PBW

Consulting Engineers
and Scientists

PASTOR, BEHLING & WHEELER, LLC
2201 Double Creek Drive, Suite 4004
Round Rock, TX 78664

Tel (512) 671-3434
Fax (512) 671-3446

October 16, 2013
PBW Project No. 1358

VIA EMAIL

Mr. Kirk Coulter
MC-127
Environmental Cleanup Section I, Team 3, Remediation Division
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087

Re: DNAPL Recovery Pilot Test – Status Update February – September 2013
Union Pacific Railroad Houston Wood Preserving Works Facility
4910 Liberty Road Facility, Houston, Texas
Post-Closure Care Permit No. HW-50343; Industrial SWR No. 31547

Dear Mr. Coulter:

Pastor, Behling & Wheeler, LLC (PBW), on behalf of Union Pacific Railroad Company, is providing this status update for the dense non-aqueous phase liquid (DNAPL) recovery pilot test being conducted at the Houston Wood Preserving Works Facility (the Site). The pilot test was initiated in February 2013, with a proposed duration of 24 months. This letter discusses the DNAPL recovery pilot test activities and results for February through September 2013.

As detailed in the PBW letter dated February 5, 2013, PBW proposed to conduct a 24-month DNAPL recovery pilot test at the Site. The following monitoring wells were selected to be included in the DNAPL recovery test based on the amount of DNAPL historically observed in the wells:

Well Name	Zone	Min. DNAPL Thickness (ft.)	Max DNAPL Thickness (ft.)
MW-57A	A-TZ	4.11	4.25
MW-12B	B-TZ	0.41	5.70
MW-41B	B-TZ	5.06	24.14
MW-57B	B-CZ	0.44	0.50
MW-32B	B-CZ	5.77	6.13
MW-33BR	B-CZ	0.30	0.30
MW-70B	B-CZ	1.44	1.53
MW-75B	B-CZ	1.84	1.90
MW-34C	C-TZ	7.24	7.60
MW-44C	C-TZ	0.75	7.10
MW-45C	C-TZ	0.39	1.50
MW-46C	C-TZ	0.10	1.25

Notes:
Average depth to water values, minimum and maximum DNAPL thicknesses based on data collected between January 2011 and December 2012.

Figure 1 shows the location of the wells used in the pilot study.

The pilot test procedures consisted of measuring the depth to groundwater surface, the depth to the groundwater/DNAPL interface, and the total depth of the well prior to DNAPL pumping. Using a peristaltic pump, DNAPL was pumped from the bottom of the well until groundwater is returned in the pump discharge. The volume of recovered DNAPL was estimated from each well, and the well was gauged to measure the total depth of the well and depth to residual DNAPL following pumping. Recovered DNAPL was temporarily stored at the 90-Day Containment Storage Area. Waste manifests for the recovered DNAPL and groundwater are provided in Attachment A.

A summary of the DNAPL recovery measurements from February through September 2013 is provided on Table 1. DNAPL thicknesses prior to each month recovery efforts over time are presented on Figure 2. Monitoring wells with the thickest DNAPL measurements included MW-12B and MW-41B on the west side of the Site (Figure 1). DNAPL thicknesses in these two wells showed an increase following the February 2013 recovery event with MW-12B (the late April measurement was noted in the field as "uncertain", but still showed an increase in May) showing a gradual decrease through September and MW-41B showing sporadic thicknesses with an overall decrease from May through September (Figure 2). The other DNAPL wells tested showed similar responses during the first eight months. DNAPL thicknesses decreased during the first three months of pumping, and then showed an increase at the end of May 2013, with the wells generally decreasing in DNAPL thickness by September.

Of the 12 wells listed to be part of the pilot test, well MW-33BR did not have any measureable DNAPL during the first eight months, and MW-34C was not pumped because of the need for street lane closure permit through the City of Houston to access the well. The lane closure permit will be requested for the subsequent monthly events.

UPRR plans to continue the monthly DNAPL pilot test recovery efforts, and will submit the next status report following the January 2014 recovery event. Concurrently with the pilot test, PBW is assessing the recovery data for evaluating more effective DNAPL recovery efforts.

If you have any questions or need additional information, please feel free to call me at (512) 671-3434 or Mr. Geoffrey Reeder of UPRR at (281) 350-7197.

Sincerely,

PASTOR, BEHLING & WHEELER, LLC

Eric C. Matzner, P.G.
Senior Consultant

cc: Waste Program Manager, TCEQ Region 12, Houston
Mr. Geoffrey Reeder, P.G., UPRR – Spring, TX

TABLES

TABLE 1

SUMMARY OF DNAPL RECOVERY MEASUREMENTS
UPRR HOUSTON, TX - WOOD PRESERVING WORKS

	MW-12B				MW-32B				MW-33BR				MW-34C			
DNAPL Recovery Date	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)
2/14/2013	9.06	39.87	5.93	2.5	6.01	30.06	6.23	2	3.72	ND	0	---	NM	NM	NM	---
4/3/2013	9.41	39.95	5.85	1	4.86	33.61	2.68	1	4.02	PoP	0	---	NM	NM	NM	---
4/22/2013	8.61	31.64	14.16	0.5*	5.62	36.08	0.21	0.25	3.63	ND	0	---	NM	NM	NM	---
5/30/2013	8.47	37.62	8.18	1.5*	5.86	32.21	4.08	2	3.59	ND	0	---	NM	NM	NM	---
6/29/2013	9.62	38.22	7.58	1.5	6.79	33.59	2.7	1.5	6.07	ND	0	---	NM	NM	NM	---
7/22/2013	11.16	39.04	6.76	1	7.14	33.91	2.38	1.5	9.68	ND	0	---	NM	NM	NM	---
8/26/2013	11.31	39.61	6.19	1	7.48	33.83	2.46	1	9.86	ND	0	---	NM	NM	NM	---
9/27/2013	11.17	40.63	5.17	1	7.23	34.39	1.9	1	9.57	ND	0	---	NM	NM	NM	---

	MW-41B				MW-44C				MW-45C				MW-46C			
DNAPL Recovery Date	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)
2/14/2013	8.91	41.1	3.71	3	18.96	62.95	7.85	1	21.26	69.9	0.7	0.25	21.07	71.3	1.6	0.25
4/3/2013	9.37	41.6	3.21	1.5	19.34	70.47	0.33	0.25*	21.39	70.39	0.21	0.25*	20.61	72.36	0.54	0.25*
4/22/2013	8.62	41.6	3.21	0.5*	18.62	70.64	0.16	0.25*	21.03	70.47	0.13	0.25*	20.61	72.61	0.29	0.25*
5/30/2013	8.73	34.16	10.65	2	18.43	70.01	0.79	0.25*	21.16	70.25	0.35	0.25*	20.59	71.61	1.29	0.25*
6/29/2013	9.72	37.12	7.69	2	19.34	70.32	0.48	0.25	21.93	70.32	0.28	0.25*	21.09	72.34	0.56	0.25*
7/22/2013	10.31	39.29	5.52	1.5	20.36	70.26	0.54	*0.25*	22.72	70.39	0.21	0.25*	21.96	72.16	0.74	0.25*
8/26/2013	10.09	34.55	10.26	2.5	20.62	70.39	0.41	0.25	22.86	70.31	0.29	0.25	22.23	72.32	0.58	0.25
9/27/2013	9.63	37.29	7.52	2	20.39	70.61	0.19	0.25	22.66	70.17	0.43	0.25	22.09	72.09	0.81	0.25

	MW-57A				MW-57B				MW-70B				MW-75B				Approx
DNAPL Recovery Date	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DNAPL Recovered (gal)
2/14/2013	10.56	22.12	4.78	0.5	28.56	41.41	1.54	0.25	6.57	34.09	1.61	0.25	10.01	34.1	3.1	0.25	10.25
4/3/2013	10.32	24.79	2.11	0.5	28.09	42.36	0.59	0.25*	6.79	35.26	0.44	0.25	13.71	36.47	0.73	0.25	5.5
4/22/2013	10.71	25.85	1.05	0.5	27.06	42.17	0.78	0.25	6.06	35.12	0.58	0.25	9.72	36.72	0.48	0.25	3.25
5/30/2013	10.63	24.16	2.74	0.5	27.13	41.63	1.32	0.25	6.19	34.67	1.03	0.25	9.61	35.09	2.11	*0.75*	7.25
6/29/2013	12.16	23.82	3.08	2	18.26	42.07	0.88	0.25	8.01	34.92	0.78	0.25*	10.61	35.61	1.59	*0.75*	8.25
7/22/2013	13.21	23.05	3.85	2	16.34	41.67	1.28	0.75	8.22	34.07	1.63	0.25*	9.74	35.71	1.49	*0.75*	7.5
8/26/2013	12.91	25.32	1.58	1	18.01	42.31	0.64	0.25	8.17	35.09	0.61	0.25	10.76	35.93	1.27	0.75	7.5
9/27/2013	12.72	25.71	1.19	0.75	17.74	42.51	0.39	0.25	8.32	35.34	0.36	0.25	10.52	36.39	0.81	0.5	6.5

Notes:
* - indicates DNAPL and groundwater mixture
--- - No DNAPL pumped
DTW - Depth to water (feet Below Top of Casing (BTOC))
DTD - Depth to DNAPL (feet BTOC)
ND - Not detected
NM - Not measured
PoP - Product on probe, not measureable

FIGURES

EXPLANATION

- UPRR Property Boundary
- Road, Parking Lot, Sidewalk
- Fence
- Railroad
- A-TZ Monitoring Well Location
- B-TZ/B-CZ Monitoring Well Location
- C-TZ Monitoring Well Location
- D-TZ Monitoring Well Location
- *(1.19)* DNAPL Thickness Jan. 2013 (Ft)
- Well Part of DNAPL Recovery Pilot Test

MW-27A
MW-27C
MW-67B
MW-53C
MW-65D
MW-28C
MW-28A
MW-63B
MW-54C
MW-68C
MW-26A
MW-33BR (0.0)
MW-36B
MW-36D
MW-45C (0.69)
MW-66D
MW-68B
MW-36A
MW-44A
MW-46C (1.59)
MW-44C (7.86)
MW-25C
MW-25A
MW-33A
MW-35B
MW-35A
MW-32AR
MW-32B (6.38)
MW-70B (1.68)
MW-71B
MW-34C (NM)
MW-57B (1.59)
MW-57A (4.76)
MW-18C
MW-58A
MW-18A
MW-60A
MW-13
MW-15C
MW-72B
MW-47C
MW-14
MW-15A
MW-15B
MW-17
MW-17C
MW-30A
MW-23C (1.64)
MW-52A
TW-56A
MW-20A
MW-31A
MW-19C
MW-55B
MW-55A
MW-38A
MW-39B
MW-73B
MW-74B
MW-49B (1.19)
MW-48C
MW-61A
MW-12A
MW-12C
MW-40B
MW-16
MW-38B
MW-12B (5.94)
MW-42B
MW-49A
TW-41B
MW-62B
MW-41B (3.68)
MW-69A
MW-59A
MW-59B
MW-59D
MW-75B (2.97)
P-11
MW-02
MW-01A
MW-03
MW-10A
MW-08
P-12
MW-09
MW-22A
MW-10B
MW-22B
MW-11B
MW-11A
P-10
MW-04
MW-07
MW-21C
MW-05
MW-24C
MW-24B
MW-24AR
MW-64A
MW-50A
MW-51A

N

Approx. Scale in Feet
0 200 400

SOURCE:
Base map from ERM-Southwest, Inc APAR Addendum, Fig 3-1, dated June 2004.

UNION PACIFIC RAILROAD CO.

HOUSTON WOOD PRESERVING WORKS

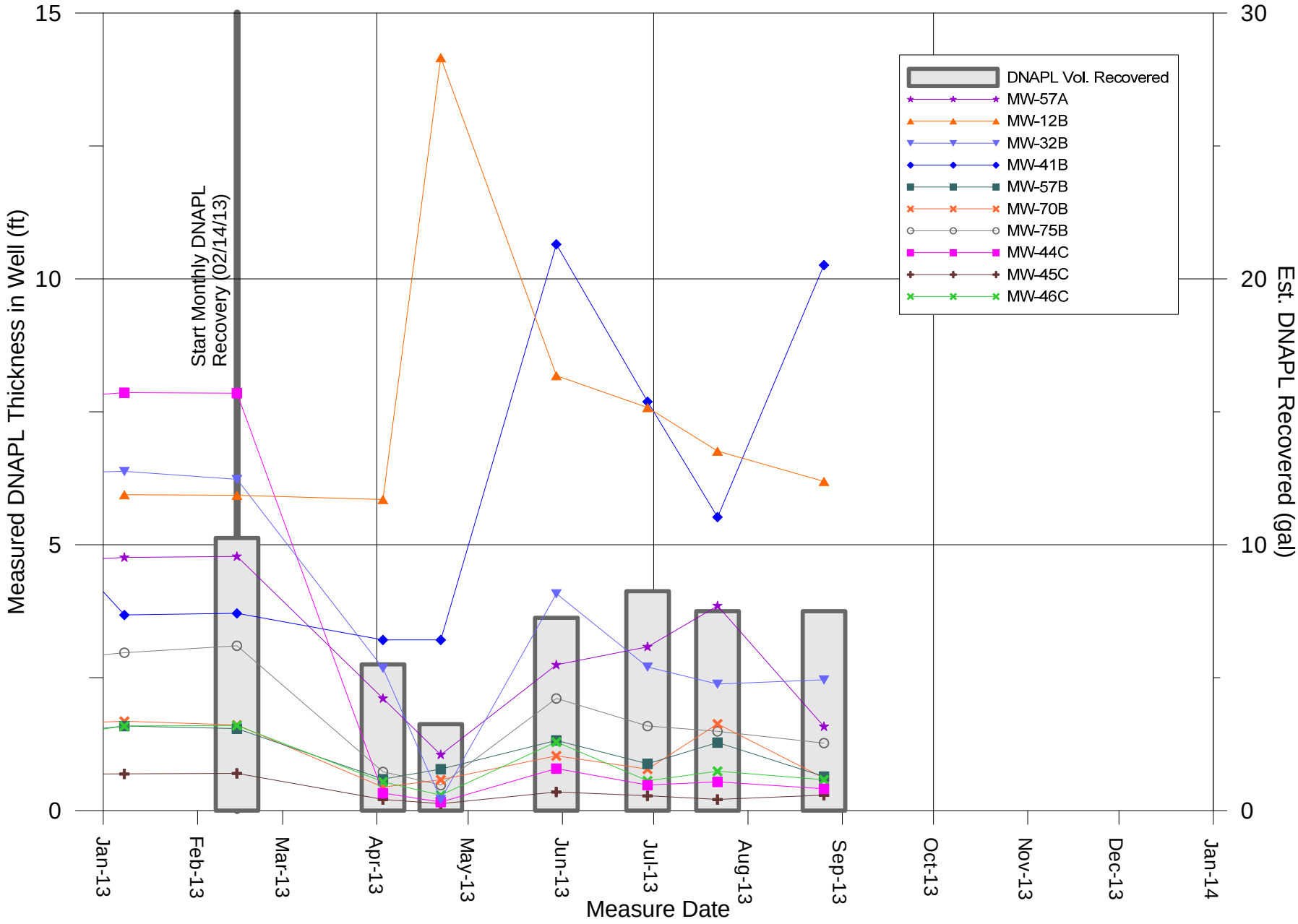
Figure 1

DNAPL RECOVERY PILOT TEST WELLS JANUARY 2013

PROJECT: 1358	BY: ZGK	REVISIONS
DATE: OCT., 2013	CHECKED: ECM	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

Figure 2
DNAPL Recovery Pilot Test Feb 2013-Sept 2013
UPRR Houston Wood Preserving Works



ATTACHMENT A

WASTE MANIFESTS

DX 5221346

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	TXD000820266	1	866-780-3116	011140887 JJK

GENERATOR

5. Generator's Name and Mailing Address
UNION PACIFIC RAILROAD
c/o USA, P.O. Box 87687
Houston, TX 77287
Generator's Phone: 281-350-7197

Generator's Site Address (if different than mailing address)
4910 Liberty Road
Houston, TX 77287

6. Transporter 1 Company Name: USA WASTE TRANSPORTATION SERVICES — U.S. EPA ID Number: TXR000032045

7. Transporter 2 Company Name: Clean Harbors Environmental Services — U.S. EPA ID Number: MAD039322250

8. Designated Facility Name and Site Address
CLEAN HARBORS DEER PARK, LLC
2027 INDEPENDENCE PARKWAY SOUTH
LA PORTE, TX 77571
Facility's Phone: 281-930-2300
U.S. EPA ID Number: TXD055141378

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. NA UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S., 9, PGIII, RQ (CREOSOTE)	001	DM	250	P	0918	219H	F034
X	2. NA3082, HAZARDOUS WASTE, LIQUID, N.O.S. (F034 WATER), 9, PGIII	001	DM	350	P	0914	101H	F034
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1)CH629200 2)CH229097 2469-TD-H156
9b1. Changed per Siobhan Leroy | KB 5/20/13

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name	Signature	Month	Day	Year
GEOFFREY REEDER	GEOFFM REEDER	5	14	13

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name	Signature	Month	Day	Year
L. DE. MONE HATCH	L De Mone Hatch	5	14	13
Transporter 2 Printed/Typed Name	**Signature**	**Month**	**Day**	**Year**
JOE LACAUR	Joe Lacaur	05	17	13

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H040	H040		

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name	Signature	Month	Day	Year
Chris Stevenson	Chris Stevenson	5	11	13

DX7697138   2469-TD-#156

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) DX7697138   SC PPW 3/02/2011   Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

GENERATOR

1. Generator ID Number: TXD000820266
2. Page 1 of: 1 / 2
3. Emergency Response Phone: 866-780-3116
4. Manifest Tracking Number: 011917032 JJK

5. Generator's Name and Mailing Address:
UNION PACIFIC RAILROAD
c/o USA, P.O. Box 87687
Houston, TX 77287

Generator's Site Address (if different than mailing address):
4910 Liberty Road
Houston, TX 77287

Generator's Phone: 281-350-7197

6. Transporter 1 Company Name: USA WASTE TRANSPORTATION SERVICES — U.S. EPA ID Number: TXR000032045

7. Transporter 2 Company Name: Clean Harbors Env. Srv. — U.S. EPA ID Number: MAD039322250

8. Designated Facility Name and Site Address:
CLEAN HARBORS DEER PARK, LLC
2027 INDEPENDENCE PARKWAY SOUTH
LA PORTE, TX 77571
U.S. EPA ID Number: TXD055141378

Facility's Phone: 281-930-2300

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. NA3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S., PGIII, RQ (CREOSOTE) 9.	~~001~~ 2 / 1	DM	250	P	0918	219H	F034
X	2. NA3082, HAZARDOUS WASTE, LIQUID, N.O.S. (F034 PURGE WATER), 9, PGIII	~~001~~ 2	DM	350	P	0914	101H	F034
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1) CH629200 2)CH229097

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: GEOFFREY REEDER — Signature: Geoffrey Reeder — Month 8 Day 13 Year 13

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: L. DeMONE HATCH — Signature: L. DeMone Hatch — Month 8 Day 13 Year 13
Transporter 2 Printed/Typed Name: Lynda O'Brien, Agent for CHES — Signature: Lynda O'Brien — Month 8 Day 14 Year 13

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H040 2. H040 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Jerri Stanner — Signature: Jerri Stanner — Month 8 Day 20 Year 13

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR