

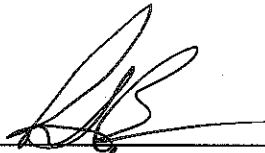
**BUREAU OF ENVIRONMENTAL REMEDIATION/REMEDIAL SECTION  
POLICY  
GUIDELINES FOR RANKING CONTAMINATED SITES**

**BER POLICY # BER-RS-001**

**DATE: Revised 9/14/2010**

**PAGES: 2 with attachment**

**Section Chief:**



**Date:**

9/15/10

**Bureau Manager:**



**Date:**

9/29/10

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**Original Policy: 1991**

**Revised Policy: 1994**

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**BUREAU OF ENVIRONMENTAL REMEDIATION/REMEDIAL SECTION  
POLICY  
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This guide describes the Contaminated Sites Ranking System (CSRS) to be used in evaluating contaminated orphan sites (sites that are in the State Water Plan Program) in Kansas. The purpose of CSRS is to set priorities for cleaning up contaminated sites where a responsible and/or voluntary party has not been identified, or has been identified but is recalcitrant and/or financially unable to address the site. However, the CSRS by itself cannot establish priorities for allocation of limited state funds for remedial action. Uniform application of the ranking system throughout the state will permit KDHE's Bureau of Environmental Remediation to identify those contaminated sites that pose the greatest hazard to human health and the environment. The CSRS is a means for applying uniform technical judgment regarding the potential hazards presented by one site relative to another site. It does not address the feasibility, desirability or degree of cleanup required, nor does it deal with readiness or ability of the State of Kansas to carry out remedial action as may be indicated. The CSRS form is attached to this policy and is available in an interactive electronic format.

The score for the following media: Soil, Ground Water, Surface Water, and Vapor Intrusion (Indoor Air) are calculated in the CSRS. The toxicity and mobility of the primary contaminant is factored in to weight the score (i.e. carbon tetrachloride is more toxic than acetone so carbon tetrachloride would add to the overall score). There are several factors for each media/pathway. Each factor is assigned a numerical value with variable range. The factor scores are then combined through addition to give a total score for that media/pathway. The total score for each media/pathway are multiplied together using the following formula which also normalizes the score to 100. Media scores range from 0 to 100.

**The Media Score (MS) is a composite of the scores for the four possible pathways:**

$$MS = (S_1 \times 0.60) + (S_2 \times 0.25) + (S_3 \times 0.10) + (S_4 \times 0.05)$$

**where:**

**S<sub>1</sub> = Highest Media Score**

**S<sub>2</sub> = Second Highest Media Score**

**S<sub>3</sub> = Third Highest Media Score**

**S<sub>4</sub> = Fourth Highest Media Score**

The effect of combining the media scores in this manner is to emphasize the primary (highest scoring) pathway while giving additional consideration to the secondary or tertiary pathways, even if they score relatively low. **NOTE: A site score must be calculated each time new data has been collected.**

Sites that score a maximum in any category are grouped as PRIORITY 1 and are the top priority sites since at least one media/pathway is impacted to the highest possible score which indicates that receptors are impacted. Sites that do not score a maximum in any category are grouped as PRIORITY 2 sites which indicates that while receptors may be threatened none are currently impacted.

Once the media score and priority for a site has been calculated proceed to the contaminant score. The contaminant score takes into account the concentrations, toxicity, and other chemical/physical properties of the contaminant. The score is simply added to the media score for a final site score:

$$\text{MS} + \text{Contaminant Score (CS)} = \text{TOTAL SITE SCORE}$$

The total maximum score for a site is 120 points which means that all media is contaminated and receptors are impacted. Once scored, sites will be grouped as Priority I or II and put into scoring order. The Unit Manger for the State Response and Property Redevelopment Unit will maintain an updated scoring list of sites.

Example:

Priority I

Site A	120
Site B	100
Site C	074
Site D	070

Priority II

Site E	075
Site F	065
Site G	050

Site D is a higher priority than Site E because one media/pathway received a maximum score which is indicative that receptors are impacted.

**RISK BASED RANKING SYSTEM**

NAME OF SITE:  
DATE SCORED:  
SCORED BY:

	SCORE
<b>GROUND WATER</b>	30
Contaminated (If YES Maximum Score Proceed to D)	0-A
Unknown if Contaminated (If UNKNOWN Proceed to A,B,C,E) (SKIP D)	0-B
Not Contaminated (Don't Proceed with this Category)	
<b>A. Depth to Ground Water</b>	8
Less than or equal to 40 feet from ground surface (Proceed with B)	6
Greater than 40 feet or less than 100 feet from ground surface (Proceed with B)	2
Greater than or equal to 100 feet from ground surface (Proceed with B)	
<b>B. Unsaturated Zone (Soils)</b>	8
Sand and Gravel >10e5 cm/sec (Proceed with C)	6
Silt, silty clay 10e5 to 10e7 cm/sec (Proceed with C)	2
Clay <10e7 cm/sec (Proceed with C)	
<b>C. Yield of Aquifer</b>	8
High yield >100 gpm (Proceed with D)	6
Moderate yield 10 to 100 gpm (Proceed with D)	2
Low yield 0 to 10 gpm (Proceed with D)	
<b>D. Impacted Targets</b>	70
Public or Private Drinking Wells have been impacted (Maximum Score - STOP)	30
Non-Drinking Private Water Wells have been impacted (Proceed to E)	0
No Public or Private Wells have been impacted (No Score Proceed to E)	
<b>E. Threatened Targets</b>	30
Public or Private Drinking Wells located within 1/2 mile of site	15
Other Wells located within 1/2 mile of site	5
Wells located within a mile of site	0
No Wells located within a mile of site	
<b>GROUNDWATER SCORE</b>	

**SCORE**

Contaminated (Proceed to A)	30
Unknown if Contaminated (Proceed to A) Groundwater is contaminated	20
Unknown if Contaminated (Proceed to A) Groundwater is not contaminated	0-A
Not Contaminated (Don't Proceed with this Category)	0-B

**SOIL**

<b>A. Targets</b>	Impacted Residential Targets (Maximum Score - STOP)	70
	Impacted Non-Residential Targets (Proceed to B)	25
	No Targets Impacted (Proceed to B)	0
<b>B. Adjacent Land Use</b>	Residential, schools, parks, day care centers (Proceed to C)	20
	Cropland/Agricultural, Commercial (Proceed to C)	10
	Industrial (Proceed to C)	5
<b>C. Soil Characteristics</b>	Clay 10e7 cm/sec (Proceed to D)	10
	Silt, Silty Clay 10e5 to 10e7 cm/sec (Proceed to D)	6
	Sand > 10e5 cm/sec (Proceed to D)	2
	Limestone or Bedrock (Don't Proceed to D)	0
<b>D. Horizon of Soil Contamination</b>	Zero to 12 inches	4
	12 inches to 36 inches	2
	Greater than 3 feet	0

**SOIL SCORE**

<b>SCORE</b>	
Contaminated (Proceed with A)	40
Unknown if Contaminated (Proceed with B) Soil and/or Groundwater Contaminated	20
Unknown if Contaminated (Proceed with B) No Soil or Groundwater Contamination	10
Not Contaminated (Don't Proceed with this Category) (Verified by sampling)	0-A

**SURFACE WATER**

Yellow shading in the cell is known contamination in either Groundwater

<b>A. Targets</b>	Drinking water intake impacted (Maximum Score - STOP)	60
	Non-Drinking water intake impacted (Proceed with C)	30
	No Surface water intake impacted (Proceed with B)	0
<b>B. Distance to Surface Water</b>	Less than or equal to 1000 feet (Proceed with C)	20
	1001 feet to 1 mile (Proceed with C)	10
	Greater than 1 mile (Proceed with C)	0
<b>C. Usage</b>	Drinking water source located within 5 downstream miles	20
	Wetlands/Sensitive Environments located within 5 downstream miles	15
	Non-Drinking water source located within 5 downstream miles	5
	No. Known intakes downstream within 5 miles	0

**SURFACE WATER SCORE**

**VAPOR INTRUSION (INDOOR AIR) ONLY  
APPLICABLE FOR VOLATILE CONTAMINANTS  
OF CONCERN**

SCORE

Is Indoor Residential Air Contaminated (Maximum score - STOP)	100
Unknown if Contaminated (Proceed with A)	0-A
Not Contaminated (Don't Proceed with this Category) (Verified by sampling)	0-B

**A. Distance from Contamination**

Is contaminated soil or groundwater known within 100 feet of sensitive and/or residential receptors?	
Yes (Proceed to B)	20
Unknown (Proceed to C)	0-A
Not Contaminated (Don't Proceed with this Category) (Verified by sampling)	0-B

Yellow shading in the cell is  
known contamination in either  
Groundwater

**B. Pathway**

Soil Gas is Contaminated (Proceed to D)	45
Unknown (Proceed to C)	0
Not Contaminated (Don't Proceed with this Category) (Verified by sampling)	0

**C. Media Impacted**

Contaminated Groundwater and/or Soil less than or equal to 20 feet below ground surface (bgs) (Proceed to D)	35
Contaminated Groundwater and/or Soil greater than 20 feet and less than 40 feet bgs (Proceed to D)	20
Contaminated Groundwater and/or Soil greater than 40 feet bgs (Proceed to D)	0-A
Groundwater and Soil are not contaminated (Don't Proceed with this Category)	0-B

**D. Targets**

Sensitive receptors (day cares, schools) located within 100 feet of known contamination	30
Residential homes/public use buildings located within 100 feet of known contamination	25
Sensitive/Residential receptors located > 100 feet but < 1000 feet of known contamination	20
Sensitive/Residential receptors located > 1000 feet of known contamination	10
No residential receptors identified	0

**INDOOR AIR SCORE**

**CALCULATING A SCORE:**

All scores are normalized to 100.

\*\*Sites that score a maximum score in any category are grouped as Priority I

\*\*Sites that do not score a maximum in any category are grouped as Priority II

**MEDIA SCORE**

- 1 Ground Water: 0
- 2 Ground Water: 0
- 3 Ground Water: 0
- 4 Ground Water: 0

Four different media were scored:

Groundwater, soil, surface water and indoor air.

Use the scores calculated for each media and plug them into the following formula:

$$\text{Highest Category Score (HCS)} * 0.5 + \text{Second HCS} * 0.3 + \text{Third HCS} * 0.15 + \text{Lowest Category Score} * 0.05 = \text{Media Score}$$

This will result in a score between 0 and 100. Proceed to scoring the contaminant.

**MEDIA SCORE**

**Priority?**

**RSK LEVELS FOR THE HIGHEST DETECTION OVER THE TIER 2**

This category takes into account a contaminant's mobility, toxicity, persistence and concentration. Use the worst case contaminant for the site.

- All Contaminants are below their respective RSK levels
- 0.1 to 5 times the RSK level
- 5.1 to 10 times the RSK level
- 10.1 to 50 times the RSK level
- Greater than 50 times the RSK level

SCORE

0	
5	
10	
15	
20	

**CONTAMINANT SCORE**  
Maximum Score = 20

**SITE SCORE**

Take the total Media Score calculated above and add the contaminant score for a final score. The Maximum Total Score for a site is 120 points.

**MEDIA SCORE + CONTAMINANT SCORE = TOTAL SCORE**

**TOTAL SCORE**  
Maximum Score = 120