

Table M-1**Toxicity Values and Standards Developed in Accordance with RECAP***Paul M. Levert, et al. v Union Texas International Corporation, et al.**Bayou Choctaw Oil & Gas Field**West Baton Rouge Parish, Louisiana*

Constituent	CAS#	RfDo mg/kg-d	REF	BCF L/kg	REF	RECAP Standards (a)				
						GWSS mg/L	GW1 / GW2 mg/L	GW3DW mg/L	Soil _{SSni} mg/kg	Soil _{ni} mg/kg
Barium	7440-39-3	0.2	IRIS	-	-	-	-	-	1.6E+04	-
Strontium	7440-24-6	0.6	IRIS	60	RAIS	2.2E+00	2.2E+01	1.3E+01	4.7E+03	4.7E+04

Notes:

- Not applicable for this site

mg/kg-d = milligrams per kilogram per day

L/kg = Liters per Kilogram

mg/L = milligrams per liter

mg/kg = milligrams per kilogram

CAS# = Chemical Abstract Number

RfDo = Oral Reference Dose

IRIS = Integrated Risk Information System (USEPA)

BCF - bioconcentration factor

RAIS = Risk Assessment Information System

GWSS = RECAP Groundwater Screening Standard

GW1 = RECAP Standard for Class 1 groundwater

GW2 = RECAP Standard for Class 2 groundwater

GW3DW = Groundwater Class 3 drinking water RECAP Standard

Soil_{SSni} = Screening Standard for soil protective of human health for non-industrial land use.Soil_{ni} = RECAP Standard for soil protective of human health for non-industrial land use.Soil_{SSGW} = Screening Standard for soil protective of groundwater.

(a) RECAP Standards calculated in accordance with Appendix H of RECAP (2003).

(b) For inorganic constituents for which a TCLP regulatory level is not available, the Soil_{SSGW} is estimated by multiplying the GW1 by a dilution factor of 100 and then by a factor of 20. This calculation approach is provided in RECAP Appendix H to duplicate the assumptions and methods used for those inorganic constituents with TCLP criteria. For a COC that is not listed in Table 3 such as strontium, the GW1 is calculated in accordance with Section H2.2.2.

**Table M-2
Delineation Standards: Example MO-1 Groundwater Calculations (a)**

*Paul M. Levert, et al. v Union Texas
Bayou Choctaw Oil Gas Field
West Baton Rouge Parish, Louisiana*

Constituents (b)	Initial GW3DW (c)	DF3 (d)	Final MO-1 GW3DW (e)	Water sol (f)	Limiting MO-1 RS (g)
Metals (mg/L)					
Arsenic	0.05	220	11	-	11
Barium	2	220	440	-	440
Strontium	13 (h)	220	2860	-	2860
BTEX (mg/L)					
Benzene	0.0011	220	0.242	1800	0.242
TPH Fractions (mg/L)					
Aromatic >C12-C16	1.3	220	286	-	286
Aromatic >C16-C21	1.0	220	220	-	220
Water Quality (mg/L)					
Chloride	60-250	220	13200-55000	-	13200-55000
TDS	300-500	220	66000-110000	-	66000-110000

Notes:

- Not Applicable
- MO-1 - Management Option 1.
- (a) The example calculations assume that a discharge could occur from shallow groundwater to surface water of Bayou Bourbeaux located at the maximum distance included in the RECAP default MO-1 model, 1750 to >2000 feet. The LDEQ-designated uses of Subsegment 120109 include primary and secondary contact recreation, fish and wildlife propagation, and drinking water supply per the Louisiana Surface Water Quality Regulations (LAC 33:IX.1123).
- (b) Constituents shown include those with constituent concentrations above the default GWss or SMCL and potentially E&P-related.
- (c) Initial GW3DW is the MO-1 RECAP Standard (RS) for Class 3 Drinking Water with no dilution factor applied, from Table 3 of RECAP, if available. Values for chloride and TDS taken from the Louisiana Surface Water Quality Regulations (LAC 33:IX.1123) for Subsegment 120109, and from SMCLs.
- (d) DF3 is the MO-1 default longitudinal Dilution Attenuation Factor for Class 3 groundwater, obtained from Appendix H of RECAP (2003) as a function of x and Sd: x is 1750 to >2,000 feet and Sd is 6-10 feet based on the average shallow zone thickness of 7 feet beneath the Levert property. The zone thins to the west (Sd<5 feet) beneath the Global Marketing property.
- (e) The final GW3DW is the initial GW3DW multiplied by DF3.
- (f) Water solubility from Table 3 of RECAP 2003.
- (g) The limiting MO-1 RS is the lower of the Final GW3DW and Water sol.
- (h) Standard not provided in RECAP; the risk-based value was calculated in accordance with Appendix H of RECAP (2003) using the current EPA-recommended toxicity value.

Table M-3**Arsenic Input for Arithmetic Mean - Surface Soil***Paul M. Levert, et al. v Union Texas International Corporation, et al.**Bayou Choctaw Oil Gas Field**West Baton Rouge Parish, Louisiana*

Arsenic Results 0-15' Outside			
Samp ID	Depth (Ft)	Provider	mg/kg
B-1	2-4	ERM	2.88
	2-4	ICON	6.51
	4-6	ERM	5.82
	4-6	ICON	3.39
	6-8	ERM	9.41
	6-8	ICON	4.64
	8-10	ERM	2.88
	8-10	ICON	4.59
B-2	6-8	ERM	4.1
	6-8	ICON	3.83
	8-10	ERM	3.63
	8-10	ICON	4.07
B-3	0-2	ERM	5.54
	0-2	ICON	5.02
	2-4	ERM	11.2
	2-4	ICON	6.11
	4-6	ERM	7.36
	4-6	ICON	3.33
	6-8	ERM	2.96
	6-8	ICON	4.88
	8-10	ERM	4.5
	8-10	ICON	6.01
B-4	0-2	ERM	3.66
	0-2	ICON	4.99
	2-4	ERM	13.7
	2-4	ICON	5.13
	4-6	ERM	9.39
	4-6	ICON	4.52
	6-8	ERM	3.06
	6-8	ICON	6.63
	8-10	ERM	2.62
	8-10	ICON	4.7
B-5	0-2	ERM	6.32
	0-2	ICON	<14.6
	2-4	ERM	3.88
	2-4	ICON	4.73
	4-6	ERM	6.99
	4-6	ICON	7.22
	6-8	ERM	15.1
	6-8	ICON	5.96
	8-10	ERM	6.11
	8-10	ICON	6.19

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Arsenic Results 0-15' Outside			
B-6	0-2	ERM	6.87
	0-2	ICON	6.35
	2-4	ERM	5.87
	DUP-02 (B-6 2-4')	ERM	7.02
	2-4	ICON	8.02
	4-6	ERM	3.42
	4-6	ICON	6.89
	6-8	ERM	7.27
	6-8	ICON	5.01
	8-10	ERM	3.29
	8-10	ICON	3.94
B-7	0-2	ERM	4.82
	0-2	ICON	5.09
	2-4	ERM	5.2
	DUP-03 (B-7 2-4')	ERM	7.29
	2-4	ICON	10.4
	4-6	ERM	9.57
	4-6	ICON	10.5
	6-8	ERM	15.5
	6-8	ICON	7.03
	8-10	ERM	6.98
	8-10	ICON	3.92
B-8	0-2	ERM	2.54
	0-2	ICON	6.44
	2-4	ERM	2.27
	DUP-04 (B-8 2-4')	ERM	3.05
	2-4	ICON	8.37
	4-6	ERM	9.23
	4-6	ICON	7.52
	6-8	ERM	4.24
	6-8	ICON	8.28
	8-10	ERM	2.7
	8-10	ICON	6.45
HA-1	0-2	ICON	4.14
	2-4	ICON	6.3
	4-6	ICON	5.46
	6-8	ICON	5.92
HA-1R	0-2	ERM	NA
	0-2	ICON	10.4
	2-4	ERM	NA
	2-4	ICON	4.09
HA-2	0-2	ICON	6.5
	2-4	ICON	6
	4-6	ICON	6.6
	6-7	ICON	5.5

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Arsenic Results 0-15' Outside			
HA-2R	0-2	ERM	NA
	0-2	ICON	5.81
HA-3R	6-8	ERM	7.1
	8-10	ERM	4.88
HA-4	2-4	ICON	5.38
	6-8	ICON	13.3
HA-5	2-4	ICON	5.23
	6-8	ICON	15.7
HA-6	2-4	ICON	5.6
	4-6	ICON	4.74
HA-7	0-2	ICON	5.46
	2-4	ICON	6.53
	4-6	ICON	4.67
	6-8	ICON	6.07
HA-7R	0-2	ERM	NA
	2-4	ERM	NA
	4-6	ERM	NA
	6-8	ERM	NA
HA-9	2-4	ICON	4.32
HA-9R	2-4	ERM	NA
HA-11	2-4	ICON	NA
	4-6	ICON	7.8
SB-1	2-4	ICON	5.91
SB-2	6-8	ICON	6.43
L-2	2-4	ICON	5.57
	4-6	ERM	0.98
	4-6	ICON	8.64
	6-8	ERM	2.9
	6-8	ICON	7.38
	8-12	ERM	10.8
	8-12	ICON	7.13
	14-16	ERM	2.89
L-3	14-16	ICON	NA
	8-10	ERM	4.19
	8-10	ICON	3.48
	10-12	ERM	3.89
	10-12	ICON	6.95
	12-14	ERM	4.02
L-3R	12-14	ICON	NA
	0-2	ERM	7.54
L-4	8-10	ERM	4.97
	2-4	ICON	5.52
	6-8	ERM	4.47
	6-8	ICON	3.48
	10-12	ERM	6.18
	10-12	ICON	3.44
	14-16	ERM	5.07
	14-16	ICON	NA

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Arsenic Results 0-15' Outside			
L-5	2-4	ICON	7.79
	6-8	ERM	2.57
	6-8	ICON	3.14
	10-12	ERM	5.12
	10-12	ICON	6.02
L-6	2-4	ICON	4.24
	6-8	ERM	3.96
	6-8	ICON	4.68
	8-10	ERM	4.26
	8-10	ICON	4.78
L-7	2-4	ICON	4.17
	6-8	ERM	4.55
	6-8	ICON	4.34
	10-12	ERM	2.6
	10-12	ICON	3.51
	14-16	ERM	3.85
L-8	14-16	ICON	NA
	2-4	ICON	14
	4-8	ERM	4.39
	4-8	ICON	<12.7
	10-12	ICON	3.95
	12-14	ERM	4.93
L-9	12-14	ICON	NA
	0-4	ICON	13.7
	4-6	ERM	4.29
	4-6	ICON	<12.9
	10-12	ERM	6.62
L-10	10-12	ICON	2.84
	0-4	ERM	8.59
	0-4	ICON	<12.3
	4-8	ERM	7.48
	4-8	ICON	<12.4
	10-12	ERM	6.97
L-11	10-12	ICON	NA
	0-4	ERM	5.06
	0-4	ICON	<12.2
	6-8	ERM	3.49
	6-8	ICON	<12.0
	8-10	ERM	4.35
	8-10	ICON	3.29
	14-16	ERM	3.45
14-16	ICON	NA	

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Arsenic Results 0-15' Outside			
L-12	2-4	ICON	5.78
	4-6	ERM	2.56
	4-6	ICON	5.39
	10-12	ERM	3.54
	10-12	ICON	2.4

Notes:

Units are mg/kg-wet.

For non-detect results (<RL), 1/2 RL used to calculate arithmetic average.

Samples included in calculation are those collected by ERM and ICON outside of the proposed remediation areas laterally and vertically.

**Groundwater Standards (Hypothetical Discharge) for Global
Marketing Property**

Duplicated from:

Groundwater Assessment and Remediation Work Plan

Date: 17 July 2019

Prepared by: ERM for Global Marketing Solutions LLC Property

Reference: Compliance Order No. E-I & E-15-2199

OC Legacy Project No. 018-003-001

Table 2
Management Option 1 Evaluation for Groundwater
Global Marketing Solutions
West Baton Rouge Parish, Louisiana

Constituents of Concern	GW 3 DW	DF3	Note	GW3DW (DF3 applied)	Maximum Concentration (mg/L)	AOIC Exceeds MO-1 LRS?
Arsenic	0.05	440	XDF3	22	0.17	NO
Constituents of Concern	Numerical Criteria*	DF3	Note	Numerical Criteria (RECAP DF3 applied)	Maximum Concentration (mg/L)	AOIC Exceeds Numerical Criteria with RECAP DF3 applied?
Chloride	60	440		26,400	14,400	NO

Notes:

All concentrations are reported in mg/L
 Chloride does not have a standard in RECAP, so numerical criteria for Cl used for surfacewater subsegment (#120109)
 DF3 based on distance/aquifer thickness from RECAP
 PoC to nearest surface water: >2,000 ft
 Aquifer thickness: <5'