1R - 428-57

REPORTS

DATE:

Aug. 11, 2009

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

August 11, 2009

Edward J. Hansen
NMOCD
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: Termination Request
Hobbs System B-32 Boot, Section 32, T18S, R38E, Unit B
NMOCD Case #: 1R428-57

Dear Mr. Hansen,

The purpose of this letter is to summarize collected data and request that NMOCD approve termination of the regulatory file associated with this site.

The Corrective Action Plan for the above referenced site, dated January 15, 2007, was verbally approved by Wayne Price during a meeting between Rice Operating Company (ROC) and NMOCD on July 17th 2007. The Corrective Action Plan stated that Rice Operating Company (ROC) would re-vegetate the site and request closure of the regulatory file after four quarters of ground water monitoring demonstrates no impairment of ground water above WQCC standards, to end in August 2007. Although four quarters of monitoring in late 2006 and into 2007 demonstrated that ground water did not exceed standards, subsequent ground water monitoring in 2008 showed an upward trend in constituents of concern. Concentrations of constituents of concern are now below WQCC standards.

Site History
The B-32 Boot was a component of the Hobbs SWD system. With the abandonment of the system in 2002, ROC excavated three feet below ground surface (bgs), removing the B-32 Boot and the uppermost portion of the vadose zone in conformance with the NMOCD approved Junction Box Closure Plan. In May 2006, a boring was advanced near the center of the former junction box per the NMOCD approved Investigation and Characterization Plan. Field data and laboratory results indicated that chloride concentrations did not exceed 600 mg/kg in samples obtained from the entire thickness of the vadose zone. PID readings of soil samples in the boring exceeded 200 ppm from 10-feet bgs to ground water, encountered at approximately 54 feet bgs. The boring was completed as a monitoring well and has been sampled quarterly since that time.

Ground Water Monitoring Data
Ground water monitoring at the B-32 site in the Hobbs SWD covers 13 quarters from May of 2006 to the present day and is shown in the graph and table below. TDS and chloride concentrations from MW-1 were below WQCC standards for six quarterly monitoring events: from the time of installation of the well in spring 2006 through the fall of 2007. For 3 quarters in 2008 TDS concentrations exceeded standards, averaging about 1,100 mg/L. The average TDS concentration over the 13 quarters of monitoring is 842 mg/L. The two most recent monitoring events showed TDS levels below 850 mg/L.

Chloride concentrations exceeded standards for five monitoring events from December 2007 to October 2008, averaging about 335 mg/L. In the two most recent monitoring events chloride concentrations at the site were below 200 mg/L. The average chloride concentration for ground water at the site over the 13 quarters of monitoring is 227 mg/L. Although an episodic increase in TDS and chloride in ground water was observed in late 2007-2008, eight quarters of ground water monitoring with TDS and chloride concentrations below WQCC standards have been observed at the site: six from May 2006-July 2007 and two from February 2009 - May 2009.

BTEX concentrations have been detected in all sampling events. Benzene concentrations exceeded standards in February and May of 2008, but have since met standards and are now below previous detection levels. All other BTEX concentrations have been below WQCC standards by one to two orders of magnitude. Sulfate has been detected in all sampling events for which it was tested. All concentrations have been less than ¼ of the standard.

The below table summarizes the ground water analytical results for chlorides, TDS, BTEX and sulfate.

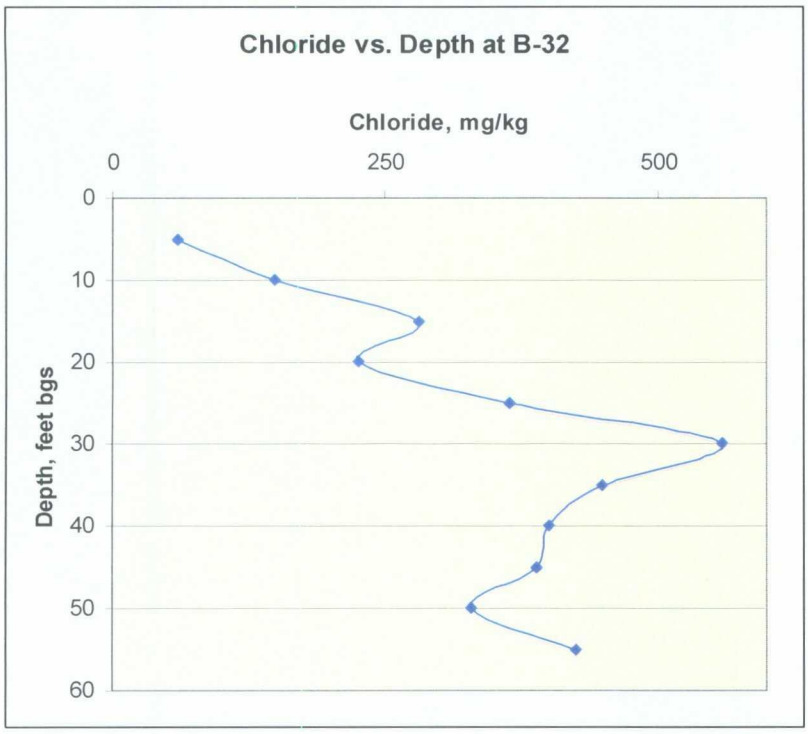
MW	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
		(mg/L)						
1	5/17/2006	143	742	<0.001	<0.001	J[0.000371]	J[0.00703]	88.3
1	9/19/2006	140	720	0.00645	<0.001	0.00212	j[0.000784]	95.2
1	10/5/2006	XXX	XXX	0.00366	<0.001	0.00222	0.00188	XXX
1	10/31/2006	148	638	0.00554	<0.001	0.00385	0.00188	91.2
1	3/19/2007	144	704	0.00478	XXX	0.00411	0.00137	94.3
1	4/25/2007	165	706	0.00656	XXX	0.00376	0.00626	89.6
1	7/30/2007	196	778	0.00341	<0.001	0.00282	0.00416	104
1	12/19/2007	332	892	0.01	<0.002	0.005	<0.006	121
1	2/8/2008	340	1110	0.036	<0.002	0.053	0.005	149
1	5/2/2008	308	929	0.013	<0.002	0.002	<0.006	87.3
1	7/25/2008	328	1030	0.007	<0.002	0.002	<0.006	124
1	10/29/2008	364	1130	0.003	0.004	0.004	0.004	96.9
1	2/2/2009	188	813	0.003	<0.001	0.004	<0.003	111
1	5/4/2009	156	757	0.002	<0.001	0.004	0.003	106

Concentrations above WQCC Standards highlighted in yellow
XXX – Not Analyzed
J and j – reported below detection limit

Soil Investigation Discussion

The site is a former boot within the Hobbs Salt Water Disposal System and as such had an impact footprint with limited lateral extent. Plate 1 shows the location of the site and other Hobbs sites on a recent aerial photograph. Chloride concentrations observed in the monitoring well boring were all below 1,000 mg/kg. The vadose zone chloride profile generated from the boring of the monitoring well showed that the highest chloride concentrations were in the lower vadose zone, from 30 feet below ground surface (bgs) to the capillary fringe at about 55 feet bgs. The well log with chloride data collected from the boring is presented in Attachment A, the graph below presents observed chloride levels in soil in the monitoring well boring.

Figure 1: TDS and Chloride Data in Ground Water at B-32



Brief episodic increases in chloride concentrations in the site monitoring well are likely a result of chloride flux of residual chloride from 30-50 feet below grade in response to El Niño precipitation events of previous years. With established vegetation and the resultant "drying" of the vadose zone, reduction of vadose zone chloride flux to ground water of about an order of magnitude will occur.

Surface Revegation

To establish vegetation, ROC mobilized to the site in April 2009 and:

1. Removed larger rocks from the area,
2. Disked the site,
3. Re-seeded the site with native plant seed, and
4. Fenced the seeded area.

Attachment B presents documentation of this re-seeding event. The data in this report demonstrate that:

- Only one soil sample shows a concentration of residual chloride in the vadose zone above 500 mg/kg,
- ROC has implemented a re-vegetation effort, and
- Over the past 13 quarters the average concentration of chloride and TDS is below WQCC Standards

Rice Request

We request that NMOCD terminate the regulatory file associated with this site.

ROC is the service provider (agent) for the Hobbs Salt Water Disposal System and has no ownership of any portion of pipeline, well or facility. The Hobbs SWD System is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis.

Please contact Hack Conder of ROC at 575-393-9174 if you have any questions concerning this submission. Thank you for your time and consideration.

Sincerely,
R.T. Hicks Consultants, Ltd.

Katie Lee

Katie Lee
Project Scientist

CC: Hack Conder, Rice Operating Company
Brad A. Jones, NMOCD Santa Fe

R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

Junction Box Site Location Map

Plate 1

Rice Operating Company

January 2007

N
W
E
S

Attachment A

Lithologic Log

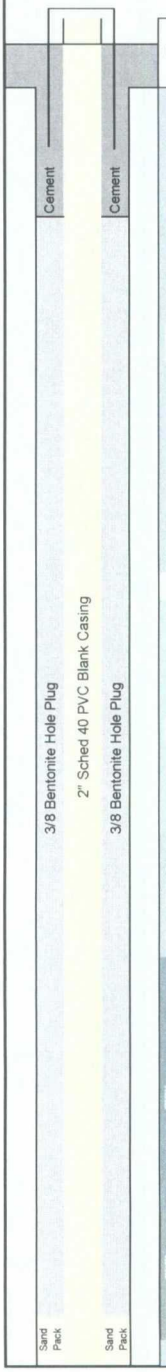
R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

LITHOLOGIC LOG AND MONITORING WELL CONSTRUCTION DIAGRAM

MONITOR WELL NO.: MW-1
SITE ID: Hobbs B-32 Boot
CONTRACTOR: Atkins Engineering
DRILLING METHOD: Hollow Stem Auger
START DATE: 5/2/2006
COMPLETION DATE: 5/3/2006

TOTAL DEPTH: 70 Feet
CLIENT: RICE *Operating Company*
COUNTY: Lea
STATE: New Mexico
LOCATION: T18S-R38E-Sec 32-Unit B
FIELD REP.: G. Van Deventer / M. Franks

COMMENTS: Located immediately adjacent to southeast side of former junction box location.



USCS	Sample Depth	Time	Type	Blowcounts (blows - in)	Chloride (ppm)	PID (ppm)	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOLIDATION, DISTINGUISHING FEATURES
	5	1534	Split Spoon	50 - 8"	60	136	Fine sand, pale yellowish brown (10YR 6/2) indurated with calcium carbonate, very pale orange (10YR 8/2), moderate hydrocarbon odor. Sand grains are subangular, and moderately well sorted.
CAL/ SM	10	1604	Split Spoon	50 - 12"	149	328	Fine sand, pale yellowish brown (10YR 6/2) indurated with calcium carbonate, very pale orange (10YR 8/2), moderate hydrocarbon odor. Sand grains are subangular, and moderately well sorted.
	15	1615	Split Spoon	22 - 24"	282	455	Fine sand, pale yellowish brown (10YR 6/2) decreasingly indurated with calcium carbonate, very pale orange (10YR 8/2), moderate hydrocarbon odor. Sand grains are subangular, and moderately well sorted.
SS	20	1628	Split Spoon	50 - 1"	226	228	As above but hard quartz stringer, grayish orange pink (5YR 7/2) with almost no recovery from split spoon. Driller reported hard streak was about one-foot thick. Moderate hydrocarbon odor continues with drilling.
SW	25	1645	Split Spoon	32 - 12" 50 - 10"	365	339	Fine sand, light olive gray (5Y 6/1), unconsolidated, subangular, moderately well sorted, strong hydrocarbon odor.
SW	30	1714	Split Spoon	50 - 12"	560	531	Fine sand, pale yellowish brown (10YR 6/2), unconsolidated, subangular, moderately well sorted, strong hydrocarbon odor.
	35	0741	Split Spoon	50 - 10"	448	569	Fine sand, olive gray (5Y 4/1), unconsolidated, subangular, moderately well sorted, strong hydrocarbon odor.
SW	40	0806	Split Spoon	50 - 6"	400	769	Fine sand, olive gray (5Y 4/1), unconsolidated, subangular, moderately well sorted, strong hydrocarbon odor.
SW	45	0830	Split Spoon	50 - 12"	388	685	Fine sand, dark yellowish brown (10YR 4/2), unconsolidated, subangular, moderately well sorted, slightly moist, strong hydrocarbon odor.
	50	0846	Split	50 - 3"	329	678	Fine sand, pale yellowish brown (10YR 6/2), unconsolidated, subangular, moderately well sorted, slightly moist, strong hydrocarbon odor.

LITHOLOGIC LOG AND MONITORING WELL CONSTRUCTION DIAGRAM

MONITOR WELL NO.: MW-1
SITE ID: Hobbs B-32 Boot
CONTRACTOR: Atkins Engineering
DRILLING METHOD: Hollow Stem Auger
START DATE: 05/02-03/2006 (Soil Boring)
COMPLETION DATE: 05/12/2006 (Monitoring Well)
COMMENTS: Located immediately adjacent to southeast side of former junction box location.

TOTAL DEPTH: 70 Feet
CLIENT: RICE *Operating Company*
COUNTY: Lea
STATE: New Mexico
LOCATION: T18S-R38E-Sec 32-Unit B
FIELD REP.: G. Van Deventer / M. Franks

USCS	Depth	Sample Time	Sample Type	Blowcounts (blows - in)	Chloride (ppm)	PID (ppm)	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOLIDATION, DISTINGUISHING FEATURES
SW	51	0846	Spoon	50 - 3"	329	678	Fine sand, pale yellowish brown (10YR 6/2), unconsolidated, subangular, moderately well sorted, slightly moist, strong hydrocarbon odor.
	55	0905	Split Spoon	50 - 2"	424	384	Fine sand, grayish orange (10YR 7/4), unconsolidated, subangular, moderately well sorted, moist, strong hydrocarbon odor. Due to hard formation at 55 feet, drilling with hollow-stem auger was discontinued. Drilling was resumed on May 12 with air rotary (geologist not present).
SW	60						Fine sand, grayish orange (10YR 7/4), unconsolidated, subangular, moderately well sorted, wet, strong hydrocarbon odor.
	65						Fine sand, grayish orange (10YR 7/4), unconsolidated, subangular, moderately well sorted, wet, strong hydrocarbon odor.
	70						Fine sand, grayish orange (10YR 7/4), unconsolidated, subangular, moderately well sorted, wet, strong hydrocarbon odor.
							Bottom of well at 70 ft below ground surface.
	75						
	80						
	85						
	90						
	95						
	100						

Appendix B

Seeding Documentation

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

HOBBS B-32 BOOT

4/28/09: REMOVING LARGER ROCKS FROM AREA

4/28/09: DISKING SOIL BEFORE PLANTING

HOBBS B-32 BOOT

4/28/09: SEEDING:
2.5 lbs Lea County Mix, 2 lbs blue grama, 6 lbs heavy recleaned race horse oats

4/28/09: INSTALLING FENCING

1

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1

Run options
--- -------

Performed by Edward J. Hansen, OCD,
for review on 9-18-09

1R428-57 1m to GW, Ksat of 1e-3 cm/sec

50 year ave. - sandy loam cov no liner - 0.036 mg/L B - 10' mixing zone
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model

1
1

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	1.00	1

DATA FOR MATERIAL 1
---- --- --------
VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	1.00	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used		1
NTSTPS	- Number of time values concentration calc		40
DUMMY	- Not presently used		1
ISOL	- Type of scheme used in unsaturated zone		1
N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------
Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations
1

DATA FOR LAYER 1
---- --- -----
VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Thickness of layer	m	CONSTANT	1.00	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.73	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Acid catalyzed hydrolysis rate	l/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	l/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.

	Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.
0.100E-09	1.00				
	Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00
0.000E+00	1.00				
	Not currently used		CONSTANT	-999.	-999.
0.000E+00	1.00				
	Not currently used		CONSTANT	-999.	-999.
0.000E+00	1.00				

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Infiltration rate	m/yr	CONSTANT	0.298E-01	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.360E-01	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11

	Near field dilution		DERIVED	1.00	0.000E+00
0.000E+00	1.00				
1					

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.
Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	31.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	CONSTANT	3.05	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.250E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05

	Temperature of aquifer	C	CONSTANT	20.0	-999.
0.000E+00	100.				
	pH	--	CONSTANT	7.00	-999.
0.300	14.0				
	Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.
0.100E-05	1.00				
	Well distance from site	m	CONSTANT	30.0	-999.
1.00	-999.				
	Angle off center	degree	CONSTANT	0.000E+00	-999.
0.000E+00	360.				
	Well vertical distance	m	CONSTANT	0.000E+00	-999.
0.000E+00	1.00				

1

TIME	CONCENTRATION
0.500E+02	0.17035E-03
0.550E+02	0.33668E-03
0.600E+02	0.57828E-03
0.650E+02	0.89468E-03
0.700E+02	0.12784E-02
0.750E+02	0.17171E-02
0.800E+02	0.21962E-02
0.850E+02	0.26977E-02
0.900E+02	0.31979E-02
0.950E+02	0.36682E-02
0.100E+03	0.40789E-02
0.105E+03	0.44064E-02
0.110E+03	0.46380E-02
0.115E+03	0.47672E-02
0.120E+03	0.48079E-02
0.125E+03	0.47626E-02
0.130E+03	0.46481E-02
0.135E+03	0.44789E-02
0.140E+03	0.42693E-02
0.145E+03	0.40319E-02

Hansen, Edward J., EMNRD

From: Hack Conder [hconder@riceswd.com]
Sent: Monday, September 21, 2009 3:00 PM
To: Hansen, Edward J., EMNRD
Subject: FW: P&A and Soil Bores Backfilled.

Ed,

Our company policy for plugging and abandoning of wells and soil bores for ROC for the past several years is as follows, all monitor wells and soil bores were plugged with bentonite chips and water to the surface.

Thanks

Hack Conder
Enviromental Manager
Rice Operating Company
575-393-9174
fax 575-397-1471