwater plume, as well as to identify impacted drinking water wells. In 1996, the CCl_4 plume was estimated as 6,500 feet long by 3,200 feet wide in the principal regional sand and gravel aquifer (NTERC 2000). The CCl_4 plume generally extends east from the site, immediately south of the West Highway 6 corridor. Numerous private/public wells located in the site vicinity have been sampled. Concentrations of CCl_4 detected in those wells have been as high as 300 µg/L (Tetra Tech 2003). The EPA maximum contaminant level (MCL) for CCl_4 in drinking water is 5 µg/L. Currently, all but one of the residences at which CCL_4 was identified in domestic wells above its MCL have been connected to city water. A whole-house water purification system still remains in operation at that one residence. Samples collected in 1997 from a nearby municipal well (Well 13) contained CCl_4 and tetrachloroethene (PCE) at concentrations at or exceeding their respective MCLs. The municipal well was taken off line as a primary well and now serves as an emergency well.

Garvey Remedial Systems

Remedial systems currently located at the site include a groundwater recovery system and two SVE systems. The groundwater treatment system, as originally constructed, consists of eight extraction wells, all located on site. RW-1 through RW-5 are screened within the upper (A/B) aquifer zones, and the remaining wells (RW-6, RW-7, and RW-8) are screened within the medial (C) aquifer zone. Water is pumped from each well through a particulate filter and into a packed (carbon) tower air stripper where it is treated via diffusion and aeration. The treated water is then pumped through another particulate filter and discharged to two injection wells located on Garvey property, upgradient of the source area.

The five shallow (A/B) wells are equipped with submersible pumps, each capable of pumping approximately 40 gallons per minute (gpm) at 245 feet of head. The three deeper (C) wells are equipped with submersible pumps capable of pumping 100 gpm at 260 feet of head. Flow meters are installed at each wellhead for monitoring of individual wells. An additional flow meter is located prior to the influent filter for monitoring total system flow. As of the date of this report, all eight wells are operational and the total system flow is approximately 300 gpm.

The SVE systems consist of eight extraction wells, five of which are screened in the upper vadose zone (20 to 50 feet below ground surface [bgs]), and three of which are screened in the lower vadose zone (60 to 110 feet bgs). Wells SVE-1, SVE-3, SVE-4, SVE-7, and SVE-8 are screened in the upper vadose zone, and wells SVE-9, SVE-10, and SVE-11 are screened in the lower vadose zone. Based on information obtained during a pilot test, the SVE wells have an expected radius of influence of 25 to 30 feet in the shallow vadose zone (predominantly silts and clays) and 150 to 180 feet in the deeper vadose zone (predominantly sand).

The systems operate using two separate blowers, one for the set of shallow wells (SVE System 1), and one for the set of deeper wells (SVE System 2). Combined, the two blowers are capable of moving air at approximately 800 standard cubic feet per minute (scfm) at optimum vacuums. As originally operated, vapors from the eight wells were combined and passed through a catalytic oxidation (catox) unit and scrubber for treatment of the contaminated vapors. However, contaminant levels in the vapor stream have subsequently decreased such that treatment of the vapors is no longer required (in accordance with state air regulations) prior to discharge. As of the date of this report, the SVE systems are optimized to capture contamination from those wells which have consistently exhibited the highest concentrations of CCl_4. Of the shallow wells, only SVE-7 and SVE-8 are currently open; SVE-1, SVE-3 and SVE-4 were closed in February 2011. Of the deep wells, only SVE-9 and SVE-11 are currently open; SVE-10 was closed in February 2011. The total system flow is approximately 800 scfm.

4.0 REPAIRS AND MODIFICATIONS

The following sections describe significant repairs and modifications completed by START from August 2008 through May 2011. A table summarizing these activities is provided with equipment information in Appendix A.

4.1 AUGUST 2008 THROUGH DECEMBER 2008

START's initial assessment of the SVE and groundwater extraction systems in August 2008 revealed several malfunctioning or non-functioning components, including several groundwater extraction wells and the sump pump located inside the equipment building. Both SVE systems appeared operational, though neither was running when START arrived at the site. In September 2008, START coordinated with the Emergency and Rapid Response Services (ERRS) contractor, Environmental Restoration, Inc., (ER) to further evaluate non-functional components of the groundwater extraction system. START/ERRS conducted downhole video logging, pump inspection, transducer inspection, and redevelopment at the four non-functioning wells. At three of the wells (RW-1, RW-3, and RW-4), pumps and/or pump motors were

found inoperable, and wells screens were determined to be at least 50% plugged. New pumps and/or pump motors were installed after the well screens had been cleaned using an acid wash; the wells were then redeveloped. Information regarding the new pumps and motors is provided in Appendix A. At the fourth well (RW-5), the pump and pump discharge pipe were found clogged with silt and sand. A downhole video log for this well identified breaches in the screen, and approximately the bottom 5 feet of the 10-foot screen had filled with sand. The damage to this well was determined irreparable, and no further maintenance activities occurred. Well rehabilitation activities were conducted by Sargent Drilling of Geneva, Nebraska.

In September 2008, START and ERRS made other repairs to the groundwater recovery system, including replacing wiring in the air stripper blower, installing new o-rings and filters in the four particulate filter canisters (two influent and two effluent), repairing a crack in the polyvinyl chloride (PVC) manifold, repairing leaks throughout the system, and replacing a bad surge protector for the transducer in RW-1. Information regarding the o-rings and particulate filters is provided in Appendix A. Air filters (both large and small) for the two SVE systems were also replaced. Information regarding the SVE air filters is provided in Appendix A. Also during this month, the on-site Operations Supervisor, Mr. Robert Dangler, began daily inspections and routine maintenance (oil changes, belt changes, etc.) of the two SVE systems, and full-time operation of these systems resumed.

In October 2008, START coordinated the installation of a high-level alarm in the air stripper tower, and an emergency shut-off button for the groundwater system. Neither of these system components had previously existed. In November 2008, ERRS completed construction of the equipment room buildout for the groundwater treatment room and the control panel room. The buildout was completed to prevent the groundwater system from freezing during the winter months, and to protect electronic equipment in the control room from dust and extreme temperatures.

In December 2008, START and ERRS completed repairs of SVE System 2 that included replacement of the existing blower motor and replacement of a bad breaker in the control panel.

4.2 JANUARY 2009 THROUGH DECEMBER 2009

In March 2009, START and ERRS coordinated with Middleton Electric of Grand Island, Nebraska, to investigate the cause of failure of RW-1. Middleton reported that a short-circuit existed in the RW-1 pump wiring somewhere between the variable frequency drive (VFD) box and the well vault, and subsequently replaced the wiring between the RW-1 vault and the RW-6 vault.

In April 2009, START and ERRS coordinated to complete several repairs and maintenance activities. The low-level float switch in the knockout tank on SVE System 2 was replaced. The transfer pump for this knockout tank had been running continuously, even though little or no water remained in the tank. Information regarding the low-level float switch is provided in Appendix A. START also replaced a leaking gasket on the air stripper transfer pump. START repaired portions of the discharge pipe leading from the bottom of the knockout tank for SVE System 2. This piping had cracked, possibly due to previous freezing, and was leaking. Finally, the discharge pipe in the well vault for RW-4 was repaired. This piping had cracked and the well vault had filled with water. Investigations of operational issues associated with RW-1, RW-6, and RW-8 also continued, as none of these wells had functioned on a regular basis since operation of the groundwater extraction system had resumed in 2008.

In May and June 2009, SVE System 2 shut down, apparently as a result of blower failure. START removed and repaired the blower for SVE System 2. The blower was transferred to Pathfinder Systems, Inc., (Pathfinder) of Kansas City, Missouri, for repair. Pathfinder indicated that the blower had been rebuilt incorrectly at some time in the past. Information regarding the blower for SVE System 2 is provided in Appendix A. Also, RW-4 continued to be inoperable, and it was determined that the disconnect inside this well vault had been damaged when the vault had flooded in April. The disconnect was replaced by Middleton Electric. ERRS also replaced the remaining high- and low-level float switches in the knockout tanks for both SVE systems. (The low-level switch for the System 2 tank had been replaced in April 2009.) Information regarding these float switches is provided in Appendix A.

In July 2009, START subcontracted with Huffman Engineering out of Lincoln, Nebraska, to replace the variable frequency drives (VFD), computer, operational software, and server associated with the programmable logic controller (PLC). Information regarding the new VFDs, computer, and operational software is provided in Appendix A. It was determined that the VFDs had been at least partially responsible for the malfunction of several wells, and that the operating software (Cimplicity) was obsolete and not sufficiently flexible for future programming needs anticipated by EPA. At EPA's request, Huffman was also tasked to add a data logging function that would allow logging of flow rates and water levels for each extraction well during pump test cycles.

In September 2009, START/ERRS performed well rehabilitation activities at RW-6 and RW-7, as these wells had exhibited reduced performance over the previous few months of operation. Initially, down-hole camera logging was conducted to identify the extent of fouling within the screened interval of each well. Well screens were then cleaned with an acid wash and redeveloped. Well rehabilitation activities were conducted by Sargent Irrigation Company of Aurora, Nebraska.

In October 2009, START replaced the transducers in RW-1 and RW-4, and repaired the transducer connection at IW-1. START also replaced the flow sensors for RW-8 and RW-4. Information regarding the flow sensors and transducers is provided in Appendix A. START and ERRS also coordinated with Guarantee Electric of Hastings, Nebraska, to replace the blower motor for the SVE System 2. The existing 7.5 horsepower (HP) motor was replaced with a larger 15HP motor because the existing motor was determined to be undersized and was consistently pulling more current than the motor's 30-Ampere rating. This caused the motor to frequently overheat and shut down. Information regarding the blower motor for SVE System 2 is provided in Appendix A. START also replaced the blower belt on the air stripper, and applied insulation to piping leading from the SVE knockout tanks. Information regarding the blower belts is provided in Appendix A.

In November 2009, START and ERRS coordinated the installation of a larger cooling unit to provide better climate control in the equipment control room. The new VFDs installed in July appear to create more heat than the old VFDs.

4.3 JANUARY 2010 THROUGH DECEMBER 2010

In late January 2010, a discharge pipe from the SVE knockout tanks froze and burst in the equipment room, damaging the PLC unit and desk top computer. START subsequently determined that the PLC and power supply required replacement and re-programming, and initiated a competitive procurement to complete these repairs. In March 2010, this work was awarded to QSPEC Solutions of Overland Park, Kansas. QSPEC began off-site re-programming work in April 2010.

In May 2010, START and ERRS coordinated the installation of groundwater recovery well RW-5, located near the southwest corner of the equipment building. This well screen had collapsed at some time prior to EPA's operation of this system, and START was tasked to design a new well located next to the existing RW-5 well vault. As directed by EPA, the well screen interval for the new RW-5 was approximately the same as the former RW-5. Information regarding the pump and transducer installed in this new well is provided in Appendix A. It should be noted that due to the relatively low volumes of water being produced in the other shallow recovery wells (RW-1 through RW-4), the pump size for this new well was reduced from 5HP (pump size in the old RW-5) to 1.5HP. The well was installed by Peterson Drilling of Riverdale, Nebraska. Also in May 2010, ERRS replaced transfer pumps for the two SVE knockout tanks, and START replaced the barometer for the groundwater recovery system. Information regarding the transfer pumps and barometer is provided in Appendix A.

In June 2010, START and subcontractors QSPEC and Guarantee Electric installed the new PLC unit for the groundwater treatment system. QSPEC also installed a new VFD for the new well (RW-5); the VFD was identical to the replacement units purchased for the other recovery wells in July 2009. Information regarding the new PLC, input/output modules, power supply, and software is provided in Appendix A. The PLC was installed successfully, and all system components appeared to be functioning normally following installation.

In August 2010, START and ERRS coordinated to replace the discharge piping and tee fittings located at the flow sensors for RW-1, RW-3 and RW-5. Flow rates indicated at these wells were deemed possibly inaccurate due to insufficient flow velocity. The flow sensors are rated for a range of 1 to 20 feet per second, and these wells were not consistently producing enough water to achieve a velocity safely within this range. The discharge pipe was reduced from 2-inch-diameter to 1-inch-diameter to create a greater flow velocity at the sensor location. This work was performed by Witt Plumbing of Hastings, Nebraska.

In October 2010, START installed repaired transducers in extraction wells RW-1, RW-2, RW-8, and IW-1. However, RW-1 appeared to have a problem with the transducer wiring between the well vault and the equipment building that was affecting water level signals to the PLC. Therefore, this well was still not functioning. START reviewed options to rewire the transducer for this well or install a telemetric transducer system that would eliminate the signal interference. Because the remedial program was already planning to install telemetric transducers in nearby monitoring wells, it was decided that RW-1 could be retro-fitted with a telemetric unit at that time.

In November 2010, START replaced the fan belt for the air stripper blower on two occasions. The first replacement belt was determined to be the incorrect type (notched belts are required) and was replaced after only 2 weeks of operation. Information regarding the blower belts is provided in Appendix A.

4.4 JANUARY 2011 THROUGH MAY 2011

In January 2011, START and ERRS coordinated with Witt Plumbing to modify discharge piping and tee fittings located at the flow sensors for RW-2, RW-4, RW-6, RW-7, and RW-8. The piping at the flow meters for RW-2 and RW-4 (shallow wells) was reduced from 2-inch to 1-inch-diameter to increase the accuracy of flow readings (as discussed for RW-1, RW-3 and RW-5 in Section 4.3). The piping at the flow meters for RW-6, RW-7, and RW-8 (deep wells) was reduced from 3-inch to 2-inch-diameter for the same reason.

Also in January, START and ERRS coordinated with Witt Plumbing to adjust flow valves and install pressure gauges on the discharge piping within the well vaults of selected groundwater extraction wells. The purpose of adjusting the valves was to determine whether flow rates at certain wells could be stabilized by dampening pump performance. Flow rates at certain wells, particularly RW-2 and RW-7, appeared to be highly erratic based on the flow meter readouts. The purpose of the pressure gauges was to monitor any pressure changes caused by adjustments of these valves and avoid damage to the discharge pipe. Valve adjustments were successful in stabilizing flow rates; however, it was determined that closing these valves, even a small amount, could additionally strain the pump motors—thereby reducing motor life. The valves for all wells have since been re-adjusted to the full open position.

In March 2011, Tetra Tech START and ERRS coordinated to remove and replace existing pumps and motors at RW-6, -7, and -8. Prior to installation of the new pumps/motors, each well casing was viewed with a downhole camera and cleaned to remove existing debris. In addition, a water level transducer was installed in RW-6, which previously had not had one. Information regarding the new pumps, motors, and transducer is provided in Appendix A. Recovery well maintenance activities were conducted by Peterson Drilling.

In April 2011, START replaced the flow sensor for the total system flow meter. Information regarding the flow sensors is provided in Appendix A.

Groundwater recovery and injection well summary information as of May 2011 is listed in Table 1.

TABLE 1

RECOVERY AND INJECTION WELL PUMP AND TRANSDUCER DEPTHS
GARVEY ELEVATOR SITE, HASTINGS, NEBRASKA

Well	Aquifer	Diameter (inches)	TOC Elevation (feet above mean sea level)	Depth (feet below TOC)			
				Well	Pump[1]	Transducer	Static Water Level
RW-1	Upper	6	1932.01	125	121	118.5	NR
RW-2	Upper	6	1930.02	126	122	119.3	NR
RW-3	Upper	6	1930.34	124	120	116.4	NR
RW-4	Upper	6	1929.22	126	122	120	NR
RW-5	Upper	6	1932.69	129	126.5	123.7	NR
RW-6	Medial	6	1930.77	153.4	150.58	147.5	118.57
RW-7	Medial	8	1932.21	152	146	143	114.1
RW-8	Medial	8	1931.98	152.3	147.5	144.5	115.6
IW-1	Injection Well	10	1927.64	225	NA	130	NR
IW-2	Injection Well	10	1927.4	225	NA	NA	NR

Notes:

1 Pump depth is referenced to the pump intake
NA Not applicable
NR Not recorded
TOC Top of casing

5.0 REFERENCES

IT Corporation. 2002. Letter report regarding downgradient groundwater monitoring results, Garvey RAPMA Site. From Herbert Fry, CPG, IT Corporation. To Ted Huscher, Nebraska Department of Environmental Quality. February 15.

Nebraska Tax Equalization and Review Commission (NTERC). 2000. Case No. 98C-1. Findings and Orders. Garvey Elevator, Inc., appellant, vs. Adams County Board of Equalization, appellee. February 8.

Tetra Tech EM Inc. (Tetra Tech). 2003. Combined Preliminary Assessment/Site Inspection, Garvey Elevator Site, Hastings, Nebraska. April 23.

Traster, David M. 2003. Letter and attachments regarding request for information pursuant to Section 104 of CERCLA, Garvey Elevator Site, Hastings Nebraska. From David M. Traster, Esq., Foulston & Siefkin LLP, representing Garvey Elevators, Inc. To Alyse Stoy, Assistant Regional Counsel, U.S. Environmental Protection Agency, Region 7. February 13.

APPENDIX A

EQUIPMENT SPECIFICATION AND REPLACEMENT INFORMATION

APPENDIX A

EQUIPMENT SPECIFICATION AND REPLACEMENT INFORMATION
GARVEY ELEVATOR SITE
HASTINGS, NEBRASKA

System	Equipment Type	Description	Vendor Contact	Replacement Date
SVE-1/SVE-2	Air filters	Air filters for SVE systems; NAPA part nos. 6641 (small filter), and 2788 (large filters)	NAPA	As needed
SVE-1/SVE-2	Float switches	High- and low-level float switches for knockout tanks; part numbers unknown – installed by ERRS	Witt Plumbing	April-June 2009
SVE-1/SVE-2	Transfer pumps	Transfer pumps for SVE knockout tanks; Gould Pump NPE 1ST1C5F4	Kelly Supply	May 2010
SVE-1/SVE-2	Lube oil	Dresser Roots High Temperature Synthetic Lubricating Oil ISO-VG-220, or equivalent	Pathfinder Systems	Every 1,500 hours
SVE-1/SVE-2	Grease	Shell Darina EP NLGI Grade 2, Shell #71522, high-temperature grease	Pathfinder Systems	Every 500 hours
SVE-1	Blower	Dresser Roots model 47 U-RA1; SN 0605927196	Pathfinder Systems	NA
SVE-1	Blower motor	WEG 7.5HP, model PE 50-7.5-213T, SN 0297 AJ83731	Guarantee Electric	NA
SVE-1	Blower belt	Part No. BX55 50	NAPA	As needed
SVE-2	Blower	Dresser Roots model 59U-RA1; SN 0034486	Pathfinder Systems	June 2009 (repair)
SVE-2	Blower motor	Worldwide Electric Corp., 15HP, model WWEM15-18-254	Guarantee Electric	October 2009
SVE-2	Blower belt	Part No. BX59 50	NAPA	As needed
Groundwater	O-rings	O-rings for particulate filter canisters; Buna-N #24LB	Carbonair Environmental Systems	As needed
Groundwater	Particulate filters (influent)	Part No. KEW25K2S; Polyester, 25µM, 7x32, welded	Fischer-Robertson	As needed
Groundwater	Particulate filters (effluent)	Part No. KEW10K2S; Polyester, 10µM, 7x32, welded	Fischer-Robertson	As needed
Groundwater	Blower belt	Part No. BX35 50	NAPA	As needed
Groundwater	RW-4 flow sensor	Signet Rotor-X0 flow sensor, model P51530-P1 for 1/2"-4" pipe	LiquiTech	October 2009
Groundwater	RW-8 flow sensor	Signet Rotor-X0 flow sensor, model P51530-P1 for 1/2"-4" pipe	LiquiTech	October 2009
Groundwater	Total system flow sensor	Signet Rotor-X1 flow sensor, model P51530-P1 for 5"-8" pipe	LiquiTech	April 2011
Groundwater	RW-1 pump/motor	Grundfos model 40S50-12, 5HP, 460V pump w/Franklin 5HP, 460V, 3-phase motor	Sargent Drilling	September 2008
Groundwater	RW-3 pump/motor	Grundfos model 40S50-12, 5HP, 460V pump w/Franklin 5HP, 460V, 3-phase motor	Sargent Drilling	September 2008

APPENDIX A (Continued)

EQUIPMENT SPECIFICATION AND REPLACEMENT INFORMATION
GARVEY ELEVATOR SITE
HASTINGS, NEBRASKA

System	Equipment Type	Description	Vendor Contact	Replacement Date
Groundwater	RW-4 pump/motor	Grundfos model 40S50-12, 5HP, 460V pump w/Franklin 5HP, 460V, 3-phase motor	Sargent Drilling	September 2008
Groundwater	RW-5 pump/motor	Goulds model 25GS10 1.0HP, 230V pump w/ Franklin model 2345149203, 1.5HP; 230V, 3-phase motor	Peterson Drilling	May 2010
Groundwater	RW-6 pump/motor	Grundfos model 150S100-5, 10HP, 460V pump w/Franklin model 001044, 10HP, 460V, 3-phase motor	Nebraska Pump	March 2011
Groundwater	RW-7 pump/motor	Grundfos model 150S100-5, 10HP, 460V pump w/Franklin model 001044, 10HP, 460V, 3-phase motor	Nebraska Pump	March 2011
Groundwater	RW-8 pump/motor	Grundfos model 150S100-5, 10HP, 460V pump w/Franklin model 001044, 10HP, 460V, 3-phase motor	Nebraska Pump	March 2011
Groundwater	RW-1 transducer	Instrumentation Northwest model PS9800, 30PSIG, open	Instrumentation Northwest	October 2009
Groundwater	RW-2 transducer	Instrumentation Northwest model PS9800, 30PSIG, open	Instrumentation Northwest	NA
Groundwater	RW-3 transducer	Instrumentation Northwest model PS9800, 30PSIG, open	Instrumentation Northwest	October 2008 (repair)
Groundwater	RW-4 transducer	Instrumentation Northwest model PS9800, 30PSIG, open	Instrumentation Northwest	October 2009
Groundwater	RW-5 transducer	Instrumentation Northwest model PS9800, 30PSIG, open	Instrumentation Northwest	May 2010
Groundwater	RW-6 transducer	Instrumentation Northwest model PS9800, 50PSIG, open	Instrumentation Northwest	March 2011
Groundwater	RW-7 transducer	Instrumentation Northwest model PS9800, 50PSIG, open	Instrumentation Northwest	NA
Groundwater	RW-8 transducer	Instrumentation Northwest model PS9800, 50PSIG, open	Instrumentation Northwest	October 2009
Groundwater	IW-1 transducer	Instrumentation Northwest model PS9800, 100PSIG, open	Instrumentation Northwest	October 2009
Groundwater	System barometer	Instrumentation Northwest model BV 9800 barometric vacuum transmitter	Instrumentation Northwest	May 2010
Groundwater	VFDs	Allen-Bradley PowerFlex 400, Drives, 480V-AC, 3-phase, 17A, 10 HP, Fixed Keypad	Huffman Engineering	July 2009 (RW-5 May 2010)

APPENDIX A (Continued)

EQUIPMENT SPECIFICATION AND REPLACEMENT INFORMATION
GARVEY ELEVATOR SITE
HASTINGS, NEBRASKA

System	Equipment Type	Description	Vendor Contact	Replacement Date
Groundwater	PC	Dell PowerEdge T100 server computer w/Raid 1 hard drive mirroring for redundancy; 160GB hard drive; 2GB ram; dual core 2.4GHz; Windows Server 2003 Standard; 17" flat panel LCD monitor	Huffman Engineering	July 2009
Groundwater	HMI software	Rockwell RSView32 Runtime, 150 tags	Huffman Engineering	July 2009
Groundwater	PLC	Allen-Bradley CompactLogix Control System w/32 analog inputs, 16 analog outputs, 32 discrete inputs and 32 contact outputs	QSPEC	August 2010
Groundwater	Input Modules	Compact High-density analog current (Cat. No. 1769-IF16C), and Compact 24V DC sink/source (Cat. No. 1769-IQ16) input modules	QSPEC	August 2010
Groundwater	Output Modules	Compact analog (Cat. No. 1769-OF8C) and Compact 16-point AC/DC relay (Cat. No. 1769-OW16) output modules	QSPEC	August 2010
Groundwater	PLC power supply	Rockwell 1606-XL 120 D power supply	QSPEC	August 2010
Groundwater	PLC software	Rockwell RSLinx OEM software	QSPEC	August 2010

APPENDIX B

VENDOR CONTACT INFORMATION

Carbonair Environmental Systems
7500 Boone Ave. North. Suite 101
Brooklyn Park. MN 55428
Phone: (763) 315-4771

Fischer-Robertson, Inc.
3890 Symmes Road
Hamilton, OH 45015
Phone: (513) 860-3445

Guarantee Electric, Inc.
1524 West 8th Street
Hastings, NE 68901
Phone: (402) 463-4586

Huffman Engineering, Inc.
5301 North 57th Street,
Lincoln, NE 68507
Phone: (402) 464-6823

Instrumentation Northwest, Inc.
8902 122nd Ave. NE
Kirkland, WA 98033
Phone: (425) 822-4434

Kelly Supply Company
PO Box 1328
Grand Island, NE 68802-1328
Phone: (308) 382-5670

LiquiTech, Inc.
13520 West 107th Street
Lenexa, KS 66215-2020
Phone: (913) 469-5375

Middleton Electric, Inc.
2716 W. Old Highway 30
Grand Island, NE 68802-0447
Phone: (308) 382-2550

NAPA Auto Parts
1045 S. Franklin
Hastings, NE 68902
Phone: (402) 463-9875

Nebraska Pump Co.
3026 North 35th Street
Lincoln, NE 68504
Phone: (402) 466-1477

Peterson Drilling, Inc.
20200 Riverdale Road
Riverdale, NE 68870
Phone: (308) 893-4293

Pathfinder Systems, Inc.
6301 Deramus Ave.
Kansas City, MO 64120
Phone: (816) 741-0282

QSPEC Solutions, Inc.
6400 Glenwood, Suite 309
Overland Park, KS 66202
Phone: (913) 403-0988

Sargent Drilling
846 S. 13th
Geneva NE 68361
Phone: (402) 759-3902

Witt Plumbing, Inc.
1726 N. Kansas Avenue
Hastings, NE 68901
Phone: (402) 463-4664