Tables

TABLE 2.2
CHRONOLOGICAL HISTORY OF INVESTIGATIONS AT OU2 AND OU6
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Date	Activity
Mid -1970	*Former Kellwood Facility developed*
1973	*Kellwood company began operating tube mill*
September, 1985	*Kellwood operations ceased*
September, 1989	*MDNR performed an investigation of the New Haven Public Water Supply Site*
June 12, 1990	*State of Missouri informed American Recreation Products (ARP) and Kellwood Company of former employees statement of cleaning solvent dumping*
1988-1993	*MDNR performed groundwater investigation of Municipal Well 3 and Pepsi Well*
1991-1998	*Geotechnology submitted a Final Contamination Delineation Plan for Metalcraft Enterprises Facility to MDNR*
April 1, 1994	*Kellwood and MDNR entered into agreement to remediate soils*
1994-1996	*Geotechnology excavated highly contaminated soil, initiated and performed landfarming*
1999	*Environmental Management Associates performed Phase I and Phase II environmental site assessment*
1999-2002	*United State Geological Survey (USGS) installed groundwater monitoring wells, and collected soil, groundwater, residential well, sediment, surface water, and tree core samples in the vicinity of the Former Kellwood Facility*
October 19, 2000	*Riverfront Site listed as a Federal NPL or Superfund site*
2000 - 2007	*USGS and Black and Veatch performed Soil, Residential well and Groundwater Investigation throughout all Operable Units*
May 17, 2004	Draft RI/FS Work Plan submitted to USEPA
June 3, 2004	Draft Residential Well Investigation Work Plan submitted to USEPA
July 21, 2004	Final Expedited Residential Well Investigation Work Plan submitted to USEPA
Week of July 12, 2004	Surface geophysics portion of the Expedited Residential Well Investigation was completed
July 26 and August 16, 2004	Residential sampling portion of the Expedited Residential Well Investigation was performed
Week of July 16, 2004	Interval Screening portion of the Expedited Residential Well Investigation (consisting of borehole geophysics and groundwater sampling at several discrete intervals at the Vedder and Laune wells) was performed
August 30, 2004	Letter responding to EPA's comments on the draft RI/FS Work Plan was submitted
September - November 2004	Monitoring well installation portion of the Expedited Residential Well Investigation was completed
September 14, 2004	Submitted the Interval Screening Report for JS-37 and JS-38
September 30, 2004	Revisions to Standard Operating Procedure No. 9, the SOP describing Volatile Organics Analysis in Groundwater using a Portable Gas Chromatograph with Photoionization Detector, were submitted
October 14, 2004	Residential Well Sampling Memo submitted to USEPA
week of November 29th-December 13th, 2004	Monitoring well development (MW1 and 2 clusters) and sampling were conducted
January - July 2005	Amanda Farms pilot well installation and sampling were conducted
Week of January 31, 2005	Second round of monitoring well sampling at MW-1 and MW-2 clusters was conducted
February 10, 2005	Monitoring Well Sampling Memo submitted
February 23, 2005	Revised RI/FS Work Plan for OU2 was submitted
February 1, 2005	Video inspection of MW2-T3 was performed
February 1, 2005	Surface water in the vicinity of MW-1 was sampled at MDNR's request
February 4, 2005	During the second round of groundwater monitoring, well MW2-T3 was sampled for selected inorganic parameters on February 4, 2005, to evaluate the high turbidity noted in this well and to determine the viability of the well.

TABLE 2.2
CHRONOLOGICAL HISTORY OF INVESTIGATIONS AT OU2 AND OU6
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Date	Activity
April 27, 2005	Revised Final Residential Well Investigation (RWI) Work Plan was submitted
April 29, 2005	Draft RWI Report was submitted to USEPA
May 26, 2005	Final OU2 RI/FS Work Plan was submitted
July 7 - July 27, 2005	Amanda Farms Well Investigation Memorandum Report , response to comments, and revised report were submitted
July 25, 2005	A variance request was submitted to the MDNR to enable Mr. Tom Barkley to convert the Amanda Farms pilot monitoring well (AF01) into a permanent residential (domestic) water well (MW-13)
September 23, 2005	Submitted a workplan outlining the voluntary installation of the proposed domestic wells to be installed at 539 Wildcat Creek Lane and 559 Wildcat Creek Lane to the MDNR. The work plan, entitled Wildcat Creek Domestic Well Installation Work Plan, presents the activities that Kellwood is proposing to perform to facilitate the voluntary installation of the requested domestic water wells
October 28, 2005	Submitted Response to Comments and Redline text of the Final Remedial Investigation/Feasibility Study Work Plan to USEPA
November 29, 2005	Submitted a redline version of the revised Wildcat Creek Domestic Well Installation Work Plan detailing the proposed confirmation sampling of the MW2 monitoring well cluster, including interconnectivity evaluation
November 30, 2005	*USEPA/MDNR representatives informed Parsons, for the first time, that the Benson and Carlin wells would not be approved for installation.*
December 12, 2005	Received final comments on the RI work plan via e-mail
January 18, 2006	Submitted the Final RI/FS Work Plan and response to USEPA's comments
January 24, 2006	Submitted the PA-54 Residential Well Investigation Report (Burt Well Report)
February 2, 2006	*USEPA approved Revised Final RI/FS Work Plan and Revised Final Conceptual Exposure Pathway Analysis*
February 22, 2006	Task 2a - Submitted a technical memorandum summarizing the proposed approach to conduct interval screening of two existing residential wells, JS-14 and JS-36 as a part of the proposed RI/FS at OU2 of the Riverfront Superfund site.
February 28, 2006	Collected the final groundwater sample from AF-01, converted to a domestic well (MW-13), in accordance with the requirements stated in the Final Amanda Farms Well Investigation Memorandum Report, dated July 27, 2005.
March 6, 2006	Submitted draft Sampling Analysis Plan (SAP) consisting of the Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP) for the OU2/OU6 RI/FS
March 14, 2006	Submitted a response to comments letter to address questions/comments on the Draft QAPP raised by Ms. Diane Harris, Regional Quality Assurance Manager, USEPA Region 7, in a conference call on March 13, 2006
March 22, 2006	Task 2a - Submitted via email, a revised interval screening study (Study) memorandum, incorporating comments from USEPA, and summarizing the proposed approach to conduct this Study
April 3 through 7, 2006	Task 2a - Performed Interval Screening Activities at JS-14 and JS-36 as a part of expedited RI/FS activities
July 10, 2006	Submitted Final SAP
July 11, 2006	*USEPA provided additional comments on Final SAP*
July 14, 2006	Parsons provides responses on USEPA's comments on the Final SAP
July 18, 2006	*USEPA approved Final SAP*
August 14, 2006	Task 2a - Parsons submitted draft interval screening report summarizing the methodology and findings of the April 2006 interval screening study of JS-14 and JS-36
September 1, 2006	USEPA, Kellwood, and Parsons discussed the possible installation of domestic wells in Wildcat Creek Estates

TABLE 2.2
CHRONOLOGICAL HISTORY OF INVESTIGATIONS AT OU2 AND OU6
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Date	Activity
September 2006	Parsons discussed the modeling goals with MDNR and ran AQTESOLV modeling scenarios. The modeling effort was not meaningful and Parsons determined AQTESOLV is not a proper modeling technique. Parsons evaluated other modeling options and suggested the use of MODFLOW to the USGS.
	Began the pre-field (intrusive) investigation of the sewers on September 25, 2006, meeting with the City of New Haven Public Works Director, Mr. Julius Gatzemeyer, to review engineering drawings and discussing the sewer flow patterns.
October 12, 2006	Submitted a letter summarizing the discussion with Mr. Julius Gatzemeyer (City of New Haven Utilities Department) regarding the portions of the City sewer system covered by the Final RI/FS Work Plan, approved February 2, 2006 (RI/FS Work Plan)
Week of November 6, 2006	Conducted an aquifer test and re-sampling event for the MW2 cluster
December 12, 2006	Submitted a draft letter report summarizing (1) the results of an aquifer test and groundwater sampling performed at the Wildcat Creek subdivision on the MW-2 cluster on November 6 through 8, 2006, (2) Modeling results obtained from WATQ, an aquifer simulation and pumping test interpretation program described in the USGS Water Resources Investigation Report 99-4225, and (3) Methodology to conduct an aquifer test at MW2 to evaluate the potential for vertical connectivity between the Roubidoux Formation and overlying transmissive zones in the Jefferson City Dolomite
January 2, 2007	Requested approval of the installation of domestic wells in Wildcat Creek Estates from MDNR with concurrence from the City of New Haven and the USEPA
January 10, 2007	Provided USEPA with the Final Wildcat Creek Well Installation Work Plan, addressing comments from USEPA, MDNR, and USGS
January 16, 2007	*MDNR approves plan to convert monitoring well MW2R to a domestic supply well for the residence at 559 Wildcat Creek Lane*
January 18, 2007	Task 5 - Submitted a letter to the USEPA to document modifications to the sewer investigation discussed in the January 4, 2007 teleconference
January 18, 2007	*Task 2a - Received comments on the August 2006 Interval Sampling Report for JS-14/JS-36*
January 22, 2007	*Received approval from the USEPA on the January 10, 2007 Final Wildcat Creek Well Installation Work Plan*
January 25, 2007	*Received an approval letter from the USEPA on the January 18, 2007 Sewer Investigation letter*
January 29, 2007	MW2R was converted to a domestic supply well
January 29, 2007	Parsons, USEPA, MDNR, and USGS participated in a meeting with the property owners to discuss the proposed monitoring wells locations (for the remedial investigation) and associated access issues
February 6, 2007	Kellwood, Bryan Cave (legal counsel for Kellwood on the Riverfront Superfund Site, OU 2/6), Parsons, and USEPA participated in a meeting with the City of New Haven to discuss the specifics of the potential water main extension and access issues for the RI
February 26, 2007	Second (and final) round of sampling was performed at MW2R
March 5, 2007	To expedite resolving access issues associated with OU6, Kellwood submitted a written proposal to the City of New Haven regarding the extension of public water to the affected residences
April 3, 2007	*Received approval from Mrs. Benson's attorney to proceed with the proposed domestic well installation at 539 Wildcat Creek Lane*

TABLE 2.2
CHRONOLOGICAL HISTORY OF INVESTIGATIONS AT OU2 AND OU6
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Date	Activity
April 16, 2007	*Received comments from the USEPA on the March 2007 monthly progress report. The letter requested that an attempt be made to pursue selected tasks (Soil Investigation, Dense Non-Aqueous Phase Liquid [DNAPL] Investigation, Surface water and Sediment Sampling, and Sanitary Sewer Inspection and Sampling) of the remedial investigation at OU 2/6*
April 25, 2007	*Bryan Cave received an approval on the access request from the City of New Haven to proceed with the proposed Soil and DNAPL Investigation on the City of New Haven property (in the vicinity of the Former Kellwood Facility). According to the City of New Haven, the City's property was not implicated in the Surface Water and Sediment Sampling. Based on additional correspondence on April 25, 2007 between Bryan Cave and the City of New Haven, it was determined that further discussions between the City and Parsons are warranted for an approval on the proposed Sanitary Sewer Inspection and Sampling.*
April 25, 2007	Submitted an access request to Tubular Steel Inc. (TSI)/Metalcraft, current owner of the Former Kellwood Facility, to proceed with select aspects of the Soil Investigation and DNAPL Investigation at the Former Kellwood Facility
May 3, 2007	Parsons met with Steve Roth and Julius Gatzemeyer, City of New Haven, to further discuss the specifics of the proposed Sanitary Sewer Inspection and Sampling. Parsons was informed that additional review and discussions in the City Council meeting (scheduled for the second week of June 2007) were warranted before access is approved.
May 1, 2007	Contacted selected residents to seek access for the Surface water and Sediment Sampling at OU 2/6.
May 27 - July 9, 2007	Completed the domestic well installation (PA-55)
July 2007 to May 2008	Task 3 - Completed DNAPL Investigation including 22 core holes and core hole abandonment
August 23, 2007	Conducted second round of post-installation sampling at PA-55
September 2007 - June 2008	Task 1- Completed soil investigation including advancing 42 direct push borings
September 2007 - May 2008	Task 5 - Completed sewer investigation including: a video survey of the sewer segment immediately downstream of the former Kellwood facility, advancing 11 DPT borings along sewer segments north of Highway 100, advancing 5 DPT borings adjacent to potential sewer defects, collection of 7 sewer water samples, and collection of 5 sewer sediment samples
October 18, 2007	Submitted the Second Round of Domestic Well Sampling Report (conducted at PA-55)
December 5, 2007	In light of access issues related to the Groundwater and Sediment and Surface Water Investigations, submitted to USEPA to pursue these investigations at alternate locations (where possible)
December 19, 2007	Submitted a response to USEPA's October 29, 2007 comments letter on the October 18, 2007 Second Round Domestic Well Sampling Report for PA-55 in the Wildcat Creek Estates.
January 2, 2008	*Received an approval letter from the USEPA on the Second Round Domestic Well Sampling Report for PA-55. USEPA suggested that in addition to the groundwater samples (at PA-55) proposed (in order to better understand the form and thereby fate of iron in groundwater at PA-55) in the December 19, 2007 letter, a minimum of two additional background samples be collected from wells near PA-55, which are screened at the same interval as PA-55.*
February 2008 - May 2008	Task 2c - Residential Well Sampling was conducted from 38 wells
February 28, 2008	Collected the groundwater samples proposed in the December 19, 2007 response to comments on the Second Round Domestic Well Sampling Report for PA-55.

TABLE 2.2
CHRONOLOGICAL HISTORY OF INVESTIGATIONS AT OU2 AND OU6
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Date	Activity
March 2008 - Present	Conducted quarterly DNAPL recovery efforts at BW-20 and L-12.
April - May 2008	Task 2a - Interval screening efforts at JS-36 and liner installation at JS-14 and JS-36
May 2008 - September 2009	Task 2d - Monitoring Well Installation; Parsons installed 13 new monitoring wells, 5 wells installed and sampled by USGS
May 2008 and April 2009	Task 2b - Direct Push Borings North of Boeuf Lutheran Road, advanced 18 DPT borings to refusal
June 9, 2008	Submitted to USEPA a report summarizing the findings of the Benson well iron issue investigation in response to January 2, 2008 request from EPA
July 21, 2008	Task 2a - Submitted (via email) a draft of the revised Interval Screening Report (JS-14 and JS-36) for USEPA's review
August 2008 - August 2009	Task 4 - Collected sediment and surface water samples where access was available
February - March, 2009	Task 2f - Slug testing was conducted at 16 Parsons' installed monitoring wells
March 2009 - September 30, 2009	Task 2e - Sitewide Groundwater Sampling Round 1; Note that selected wells were sampled by USGS
June 18, 2009	Conducted a video survey of JS-25 (Beaver Brand Hats, located east of Highway C) on June 18, 2009 to evaluate the length and condition of the well casing
July - August 2009	Task 2f - Aquifer testing was conducted at selected monitoring wells and the City Wells 3 and 4
August 4, 2009	Task 11 - Submitted the soil vapor sampling work plan (near the New Haven High School) to USEPA
September 2, 2009	Task 2g - Completed surveying of the final monitoring well locations
September 8 and September 14, 2009	Task 11 - Completed soil vapor sampling activities (in the August 25, 2009 revised work plan) at the New Haven High School

Notes:

Text in italics represents work performed by others (other than Parsons)

To accommodate the proposed RI/FS schedule, selected reports/memoranda (Task 6a – Preliminary Site Characterization Report, Task 6b – Fate and Transport Memorandum, Task 6d – Data Analysis Technical Memorandum, Task 6f – Candidate Technologies Technical Memorandum) were eliminated.

Instead, these components were included directly in the RI Report

TABLE 2.3
HISTORIC SOIL SAMPLING RESULTS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Sample Name	Date Collected	Depth Interval (feet bgs)	PCE	TCE	cis-DCE	trans-DCE	VC	Toluene	Benzene
Laboratory Analysis									
MW-2[1]	7/15/99	0-3	**339,000**	**2,100**	**5,620**	---	---	---	---
OU2-SO-G01	2/20/01	0-1	<6.0	<6.0	<3.0	<3.0	<12	<6.0	<6.0
OU2-SO-G02	2/20/01	0-1	<6.0	<6.0	<3.0	<3.0	<12	<6.0	<6.0
OU2-SO-G03	2/20/01	0-1.5	**3,300 Q**	<310	<150	<150	<620	<310	<310
OU2-SO-G04	2/20/01	0-2	<5.9	<5.9	<3.0	<3.0	<12	<5.9	<5.9
OU2-SO-G05	2/20/01	0-2	<6.0	<6.0	<3.0	<3.0	<12	<6.0	<6.0
OUX-SO-EC06	3/14/02	0-0.5	<6.3	<6.3	<3.2	<3.2	<13	<6.3	<6.3
OUX-SO-EC07	3/14/02	0-0.5	<6.2	<6.2	<3.1	<3.1	<13	<6.2	<6.2
OUX-SO-EC08	3/14/02	0-0.5	<6.4	<6.4	<3.2	<3.2	<13	<6.4	<6.4
OUX-SO-EC09	3/14/02	0-0.5	<6.5	<6.5	<3.2	<3.2	<13	<6.5	<6.5
Field GC Analysis									
OU2-G01	2/20/01	0-1.5	**0.31**	0	0	**0.07**	0	---	**0.49**
OU2-G02	2/20/01	0-1	**0.07**	0	0	**0.03**	0	---	**0.05**
OU2-G03	2/20/01	0-1.5	**14,226**	**12.68**	**21.46**	**0.12**	0	---	**9.74**
OU2-G03 (DUP)	2/20/01	0-1.5	**17,610**	**2.4**	**2.3**	0	0	---	**4.5**
OU2-G04	2/20/01	0-2	**2,223.6**	**10.74**	**8.05**	0	0	---	**1.81**
OU2-G04 (DUP)	2/20/01	0-2	**5,280**	**30.8**	**2**	0	0	---	0
OU2-G05	2/20/01	0-2	**21.3**	0	0	0	0	---	**0.6**
OU2-BW-21A	3/8/01	5	**0.2**	0	0	0	0	---	**2.73**
OU2-BW-21A	3/8/01	10	0.0	0	**17**	0	0	---	0
OU2-BW-21A (DUP)	3/8/01	10	0.0	0	**0.73**	0	0	---	**0.22**
OU2-BW-21A	3/23/01	30	**6.2**	**3.31**	**8.32**	**0.05**	0	---	**4.95**
OU2-GPM01	10/22/01	3	0.0	0	0	0	0	---	0
OU2-GPM01	10/22/01	5.5	0.0	0	0	0	0	---	0
OU2-GPM01 (DUP)	10/22/01	18.5	0.0	0	0	0	0	---	0
OU2-GPM01	10/23/01	23.5	0.0	0	0	0	0	---	0
OU2-GPM01 (DUP)	10/23/01	31	0.0	0	0	0	0	---	**17.24**
OU2-GPM01 (DUP)	10/23/01	39	**24.8**	0	0	0	0	---	0

Notes:
Data for USGS samples are from USGS Lab Sample Log and Field GC Log unless noted
[1] - Data for MW-2 are from Pre-Acquistion ESA, Phase I and Limited Phase II Investigation Report, EMA, December 1999.
Results in ug/kg
Dup-Duplicate Sample
"---" Sample was not analyzed for this compound, or results are unknown
DCE - Dichloroethene
PCE - Tetrachloroethene
TCE - Trichloroethene
VC - Vinyl Chloride
Q - Sample was diluted

TABLE 2.4
U.S. GEOLOGICAL SUVEY MONITORING WELL CONSTRUCTION
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Well Name	Completion Type	Altitude of Measuring Point (feet msl)	Top of Monitoring Interval (feet bls)	Bottom of Monitoring Interval (feet bls)	Uppermost Producing Formation	Lowermost Producing Formation
BW-04	Open Hole	575.5	242.5	425	Cotter	Jeff City
BW-07	Open Hole	674.05	338.5	530	JC	Rbdx
BW-20	Open Hole	603.5	10	20	Cotter	Cotter
BW-21	Open Hole	584.63	374.5	440	Rbdx	Rbdx
BW-21A	Screen	585.34	43	52.4	Overburden	Cotter
BW-22	Open Hole	579.12	160	260	Cotter	Jeff City

TABLE 2.5
HISTORICAL GROUNDWATER SAMPLING RESULTS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Sample Name	Collection Date	Screened Interval (feet bgs)	Laboratory or Field GC Analysis	PCE (µg/L)	TCE (µg/L)	cis-DCE (µg/L)	trans-DCE (µg/L)	Vinyl Chloride (µg/L)	Toluene (µg/L)	Benzene (µg/L)
Public Supply Well										
OUX-W3	3/22/1999	525-885	Field GC	ND	ND	ND	ND	ND	–	ND
City Well #3*	5/31/2000	525-885	Laboratory	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	–
OUX-W3	5/31/2000	525-885	Field GC	ND	ND	ND	ND	ND	–	ND
City Well #3*	11/13/2000	525-885	Laboratory	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	–
City Well #3*	01/24/01	525-885	Laboratory	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	–
OUX-W3	1/24/2001	525-885	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-GW-W3	06/06/01	525-885	Laboratory	<1	<1	<1	<1	<1	<1	<1
OUX-GW-W3	09/05/01	525-885	Laboratory	<1	<1	<1	<1	<1	<1	<1
OUX-GW-W3	08/01/02	525-885	Laboratory	<1	<1	<1	<.5	<2	<1	<1
OUX-GW-W3	08/16/02	525-885	Laboratory	<0.03	<0.04	<0.04	<0.03	<0.11	<0.05	<0.04
OUX-GW-W3	07/16/99	525-885	Laboratory	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1
OUX-GW-W3	05/31/00	525-885	Laboratory	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1
OUX-GW-W3	11/13/00	525-885	Laboratory	<1	<1	<1	<1	<1	<1	<1
OUX-W3	6/6/2001	525-885	Field GC	ND	ND	**0.12**	ND	ND	–	ND
OUX-GW-W3**	12/16/03	525-885	Laboratory	<5	<5	<5	<5	<5	<5	<5
Monitoring Wells										
OU2-BW-20	4/9/2001	3-10	Field GC	**1.4**	ND	**8.62**	ND	ND	–	**5.33**
OU2-BW-20	4/13/2001	3-10	Field GC	**59,480**	**48.8**	**0.65**	ND	ND	–	**0.85**
OU2-GW-BW-20	04/17/01	10-20	Laboratory	**200,000**	<5,000	<5,000	<2,500	<10,000	<5,000	<5,000
OU2-BW-20	4/18/2001	10-20	Field GC	**44.5**	**0.3**	**1.2**	**0.07**	ND	–	ND
OU2-GW-BW-20***	05/22/01	10-20	Laboratory	**1,400,000**	<40,000	<40,000	<20,000	<80,000	<40,000	<40,000
OU2-BW-21	1/10/2001	0-59	Field GC	**77.3**	**11.4**	**1.97**	ND	ND	–	ND
OU2-BW-21	1/10/2001	59-100	Field GC	**1,187**	**136.8**	**18.82**	**1.39**	ND	–	**8.03**
OU2-BW-21	1/31/2001	59-100	Field GC	ND	ND	ND	ND	ND	–	**0.7**
OU2-BW-21	5/31/2001	374.5-440	Field GC	**0.02**	ND	**0.04**	**3.03**	ND	–	ND
OU2-BW-21	5/31/2001	374.5-440	Field GC	**0.01**	ND	**0.16**	**1.85**	ND	–	ND
OU2-BW-21	5/31/2001	374.5-440	Field GC	**0.02**	ND	ND	ND	ND	--	ND
OU2-BW-21	8/21/2001	374.5-440	Field GC	ND	ND	ND	ND	ND	–	ND
OU2-BW-21	7/30/2002	374.5-440	Field GC	ND	ND	ND	ND	ND	–	ND
OU2-GW-BW-21***	05/31/01	374.5-440	Laboratory	<1	<1	<1	<1	<1	<1	<1
OU2-GW-BW-21	08/21/01	374.5-440	Laboratory	<1	<1	<1	<1	<1	<1	<1
OU2-GW-BW-21	07/30/02	374.5-440	Laboratory	<1	<1	<1	<.5	<2	<1	<1
OU2-BW-21A	3/20/2001	0-8	Field GC	ND	ND	ND	ND	ND	–	ND
OU2-GW-BW-21A***	06/11/01	43-52.4	Laboratory	**1,000**	**160**	**28 J**	<25	<100	<50	<50
OU2-GW-BW-21A	08/21/01	43-52.4	Laboratory	**1,000**	**160**	**32J**	<25	<100	<50	<50

TABLE 2.5
HISTORICAL GROUNDWATER SAMPLING RESULTS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Sample Name	Collection Date	Screened Interval (feet bgs)	Laboratory or Field GC Analysis	PCE (µg/L)	TCE (µg/L)	cis-DCE (µg/L)	trans-DCE (µg/L)	Vinyl Chloride (µg/L)	Toluene (µg/L)	Benzene (µg/L)
OU2-GW-BW-21A	07/30/02	43-52.4	Laboratory	**970**	**170**	**34**	<33	<33	<33	<33
OU2-BW-21A	7/30/2002	43-52.5	Field GC	**3,490**	**330**	**40**	**0.33**	ND	–	ND
OU2-BW-22	2/6/2001	66-105	Field GC	**808**	**53.6**	**13**	**0.72**	ND	–	**0.24**
OU2-BW-22	2/6/2001	66-126	Field GC	**1,170**	**70**	**50**	ND	ND	–	ND
OU2-BW-22	2/13/2001	60-160	Field GC	**389**	**11.4**	**10.25**	ND	ND	–	ND
OU2-BW-22	2/13/2001	80	Field GC	**256.95**	**5.54**	**3.39**	**0.02**	ND	–	**0.12**
OU2-BW-22	2/26/2001	160-260	Field GC	ND	ND	ND	ND	ND	–	**0.19**
OU2-BW-22	2/27/2001	160-260	Field GC	ND	ND	ND	ND	ND	–	ND
OU2-GW-BW-22***	05/29/01	180-260	Laboratory	<1	<1	<1	<1	<1	<1	<1
OU2-GW-BW-22	08/21/01	180-260	Laboratory	<1	<1	<1	<1	<1	<1	<1
OU2-GW-BW-22	07/30/02	180-260	Laboratory	<1	<1	<1	<.5	<2	**0.26 J**	<1
OU2-BW-22	7/30/2002	180-260	Field GC	ND	ND	ND	ND	ND	–	ND
OU2-GPM01	10/23/2001	0-41.75	Field GC	**2,989.5**	**353.1**	**144.75**	**16.45**	ND	–	ND
OU2-MW-101	1/15/2002	33.5-53.5	Field GC	**1.24**	ND	ND	ND	ND	–	ND
OU2-MW-101	1/15/2002	33.5-53.5	Field GC	**1.5**	ND	ND	ND	ND	–	ND
OU2-MW-101	7/31/2002	33.5-53.5	Field GC	**3.34**	ND	ND	ND	ND	–	ND
OU2-MW-102	1/15/2002	33-55	Field GC	ND	ND	ND	ND	ND	–	ND
OU2-MW-102	1/15/2002	33-55	Field GC	ND	ND	ND	ND	ND	–	ND
OU2-MW-102	1/15/2002	33-55	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-UNKNOWN WELL	11/14/2001	0-34.5	Field GC	ND	ND	ND	**0.02**	ND	–	ND
OU2-G05	2/22/2001	0-2	Field GC	**8.73**	**0.97**	**0.53**	ND	ND	–	**0.59**
OU2-G05	2/22/2001	0-2	Field GC	**7.76**	**3.47**	**8.26**	ND	ND	–	**2.05**
Residential Wells										
DM-01*	3/23/1999	123-250	Field GC	<0.1	<0.1	–	--	--	–	--
JS-03*	3/22/1999	52-330	Field GC	<0.1	**0.2**	--	–	--	–	–
JS-06*	3/22/1999	120-400	Field GC	<0.1	<0.1	–	--	--	–	--
DM-06*	3/23/1999	NA	Field GC	<0.1	**1.3**	--	–	--	–	–
JS-07*	3/22/1999	103-415	Field GC	<0.1	<0.1	–	--	--	–	--
JS-09*	3/24/1999	106-360	Field GC	<0.1	<0.1	–	--	--	–	--
JS-10*	3/24/1999	NA	Field GC	<0.1	<0.1	–	--	--	–	--
OUX-GW-JS-10	10/04/02	0	Laboratory	<1	<1	<1	<1	<1	<1	<1
JS-11*	03/24/99	NA	Field GC	<0.1	<0.1	–	--	--	–	--
JS-12*	3/24/1999	NA	Field GC	<0.1	<0.1	–	--	--	–	--
OUX-GW-JS-12	01/29/02	400	Laboratory	<1	<1	<1	<1	<1	<1	<1
JS-13*	3/24/1999	NA	Field GC	<0.1	<0.1	–	--	--	–	--
DM-14*	3/25/1999	NA	Field GC	<0.1	0.8	--	–	--	–	--

TABLE 2.5
HISTORICAL GROUNDWATER SAMPLING RESULTS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Sample Name	Collection Date	Screened Interval (feet bgs)	Laboratory or Field GC Analysis	PCE (µg/L)	TCE (µg/L)	cis-DCE (µg/L)	trans-DCE (µg/L)	Vinyl Chloride (µg/L)	Toluene (µg/L)	Benzene (µg/L)
JS-14*	3/24/1999	NA	Field GC	**0.3**	<0.1	--	--	--	–	--
OUX-GW-JS-14	03/24/99	NA	Laboratory	**0.11 E**	<0.125	<0.125	<0.125	<0.25	<0.125	<0.125
OUX-GW-JS-14	01/16/02	NA	Laboratory	**1.4**	<1	<1	<1	<1	<1	<1
DM-15*	3/25/1999	109-290	Field GC	<0.1	<0.1	–	--	--	–	--
JS-15*	3/24/1999	120-425	Field GC	<0.1	<0.1	–	--	--	–	--
OUX-GW-JS-15	01/29/02	120-425	Laboratory	<1	<1	<1	<1	<1	<1	<1
JS-16*	3/25/1999	50-395	Field GC	<0.1	**4**	--	–	--	–	–
JS-17*	3/25/1999	NA	Field GC	<0.1	<0.1	–	--	--	–	--
DM-17*	3/30/1999	273-520	Field GC	<0.1	<0.1	–	--	--	–	--
JS-20*	03/31/99	NA	Field GC	<0.1	<0.1	–	--	--	–	--
OUX-GW-JS-20	01/29/02	400	Laboratory	<1	<1	<1	<1	<1	<1	<1
DM-21*	3/31/1999	NA	Field GC	<0.1	<0.1	–	--	--	–	--
OUX-GW-JS-22***	12/5/2000	406-1155	Laboratory	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DM-23*	04/01/99	100-490	Field GC	<0.1	<0.1	--	–	--	–	--
JS-25*	8/26/1999	--	Field GC	<0.1	<0.1	–	--	--	–	--
JS-26*	2/4/2000	NA	Field GC	<0.1	<0.1	–	--	--	–	--
JS-27*	7/11/2000	NA	Field GC	<0.1	<0.1				–	
JS-29*	01/24/01	NA	Field GC	<0.1	<0.1	–	--	--	–	--
OUX-GW-JS-29	01/24/01	NA	Laboratory	<1	<1	<1	<1	<1	<1	<1
JS-33*	03/22/01	NA	Field GC	<0.1	<0.1	–	--	--	–	--
JS-35*	8/28/2001	NA	Field GC	<0.1	<0.1	–	--	--	–	--
OUX-GW-JS-35	08/28/01	NA	Laboratory	<1	<1	<1	<1	<1	<1	<1
JS-36*	11/15/01	NA	Field GC	**200**	<15	--	–	--	–	–
OUX-GW-JS-36	11/16/01	468	Laboratory	**200**	<13	<13	<6.7	<27	<13	<13
JS-37*	01/16/02	61-297	Field GC	**69**	<4	--	–	--	–	–
OU2-GW-JS-37****	01/16/02	61-237	Laboratory	**62**	**1.0 J**	**1.0 J**	<4	<4	<4	<4
OU2-GW-JS-37	05/01/02	61-237	Laboratory	**69**	<4	<4	<4	<4	<4	<4
JS-38*	07/10/02	80-340	Field GC	**9.8**	0.36	--	–	--	–	–
OUX-GW-JS-38	07/10/02	105	Laboratory	**9.8**	**0.36 J**	<1	<0.5	<2	<1	<1
JS-39*	07/10/02	140-385	Field GC	<0.1	<0.1	–	--	--	–	–
OUX-GW-JS-39	07/10/02	140-385	Laboratory	<1	<1	<1	<0.5	<2	<1	<1
JS-40*	07/25/02	NA	Field GC	<0.1	<0.1	–	--	--	–	--
OUX-GW-JS-40	07/25/02	NA	Laboratory	<1	<1	<1	<1	<1	<1	<1
JS-41*	07/25/02	NA	Field GC	<0.1	<0.1	–	--	--	–	--
OUX-GW-JS-41	07/25/02	NA	Laboratory	<1	<1	<1	<1	<1	<1	<1
JS-42*	08/01/02	NA	Field GC	<0.1	<0.1	–	--	--	–	--
OUX-GW-JS-42	08/01/02	NA	Laboratory	<1	<1	<1	<.5	<2	<1	<1

TABLE 2.5
HISTORICAL GROUNDWATER SAMPLING RESULTS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Sample Name	Collection Date	Screened Interval (feet bgs)	Laboratory or Field GC Analysis	PCE (µg/L)	TCE (µg/L)	cis-DCE (µg/L)	trans-DCE (µg/L)	Vinyl Chloride (µg/L)	Toluene (µg/L)	Benzene (µg/L)
JS-43*	08/01/02	NA	Field GC	<0.1	<0.1	–	--	--	–	--
OUX-GW-JS-43	08/01/02	NA	Laboratory	<1	<1	<1	<.5	<2	<1	<1
JS-44*	8/1/2002	NA	Field GC	<0.1	<0.1	–	--	--	–	--
OUX-GW-JS-44	08/01/02	NA	Laboratory	<1	<1	<1	<.5	<2	<1	<1
JS-45*	08/01/02	NA	Field GC	<0.1	<0.1	–	--	--	–	--
OUX-GW-JS-45	08/01/02	NA	Laboratory	<1	<1	<1	<.5	<2	<1	<1
JS-46*	08/01/02	NA	Field GC	<0.1	<0.1	–	--	--	–	--
OUX-GW-JS-46	08/01/02	NA	Laboratory	<1	<1	<1	<.5	<2	<1	<1
JS-47*	08/16/02	90-390	Field GC	<0.1	<0.1	–	--	--	–	--
JS-50*	9/6/2002	200-400	Field GC	<0.1	<0.1	–	--	--	–	--
OU2-JS-37	1/16/2002	NA	Field GC	**43.67**	**2.36**	**3.67**	ND	ND	–	ND
OU2-JS-37	1/16/2002	NA	Field GC	**36.16**	**2.04**	**5.19**	ND	ND	--	ND
OU2-JS-37	4/30/2002	ND	Field GC	**95.4**	**4.06**	**1.03**	ND	ND	--	ND
OUX-JS-06	3/23/1999	ND	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-07	3/23/1999	ND	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-08	3/23/1999	ND	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-10	3/24/1999	ND	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-11	3/24/1999	ND	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-12	3/24/1999	ND	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-13	3/24/1999	ND	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-14	3/24/1999	ND	Field GC	**0.08**	ND	ND	ND	ND	--	ND
OUX-JS-14	3/24/1999	ND	Field GC	**0.33**	ND	ND	ND	ND	--	ND
OUX-JS-14	1/16/2002	ND	Field GC	**4.1**	ND	ND	ND	ND	--	ND
OUX-JS-15	3/24/1999	ND	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-15	1/29/2002	120-425	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-20	3/31/1999	ND	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-20	1/29/2002	400	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-22	12/5/2000	406-1155	Field GC	ND	ND	ND	ND	ND	–	**0.01**
OUX-JS-22	12/5/2000	406-1155	Field GC	ND	ND	ND	**0.53**	ND	--	**0.06**
OUX-JS-22	12/5/2000	406-1155	Field GC	**0.58**	ND	ND	**0.51**	**4.02**	--	**0.44**
OUX-JS-22	12/5/2000	406-1155	Field GC	ND	ND	ND	**0.52**	**3.92**	--	**2.78**
OUX-JS-22	12/5/2000	406-1155	Field GC	ND	ND	ND	**0.03**	**10.54**	--	**0.17**
OUX-JS-22	12/5/2000	406-1155	Field GC	ND	ND	ND	ND	**4.93**	--	**0.01**
OUX-JS-26	2/7/2000	ND	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-27	7/11/2000	ND	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-29	1/24/2001	ND	Field GC	ND	ND	ND	**0.02**	ND	--	ND
OUX-JS-33	3/22/2001	ND	Field GC	ND	ND	ND	ND	ND	–	ND

TABLE 2.5
HISTORICAL GROUNDWATER SAMPLING RESULTS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Sample Name	Collection Date	Screened Interval (feet bgs)	Laboratory or Field GC Analysis	PCE (µg/L)	TCE (µg/L)	cis-DCE (µg/L)	trans-DCE (µg/L)	Vinyl Chloride (µg/L)	Toluene (µg/L)	Benzene (µg/L)
OUX-JS-35	8/28/2001	NA	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-36	11/15/2001	468	Field GC	**309.4**	**3.61**	**4.78**	ND	ND	–	ND
OUX-JS-36	11/15/2001	468	Field GC	**345.6**	**4.65**	**8.21**	ND	ND	–	ND
OUX-JS-36	11/15/2001	468	Field GC	**133**	**1.96**	**1.6**	**0.04**	ND	–	ND
OUX-JS-36	11/16/2001	468	Field GC	**432.8**	**6.07**	**11**	**0.09**	ND	–	**1.93**
OUX-JS-36	1/15/2002	NA	Field GC	**115.5**	**12.1**	ND	**5.39**	ND	–	ND
OUX-JS-40	7/25/2002	NA	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-41	7/25/2002	NA	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-42	8/1/2002	NA	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-43	8/1/2002	NA	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-44	8/1/2002	NA	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-45	8/1/2002	NA	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-46	8/1/2002	NA	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-47	8/16/2002	390	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-51	1/29/2002	400	Field GC	ND	ND	ND	ND	ND	–	ND
OUX-JS-51	1/29/2002	147-425	Field GC	ND	ND	ND	ND	ND	–	ND
PB-17*	3/31/1999	NA	Field GC	<0.1	<0.1	–	--	--	–	--

Notes:
Data are from USGS Lab Sample Log and Field GC Log unless otherwise noted.
* Data are from USEPA website (http://mo.water.usgs.gov/epa/nh/Datadocs_files/table00-01.pdf), downloaded May 3, 2004).
** Data are from quarterly monitoring performed by Parsons.
*** Data are from letters to Mayor of New Haven (August 6, 2001 and February 15, 2001) and residents (February 15, 2001).
**** Data are from USGS Contract Laboratory Results Summary.
NA - Not available
ND - Analyte was not detected, however, the detection limit was not specified.
-– Sample was not analyzed for this compound.
Dup - Duplicate sample
E - Result exceeded calibration range, secondary dilution required.
J - Result is an estimated value below the reporting limit or a tentatively identified compound (TIC).
Q - Sample was diluted.

JS-07	JS-27	JS-41	JS-51
JS-10	JS-29	JS-42	JS-52*
JS-11	JS-33	JS-43	DM-21
JS-12	JS-36*	JS-44	PA-53
JS-14*	JS-37	JS-45	PA-55*
JS-15	JS-38*	JS-47	MW-13
JS-20	JS-39	JS-50	MW-2R
JS-25	JS-40	W-3	

Table 2-6: Task 2c – Residential well sampling locations. Also see Figure 2-10.

SUB-SLAB VAPOR SAMPLING RESULTS
METALCRAFT ENTERPRISES FACILITY
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Sub-slab Air Screening Level[1] (µg/m³)		Sample ID	SSVI-SV01-000.4-101204	SSVI-SV02-000.4-101204	SSV2-SV01-000.4-101204	SSV3-SV01-000.4-101204	SSV4-SV01-000.4-101204	SSV5-SV01-000.4-101204	SSV6-SV01-000.4-101204	SSV7-SV01-000.4-101204
	1.00E-06	Non-Cancer	Sample Date	4-Dec-10	4-Dec-10	4-Dec-10	4-Dec-10	4-Dec-10	4-Dec-10	4-Dec-10	4-Dec-10
	Cancer Risk	HI = 1	Units	ug/m³	ug/m³	ug/m³	ug/m³	ug/m³	ug/m³	ug/m³	ug/m³
PCE	20.8	11,900		**7,900**	**7,400 D**	**3,400**	**940 D**	**110**	**6,100 D**	**530 D**	**14**
TCE[2]	61.3	440		**770**	**67**	**750**	**210**	**16**	**700**	**1.6**	**3.9**
cis-1,2-DCE[2]	-	2,630		**120**	**11**	**140**	**100**	**25**	**110**	<0.79	**2.4**
trans-1,2-DCE	-	2,630		**87**	**7.3**	<16	<2.5	<0.79	<16	<0.79	<0.79
Vinyl chloride	27.9	4,380		<16	<0.51	<10	<1.6	**3.0**	<10	<0.51	**<0.51**

1 Sub-slab Air Screening Level = Industrial Indoor Air Screening Level/Attenuation Factor (α), where α = 0.1 (USEPA, 2008).

2 TCE's non-cancer screening level derived using NYSDOH's reference concentration of 1E-02 mg/m³ (NYSDOH, 2006).

3 Inhalation toxicity values are not currently available for *cis*-1,2-DCE. *trans*-1,2-DCE is used as a surrogate.

Bold font indicates positive detection

D Indicates sample diluted to be within range of instrument

Results exceed the Sub-Slab Air Screening Level

Sample SVI-SV02-000.4-101204 is a replicate sample of SSVI-SV01-000.4-101204

Figure 5a: Sub-slab sampling results.

INDOOR AIR SAMPLING RESULTS
METALCRAFT ENTERPRISES FACILITY
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Industrial Indoor Air Screening Level (µg/m³)			Sample ID	ME05-IA01-110129	ME05-IA02-110129	ME03-IA01-110129	ME04-IA01-110129	ME06-IA01-110129	ME08-IA02-110129	ME09-IA01-110129	ME07-IA01-110129	ME03-IA01-110129	ME10-IA01-110129	ME01-AM01-110129
				Inlet Height (inches)	61	57	66.5	58	63	63	64.5	77	66.5	56	48
	1.00E-04	1.00E-06	Non-Cancer	Sample Date	Jan 29-30, 2011	Jan 29-30, 2011	Jan 29-30, 2011	Jan 29-30, 2011	Jan 29-30, 2011	Jan 29-30, 2011	Jan 29-30, 2011	Jan 29-30, 2011	Jan 29-30, 2011	Jan 29-30, 2011	Jan 29-30, 2011
	High End Cancer Risk Range	Low End Cancer Risk Range	HI = 1	Units	ug/m³	ug/m³	ug/m³	ug/m³	ug/m³	ug/m³	ug/m³	ug/m³	ug/m³	ug/m³	ug/m³
PCE	208	2.08	1,190		**19**	**13**	**16**	**11**	**17**	**14**	**21**	**16**	**20**	**24**	< 1.4
TCE[1]	613	6.13	44		**2.4**	**1.9**	**2.2**	**1.3**	**1.8**	**1.6**	**2.2**	**1.3**	**2.1**	**2.6**	< 1.1
cis-1,2-DCE[2]	-	-	293		**2.1**	**1.6**	**1.8**	**0.92**	**1.3**	**1.2**	**2.4**	**0.93**	**1.4**	**0.99**	< 0.79
trans-1,2-DCE	-	-	293		< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79
Vinyl chloride	279	2.79	438		< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51

1 TCE's non-cancer screening level derived using NYSDOH's reference concentration of 1E-02 mg/m³ (NYSDOH, 2006).
2 Inhalation toxicity values are not currently available for *cis*-1,2-DCE. *trans*-1,2-DCE is used as a surrogate.
Bold font indicates positive detection
D Indicates sample diluted to be within range of instrument
Results within the low end and high end of the cancer Industrial Indoor Air Risk Range
Sample ME05-IA02-110129 is a duplicate sample of ME05-IA01-110129
Sample ME01-AM01-110129 is an ambient sample collected approximately 150 feet west of the Metalcraft Facility.

Table 5b: Indoor air sampling results.

Table 5-1

GEOLOGIC UNITS OF THE OZARK AQUIFER
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

System	Formation	Approximate Thickness (Feet)	General Lithology	General Hydrologic Properties
Ordovician	St. Peter Sandstone	Less than 40	Fine-grained cemented quartz sandstone.	Yields of 10 to 50 gpm where moderately thick.
	Powell Dolomite	0 to 95	Difficult to differentiate. Crystalline cherty dolostone with abundant thin shale partings and occasional thin sandstone beds. Thicker (2 to 10 feet thick) sandstone beds in Cotter. Within the Cotter, the upper sandstone marker bed and the Swan Creek sandstone member are important marker horizons and are laterally persistent.	Adequate for small domestic supply. Yields of 5 to 15 gpm locally. Less permeable than surrounding units and impedes downward water movement. Within the Cotter, the upper sandstone marker bed and the Swan Creek sandstone member are laterally persistent permeable zones.
	Cotter Dolomite	85 to 300		
	Jefferson City Dolomite	150 to 165		
	Roubidoux Formation	110 to 120	Cherty, sandy dolostone. Middle 20 to 30 feet is clean sandstone.	Normal yields of 15 to 50 gpm. Target unit for newer domestic wells.
	Upper Gasconade Dolomite	35 to 50	Massively bedded, crystalline dolostone.	Lower permeability than surrounding units.
	Lower Gasconade Dolomite	200 to 240	Cherty dolostone with massive chert beds.	Combined yields of upper and lower units range from 50 to 75 gpm.
	Gunter Sandstone Member of Gasconade Dolomite	35 to 50	Dolostone with less than 10 percent sand.	Normal yield of 40 to 50 gpm, but 200 to 500 gpm locally.
Cambrian	Eminence Dolomite	145 to 180	Crystalline dolostone with less than 5 percent chert and sand.	Yields of 75 to 250 gpm.
	Potosi Dolomite	Greater than 170	Crystalline dolostone with abundant small solution cavities and quartz druse.	Target zone of most high capacity wells. Yields 200 to 1,000 gpm.

Notes:
Table reproduced from Focused Remedial Investigation of OU1 and OU3, January 2003.
gpm - gallons per minute

Table 5-2: Groundwater sampling results in unconsolidated deposits north of Boeuf Lutheran Road.

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN OVERBURDEN NORTH OF BOEUF LUTHERAN ROAD (TASK 2B)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID	500-18318-1	500-18318-3	500-18318-4	500-18318-5	500-18318-6	500-18367-3	500-18367-2
		Sample Date	15-Apr-09	15-Apr-09	16-Apr-09	16-Apr-09	16-Apr-09	17-Apr-09	17-Apr-09
		Sample Depth (feet)	42	39.4	32.5	29.5	29.5	12.3	5.2
		Sample ID	CSE04-GW01-042.0-090415	CSE05-GW01-039.4-090415	CSE06-GW01-032.5-090416	CSE07-GW01-029.5-090416	CSE07-GW02-029.5-090416	CSE08-GW01-012.3-090417	CSE10-GW01-005.2-090417
VOCs		UNITS:							
Acetone	2,970	ug/L	R	R	**5.4** J	R	R	R	R
Trichloroethene	5	ug/L	**63**	**220**	**46**	**47**	**65**	**95**	ND
Tetrachloroethene	5	ug/L	**1500** +	**2800** +	**590** +	**710** +	**870** +	**560** +	ND
1,2-Dichloroethene, Total	70	ug/L	**32**	**64**	**8.4**	**9**	**11**	**27**	ND

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
+: results reported from diluted samples
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample ID indicates duplicate sample

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN OVERBURDEN NORTH OF BOEUF LUTHERAN ROAD (TASK 2B)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID	500-18318-7	500-18318-8	500-18367-5	500-11381-1	500-11379-6	500-11379-4	500-11381-2
		Sample Date	16-Apr-09	16-Apr-09	17-Apr-09	14-May-08	14-May-08	14-May-08	15-May-08
		Sample Depth (feet)	4.5	6	27.4	8	27.4	27.4	16
		Sample ID	CSE11-GW01-004.5-090416	CSE12-GW01-006.0-090416	CSN01-GW01-027.4-090417	CSN2-GW01-008.0-080514	CSN2-GW01-027.4-080515	CSN2-GW02-027.4-080514	CSN3-GW01-016.0-080515
VOCs		UNITS:							
Acetone	2,970	ug/L	R	**10** J	R	**11**	**35** J+	ND	ND
Trichloroethene	5	ug/L	ND	ND	**80**	ND	**17** +	**15** +	ND
Tetrachloroethene	5	ug/L	ND	**1.2**	**720** +	ND	**170** +	**300** +	ND
1,2-Dichloroethene, Total	70	ug/L	ND	ND	**31**	ND	**4.2** +	**3.1** +	ND

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
+: results reported from diluted samples
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample ID indicates duplicate sample

Table 5-2: Groundwater sampling results in unconsolidated deposits north of Boeuf Lutheran Road.

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN OVERBURDEN NORTH OF BOEUF LUTHERAN ROAD (TASK 2B)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID	500-11379-7	500-11379-5	500-11402-2	500-18367-4
		Sample Date	15-May-08	15-May-08	16-May-08	17-Apr-09
		Sample Depth (feet)	25.7	26.8	27	33.7
		Sample ID	CSN3-GW01-025.7-080515	CSN4-GW01-026.8-080515	CSN5-GW01-027.0-080516	CSN06-GW01-033.7-090417
VOCs		UNITS:				
Acetone	2,970	ug/L	ND	**5.6** +	**12**	R
Trichloroethene	5	ug/L	**4.4**	**34** +	**70**	**56**
Tetrachloroethene	5	ug/L	**52**	**260** +	**780** +	**770** +
1,2-Dichloroethene, Total	70	ug/L	ND	**8.1** +	**11**	**9.6**

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
+: results reported from diluted samples
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample ID indicates duplicate sample

Table 5-2: Groundwater sampling results in unconsolidated deposits north of Boeuf Lutheran Road.

Table 7-1: Chemicals of Potential Concern.

PHYSICAL PROPERTIES FOR CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

COPC[b]	CAS Number[c]	Parameter Value[d] H'	Ref[e]	D^{air} (cm^2/s)[f]	Ref	D^{water} (cm^2/s)[f]	Ref	Koc (L/kg)[f]	Ref	Kd (cm^3/g)[f]	Ref	OAF	Ref	DAF	Ref
Volatile Organic Compounds															
Methylene Chloride	75-09-2	1.30E-01	RSL	1.00E-01	RSL	1.35E-05	RSL	2.37E+01	RSL	1.42E-01	CA	**	U	--	-
Naphthalene	91-20-3	1.80E-02	RSL	6.00E-02	RSL	8.40E-06	RSL	1.84E+03	RSL	1.10E+01	CA	**	U	0.13	U
Tetrachloroethylene (PCE)	127-18-4	7.20E-01	RSL	5.00E-02	RSL	9.50E-06	RSL	1.07E+02	RSL	6.42E-01	CA	**	U	--	-
Trichloroethylene (TCE)	79-01-6	4.00E-01	RSL	6.90E-02	RSL	1.00E-05	RSL	6.77E+01	RSL	4.06E-01	CA	**	U	--	-
1,2-Dichloroethene, total	540-59-0	1.70E-01	RSL	9.00E-02	RSL	1.10E-05	RSL	4.38E+01	RSL	2.63E-01	CA	**	U	--	-
Vinyl Chloride	75-01-4	1.10E+00	RSL	1.10E-01	RSL	1.20E-05	RSL	2.37E+01	RSL	1.42E-01	CA	**	U	--	-
Semivolatile Organic Compounds															
Benzo(a)anthracene	56-55-3	4.90E-04	RSL	5.10E-02	SSL	9.00E-06	SSL	2.31E+05	RSL	1.39E+03	CA	**	U	0.13	U
Benzo(a)pyrene	50-32-8	1.90E-05	RSL	4.30E-02	SSL	9.00E-06	SSL	7.87E+05	RSL	4.72E+03	CA	**	U	0.13	U
Chrysene	218-01-9	2.10E-04	RSL	2.48E-02	SSL	6.21E-06	SSL	2.36E+05	RSL	1.42E+03	CA	**	U	0.13	U
Hexachlorobenzene	118-74-1	7.00E-02	RSL	5.42E-02	SSL	5.91E-06	SSL	3.38E+03	RSL	2.03E+01	CA	**	U	0.1	U
4-bromophenyl phenyl ether	101-55-3	--	-	--	-	--	-	--	-	--	-	--	-	--	-
Inorganics															
Arsenic	7440-38-2	--	NU	--	NU	--	NU	--	NU	31	SSL	**	U	0.03	U

a/ Parameters defined as: H' = Henry's law constant (unitless); D^{air} = Diffusivity in air; D^{water} = Diffusivity in water; Koc = Organic carbon partition coefficient; Kd = Soil-water partition coefficient; OAF = Oral absorption factor; DAF = Dermal absorption factor.

b/ COPC = Chemical of potential concern.

c/ CAS = Chemical abstracts service number.

d/ Ref = References; RSL = USEPA (2009, Inorganic K_d value based on a site specific pH of 8.0); U = USEPA (2004b); CA = Calculated per USEPA (1996a) guidance; NU = Not used.

e/ Units are defined as: cm^2/s = Square centimeters per second; L/kg = Liters per kilogram; and cm^3/g = Cubic centimeters per gram.

f/ "**" = Per USEPA (2001b) guidance, toxicity factors were not adjusted for chemicals with gastrointestinal absorption values greater than 50-percent.

g/ "--" = Data unavailable.

EXPOSURE POINT CONCENTRATION SUMMARY

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/Future
Medium:	Groundwater-shallow (on-site)
Exposure Medium:	Ambient Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
	Naphthalene	mg/l	NA	NA	2.90E-04	2.90E-04	mg/l	max.	Few samples
	1,2-Dichloroethene (total)	mg/l	NA	NA	7.80E-02	7.80E-02	mg/l	max.	Less than 20 samples
	Methylene chloride	mg/l	NA	NA	1.90E-02	1.90E-02	mg/l	max.	Less than 20 samples
	Tetrachloroethene	mg/l	NA	NA	1.90E+02	1.90E+02	mg/l	max.	Less than 20 samples
	Trichloroethene	mg/l	NA	NA	1.50E-01	1.50E-01	mg/l	max.	Less than 20 samples

NA - Not applicable

max. - maximum concentration

See Table 4 for maximum concentrations of COPCs in shallow groundwater presented in this table.

Table 7-2: Exposure Point Concentrations for OU2 and OU6.

EXPOSURE POINT CONCENTRATION SUMMARY

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Groundwater-Deep
Exposure Medium:	Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Tap Water	Methylene Chloride	mg/l	NA	NA	5.20E-03	5.20E-03	mg/l	max.	Standard Practice
	Tetrachloroethene	mg/l	NA	NA	4.91E+02	4.91E+02	mg/l	max.	Standard Practice

NA - Not applicable

max. - maximum concentration

See Table 5 for maximum concentrations of COPCs in deep groundwater presented in this table.

Table 7-3: Exposure Point Concentrations for OU2 and OU6.

EXPOSURE POINT CONCENTRATION SUMMARY

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution) (1)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (2)	Rationale
Surface Soil (<3 feet)	Arsenic	mg/kg	NA	NA	5.10E+00	5.10E+00	mg/kg	Max	Few samples
	Benzo(a)pyrene	mg/kg	NA	NA	3.60E-02	3.60E-02	mg/kg	Max	Few samples
	Tetrachloroethene	mg/kg	2.29E+00	7.26E+00	2.30E+01	7.26E+00	mg/kg	99% KM (Chebyshev) UCL	representative
Residential Mixed Soil (0-10 feet)	Arsenic	mg/kg	5.06E+00	NA	1.50E+01	1.50E+01	mg/kg	Max	Few samples
	Benzo(a)pyrene	mg/kg	2.90E-02	NA	3.60E-02	3.60E-02	mg/kg	Max	Few samples
	Tetrachloroethene	mg/kg	8.94E+00	3.04E+01	2.90E+02	3.04E+01	mg/kg	97.5% KM (Chebyshev) UCL	representative

(1) recommended UCL values per ProUCL distributions. (2) ProUCL recommended distributions. max. = maximum concentration

Table 7-4: Exposure Point Concentrations for OU2 and OU6.

EXPOSURE POINT CONCENTRATION SUMMARY

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Indoor Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution) (1)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (2)	Rationale
On-property Building	Tetrachloroethene	ug/m^3	--	--	3.90E+04	3.90E+04	ug/m^3	max.	Standard Practice

(1) Recommended UCL values per ProUCL distributions. "-" not calculated.

(2) ProUCL recommended distributions. Max.- maximum concentration

Table 7-5: Exposure Point Concentrations for OU2 and OU6.

EXPOSURE POINT CONCENTRATION SUMMARY

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/Future
Medium:	Sediments
Exposure Medium:	Sediments

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution) (1)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (2)	Rationale
Boeuf Creek	Benzo(a)pyrene	mg/kg	--	--	3.52E-02	3.52E-02	mg/kg	max.	Only Sample
Tributaries	Arsenic	mg/kg	--	--	2.40E+01	2.40E+01	mg/kg	max.	Only Sample

(1) Recommended UCL values per ProUCL distributions. "--" not calculated. (2) ProUCL recommended distributior Max.- maximum concentration

Table 7-6: Exposure Point Concentrations for OU2 and OU6.

Table 7-7: Exposure Point Concentrations for OU2 and OU6.

EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution) (1)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (2)	Rationale
Boeuf Creek Tributaries	Methylene Chloride	mg/L	NA	NA	7.50E-03	7.50E-03	mg/L	max.	Standard practice
	Tetrachloroethene	mg/L	2.18E+01	3.02E+01	1.00E-01	3.02E+01	mg/L	95% KM (Chebyshev) UCL	Standard practice
	Trichloroethene	mg/L	NA	NA	1.26E-02	1.26E-02	mg/L	max.	Standard practice
	Vinyl chloride	mg/L	NA	NA	3.37E-02	3.37E-02	mg/L	max.	Standard practice
	Benzo(a)anthracene	mg/L	NA	NA	1.60E-04	1.60E-04	mg/L	max.	Only sample
	Benzo(b)fluoranthene	mg/L	NA	NA	4.20E-05	4.20E-05	mg/L	max.	Only sample
	Chrysene	mg/L	NA	NA	6.70E-05	6.70E-05	mg/L	max.	Only sample
	Hexachlorobenzene	mg/L	NA	NA	6.50E-05	6.50E-05	mg/L	max.	Only sample

(1) recommended UCL values per ProUCL distributions. NA-Not calculated.
(2) ProUCL recommended distributions. Max.- maximum concentration

EXPOSURE POINT CONCENTRATIONS ASSOCIATED WITH SOIL EXPOSURE

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Chemical of Potential Concern	Surface Soil (0-3') mg/kg	Mixed Soil (0-10') mg/kg
Tetrachloroethylene	7.26E+00	3.04E+01
Benzo(a)pyrene	3.60E-02	3.60E-02
Arsenic	5.10E+00	1.50E+01

Table 7-8: Exposure Point Concentrations for OU2 and OU6.

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

Riverfront Superfund Site - OU2/OU6

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units	(1)	Value (2)	Units			Source(s) (3)	Date(s) (MM/DD/YYYY)
Arsenic	Chronic	3.00E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Skin	3	IRIS	04/01/09
	Subchronic	3.00E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Skin	3	HEAST	1997
Benzo(a)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(a)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(b)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chrysene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	Chronic	2.00E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Body weight	3000	IRIS	04/01/09
	Subchronic	6.00E-01	mg/kg-day	1	6.00E-01	mg/kg-day	Body weight	3000	ATSDR	2009
Methylene chloride	Chronic	6.00E-02	mg/kg-day	1	6.00E-02	mg/kg-day	Liver	100	IRIS	04/01/09
	Subchronic	6.00E-02	mg/kg-day	1	6.00E-02	mg/kg-day	Liver	100	HEAST	1997
Tetrachloroethene	Chronic	1.00E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1000	IRIS	04/01/09
	Subchronic	1.00E-01	mg/kg-day	1	1.00E-01	mg/kg-day	Liver	1000	HEAST	1997
Trichloroethylene	N/A	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichloroethylene, total	Chronic	9.00E-03	mg/kg/day	1	9.00E-03	mg/kg/day	Liver	1000	RSL	04/01/09
	Subchronic	1.00E-01	mg/kg-day	1	1.00E-01	mg/kg-day	Blood	1000	PPRTV	2009
Hexachlorobenzene	Chronic	8.00E-04	mg/kg/day	1	8.00E-04	mg/kg/day	Liver	100	IRIS	04/01/09
Vinyl chloride	Chronic	3.00E-03	mg/kg/day	1	3.00E-03	mg/kg/day	Liver	30	IRIS	08/07/00

(1) Source: see Table 10.

(2) RfDABS = RfDo X ABSGI

(3) For IRIS values, the date IRIS was searched is provided.
For HEAST values, a reference to the PRGs is provided.
For NCEA values, a reference to the PRGs is provided.

IRIS = Integrated Risk Information System
NCEA = National Center for Environmental Assessment
RSL = U.S. EPA Regional Screening Levels
HEAST= Health Effects Assessment Summary Tables

N/A = Not Applicable or Not Available

Table 7-9: COPCs for non-cancer toxicity data (oral/dermal) for OU2 and OU6.

NON-CANCER TOXICITY DATA -- INHALATION

Riverfront Superfund Site - OU2/OU6

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units			Source(s) (2)	Date(s) (MM/DD/YYYY)
Arsenic	Chronic Subchronic	3.00E-05	mg/m^3			CAL	
Benzo(a)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(a)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(b)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chrysene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	Chronic Subchronic	3.00E-03	mg/m^3	nasal	3000	IRIS	10/1/09
Methylene chloride	Chronic Subchronic	1.10E+00	mg/m^3	Liver	100	ATSDR	2009
Tetrachloroethene	Chronic Subchronic	2.70E-01	mg/m^3	N/A	N/A	ATSDR	2009
Trichloroethylene	Chronic Subchronic	1.00E-02	mg/m^3	Lung	N/A	NY	2006
1,2-Dichloroethylene, total	Chronic Subchronic	6.00E-02	mg/m3			USEPA	2009
Hexachlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vinyl Chloride	Chronic Subchronic	1.00E-01	mg/m3	Liver	30	IRIS	08/07/00

N/A = Not Applicable or Not Available

(2) For IRIS values, the date IRIS was searched is provided.
For HEAST values, a reference to the RSLs is provided.
For NCEA values, a reference to the RSLs is provided.

IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
RSL = U.S. EPA Regional Screening Levels Tables
Cal = California Toxicity Criteria Database

Table 7-10: COPCs for non-cancer toxicity data (inhalation) for OU2 and OU6.

CANCER TOXICITY DATA -- ORAL/DERMAL

Riverfront Superfund Site - OU2/OU6

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units	(1)	Value (2)	Units	(3)	Source(s) (4)	Date(s) (MM/DD/YYYY)
Arsenic	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	10/2/09
Benzo(a)anthracene	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/2/09
Benzo(a)pyrene	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/2/09
Benzo(b)fluoranthene	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/2/09
Chrysene	7.30E-03	$(mg/kg\text{-}day)^{-1}$	1	7.30E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/2/09
Naphthalene	N/A	N/A	N/A	N/A	N/A	C	IRIS	10/2/09
Methylene chloride	7.50E-03	$(mg/kg\text{-}day)^{-1}$	1	7.50E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/2/09
Tetrachloroethene	5.40E-01	$(mg/kg\text{-}day)^{-1}$	1	5.40E-01	$(mg/kg\text{-}day)^{-1}$	N/A	IRIS	10/2/09
Trichloroethylene	1.30E-02	$(mg/kg\text{-}day)^{-1}$	1	1.30E-01	$(mg/kg\text{-}day)^{-1}$	B1	CALEPA	10/2/09
1,2-Dichloroethylene, total	N/A	N/A	1	N/A	N/A	D	IRIS	10/2/09
Hexachlorobenzene	1.60E+00	(mg/kg-day)-1	1	1.60E+00	(mg/kg-day)-1	B2	IRIS	10/2/09
Vinyl Chloride	7.20E-01	(mg/kg-day)-1	1	7.20E-01	(mg/kg-day)-1	A	IRSI	10/2/09

(1) Source: see Table 10.

(2) $SF_{ABS} = \frac{SF_O}{ABS_G}$

(4) IRIS = Integrated Risk Information System

RSL = U.S. EPA Regional Screening Levels

CALEPA = California

N/A = Not Applicable or Not Available

(3) Weight of Evidence/EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

Table 7-11: COPCs for cancer toxicity data (oral/dermal) for OU2 and OU6.

CANCER TOXICITY DATA – INHALATION
Riverfront Superfund Site - OU2/OU6

Chemical of Potential Concern	Unit Risk		Weight of Evidence/ Cancer Guideline Description (2)	Unit Risk : Inhalation CSF	
	Value	Units		Source(s) (3)	Date(s) (MM/DD/YYYY)
Arsenic	4.30E-03	$(\mu g/m^3)^{-1}$	A	IRIS	10/2/09
Benzo(a)anthracene	1.10E-04	$(\mu g/m^3)^{-1}$	B2	CAL	2009
Benzo(a)pyrene	1.10E-03	$(\mu g/m^3)^{-1}$	B2	CAL	2009
Benzo(b)fluoranthene	1.10E-04	$(\mu g/m^3)^{-1}$	B2	CAL	2009
Chrysene	1.10E-05	$(\mu g/m^3)^{-1}$	B2	CAL	2009
Naphthalene	3.40E-05	$(\mu g/m^3)^{-1}$	C	CAL	10/2/09
Methylene chloride	4.70E-07	$(\mu g/m^3)^{-1}$	B2	IRIS	10/2/09
Tetrachloroethene	5.90E-06	$(\mu g/m^3)^{-1}$	N/A	CAL	2004
Trichloroethylene	2.00E-06	$(\mu g/m^3)^{-1}$	B1	CAL	2004
1,2-Dichloroethylene, total	N/A	N/A	D	IRIS	10/2/09
Hexachlorobenzene	4.60E-04	$(\mu g/m^3)^{-1}$	B2	IRIS	N/A
Vinyl chloride	4.40E-06	$(\mu g/m^3)^{-1}$	A	IRIS	8/7/00

(1) SFi = Unit Risk x Adjustment Factor or Inhalation RfD

(2) Weight of Evidence/EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

(3) IRIS = Integrated Risk Information System
HEAST= Health Effects Assessment Summary Tables
NCEA = National Center for Environmental Assessment
RSL = U.S. EPA Regional Screening Levels
N/A = Not applicable or Not available
For IRIS values, the date IRIS was searched is provided.
For HEAST values, a reference of the PRGs is provided.

Table 7-12: COPCs toxicity data (inhalation) for OU2 and OU6.

Applicable Compounds	Target Concentration (ug/kg)	Basis
SURFACE SOILS – Pathway: Prevent direct contact with impacted surface soils and consumption of impacted food		
PCE	9,920	Region 5 ESL
Applicable Compounds	**Target Level (ug/L)**	**Basis**
SURFACE WATER – Pathway: Prevent direct contact with impacted surface water		
PCE	111	Region 3 BTAG
(Note: detected concentrations of PCE at OU2 and OU6 were below the Region 3 BTAG target level.)		
Applicable Compounds	**Target Level (ug/kg)**	**Basis**
SEDIMENT – Pathway: Prevent direct contact with impacted sediment		
PCE	468	Region 3 BTAG
(Note: detected concentrations of PCE at OU2 and OU6 were below this target level.)		

PCE = Tetrachloroethylene
ESL = Ecological Screening Level

Table 8.1: RAOs for ecological receptors.

REGULA-TION	BRIEF SUMMARY	ALTERNATIVES [1]													COMMENTS ON APPLICABILITY
		1	2a	2b	2c	2d	3a	3b	4a	4b	4c	4d	5	6	
40 CFR 141	National primary drinking water standards: Establish maximum contaminant levels (MCLs), which are health based standards for public water systems and non-enforceable drinking water quality goals (MCLGs). The MCLGs are set to levels that produce no known or anticipated adverse health effect.	NC	C	C	C	C	C	C	C	C	C	C	C	C	The MCLs for organic constituents are relevant and appropriate to impacted groundwater in a potential or actual drinking water aquifer. This would apply to the isolated impacts in the lower Jefferson City / Roubidoux formation that is used as a potable water source. Alternative 1 would not include the continued operation of the whole house treatment units and would not provide any protection against use of impacted water in the isolated areas where the potable water aquifer is used as a residential potable water source. Alternatives 2a, 2c, 3a, 4a, 4b, 4c, 4d, 5, and 6 include whole house treatment systems to treat the extracted groundwater in the impacted areas of the potable water aquifer prior to use. Over time, the extracted groundwater would meet RAOs. Alternatives 2b, 2d, and 3b provide an alternate water source and seals off the impacted aquifer from use as a potable water source in the area of impacted water. The impacted groundwater is anticipated to disperse and dissipate before it would reach any other receptors.
40 CFR 143	National Secondary Drinking Water Standards: Establish secondary maximum contaminant levels (SMCLs), which are non-enforceable guidelines for public water systems to protect the aesthetic quality of the water.	C	C	C	C	C	C	C	C	C	C	C	C	C	SMCLs may be relevant and appropriate if treated groundwater is used as a source of drinking water. None of the SMCL parameters are affected by the isolated impacted groundwater in the lower Jefferson City / Roubidoux formation.
40 CFR 144 – 147	Underground Injection Control (UIC) Regulations: Provides for protection of underground sources of drinking water.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	If an alternative involves underground injection in a drinking water aquifer, this part would be applicable or relevant and appropriate. Alternatives 2c, 2d, 4b, 4c, 4d, 5, and 6 involve injection of remediation materials; however the injection will be in the unconsolidated material and upper bedrock containing non-potable drinking water, not in the lower Jefferson City / Roubidoux formation that is a drinking water aquifer. .
42 USC 4901	Noise Control Act: Activities must not result in noise that will jeopardize the health or welfare of the public.	C	C	C	C	C	C	C	C	C	C	C	C	C	Regulation is handled on a state and local level. All alternatives would mandate compliance with noise regulations.
10 CSR 25-3.260 (1)(H)2	Waste Characterization: Requires that wastes at the site be characterized to determine if the wastes meets the definition of hazardous waste in the citation.	C	C	C	C	C	C	C	C	C	C	C	C	C	This standard would apply to alternatives that require collection and disposal of material off-site. This would include drill cuttings, water from monitoring activities, DNAPL extraction, and extracted material from thermal process. For all alternatives, waste materials would be characterized prior to disposal.
10 CSR 25-4.261	Identification and Listing of Hazardous Waste: Defines those solid wastes which are subject to regulations as hazardous wastes under 10CFR25.	C	C	C	C	C	C	C	C	C	C	C	C	C	This standard would apply to alternatives that require collection and disposal of material off-site. This would include drill cuttings, water from monitoring activities, DNAPL extraction, and extracted material from thermal process. For all alternatives, waste materials would be characterized prior to disposal.

[1] C = Complies with ARAR NC = Does not comply with ARAR NA = ARAR is not applicable

Table 10.1: Evaluation of ARARs for Alternatives 2 through 6.

REGULA-TION	BRIEF SUMMARY	ALTERNATIVES [1]													COMMENTS ON APPLICABILITY
		1	2a	2b	2c	2d	3a	3b	4a	4b	4c	4d	5	6	
10 CSR 25-18.018	Missouri Risk Based Corrective Action (MRBCA): Outlines a risk based process for determining cleanup goals at sites with known or suspected hazardous substance contamination.	NC	C	C	C	C	C	C	C	C	C	C	C	C	This process was used for the risk assessment and determining the remedial action objectives. Compliance is relative to meeting remedial action objectives. See discussion above regarding MCLs.
10 CSR 20-7.031 (2)	Missouri Water Quality Standards: Outlines the antidegradation criteria for protection of waters of the state, surface water bodies and groundwater	NC	C	C	C	C	C	C	C	C	C	C	C	C	The requirements of the antidegradation policy tier 1 are met for Alternatives 2A through 6. Tier 2 and tier 3 do not apply as the existing water quality is not better than applicable water quality criteria (tier 2) and none of the receiving streams are listed in tables D and E of the regulation as outstanding resource waters (tier 3).
10 CSR 20-7.031 (3)	Missouri Water Quality Standards: Outlines the general water quality criteria for protection of waters of the state	C	C	C	C	C	C	C	C	C	C	C	C	C	The General Criteria water quality criteria are met for Alternatives 2A through 6.
10 CSR 20-7.031 (4)	Missouri Water Quality Standards: Outlines the specific criteria for protection of classified waters	NC	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	This standard would apply to alternatives that include discharges into the 500 tributary north of Boeuf Lutheran Road which is included as a classified stream in Table H of 10 CSR 20-7.031 (samples have exceeded criteria for human health – fish consumption in table A). The Human Health Risk Assessment determined that the segment of the stream impacted is too small to be considered fishable waters. A waiver of the regulations may be required. The 700 tributary is not a classified stream and does not fall under this standard. [1] The 500 tributary is too small to be considered fishable waters so the criteria are not applicable.
10 CSR 20-7.031 (5)	Missouri Water Quality Standards: Outlines the specific criteria for protection of groundwater	NC	C	C	C	C	C	C	C	C	C	C	C	C	This regulation is not applicable to the upper sandstone formation where the majority of the impacted groundwater is located as it does not fall under the definition of an aquifer. Alternatives 2b, 2d, and 3b would have isolated pockets of groundwater above MCLs to remain after wells are abandoned. These COPCs would disperse before reaching any receptors. Alternatives 2a, 2c, 3a, 4a, 4b, 4c, 4d, 5, and 6 have the impacted groundwater pumped and run through a treatment system controlling migration of the impacted groundwater.
10 CSR 10-6	Missouri Air Pollution Control Program: Ambient concentrations of VOCs should be less than their respective acceptable ambient air levels at the Site boundary.	NA	NA	NA	NA	NA	C	C	C	C	C	C	NA	NA	These requirements would be relevant and appropriate for alternatives 3a, 3b, 4a, 4b, and 4c which potentially involve discharge of contaminants to the air as the thermal treatment process includes removal using vapor extraction.
10 CSR 23	Well Construction Code: Regulates the construction and abandonment of domestic water wells (23-3) and monitoring wells (23-4).	NA	C	C	C	C	C	C	C	C	C	C	C	C	If an alternative includes installing new or abandoning wells, these requirements may be applicable or relevant and appropriate.

[1] C = Complies with ARAR NC = Does not comply with ARAR NA = ARAR is not applicable

Table 10.1: Evaluation of ARARs for Alternatives 2 through 6.