



# **DIVISION OF UNDERGROUND STORAGE TANKS**

## **RISK-BASED CLEANUP LEVELS (RBCLs)**

**Control Number UST-G-3-RBCLs-080522**

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**REVISION HISTORY TABLE**

| <b>Revision Number</b> | <b>Date</b> | <b>Brief Summary of Change</b>  |
|------------------------|-------------|---|
| 0                      | 12/04/2004  | Issuance of Guidance:<br>Technical Guidance<br>Document (TGD) - 017   |
| 1                      | 12/01/2005  | Revision of TGD-017   |
| 2                      | 09/01/2006  | Revision of TGD-017   |
| 3                      | 08/05/2022  | Revision of RBCLs to: include<br>correct spelling of<br>Dibenz(a,h)anthracene, correct<br>surface water values and<br>nomenclature, and update<br>reference for surface water |



**RISK-BASED CLEANUP LEVELS**

| CHEMICALS OF CONCERN    | Volatilization to Indoor Air |                  |                   |                  |
|-------------------------|------------------------------|------------------|-------------------|------------------|
|                         | Subsurface Soil              |                  | Groundwater       |                  |
|                         | Residential (ppm)            | Commercial (ppm) | Residential (ppm) | Commercial (ppm) |
| Benzene                 | 0.0729                       | 3.80             | 0.072             | 0.375            |
| Toluene                 | 6.78                         | 62.2             | 4.31              | 39.6             |
| Ethylbenzene            | 143                          | 1,310            | 10.3              | 94.8             |
| Xylenes (Total)         | 9.6                          | 88               | 3.57              | 32.7             |
| MtBE                    | 39.6                         | 364              | 175               | 1,610            |
| Acenaphthene            | NA                           | NA               | NA                | NA               |
| Acenaphthylene          | NA                           | NA               | NA                | NA               |
| Anthracene              | NA                           | NA               | NA                | NA               |
| Benzo(a)anthracene      | NA                           | NA               | NA                | NA               |
| Benzo(a)pyrene          | NA                           | NA               | NA                | NA               |
| Benzo(b)fluoranthene    | NA                           | NA               | NA                | NA               |
| Benzo(g,h,i)perylene    | NA                           | NA               | NA                | NA               |
| Benzo(k)fluoranthene    | NA                           | NA               | NA                | NA               |
| Chrysene                | NA                           | NA               | NA                | NA               |
| Dibenzo(a,h)anthracene  | NA                           | NA               | NA                | NA               |
| EDB                     | 0.18                         | 1.05             | 0.0855            | 0.499            |
| EDC                     | 0.00755                      | 0.166            | 0.0267            | 0.0587           |
| Fluoranthene            | NA                           | NA               | NA                | NA               |
| Fluorene                | NA                           | NA               | NA                | NA               |
| Indeno(1,2,3-c,d)pyrene | NA                           | NA               | NA                | NA               |
| Naphthalene             | 135                          | 403              | 9.81              | 31               |
| Phenanthrene            | NA                           | NA               | NA                | NA               |
| Pyrene                  | NA                           | NA               | NA                | NA               |
| Cadmium                 | NA                           | NA               | NA                | NA               |
| Chromium                | NA                           | NA               | NA                | NA               |
| Lead                    | NA                           | NA               | NA                | NA               |
| Silver                  | NA                           | NA               | NA                | NA               |
| Zinc                    | NA                           | NA               | NA                | NA               |



| Other Pathways or Points of Exposure |                 |                                  |   |
|--------------------------------------|-----------------|----------------------------------|---|
| CHEMICALS OF CONCERN                 | Groundwater     | Surface Water                    |   |
|                                      | Ingestion (ppm) | Domestic Water Supply Use* (ppm) | <del>Water &amp; Organisms</del><br><u>Only Use**</u> (ppm) |
| Benzene                              | 0.005           | 0.005                            | 0.51  |
| Toluene                              | 1               | 1                                | <del>200</del> <u>15</u>                                    |
| Ethylbenzene                         | 0.7             | 0.7                              | <del>29</del> <u>2.1</u>                                    |
| Xylenes (Total)                      | 10              | 10                               | NA  |
| MtBE                                 | 0.02            | NA                               | NA  |
| Acenaphthene                         | 0.939           | NA                               | 0.99  |
| Acenaphthylene                       | 0.939           | NA                               | NA  |
| Anthracene                           | 0.0434          | NA                               | 40  |
| Benzo(a)anthracene                   | 0.00117         | NA                               | 0.00018   |
| Benzo(a)pyrene                       | 0.0002          | 0.0002                           | 0.00018   |
| Benzo(b)fluoranthene                 | 0.00117         | NA                               | 0.00018   |
| Benzo(g,h,i)perylene                 | 0.0007          | NA                               | NA  |
| Benzo(k)fluoranthene                 | 0.0008          | NA                               | 0.00018   |
| Chrysene                             | 0.0016          | NA                               | 0.00018   |
| Dibenzo(a,h)anthracene               | 0.000117        | NA                               | 0.00018   |
| Ethylene Dibromide (EDB)             | 0.00005         | 0.00005                          | NA  |
| Ethylene Dichloride (EDC)            | 0.005           | 0.005                            | 0.37  |
| Fluoranthene                         | 0.206           | NA                               | 0.14  |
| Fluorene                             | 0.626           | NA                               | 5.3   |
| Indeno(1,2,3-c,d)pyrene              | 0.00117         | NA                               | 0.00018   |
| Naphthalene                          | 0.02            | NA                               | NA  |
| Phenanthrene                         | 0.469           | NA                               | NA  |
| Pyrene                               | 0.135           | NA                               | 4   |
| Cadmium                              | 0.005           | 0.005                            | NA  |
| Chromium                             | 0.1             | 0.1                              | NA  |
| Lead                                 | <u>0.015***</u> | 0.005                            | NA  |
| Silver                               | 0.1             | NA                               | <u>NA</u>   |
| Zinc                                 | 5               | NA                               | <u>NA</u>   |

\* General Water Quality Criteria - Rule 1200-4-3-.030400-40-03-.03(1)(j)

\*\* General Water Quality Criteria - Rule 0400-40-03.03(4)(j)

\*\*\* Lead is set at EPA action level



Resident-Child

| CHEMICALS OF CONCERN    | SUB-SURFACE SOIL  | GROUND-WATER  | GROUND-WATER                            |
|-------------------------|---|---|---|
|                         | Indoor Inhalation of Vapor Emissions Resident-Child (ppm) | Indoor Inhalation of Vapor Emissions Resident-Child (ppm) | Ingestion of Water Resident-Child (ppm) |
| Benzene                 | 7.29E-02  | 7.20E-02  | 5.00E-03                                |
| Toluene                 | 6.78E+00  | 4.31E+00  | 1.00E+00                                |
| Ethylbenzene            | 1.43E+02  | 1.03E+01  | 7.00E-01                                |
| Xylenes (Total)         | 9.60E+00  | 3.57E+00  | 1.00E+01                                |
| MtBE                    | 3.96E+01  | 1.75E+02  | 2.00E-02                                |
| Acenaphthene            | NA  | NA  | 9.39E-01                                |
| Acenaphthylene          | NA  | NA  | 9.39E-01                                |
| Anthracene              | NA  | NA  | 4.34E-02                                |
| Benzo(a)anthracene      | NA  | NA  | 1.17E-03                                |
| Benzo(a)pyrene          | NA  | NA  | 2.00E-04                                |
| Benzo(b)fluoranthene    | NA  | NA  | 1.17E-03                                |
| Benzo(g,h,i)perylene    | NA  | NA  | 7.00E-04                                |
| Benzo(k)fluoranthene    | NA  | NA  | 8.00E-04                                |
| Chrysene                | NA  | NA  | 1.60E-03                                |
| Dibenzo(a,h)anthracene  | NA  | NA  | 1.17E-04                                |
| EDB                     | 1.80E-01  | 8.55E-02  | 5.00E-05                                |
| EDC                     | 7.55E-03  | 2.67E-02  | 5.00E-03                                |
| Fluoranthene            | NA  | NA  | 2.06E-01                                |
| Fluorene                | NA  | NA  | 6.26E-01                                |
| Indeno(1,2,3-c,d)pyrene | NA  | NA  | 1.17E-03                                |
| Naphthalene             | 1.35E+02  | 9.81E+00  | 2.00E-02                                |
| Phenanthrene            | NA  | NA  | 4.69E-01                                |
| Pyrene                  | NA  | NA  | 1.35E-01                                |
| Cadmium                 | NA  | NA  | 5.00E-03                                |
| Chromium                | NA  | NA  | 1.00E-01                                |
| Lead                    | NA  | NA  | 1.50E-02                                |
| Silver                  | NA  | NA  | 1.00E-01                                |
| Zinc                    | NA  | NA  | 5.00E+00                                |



Commercial/ Industrial Worker

| CHEMICALS OF CONCERN           | SUB-SURFACE SOIL  | GROUND WATER  | GROUND WATER  |
|--------------------------------|---|---|---|
|                                | Indoor Inhalation of Vapor Emissions Commercial/Industrial Worker (ppm) | Indoor Inhalation of Vapor Emissions Commercial/Industrial Worker (ppm) | Ingestion of Water Commercial/Industrial Worker (ppm) |
| <b>Benzene</b>                 | 3.80E+00  | 3.75E-01  | 5.00E-03  |
| <b>Toluene</b>                 | 6.22E+01  | 3.96E+01  | 1.00E+00  |
| <b>Ethylbenzene</b>            | 1.31E+03  | 9.48E+01  | 7.00E-01  |
| <b>Xylenes (Total)</b>         | 8.80E+01  | 3.27E+01  | 1.00E+01  |
| <b>MtBE</b>                    | 3.64E+02  | 1.61E+03  | 2.00E-02  |
| <b>Acenaphthene</b>            | NA  | NA  | 9.39E-01  |
| <b>Acenaphthylene</b>          | NA  | NA  | 9.39E-01  |
| <b>Anthracene</b>              | NA  | NA  | 4.34E-02  |
| <b>Benzo(a)anthracene</b>      | NA  | NA  | 1.17E-03  |
| <b>Benzo(a)pyrene</b>          | NA  | NA  | 2.00E-04  |
| <b>Benzo(b)fluoranthene</b>    | NA  | NA  | 1.17E-03  |
| <b>Benzo(g,h,i)perylene</b>    | NA  | NA  | 7.00E-04  |
| <b>Benzo(k)fluoranthene</b>    | NA  | NA  | 8.00E-04  |
| <b>Chrysene</b>                | NA  | NA  | 1.60E-03  |
| <b>Dibenzo(a,h)anthracene</b>  | NA  | NA  | 1.17E-04  |
| <b>EDB</b>                     | 1.05E+00  | 4.99E-01  | 5.00E-05  |
| <b>EDC</b>                     | 1.66E-02  | 5.87E-02  | 5.00E-03  |
| <b>Fluoranthene</b>            | NA  | NA  | 2.06E-01  |
| <b>Fluorene</b>                | NA  | NA  | 6.26E-01  |
| <b>Indeno(1,2,3-c,d)pyrene</b> | NA  | NA  | 1.17E-03  |
| <b>Naphthalene</b>             | 4.03E+02  | 3.10E+01  | 2.00E-02  |
| <b>Phenanthrene</b>            | NA  | NA  | 4.69E-01  |
| <b>Pyrene</b>                  | NA  | NA  | 1.35E-01  |
| <b>Cadmium</b>                 | NA  | NA  | 5.00E-03  |
| <b>Chromium</b>                | NA  | NA  | 1.00E-01  |
| <b>Lead</b>                    | NA  | NA  | 1.50E-02  |
| <b>Silver</b>                  | NA  | NA  | 1.00E-01  |
| <b>Zinc</b>                    | NA  | NA  | 5.00E+00  |



Surface Waters

| <b>CHEMICALS OF CONCERN</b>    | <b>Domestic Water Supply Use*<br/>(ppm)</b> | <b>Water and Organisms Use*<br/>(ppm)</b> |
|--------------------------------|---|---|
| <b>Benzene</b>                 | 5.00E-03                                    | 5.10E-01                                  |
| <b>Toluene</b>                 | 1.00E+00                                    | 2.00E+02                                  |
| <b>Ethylbenzene</b>            | 7.00E-01                                    | 2.90E+01                                  |
| <b>Xylenes (Total)</b>         | 1.00E+01                                    | N/A                                       |
| <b>MtBE</b>                    | N/A   | N/A                                       |
| <b>EDB</b>                     | 5.00E-05                                    | N/A                                       |
| <b>EDC</b>                     | 5.00E-03                                    | 3.70E-01                                  |
| <b>Acenaphthene</b>            | N/A   | 9.90E-01                                  |
| <b>Acenaphthylene</b>          | N/A   | N/A                                       |
| <b>Anthracene</b>              | N/A   | 4.00E+01                                  |
| <b>Benzo(a)anthracene</b>      | N/A   | 1.80E-04                                  |
| <b>Benzo(a)pyrene</b>          | 2.00E-04                                    | 1.80E-04                                  |
| <b>Benzo(b)fluoranthene</b>    | N/A   | 1.80E-04                                  |
| <b>Benzo(g,h,i)perylene</b>    | N/A   | N/A                                       |
| <b>Benzo(k)fluoranthene</b>    | N/A   | 1.80E-04                                  |
| <b>Chrysene</b>                | N/A   | 1.80E-04                                  |
| <b>Dibenzo(a,h)anthracene</b>  | N/A   | 1.80E-04                                  |
| <b>Fluoranthene</b>            | N/A   | 1.40E-01                                  |
| <b>Fluorene</b>                | N/A   | 5.30E+00                                  |
| <b>Indeno(1,2,3-c,d)pyrene</b> | N/A   | 1.80E-04                                  |
| <b>Naphthalene</b>             | N/A   | N/A                                       |
| <b>Phenanthrene</b>            | N/A   | N/A                                       |
| <b>Pyrene</b>                  | N/A   | 4.00E+00                                  |
| <b>Cadmium</b>                 | 5.00E-03                                    | N/A                                       |
| <b>Chromium</b>                | 1.00E-01                                    | N/A                                       |
| <b>Lead</b>                    | 5.00E-03                                    | N/A                                       |
| <b>Silver</b>                  | N/A   | N/A                                       |
| <b>Zinc</b>                    | N/A   | N/A                                       |

\*-General Water Quality Criteria - Rule 1200-4-3-.03