

# Regulations Governing the Preliminary Assessment of Soil and Groundwater Pollution Control Sites

Promulgated by Environmental Protection Administration order Huan-Shu-Tu-Tzu No.0920031925 on May 7, 2003

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## Article 1

These Regulations are determined pursuant to Article 21, Paragraph 3 of the Soil and Groundwater Pollution Remediation Act (herein referred to as this Act).

## Article 2

Those control sites which fulfill one of the following circumstances after preliminary assessment shall be reported to the central competent by the local competent authority and officially announced as remediation site following central competent authority approval.

- I. Control sites for which the concentration of a single pollutant exceeds soil or groundwater pollution control standards by more than 20 times.
- II. Control sites for which the calculation of the pollution total score  $P$  based on the “soil pollution grade ( $T_s$ )” and the “groundwater pollution grade ( $T_{gw}$ )” reaches more than 20 points.
- III. Control sites that are located in drinking water source protection areas, within a certain distance from drinking water intake points, or in the water catchment area of a dam or reservoir.
- IV. Control sites that are located in a national park, wildlife protection area, sensitive ecology or preserve, or the habitat of endangered species or plant life.
- V. Control sites that are located in a special scenic area or a forest recreation area.
- VI. Control sites that are located on a school campus, in a public park, green belt, or children's recreational area.
- VII. Other major incidents of pollution as designated and officially announced by the central competent authority

The assessment table for the preliminary assessment in Paragraph 1 is shown in Appendix 1.

## Article 3

The soil pollution grade ( $T_s$ ) in these Regulations shall be the sum ( $\sum T_{si}$ ) of the soil pollution control standard multiples reached by soil pollutant concentrations. Its calculation formula shall be as follows:

$$T_s = \sum T_{si} = C_1 / S_1 + C_2 / S_2 + \dots + C_n / S_n$$

$C_i$ :  $i$  category pollutant concentrations that reach soil pollution control standards,  $i=1, 2, \dots, n$

$S_j$ :  $j$  category soil pollutant control standards,  $j=1, 2, \dots, n$

The calculation formula for the foregoing paragraph is shown in Appendix 2.

## Article 4

The groundwater pollution grade ( $T_{gw}$ ) in these Regulations shall be the sum ( $\sum T_{gwi}$ ) of the groundwater pollution control standard multiples reached by groundwater pollutant concentrations. Its calculation formula shall be as follows:

$$T_{gw} = \sum T_{gwi} = C_1 / S_1 + C_2 / S_2 + \dots + C_n / S_n$$

$C_i$ :  $i$  category pollutant concentrations that reach groundwater pollution control standards,  $i=1, 2, \dots, n$

$S_i$ :  $i$  category groundwater pollutant control standards,  $i=1, 2 \dots n$

The calculation formula in the foregoing paragraph follows Appendix 3.

#### **Article 5**

The calculation formula for the pollution total score  $P$  shall be as follows:

$$P = \sqrt{\frac{T_s^2 + T_{gw}^2}{2}}$$

#### **Article 6**

The local authority for a control site pursuant to Article 2, Paragraph 1, shall inform the perpetrators of pollution at the control site, all land users, land managers, and landowners of their obligation to apply for a health risk assessment.

Persons that receive notice of the health risk assessment shall apply for a health risk assessment with the local competent authority within two weeks of receiving notification, and within four months for approval, shall submit a health assessment report for review. The local competent authority shall complete the review within three months of collecting and processing the reports and send the conclusions to the central competent authority to keep on record.

Control sites where one of the following circumstances apply are not subject to the foregoing paragraph:

- I. Control sites pursuant to Article 2, Paragraph 1, Subparagraph 1, whose total concentration of phenol, nitrate nitrogen, or nitrite nitrogen exceeds soil or groundwater pollution control standard by more than 20 times
- II. Control sites subject to Article 2, Paragraph 1, Subparagraph 4 or Article 2, Paragraph 1, Subparagraph 7

The central competent authority shall determine the hazard appraisal, dosage reaction assessment, exposure volume assessment, and description of risk characteristics included in the health risk assessment.

In order to review health risk assessments, the local competent authority shall establish a health risk assessment review committee and invite relevant agencies, representatives, experts, and scholars to form the committee; the number of experts and scholars shall not be less than half of the total number of committee members.

#### **Article 7**

The local competent authority shall not submit a request to the central competent authority to officially announce the site as a remediation site if, upon completion of the review of the health risk assessment, the cancer risk is found to be less than 1% and other non-cancer risks are also less than 1%. However, the site in question shall be handled according to relevant control site regulations pursuant to this Act.

#### **Article 8**

These Regulations shall take effect on the date of promulgation.

# Appendix 1 Control Site Preliminary Assessment Table

Site name: \_\_\_\_\_

Site address: \_\_\_\_\_

Assessment of control site pollution conditions				Yes	No
1. Control sites that are located in drinking water source protection areas, within a certain distance from drinking water intake points, or in the water catchment area of a dam or reservoir.				<input type="checkbox"/>	<input type="checkbox"/>
2. Control sites that are located in a national park, wildlife protection area, sensitive ecology or nature preserve, or the habitat of endangered species or plant life.				<input type="checkbox"/>	<input type="checkbox"/>
3. Control sites that are located in a special scenic area or a forest recreation area.				<input type="checkbox"/>	<input type="checkbox"/>
4. Control sites that are located on a school campus, in a public park, green belt, or children's recreational area.				<input type="checkbox"/>	<input type="checkbox"/>
5. Other major incidents of pollution as designated and officially announced by the central competent authority				<input type="checkbox"/>	<input type="checkbox"/>
6. The concentration of a single pollutant at the control site exceeds soil or groundwater pollution control standards by more than 20 times. If Yes has been checked, please list the name of the pollutants and their multiples.				<input type="checkbox"/>	<input type="checkbox"/>
Soil		Groundwater			
Pollutant name	Multiple	Pollutant name	Multiple		
7. Calculate the pollution total score $P$ according to the following formula. Does $P$ reach more than 20 points?				<input type="checkbox"/>	<input type="checkbox"/>
Calculate the soil pollution grade ( $T_s$ ) according to Appendix 2. $T_s =$ _____ (when soil pollutant concentration has not reached control standards, then $T_s$ is to be calculated as 0 points)					
Calculate the groundwater pollution grade ( $T_{gw}$ ) according to Appendix 3. $T_{gw} =$ _____ (when groundwater pollutant concentration has not reached control standards, then $T_{gw}$ is to be calculated as 0 points)					
$P = \sqrt{\frac{T_s^2 + T_{gw}^2}{2}}$					

Assessment Results	
1. If for any of the above assessment items the “Yes” box has been checked, the “remediation site” box must be checked for this site. 2. If for all of the above assessment items the “No” box has been checked, the “control site” box must be checked for this site.	
<input type="checkbox"/> Control site	<input type="checkbox"/> Remediation site
Assessing organization:	Approving organization:
Assessed by:	Approved by:

Note:  $T_s$ ,  $T_{gw}$  and  $P$  in this table must be rounded to the first digit to the right of the decimal point.

# Appendix 2 Soil Pollution Grading Table

Site name: \_\_\_\_\_

Pollutant items		Soil pollution control standards $S_i$ (mg/kg)	Soil pollutant concentrations that reach control standards $C_i$ (mg/kg)	Multiples that reach control standards $T_{si} = \frac{C_i}{S_i}$
Heavy metals	As (Arsenic)	60		
	Cd (Cadmium)	20 (5 for farmland)		
	CR (Chromium)	250		
	Cu (Copper)	400 (200 for farmland)		
	Hg (Mercury)	20 (5 for farmland)		
	Ni (Nickel)	200		
	Pb (Lead)	2000 (500 for farmland)		
	Zn (Zinc)	2000 (600 for farmland)		
Organic compounds	Benzene	5		
	Carbon tetrachloride	5		
	Chloroform	100		
	1,2-Dichloroethane	8		
	(cis-1,2-Dichloroethylene)	7		
	(trans-1,2-Dichloroethylene)	50		
	1,2-Dichloropropane	0.5		
	1,2-Dichlorobenzene	100		
	1,3-Dichlorobenzene	100		
	3,3'-Dichlorobenzidine	2		
	Ethylbenzene	250		
	Hexachlorobenzene	500		
	Pentachlorophenol	200		
	Tetrachloroethylene	10		

# Appendix 2 Soil Pollution Grading Table (continued)

Site name: \_\_\_\_\_

Pollutant items		Soil pollution control standards $S_i$ (mg/kg)	Soil pollutant concentrations that reach control standards $C_i$ (mg/kg)	Multiples that reach control standards $T_{si} = \frac{C_i}{S_i}$
<b>Organic compounds</b>	<b>Toluene</b>	500		
	<b>TPH (Total Petroleum Hydrocarbons)</b>	1000		
	<b>Trichloroethylene</b>	60		
	<b>2,4,5-Trichlorophenol</b>	350		
	<b>2,4,5-Trichlorophenol</b>	40		
	<b>Vinyl chloride</b>	10		
	<b>Xylenes</b>	500		
<b>Agricultural chemicals</b>	<b>Aldrin</b>	0.04		
	<b>Chlordane</b>	0.5		
	<b>4,4'-Dichlorodiphenyl-trichloroethane</b>	0.04		
	<b>Dieldrin</b>	0.04		
	<b>Endrin</b>	20		
	<b>Heptachlor</b>	0.2		
	<b>Toxaphene</b>	0.6		
	<b>Endosulfan</b>	60		
<b>Other organic compounds</b>	<b>Dioxins</b>	1000 (ng-TEQ/kg)		
	<b>Polychlorinated biphenyls</b>	0.09		
<p><b>The soil pollution grade (<math>T_s</math>) is equivalent to the sum of the above listed multiples that reach control standards</b>      <math>T_s =</math></p>				

Note:  $T_{si}$  and  $T_s$  in this table must be rounded to the first digit to the right of the decimal point.

# Appendix 3 Groundwater Pollution Grading Table

Site name: \_\_\_\_\_

Pollutant items		Second Category Groundwater Pollution Control Standards $S_i$ (mg/L)	Groundwater pollutant concentrations that reach control standards $C_i$ (mg/L)	Multiples that reach control standards $T_{gw_i} = \frac{C_i}{S_i}$
Heavy metals	Arsenic (As)	0.50		
	Cadmium (Cd)	0.050		
	Chromium (CR)	0.50		
	Copper (Cu)	10		
	Lead (Pb)	0.50		
	Mercury (Hg)	0.020		
	Lindane (Ni)	10		
	Zinc (Zn)	50		
Monocyclic aromatic hydrocarbons	Benzene	0.050		
	Toluene	10		
Polycyclic aromatic hydrocarbons	Naphthalene	0.40		
Chlorinated hydrocarbons	Carbon tetrachloride	0.050		
	Chlorobenzene	1.0		
	Chloroform	1.0		
	Chloromethane	0.30		
	1,4-Dichlorobenzene	0.750		
	1,1-Dichloroethane	8.50		
	1,2-Dichloroethane	0.050		

# Appendix 3 Groundwater Pollution Grading Table (continued)

Site name: \_\_\_\_\_

Pollutant items	Second Category Groundwater Pollution Control Standards $S_i$ (mg/L)	Groundwater pollutant concentrations that reach control standards $C_i$ (mg/L)	Multiples that reach control standards $T_{gwi} = \frac{C_i}{S_i}$
<b>Chlorinated hydrocarbons</b>	<b>1,1-Dichloroethylene</b>	0.070	
	<b>(cis-1,2-Dichloroethylene)</b>	0.70	
	<b>(trans-1,2-Dichloroethylene)</b>	1.0	
	<b>Phenols</b>	0.140	
	<b>Tetrachloroethylene</b>	0.050	
	<b>Trichloroethylene</b>	0.050	
	<b>Vinyl chloride</b>	0.020	
<b>Agricultural chemicals</b>	<b>2,4-D</b>	0.70	
	<b>Carbofuran</b>	0.40	
	<b>Chlordane</b>	0.020	
	<b>Diazinon</b>	0.050	
	<b>Methamidophos</b>	0.20	
	<b>Paraquat</b>	0.30	
	<b>Parathion</b>	0.220	
	<b>Toxaphene</b>	0.030	
<b>General items</b>	<b>Nitrate as N</b>	100	
	<b>Nitrite nitrogen (Nitrite as N)</b>	10	
<p><b>The groundwater pollution grade (<math>T_{gw}</math>) is equivalent to the sum of the above listed multiples that reach control standards <math>T_{gw} =</math></b></p>			

Note:  $T_{gwi}$  and  $T_{gw}$  in this table must be rounded to the first digit to the right of the decimal point.