Executive Regulation

For the Prevention and Remediation of Soil Pollution

For the Environmental Law issued by the Royal Decree

No. (m/165), dated 19/11/1441 Hijri

National Center for Archives & Records

***** Note: In the event of any discrepancy between the Arabic original version of this Executive Regulation and its English translation, the Arabic version prevails *****

National Center for Archives & Records

Contents

Article (1) – Definitions **4**

Article (2) – Scope of Application **5**

Article (3) – The Centre's Scope of Work regarding the Prevention and Remediation of Soil Pollution **5**

Article (4) – Soil Protection Standards **6**

Article (5) – Locating Sites with Polluted Soil **6**

Article (6) – Role of Persons regarding Soil Pollution Prevention and Protection **7**

Article (7) – Prohibitions **8**

Article (8) – Violations Apprehension and Penalties Imposition **8**

Appendix 1 – Standards for Protecting Soil from Pollution **11**

National Center for Archives & Records

Article (1) – Definitions

The following terms and expressions - wherever they appear in this executive regulation – shall have the meanings set forth below, except where it is therein expressly otherwise:

Law: Environmental Law.

Executive Regulations: Executive Regulations for the Environmental Law.

Executive Regulation: Executive Regulation for the Prevention and Remediation of Soil Pollution.

Ministry: Ministry of Environment, Water and Agriculture.

Minister: Minister of Environment, Water and Agriculture.

Center: National Center for Environmental Compliance.

Competent Authority: The Ministry or any of the national environmental centers, within their jurisdictions.

Inspectors: Employees designated by a decision issued by the Minister or the chairman of the Center's board of directors to undertake environmental monitoring and inspections, and to apprehend, investigate, and substantiate violations to the provisions of the law and Executive Regulations.

Person: Any public or private natural or legal person.

Coarse-Grained Soil (Sand and Gravel): Soil in which grains are equal to or larger than 75 µm.

Soft Soil (Silt and Clay): Soil in which grains are smaller than 75 µm.

Soil Pollution (Polluted Soil): Soil degradation caused by the presence of chemicals or other factors in unusual concentrations or quantities, which leads, directly or indirectly, to damage to human health, animal wildlife, vegetation and/or surface and ground water resources.

Environmental Pollution: Presence of one or more substances or factors, in specific quantities or with specific characteristics, over a period of time, that directly or indirectly cause environmental harm.

Environmental Degradation: Severe damage to the environment caused by the depletion of natural resources, destruction of habitats, or the extinction of wildlife species, or the pollution of environmental media and the deterioration of air, water, and soil quality.

Compensation: Monetary amount paid by the person who causes damage, pollution or environmental degradation, to compensate for or eliminate the damage, pollution or environmental degradation resulting from such damage, pollution, or environmental degradation. The compensation includes rehabilitation expenses the event that rehabilitation was not carried

out by the person causing damage, pollution, or environmental degradation.

Environmentally Sensitive Areas: Areas that have environmental significance and whose degradation has negative repercussions for the environment. They include protected areas, parks, forests, wetlands, significant bird habitat, mangroves, landscaped sites, watersheds, water catchment and run-off areas, beaches, waterways, aquifers or other area(s) identified or declared by as environmentally sensitive areas by the State, the Ministry or the national environmental centers.

Sensitive Receptors: Receptors that are likely to be severely affected by an activity or project due to their geographical proximity or sensitive nature. They include environmental elements, living species, archeological, cultural and religious sites, and community groups (such as endangered species, hospitals, elder care centers, schools, residential complexes, and others).

Environmental Rehabilitation: Any procedure conducted on an environmentally degraded site or one that is affected by environmental damage or pollution, to restore its natural state of environmental balance, in accordance with the standards set by competent authority.

Remediation of Polluted Sites: Any procedure conducted on a polluted site to restore its natural state of environmental balance in accordance with the requirements specified by competent authority.

Polluter: Person or activity causing environmental pollution.

Article (2) – Scope of Application

The provisions of these Executive Regulations shall apply to all persons in the Kingdom and their activities within the Kingdom's territory, in order to protect soil from pollution, including the implementation of preventive measures against soil pollution and remediation of polluted soil.

National Center for Archives & Records

Article (3) – The Centre's Scope of Work regarding Prevention and Remediation of Soil Pollution

The Center shall undertake the tasks and responsibilities related to prevention and remediation of polluted soil, including:

(1) Developing rules, requirements, and controls to handle sites with polluted soil.

(2) Developing and executing national plans that aim at preventing and mitigating the impact of soil pollution.

(3) Monitoring and assessing soil pollution periodically.

(4) Coordinating with competent authorities to set up a comprehensive database on soil classification and quality in the Kingdom; and updating it periodically.
(5) Developing requirements for soil and site uses after pollution remediation.
(6) Identifying the various sites with polluted soil for which the responsible polluter has not been identified; and coordinating with competent authorities on the development and implementation of plans to rehabilitate those sites.
(7) Issuing a list of pesticides, fertilizers and soil conditioners that cause soil pollution and whose use is prohibited, in coordination with the Deputy Ministry for Agriculture, the Saudi Food and Drug Authority, the National Center for Vegetation Cover, and any other competent authority.
(8) Monitoring and publishing soil pollution indicators as indicated by the Ministry.
(9) Developing national reports on the levels of soil pollution as well as mitigation, preventative, and rehabilitative measures, and publishing them as indicated by the Ministry.
(10) Developing and implementing study and research programs on soil protection.
(11) Organizing environmental awareness activities on soil protection, including courses, seminars, specialized workshops, and media campaigns.
(12) Inspecting, monitoring, and apprehending all violations of these Executive Regulations, and coordinating with the security authorities at Ministry of the Interior, whenever necessary, to apprehend violators.

Article (4) – Soil Protection Standards

(1) Appendix (1) of these Executive Regulations specifies the soil protection standards based on the classification of soil particles' size (coarse and soft soil) and on the types of land use.
(2) These standards represent the pollution levels of the soil above which sites are considered to have polluted soil.
(3) All persons must comply with these standards, refrain from causing soil pollution in any way, and remediate and rehabilitate polluted sites in accordance with these standards and what is set forth by the Center.

Article (5) – Locating Polluted Soil Sites

(1) The Center shall develop and execute a national program to monitor soil pollution across the Kingdom (in coordination with competent authorities), including the following as a minimum:
   a. Mechanism to locate potential polluted sites.

b. Pollution indicators.
c. Sampling locations, periods and timelines.
d. Requirements for validation and analysis of results.
e. Staff responsibilities and required qualifications.
f. Requirements for records' documentation and management.
g. QA/QC procedures for monitoring processes.
h. Requirements for reporting polluted soil sites and sources of pollution.

(2) When monitoring a polluted soil site(s), the Center shall conduct an investigation and technical studies to determine the source(s) of pollution.

(3) If the investigation proves that the pollution is caused by several sources that operate within the limits of the requirements and conditions of their environmental permits and licenses, the Center may take the appropriate measures in coordination with the oversight body(ies), including:

a. Require relevant persons to interrupt the pollution source(s) and remediate pollution in accordance with the Executive Regulations for the Environmental Rehabilitation of Degraded Sites and Treatment of Polluted Sites.
b. Supervise and follow up on operations to limit the site(s) pollution propagation, and coordinate with competent authorities in case the situation exceeds the capabilities and capacities of pollution source(s).
c. Implement the appropriate monitoring program targeting polluters' environmental compliance.
d. Develop an action plan and follow up on its implementation in order to reduce soil pollution and treat and rehabilitate polluted soil in accordance with the Executive Regulations for the Environmental Rehabilitation of Degraded Sites and Treatment of Polluted Sites.

National Center for Archives & Records

Article (6) – Role of Persons regarding Soil Pollution Prevention and Protection

All persons must comply with the provisions of this Executive Regulations in accordance with the following:

(1) Take all necessary measures to prevent or minimize soil pollution, reduce pollution generation, and treat sources of pollution.

(2) Rehabilitate polluted soil sites in accordance with the Executive Regulations for the Environmental Rehabilitation of Degraded Sites and Treatment of Polluted Sites.

(3) Develop up-to-date records specifying the various measures and actions previously taken with regard to soil pollution.
(4) Provide data and information on the levels of soil pollution whenever requested by the Center.
(5) Inform the Center of any changes related to the levels of soil pollution, as well as the remediation and prevention measures taken in this regard.

Article (7) – Prohibitions

(1) It is prohibited to engage in any activity or action that may lead, directly or indirectly, to damage or pollute soil, negatively affect its use, or destroy its natural properties.
(2) It is prohibited not to take appropriate measures to prevent soil pollution.
(3) It is prohibited not to take appropriate measures to reduce pollution generation and treat the sources of pollution.
(4) It is prohibited not to comply with the standards specified herein during the remediation of polluted soil and the environmental rehabilitation of polluted sites.
(5) It is prohibited not to submit updated records specifying the various measures and actions taken with regard to soil pollution.
(6) It is prohibited to provide incorrect information, data, or records.
(7) It is prohibited not to inform the Center as soon as soil pollution is detected during an activity.

Article (8) – Violations Apprehension and Penalties Imposition

Violations of the provisions of the Executive Regulations shall be apprehended, and the penalties set out in Table (1) shall be imposed in accordance with the Executive Regulations for Apprehension of Violations and Imposition of Penalties of the Environmental Law, taking into account the following:

(1) Serious violations shall be prescribed a penalty proportional to the degree of damage, size and inherent importance of the damaged site, and economic and social implications arising therefrom.
(2) The estimation of the penalty for significant violations referred to in clause (1) of this article shall be made by a committee of experts and qualified persons, established by virtue of a decision of the Center's CEO.
(3) Violations shall be deemed serious if they involve any of the following acts:
   a. Acts stipulated in Article (35) of the law.

National Center for Archives & Records

b. Acts that lead to environmental degradation.
c. Acts that harm sensitive receptors or environmentally sensitive areas.

National Center for Archives & Records

Table (1) – Violations and Penalties

#	Violation	Penalty (Saudi Riyals)	Comment
1	Engaging in any activity or action that may lead, directly or indirectly, to damage or pollute the soil, negatively affect its use, or destroy its natural properties	From 20,000 to 10,000,000	The violator must rectify the violation, repair the damage, and pay compensations
2	Failing to take the appropriate measures to prevent soil pollution	From 20,000 to 500,000	The violator must rectify the violation, repair the damage, and pay compensations
3	Failing to take appropriate measures to reduce the propagation of pollution and treat sources of pollution, if any	From 20,000 to 500,000	The violator must rectify the violation, repair the damage, and pay compensations
4	Failing to comply with soil protection standards set by the Center	From 10,000 to 10,000,000	The violator must rectify the violation, repair the damage, and pay compensations
5	Failing to treat polluted soil and rehabilitate sites with polluted soil in compliance with soil protection standards set by the Center	From 30,000 to 10,000,000	The violator must rectify the violation, repair the damage, and pay compensations
6	Failing to provide updated records specifying the various measures and actions taken with regard to soil pollution	From 50,000 to 100,000	The violator must rectify the violation
7	Failing to inform the Center as soon as soil pollution is detected during an activity	From 10,000 to 1,000,000	The violator must rectify the violation, repair the damage, and pay compensations

Appendix 1 – Standards for Protecting Soil from Pollution

The standards listed in the table below do not apply when it is established that the natural concentrations in the soil exceed the standards for protecting soil from pollution. Persons in this case must coordinate with the Center to find appropriate solutions.

Chemical	Unit	Soil Particle Size Classification										Comments
		Coarse Soil					Soft Soil					
		Types of Land Use										
		Natural Area	Agricultural	Residential/ Gardens	Commercial	Industrial	Natural Area	Agricultural	Residential/ Gardens	Commercial	Industrial	
		Limits										
pH (in 0.01M $CaCl_2$)	pH	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	
Cyanide (free)	Mg/ Kg	0.9	0.9	0.9	8	8	0.9	0.9	0.9	8	8	
Fluoride	Mg/ Kg	200	200	200	2,000	2,000	200	200	200	2,000	2,000	
Sulphur (elemental)	Mg/ Kg	500	500	500	500	500	500	500	500	500	500	
Minerals												
Antimony (Sb)	Mg/ Kg	20	20	20	40	40	20	20	20	40	40	
Arsenic (inorganic) (As)	Mg/ Kg	17	17	17	26	26	17	17	17	26	26	
Barium (non-barite) (Ba)	Mg/ Kg	750	750	500	2,000	2,000	750	750	500	2,000	2,000	
Barite-barium	Mg/ Kg	10,000	10,000	10,000	15,000	14,0000	10,000	10,000	10,000	15,000	140,000	
Beryllium (Be)	Mg/ Kg	5	5	5	8	8	5	5	5	8	8	
Boron (saturated phase extract) (B)	Mg/ Kg	3.3	3.3	3.3	5	5	3.3	3.3	3.3	5	5	
Cadmium (Cd)	Mg/ Kg	3.8	1.4	10	22	22	3.8	1.4	10	22	22	

National Center for Archives & Records

Chemical	Unit	Soil Particle Size Classification										Comments
		Coarse Soil					Soft Soil					
Chromium (hexavalent) (Cr^{+6})	Mg/ Kg	0.4	0.4	0.4	1.4	1.4	0.4	0.4	0.4	1.4	1.4	
Chromium (total)	Mg/ Kg	64	64	64	87	87	64	64	64	87	87	
Cobalt (Co)	Mg/ Kg	20	20	20	300	300	20	20	20	300	300	
Copper (Cu)	Mg/ Kg	63	63	63	91	91	63	63	63	91	91	
Lead (Pb)	Mg/ Kg	70	70	140	260	600	70	70	140	260	600	
Mercury (inorganic)	Mg/ Kg	12	6.6	6.6	24	50	12	6.6	6.6	24	50	
Molybdenum (Mo)	Mg/ Kg	4	4	4	40	40	4	4	4	40	40	
Nickel (Ni)	Mg/ Kg	45	45	45	89	89	45	45	45	89	89	
Selenium (Se)	Mg/ Kg	1	1	1	2.9	2.9	1	1	1	2.9	2.9	
Silver	Mg/ Kg	20	20	20	40	40	20	20	20	40	40	
Thallium (TI)	Mg/ Kg	1	1	1	1	1	1	1	1	1	1	
Tin (Sn)	Mg/ Kg	5	5	5	300	300	5	5	5	300	300	
Uranium (U)	Mg/ Kg	33	23	23	33	300	33	23	23	33	300	
Vanadium (V)	Mg/ Kg	130	130	130	130	130	130	130	130	130	130	
Zinc (Zn)	Mg/ Kg	200	200	200	360	360	200	200	200	360	360	
Hydrocarbons												
Benzene (C_6H_6)	Mg/ Kg	0.078	0.073	0.073	0.078	0.078	0.046	0.046	0.046	0.046	0.046	Topsoil
Benzene (C_6H_6)	Mg/ Kg	0.078	0.078	0.078	0.078	0.078	0.046	0.046	0.046	0.046	0.046	Subsurface soil

Chemical	Unit	Soil Particle Size Classification										Comments
		Coarse Soil					Soft Soil					
Toluene (C_7H_8)	Mg/Kg	0.12	0.12	0.12	0.12	0.12	0.52	0.52	0.52	0.52	0.52	Topsoil
Toluene (C_7H_8)	Mg/Kg	0.12	0.12	0.12	0.12	0.12	0.52	0.52	0.52	0.52	0.52	Subsurface soil
Ethylbenzene (C_8H_{10})	Mg/Kg	0.14	0.018	0.14	0.14	0.14	0.073	0.073	0.073	0.073	0.073	Topsoil
Ethylbenzene (C_8H_{10})	Mg/Kg	0.14	0.14	0.14	0.14	0.14	0.073	0.073	0.073	0.073	0.073	Subsurface soil
Xylenes (C_8H_{10})	Mg/Kg	1.9	0.003	1.9	1.9	1.9	0.99	0.99	0.99	0.99	0.99	Topsoil
Xylenes (C_8H_{10})	Mg/Kg	1.9	1.9	1.9	1.9	1.9	0.99	0.99	0.99	0.99	0.99	Subsurface soil
Styrene (C_8H_8)	Mg/Kg	0.8	0.8	0.8	0.8	0.8	0.68	0.68	0.68	0.68	0.68	
F1: C6 to C10	Mg/Kg	210	24	24	270	270	210	210	210	320	320	Topsoil
F2: C10 to C16	Mg/Kg	150	130	130	260	260	150	150	150	260	260	Topsoil
F3: C16 to C34	Mg/Kg	300	300	300	1,700	1,700	1,300	1,300	1,300	2,500	2,500	Topsoil
F4: C34 to C50	Mg/Kg	2,800	2,800	2,800	3,300	3,300	5,600	5,600	5,600	6,600	6,600	Topsoil
F1: C6 to C10	Mg/Kg	420	30	30	440	440	420	420	420	640	640	Subsurface soil
F2: C10 to C16	Mg/Kg	300	160	160	520	520	300	300	300	520	520	Subsurface soil
F3: C16 to C34	Mg/Kg	600	600	600	3,400	3,400	2,600	2,600	2,600	4,300	4,300	Subsurface soil
F4: C34 to C50	Mg/Kg	5,600	5,600	5,600	6,600	6,600	10,000	10,000	10,000	10,000	10,000	Subsurface soil
Acenapthene ($C_{12}H_{10}$)	Mg/Kg	0.38	0.38	0.38	0.38	0.38	0.32	0.32	0.32	0.32	0.32	
Anthracene ($C_{14}H_{10}$)	Mg/Kg	0.0056	0.0056	0.0056	0.0056	0.0056	0.0046	0.0046	0.0046	0.0046	0.0046	
Fluoranthene ($C_{16}H_{10}$)	Mg/Kg	0.039	0.039	0.039	0.039	0.039	0.032	0.032	0.032	0.032	0.032	

Chemical	Unit	Soil Particle Size Classification										Comments
		Coarse Soil					Soft Soil					
Fluorene ($C_{13}H_{10}$)	Mg/ Kg	0.34	0.34	0.34	0.34	0.34	0.29	0.29	0.29	0.29	0.29	
Naphthalene ($C_{10}H_8$)	Mg/ Kg	0.017	0.017	0.017	0.017	0.017	0.014	0.014	0.014	0.014	0.014	
Phenanthrene ($C_{14}H_{10}$)	Mg/ Kg	0.061	0.061	0.061	0.061	0.061	0.051	0.051	0.051	0.051	0.051	
Pyrene ($C_{16}H_{10}$)	Mg/ Kg	0.04	0.04	0.04	0.04	0.04	0.034	0.034	0.034	0.034	0.034	
Carcinogenic PAHs	Mg/ Kg	1	1	1	1	1	1	IACR<1	1	1	1	
Benz[a]anthracene ($C_{18}H_{12}$)	Mg/ Kg	0.083	0.083	0.083	0.083	0.083	0.07	0.07	0.07	0.07	0.07	
Benzo[b+j]fluoranthene	Mg/ Kg	6.2	6.2	-	-	-	6.2	6.2	-	-	-	
Benzo[k]fluoranthene ($C_{20}H_{12}$)	Mg/ Kg	6.2	6.2	-	-	-	6.2	6.2	-	-	-	
Benzo[a]pyrene ($C_{20}H_{12}$)	Mg/ Kg	0.6	0.6	0.77	0.77	0.77	0.6	0.6	0.7	0.7	0.7	
Chrysene ($C_{18}H_{12}$)	Mg/ Kg	6.2	6.2	-	-	-	6.2	6.2	-	-	-	
Halogen Aliphatic Compounds												
Vinyl chloride (C_2H_3Cl)	Mg/ Kg	0.02	0.00034	0.00034	0.0043	0.0043	0.014	0.0083	0.0083	0.014	0.014	
1,1-Dichloroethene ($C_2H_2Cl_2$)	Mg/ Kg	0.24	0.021	0.021	0.24	0.24	0.15	0.15	0.15	0.15	0.15	
Trichloroethene (Trichloroethylene, TCE)	Mg/ Kg	0.081	0.012	0.012	0.081	0.081	0.054	0.054	0.054	0.054	0.054	
Tetrachloroethene (C_2Cl_4)	Mg/ Kg	0.46	0.018	0.018	0.22	0.22	0.26	0.26	0.26	0.26	0.26	
1,2-Dichloroethane ($C_2H_4Cl_2$)	Mg/ Kg	0.041	0.0027	0.0027	0.033	0.033	0.025	0.0062	0.025	0.025	0.15	

National Center for Archives & Records

Chemical	Unit	Soil Particle Size Classification										Comments
		Coarse Soil					Soft Soil					
Dichloromethane (Methylene chloride) (CH_2Cl_2)	Mg/ Kg	0.095	0.048	0.095	0.095	0.095	0.1	0.052	0.1	0.1	0.1	
Trichloromethane (Chloroform) ($CHCl_3$)	Mg/ Kg	0.003	0.003	0.003	0.003	0.003	0.0029	0.0029	0.0029	0.0029	0.0029	
Tetrachloromethane (Carbon tetrachloride) (CCl_4)	Mg/ Kg	0.062	0.00056	0.00057	0.0069	0.0069	0.037	0.013	0.013	0.037	0.037	
Dibromochloromethane ($CHBr_2Cl$)	Mg/ Kg	1.5	0.12	0.27	1.5	1.5	0.91	0.12	0.91	0.91	0.91	
Chlorobenzene (C_6H_5Cl)	Mg/ Kg	1.1	0.018	0.018	0.22	0.22	0.61	0.39	0.39	0.61	0.61	
1,2-Dichlorobenzene ($C_6H_4Cl_2$)	Mg/ Kg	0.18	0.18	0.18	0.18	0.18	0.097	0.097	0.097	0.097	0.097	
1,4-Dichlorobenzene ($C_6H_4Cl_2$)	Mg/ Kg	0.098	0.098	0.098	0.098	0.098	0.051	0.051	0.051	0.051	0.051	
1,2,3-Trichlorobenzene ($C_6H_3Cl_3$)	Mg/ Kg	0.31	0.26	0.26	0.31	0.31	0.26	0.26	0.26	0.26	0.26	
1,2,4-Trichlorobenzene ($C_6H_3Cl_3$)	Mg/ Kg	0.93	0.23	0.23	0.93	0.93	0.78	0.78	0.78	0.78	0.78	
1,3,5-Trichlorobenzene ($C_6H_3Cl_3$)	Mg/ Kg	3.6	0.13	0.13	1.3	1.3	1.9	1.9	1.9	1.9	1.9	
1,2,3,4-Tetrachlorobenzene ($C_6H_2Cl_4$)	Mg/ Kg	0.05	0.05	0.05	0.05	0.05	0.042	0.042	0.042	0.042	0.042	

National Center for Archives & Records

Chemical	Unit	Soil Particle Size Classification										Comments
		Coarse Soil					Soft Soil					
1,2,3,5-Tetrachlorobenzene ($C_6H_2Cl_4$)	Mg/Kg	0.7	0.1	0.1	0.7	0.7	0.37	0.37	0.37	0.37	0.37	
1,2,4,5-Tetrachlorobenzene ($C_6H_2Cl_4$)	Mg/Kg	0.37	0.052	0.052	0.37	0.37	0.19	0.19	0.19	0.19	0.19	
Pentachlorobenzene (C_6HCl_5)	Mg/Kg	4.5	4.5	4.5	4.5	4.5	3.7	3.7	3.7	3.7	3.7	
Hexachlorobenzene (C_6Cl_6)	Mg/Kg	7	0.5	0.5	6	6	3.6	0.8	3.6	3.6	3.6	
2,4-Dichlorophenol ($C_6H_4Cl_2O$)	Mg/Kg	0.0034	0.0034	0.0034	0.0034	0.0034	0.0029	0.0029	0.0029	0.0029	0.0029	
2,4,6-Trichlorophenol ($C_6H_2Cl_3OH$)	Mg/Kg	0.37	0.37	0.37	0.37	0.37	0.19	0.19	0.19	0.19	0.19	
2,3,4,6-Tetrachlorophenol ($C_6H_2Cl_4O$)	Mg/Kg	0.047	0.047	0.047	0.047	0.047	0.039	0.039	0.039	0.039	0.039	
Pentachlorophenol (C_6HCl_5O)	Mg/Kg	0.029	0.029	0.029	0.029	0.029	0.024	0.024	0.024	0.024	0.024	
Dioxins & Furans	Mg/Kg	0.00025	0.000004	0.000004	0.000004	0.000004	0.00025	0.000004	0.000004	0.000004	0.000004	
Polychlorinated biphenyl (PCBs)	Mg/Kg	1.3	13	22	33	33	1.3	1.3	22	33	33	
Pesticides												
Aldicarb ($C_7H_{14}N_2O_2S$)	Mg/Kg	0.065	0.012	0.065	0.065	0.065	0.041	0.012	0.041	0.041	0.041	
Aldrin ($C1_2H_8Cl_6$)	Mg/Kg	11	3.4	3.4	5.1	11	5.9	3.4	3.4	5.1	5.9	
Atrazine and metabolites	Mg/Kg	0.01	0.01	0.01	0.01	0.01	0.0088	0.0088	0.0088	0.0088	0.0088	
Azniphos-methyl ($C_{10}PN_3H_{12}S2O_3$)	Mg/Kg	0.75	0.75	0.75	0.75	0.75	0.41	0.41	0.41	0.41	0.41	

National Center for Archives & Records

Chemical	Unit	Soil Particle Size Classification										Comments
		Coarse Soil					Soft Soil					
Bendiocarb ($C_{11}H_{13}NO_4$)	Mg/ Kg	0.21	0.21	0.21	0.21	0.21	0.14	0.14	0.14	0.14	0.14	
Bromacil ($C_9H_{13}BrN_2O_2$)	Mg/ Kg	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	
Bromoxynil ($C_7H_3Br_2NO$)	Mg/ Kg	0.052	0.052	0.052	0.052	0.052	0.044	0.044	0.044	0.044	0.044	
Carbaryl ($C_{12}H_{11}NO_2$)	Mg/ Kg	3.6	3.6	3.6	3.6	3.6	1.9	1.9	1.9	1.9	1.9	
Carbofuran ($C1_2H_{15}NO_3$)	Mg/ Kg	1.2	0.089	1.2	1.2	1.2	0.68	0.082	0.68	0.68	0.68	
Chlorothalonil ($C_8Cl_4N_2$)	Mg/ Kg	0.01	0.01	0.01	0.01	0.01	0.0084	0.0084	0.0084	0.0084	0.0084	
Chlorpyrifos ($C_9H_{11}Cl_3NO_3PS$)	Mg/ Kg	95	3.8	95	95	95	49	3.2	49	49	49	
Cyanazine ($C_9H_{13}ClN_6$)	Mg/ Kg	0.21	0.032	0.21	0.21	0.21	0.12	0.029	0.12	0.12	0.12	
2,4-Dichlorophenoxy acetic acid ($C_8H_6Cl_2O_3$)	Mg/ Kg	0.67	0.1	0.67	0.67	0.67	0.43	0.1	0.43	0.43	0.43	
Dichlorodiphenyl trichloroethane ($C_{14}H_9Cl_5$)	Mg/ Kg	0.7	0.7	12	12	12	0.7	0.7	12	12	12	
Diazinon ($C_{12}H_{21}N_2O_3PS$)	Mg/ Kg	4.2	4.2	4.2	4.2	4.2	2.2	2.2	2.2	2.2	2.2	
Dicamba ($C_8H_6Cl_2O_3$)	Mg/ Kg	0.79	0.12	0.79	0.79	0.79	0.5	0.12	0.5	0.5	0.5	
Dichlofop-methyl ($C_{16}H_{14}Cl_2O_4$)	Mg/ Kg	2.4	0.095	2.4	2.4	2.4	2	0.079	2	2	2	
Dieldrin ($C_{12}H_8Cl_6O$)	Mg/ Kg	1.1	1.1	1.1	1.1	1.1	0.59	0.59	0.59	0.59	0.59	
Dimethoate ($C_5H_{12}NO_3PS_2$)	Mg/ Kg	0.0055	0.0027	0.0055	0.0055	0.0055	0.0058	0.0028	0.0058	0.0058	0.0058	
Dinoseb ($C_{10}H_{12}N_2O_5$)	Mg/ Kg	5.5	1.7	5.5	5.5	5.5	2.8	1.4	2.8	2.8	2.8	

Chemical	Unit	Soil Particle Size Classification										Comments
		Coarse Soil					Soft Soil					
Diquat ($C_{12}H_{12}Br_2N_2$)	Mg/ Kg	21	21	21	21	21	11	11	11	11	11	
Diuron ($C_9H_{10}Cl_2N_2O$)	Mg/ Kg	3.5	3.5	3.5	3.5	3.5	1.9	1.9	1.9	1.9	1.9	
Endosulfan ($C_9H_6Cl_6O_3S$)	Mg/ Kg	0.0015	0.0015	0.0015	0.0015	0.0015	0.0013	0.0013	0.0013	0.0013	0.0013	
Endrin ($C_{12}H_8Cl_6O$)	Mg/ Kg	4.7	4.7	4.7	4.7	4.7	2.4	2.4	2.4	2.4	2.4	
Glyphosate ($C_3H_8NO_5P$)	Mg/ Kg	0.049	0.049	0.049	0.049	0.049	0.054	0.054	0.054	0.054	0.054	
Heptachlor epoxide ($C_{10}H_5Cl_7O$)	Mg/ Kg	0.076	0.01	0.01	0.076	0.076	0.039	0.039	0.039	0.039	0.039	
Lindane ($C_6H_6Cl_6$)	Mg/ Kg	0.6	0.13	0.6	0.6	0.6	0.31	0.11	0.31	0.31	0.31	
Linuron ($C_9H_{10}Cl_2N_2O_2$)	Mg/ Kg	0.059	0.059	0.059	0.059	0.059	0.051	0.051	0.051	0.051	0.051	
Malathion ($C_{10}H_{19}O_6PS_2$)	Mg/ Kg	1.3	1.3	1.3	1.3	1.3	0.82	0.82	0.82	0.82	0.82	
MCPA	Mg/ Kg	0.66	0.025	0.66	0.66	0.66	0.42	0.026	0.42	0.42	0.42	
Methoxychlor ($C_{16}H_{15}Cl_3O_2$)	Mg/ Kg	0.056	0.056	0.056	0.056	0.056	0.046	0.046	0.046	0.046	0.046	
Metolachlor ($C_{15}H_{22}ClNO_2$)	Mg/ Kg	0.055	0.055	0.055	0.055	0.055	0.048	0.048	0.048	0.048	0.048	
Metribuzin ($C_8H_{14}N_4OS$)	Mg/ Kg	0.028	0.014	0.028	0.028	0.028	0.024	0.012	0.024	0.024	0.024	
Paraquat (as dichloride)	Mg/ Kg	2.2	2.2	2.2	2.2	2.2	1.1	1.1	1.1	1.1	1.1	
Parathion ($C_{10}H_{14}NO_5PS$)	Mg/ Kg	14	14	14	14	14	7.2	7.2	7.2	7.2	7.2	
Phorate ($C_7H_{17}O_2PS_3$)	Mg/ Kg	0.14	0.14	0.14	0.14	0.14	0.075	0.075	0.075	0.075	0.075	
Picloram ($C_6H_3Cl_3N_2O_2$)	Mg/ Kg	0.022	0.022	0.022	0.022	0.022	0.024	0.024	0.024	0.024	0.024	

National Center for Archives & Records

Chemical	Unit	Soil Particle Size Classification										Comments
		Coarse Soil					Soft Soil					
Simazine ($C_7H_{12}ClN_5$)	Mg/ Kg	0.038	0.038	0.038	0.038	0.038	0.033	0.033	0.033	0.033	0.033	
Tebuthiuron ($C_9H_{16}N_4OS$)	Mg/ Kg	0.046	0.046	0.046	0.6	0.6	0.046	0.046	0.046	0.6	0.6	
Terbufos ($C_9H_{21}O_2PS_3$)	Mg/ Kg	0.15	0.15	0.15	0.15	0.15	0.08	0.08	0.08	0.08	0.08	
Toxaphene ($C_{10}H_8Cl_8$)	Mg/ Kg	6.3	4.8	4.8	6.3	6.3	3.3	3.3	3.3	3.3	3.3	
Triallate ($C_{10}H_{16}Cl_3NOS$)	Mg/ Kg	0.0092	0.0092	0.0092	0.0092	0.0092	0.0077	0.0077	0.0077	0.0077	0.0077	
Trifluarin ($C_{13}H_{16}F_3N_3O_4$)	Mg/ Kg	0.045	0.045	0.045	0.045	0.045	0.038	0.038	0.038	0.038	0.038	
Other Organic Compounds												
Aniline ($C_6H_5NH_2$)	Mg/ Kg	0.6	0.6	0.6	0.6	0.6	0.36	0.36	0.36	0.36	0.36	
Bis(2-ethyl-hexyl) phthalate ($C_{24}H_{38}O_4$)	Mg/ Kg	41	41	41	41	41	34	34	34	34	34	
Dibutyl phthalate ($C_{16}H_{22}O_4$)	Mg/ Kg	0.65	0.65	0.65	0.65	0.65	0.54	0.54	0.54	0.54	0.54	
Dichlorobenzidine	Mg/ Kg	8.1	8.1	8.1	8.1	8.1	4.2	4.2	4.2	4.2	4.2	
Diethanolamine ($C_4H_{11}NO_2$)	Mg/ Kg	3.5	3.5	3.5	3.5	3.5	2	2	2	2	2	
Diethylene glycol ($C_4H_{10}O_3$)	Mg/ Kg	15	15	15	15	15	10	10	10	10	10	
Diisopropanolamine ($C_6H_{15}NO_2$)	Mg/ Kg	17	17	17	17	17	14	14	14	14	14	
Ethylene Glycol ($C_2H_6O_2$)	Mg/ Kg	62	62	62	62	62	60	60	60	60	60	
Hexachlorobutadiene (C_4Cl_6)	Mg/ Kg	0.031	0.0067	0.0067	0.031	0.031	0.026	0.026	0.026	0.026	0.026	
Methanol CH_3OH	Mg/ Kg	11	11	11	11	11	37	37	37	37	37	

National Center for Archives & Records

Chemical	Unit	Soil Particle Size Classification										Comments
		Coarse Soil					Soft Soil					
Methylmethacrylate ($C_5H_8O_2$)	Mg/Kg	1.8	0.1	0.1	1.3	1.3	1.3	1.3	1.3	1.3	1.3	
Monoethanolamine (C_2H_7NO)	Mg/Kg	10	10	10	10	10	20	20	20	20	20	
Methyl tert-butyl ether (MTBE)	Mg/Kg	0.062	0.046	0.046	0.062	0.062	0.044	0.044	0.044	0.044	0.044	
Nonylphenol + ethoxylates	Mg/Kg	5.7	5.7	5.7	14	14	5.7	5.7	5.7	14	14	
Phenol (C_6H_6O)	Mg/Kg	0.0024	0.0012	0.0024	0.0024	0.0024	0.0028	0.0014	0.0028	0.0028	0.0028	
Sulfolane ($(CH_2)_4SO_2$)	Mg/Kg	0.21	0.21	0.21	0.21	0.21	0.18	0.18	0.18	0.18	0.18	
Triethylene glycol ($C_6H_{14}O_4$)	Mg/Kg	150	150	150	150	150	100	100	100	100	100	
Radioactive Elements												
Uranium-238 Series (all progeny)	Bq/g	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Uranium-238 (^{238}U, ^{234}Th, ^{234}mPa, ^{234}U)	Bq/g	10	10	10	10	10	10	10	10	10	10	
Thorium-230	Bq/g	10	10	10	10	10	10	10	10	10	10	
Radium-226(in equilibrium with its progeny)	Bq/g	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Lead-210(in equilibrium with 210Bi and 210Po)	Bq/g	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Thorium-232 Series (all progeny)	Bq/g	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Thorium-232	Bq/g	10	10	10	10	10	10	10	10	10	10	

National Center for Archives & Records

Chemical	Unit	Soil Particle Size Classification										Comments
		Coarse Soil					Soft Soil					
Radium-228 (in equilibrium with 228Ac)	Bq/g	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Thorium-228(in equilibrium with its progeny)	Bq/g	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Potassium-40	Bq/g	17	17	17	17	17	17	17	17	17	17	

National Center for Archives & Records