## CHEMICAL UPDATE WORKSHEET

<table>
<thead>
<tr>
<th>Chemical Name:</th>
<th>Di-n-octyl phthalate</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS #:</td>
<td>117-84-0</td>
</tr>
<tr>
<td>Revised By:</td>
<td>RRD Toxicology Unit</td>
</tr>
<tr>
<td>Revision Date:</td>
<td>September 16, 2015</td>
</tr>
</tbody>
</table>

### (A) Chemical-Physical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Part 201 Value</th>
<th>Updated Value</th>
<th>Reference Source</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Weight (g/mol)</td>
<td>390.62</td>
<td>390.57</td>
<td>EPI</td>
<td>EXP</td>
</tr>
<tr>
<td>Physical State at ambient temp</td>
<td>Liquid</td>
<td>Solid</td>
<td>MDEQ</td>
<td></td>
</tr>
<tr>
<td>Melting Point (°C)</td>
<td>248</td>
<td>25.00</td>
<td>EPI</td>
<td>EXP</td>
</tr>
<tr>
<td>Boiling Point (°C)</td>
<td>234</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Solubility (ug/L)</td>
<td>3000</td>
<td>22</td>
<td>EPI</td>
<td>EXP</td>
</tr>
<tr>
<td>Vapor Pressure (mmHg at 25°C)</td>
<td>0.0000004484</td>
<td>1.00E-07</td>
<td>EPI</td>
<td>EXP</td>
</tr>
<tr>
<td>HLC (atm-m³/mol at 25°C)</td>
<td>7.66E-7</td>
<td>6.68E-05</td>
<td>SSG</td>
<td>EXP</td>
</tr>
<tr>
<td>Log Kow (log P; octanol-water)</td>
<td>7.51</td>
<td>8.10</td>
<td>EPI</td>
<td>EXP</td>
</tr>
<tr>
<td>Koc (organic carbon; L/Kg)</td>
<td>2.41E+7</td>
<td>1.408E+05</td>
<td>EPI</td>
<td>EST</td>
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<tr>
<td>Ionizing Koc (L/kg)</td>
<td>NR</td>
<td>NA</td>
<td>NA</td>
<td></td>
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<tr>
<td>Diffusivity in Air (Di; cm²/s)</td>
<td>0.0151</td>
<td>1.73E-02</td>
<td>W9</td>
<td>EST</td>
</tr>
<tr>
<td>Diffusivity in Water (Dw; cm²/s)</td>
<td>3.58</td>
<td>4.1731E-06</td>
<td>W9</td>
<td>EST</td>
</tr>
<tr>
<td>Soil Water Partition Coefficient (Kd; inorganics)</td>
<td>NR</td>
<td>NR</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Property</td>
<td>Part 201 Value</td>
<td>Updated Value</td>
<td>Reference Source</td>
<td>Comments</td>
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<td>-----------------------------------------------</td>
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<td>---------------</td>
<td>------------------</td>
<td>----------</td>
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<tr>
<td>Flash Point (°C)</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Lower Explosivity Level (LEL; unit less)</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<td>Critical Temperature (K)</td>
<td>862.22</td>
<td>EPA2001</td>
<td>EXP</td>
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<tr>
<td>Enthalpy of Vaporization (cal/mol)</td>
<td>1.40E+04</td>
<td>EPA2001</td>
<td>EST</td>
<td></td>
</tr>
<tr>
<td>Density (g/mL, g/cm³)</td>
<td>0.978</td>
<td>PC</td>
<td>EXP</td>
<td></td>
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<tr>
<td>EMSOFT Flux Residential 2 m (mg/day/cm²)</td>
<td>NA</td>
<td>4.50E-07</td>
<td>EMSOFT</td>
<td>EST</td>
</tr>
<tr>
<td>EMSOFT Flux Residential 5 m (mg/day/cm²)</td>
<td>NA</td>
<td>4.50E-07</td>
<td>EMSOFT</td>
<td>EST</td>
</tr>
<tr>
<td>EMSOFT Flux Nonresidential 2 m (mg/day/cm²)</td>
<td>NA</td>
<td>5.66E-07</td>
<td>EMSOFT</td>
<td>EST</td>
</tr>
<tr>
<td>EMSOFT Flux Nonresidential 5 m (mg/day/cm²)</td>
<td>NA</td>
<td>5.66E-07</td>
<td>EMSOFT</td>
<td>EST</td>
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</table>
### (B) Toxicity Values/Benchmarks

<table>
<thead>
<tr>
<th>Reference Dose (RfD) (mg/kg/day)</th>
<th>Part 201 Value</th>
<th>Updated Value</th>
<th>Source/Reference/ Date</th>
<th>Comments/Notes /Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per RD / CCD: 7-12 month dietary study in rats (Piekacz, 1971), NOAEL = none LOAEL = 175 mg/kg/day; UF=10,000 (adjusted/change d from 1000 in HEAST; need to verify) Critical effect = increased liver and kidney weights. CCD/RD date: 2/1/1992.</td>
<td>1.8E-2</td>
<td>1.2E-2</td>
<td>PPRTV, 2012</td>
<td>Complete.</td>
</tr>
</tbody>
</table>

**Basis:** PPRTV is a Tier 2 source. PPRTV (2012) chronic p-RfD = 1.2E-2 mg/kg-day:

**Critical Study:** Poon, R; Lecavalier, P; Mueller, R; et al. (1997) Subchronic oral toxicity of di-n-octyl phthalate and di (2-ethylhexyl) phthalate in the rat. Food Chem Toxicol 35(2):225−239.

**Method(s):** Young (males 105-130g; females 93-111g) Sprague-Dawley rats (10 animals/sex/dose) were exposed via diet to 0-, 5-, 50-, 500-, or 5000-ppm di-n-octyl phthalate (DNOP) daily for 13 weeks. The study authors calculated average daily doses of 0, 0.4, 3.5, 36.8, and 350.1 mg/kg-day for males and 0, 0.4, 4.1, 40.8, and 402.9 mg/kg-day for females.

**Critical effect:** liver effects (changes in histopathology, enzyme activity, and weight)

**End point or Point of Departure (POD):** NOAELADJ = 36.8 mg/kg-day

**Uncertainty Factors:** UF = 3,000 (10 each for intraspecies variability, interspecies extrapolation and use of a subchronic study, and 3 for database deficiencies)

**Source and date:** PPRTV, 12/20/2012

**Tier 1 and 2 Sources:**

**IRIS:** No IRIS file available at this time.

**MRL:** Per ATSDR MRL list April 2015, no chronic oral MRL at this time.

Intermediate MRL = 0.4 mg/kg-day was derived final 9/1997:

**Critical Study:** Poon, R; Lecavalier, P; Mueller, R; et al. (1997) Subchronic oral toxicity of di-n-octyl phthalate and di (2-ethylhexyl) phthalate in the rat. Food Chem Toxicol 35(2):225−239.

**Method(s):** Sprague-Dawley rats (10 animals/sex/dose) were exposed to 0-, 5-, 50-, 500-, or 5000-ppm di-n-octyl phthalate (DNOP) daily for 13 weeks.

**Critical effect:** hepatic ethoxyresorufin-O-deethylase (EROD) activity and histological changes that were observed in the livers of male and female rats.

**End point or Point of Departure (POD):** NOAEL = 40.8 mg/kg-day

**Uncertainty Factors:** UF = 100 (10 each for intraspecies variability and
<table>
<thead>
<tr>
<th>Part 201 Value</th>
<th>Updated Value</th>
<th>Source/Reference/Date</th>
<th>Comments/Notes/Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>interspecies extrapolation)</td>
<td>Source and date: ATSDR, 9/1997</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tier 3 Source: MDEQ: 1) Per DEQ-CCD/WRD (2/1/1992), RFD = 1.8E-2 mg/kg-day. See part 201 Value RfD details. 2) Per DEQ-CCD (1/2000), WRD derived RFD = 0.0368 (3.7E-2) mg/kg-day based on the same study (Poon et al., 1997) used by PPRTV to derive the p-RfD and total UF of 1,000 (10 each for intraspecies variability, interspecies extrapolation, and use of a subchronic study).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Oral Cancer Slope Factor (CSF) (mg/kg-day)^(-1)**

| -- | -- | \(4.7E+2\) | Complete |
| NA | Carcinogen Weight-of-Evidence (WOE) Class: “Inadequate Information to Assess Carcinogenic Potential” IRIS WOE Basis: Di-n-octylphthalate has not been classified for carcinogenic effects by the Department of Health and Human Services, the International Agency for Research on Cancer, or the EPA. Adequate information is not available to assess carcinogenic potential. Source and Date: PPRTV, 12/20/2012 |
| NA | Tier 1 and 2 Sources: IRIS: No IRIS file available at this time. PPRTV: Per PPRTV (12/20/2012), no cancer value at this time. MRL: NA; MRLs are for non-cancer effects only. |
| NA | Tier 3 Source: MDEQ: Per DEQ-CCD, no value at this time. |

<p>| Reference Concentration (RfC) or Initial Threshold | -- | (4.7E+2) | MDEQ, 2007 |</p>
<table>
<thead>
<tr>
<th>Screening Level (ITSL) (µg/m³)</th>
<th>Part 201 Value</th>
<th>Updated Value</th>
<th>Source/Reference/ Date</th>
<th>Comments/Notes /Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basis:</strong> MDEQ was the only value retrieved from the Tier 3 search. <strong>Tier 1 and 2 Sources:</strong> IRIS: No IRIS file available at this time. PPRTV: Per PPRTV (12/20/2012), no value at this time. MRL: Per ATSDR MRL list April 2015, no inhalation MRL value at this time. <strong>Tier 3 Sources:</strong> MDEQ: AQD (2007) ITSL = 4.7E+2 µg/m³ with 24 hour averaging time Basis: ITSL based on 13 week subchronic oral study: <strong>Critical Study:</strong> Poon, R; Lecavalier, P; Mueller, R; et al. (1997) Subchronic oral toxicity of di-n-octyl phthalate and di (2-ethylhexyl) phthalate in the rat. Food Chem Toxicol 35(2):225−239. <strong>Method(s):</strong> Sprague-Dawley rats (10 animals/sex/dose) were exposed to 0-, 5-, 50-, 500-, or 5000-ppm di-n-octyl phthalate (DNOP) daily for 13 weeks. <strong>Critical effect:</strong> mild liver and thyroid changes <strong>End point or Point of Departure (POD):</strong> NOAEL = 40 mg/kg-bw/day <strong>Uncertainty Factors:</strong> UF = 300 (10 each for intraspecies variability and interspecies extrapolation and 3 for use of a subchronic study) <strong>Source and date:</strong> MDEQ-CCD/AQD - 7/25/2007. <strong>Other Tier 3:</strong> No value is available at this time from these Tier 3 sources/databases: HEAST, NTP ROC, health and environmental agencies of California, Massachusetts, Minnesota, New Jersey, New York, and Texas, WHO (IARC), WHO (IPCS/INCHEM), Canada, The Netherlands (RIVM), OECD HPV, and ECHA (REACH).</td>
<td>Complete.</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

| RfC/ITSL details | NA | | | |

| Inhalation Unit Risk Factor (IURF) ((µg/m³)⁻¹) | -- | NA | MDEQ, 2015 | Complete. |

<p>| IURF details | NA | Carcinogen Weight-of-Evidence (WOE) Class: “Inadequate Information to Assess Carcinogenic Potential” IRIS WOE Basis: Di-n-octylphthalate has not been classified for carcinogenic | |</p>
<table>
<thead>
<tr>
<th>Mutagenic Mode of Action (MMOA)? (Y/N)</th>
<th>Part 201 Value</th>
<th>Updated Value</th>
<th>Source/Reference/Date</th>
<th>Comments/Notes/Issues</th>
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</thead>
<tbody>
<tr>
<td>--</td>
<td>effects by the Department of Health and Human Services, the International Agency for Research on Cancer, or the EPA. Adequate information is not available to assess carcinogenic potential. <strong>Source and Date:</strong> PPRTV, 12/20/2012</td>
<td>NO</td>
<td>EPA, 2015</td>
<td></td>
</tr>
</tbody>
</table>

**Tier 1 and 2 Sources:**
- **IRIS:** No IRIS file available at this time.
- **PPRTV:** Per PPRTV (12/20/2012), no cancer value at this time.
- **MRL:** NA; MRLs are for non-cancer effects only.

**Tier 3 Source:**
- **MDEQ:** Per DEQ-CCD, no value at this time.

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<tr>
<th>MMOA Details</th>
<th>Part 201 Value</th>
<th>Updated Value</th>
<th>Source/Reference/Date</th>
<th>Comments/Notes/Issues</th>
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<tbody>
<tr>
<td>NA</td>
<td>Not listed as a carcinogen with mutagenic MOA in the EPA OSWER List. <a href="http://www.epa.gov/oswer/riskassessment/sghandbook/chemicals.htm">http://www.epa.gov/oswer/riskassessment/sghandbook/chemicals.htm</a></td>
<td>NA</td>
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<table>
<thead>
<tr>
<th>Developmental or Reproductive Effector? (Y/N)</th>
<th>Part 201 Value</th>
<th>Updated Value</th>
<th>Source/Reference/Date</th>
<th>Comments/Notes/Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>No, the RfD or RfC/ITSL is not based on a reproductive-developmental effect. Other studies reviewed in PPRTV (2012) have reported testicular and thyroid alteration in rats. Hinton et al. (1986) Oishi and Hiraga (1980)</td>
<td>NO</td>
<td>MDEQ, 2014</td>
<td></td>
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<table>
<thead>
<tr>
<th>Developmental or Reproductive Toxicity Details</th>
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<th>Updated Value</th>
<th>Source/Reference/Date</th>
<th>Comments/Notes/Issues</th>
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<tbody>
<tr>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<table>
<thead>
<tr>
<th>State Drinking Water Standard (SDWS) (ug/L)</th>
<th>Part 201 Value</th>
<th>Updated Value</th>
<th>Source/Reference/Date</th>
<th>Comments/Notes/Issues</th>
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</thead>
<tbody>
<tr>
<td>--</td>
<td>NO</td>
<td>NO</td>
<td>SDWA, 1976</td>
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<th>SDWS details</th>
<th>Part 201 Value</th>
<th>Updated Value</th>
<th>Source/Reference/Date</th>
<th>Comments/Notes/Issues</th>
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</thead>
<tbody>
<tr>
<td>NA</td>
<td>MI Safe Drinking Water Act (SDWA) 1976 PA 399</td>
<td>SDWA, 1976 and USEPA SMCL List</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contaminant Level (SMCL) (ug/L)</td>
<td>Part 201 Value</td>
<td>Updated Value</td>
<td>Source/Reference/Date</td>
<td>Comments/Notes /Issues</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------</td>
<td>---------------</td>
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<td>------------------------</td>
</tr>
<tr>
<td>SMCL details</td>
<td>NA</td>
<td>MI Safe Drinking Water Act (SDWA) 1976 PA 399 and USEPA SMCL List, 2015</td>
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<tr>
<td>Is there an aesthetic value for drinking water? (Y/N)</td>
<td>NO</td>
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<td>NA</td>
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<td>Aesthetic value (ug/L)</td>
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<td>NA</td>
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<td>Aesthetic Value details</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Phytotoxicity Value? (Y/N)</td>
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<td>Phytotoxicity details</td>
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<tr>
<td>Others</td>
<td>NA</td>
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### (C) Chemical-specific Absorption Factors

<table>
<thead>
<tr>
<th>Part 201 Value</th>
<th>Update</th>
<th>Source/Reference/Dates</th>
<th>Comments/Notes/Issues</th>
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<tbody>
<tr>
<td>Gastrointestinal absorption efficiency value (ABSgi)</td>
<td>---</td>
<td>1.0</td>
<td>MDEQ, 2015/USEPA RAGS-E, 2004</td>
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<td>ABSgi details</td>
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<td></td>
<td>RAGS E (USEPA, 2004) Default Value</td>
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<td>Skin absorption efficiency value (AEd)</td>
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<td>0.1</td>
<td>MDEQ, 2015</td>
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<td>AEd details</td>
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<tr>
<td>Ingestion Absorption Efficiency (AEi)</td>
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<td>0.5</td>
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<td>AEi Details</td>
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<tr>
<td>Relative Source Contribution for Water (RSC(_W))</td>
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<td>0.2</td>
<td>MDEQ, 2015</td>
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<tr>
<td>Relative Source Contribution for Soil (RSC(_S))</td>
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<td>1.0</td>
<td>MDEQ, 2015</td>
</tr>
<tr>
<td>Relative Source Contribution for Air (RSC(_A))</td>
<td></td>
<td>1.0</td>
<td>MDEQ, 2015</td>
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<tr>
<td>Others</td>
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### (D) Rule 57 Water Quality Values and GSI Criteria

<table>
<thead>
<tr>
<th>Current GSI value (μg/L)</th>
<th>ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Updated GSI value (μg/L)</td>
<td>ID</td>
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<tr>
<td>Rule 57 Drinking Water Value (μg/L)</td>
<td>240</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Human Non-cancer Values- Drinking water source (HNV-drink)</th>
<th>Rule 57 Value (μg/L)</th>
<th>Verification Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>240</td>
<td>2/1999</td>
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<table>
<thead>
<tr>
<th>Human Non-Cancer Values- Non-drinking water sources (HNV-Non-drink)</th>
<th>Rule 57 Value (μg/L)</th>
<th>Verification Date</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>300</td>
<td>2/1999</td>
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</table>

<table>
<thead>
<tr>
<th>Wildlife Value (WV)</th>
<th>Rule 57 Value (μg/L)</th>
<th>Verification Date</th>
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<tbody>
<tr>
<td></td>
<td>NA</td>
<td>NA</td>
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</table>

<table>
<thead>
<tr>
<th>Human Cancer Values for Drinking Water Source (HCV-drink)</th>
<th>Rule 57 Value (μg/L)</th>
<th>Verification Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NA</td>
<td>NA</td>
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<table>
<thead>
<tr>
<th>Human Cancer values for non-drinking water source (HCV-Non-drink)</th>
<th>Rule 57 Value (μg/L)</th>
<th>Verification Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NA</td>
<td>NA</td>
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</table>

<table>
<thead>
<tr>
<th>Final Chronic Value (FCV)</th>
<th>Rule 57 Value (μg/L)</th>
<th>Verification Date</th>
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<tr>
<td></td>
<td>ID</td>
<td>8/1998</td>
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<table>
<thead>
<tr>
<th>Aquatic maximum value (AMV)</th>
<th>Rule 57 Value (μg/L)</th>
<th>Verification Date</th>
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<tbody>
<tr>
<td></td>
<td>ID</td>
<td>8/1998</td>
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</table>

<table>
<thead>
<tr>
<th>Final Acute Value (FAV)</th>
<th>Rule 57 Value (μg/L)</th>
<th>Verification Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ID</td>
<td>8/1998</td>
</tr>
</tbody>
</table>

Sources:
1. MDEQ Surface Water Assessment Section Rule 57 [website](#)
2. MDEQ Rule 57 [table](#)
### (E) Target Detection Limits (TDL)

<table>
<thead>
<tr>
<th>Target Detection Limit – Soil (µg/kg)</th>
<th>Value</th>
<th>Source</th>
</tr>
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<tr>
<td></td>
<td>330</td>
<td>MDEQ, 2015</td>
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<table>
<thead>
<tr>
<th>Target Detection Limit – Water (µg/L)</th>
<th>Value</th>
<th>Source</th>
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<td>5</td>
<td>MDEQ, 2015</td>
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<table>
<thead>
<tr>
<th>Target Detection Limit – Air (ppbv)</th>
<th>Value</th>
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</tr>
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<tbody>
<tr>
<td></td>
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<td>MDEQ, 2015</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Target Detection Limit – Soil Gas (ppbv)</th>
<th>Value</th>
<th>Source</th>
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<tr>
<td></td>
<td>NA</td>
<td>MDEQ, 2015</td>
</tr>
</tbody>
</table>
CHEMICAL UPDATE WORKSHEET ABBREVIATIONS:

CAS # - Chemical Abstract Service Number.

Section (A) Chemical-Physical Properties

Reference Source(s):

EMSOFT USEPA Exposure Model for Soil-Organic Fate and Transport (EMSOFT) (EPA, 2002)
EPI USEPA’s Estimation Programs Interface SUITE 4.1, Copyright 2000-2012
HSDB Hazardous Substances Data Bank
MDEQ Michigan Department of Environmental Quality
NPG National Institute for Occupational Safety and Health Pocket Guide to Chemical Hazards
PC National Center for Biotechnology Information’s PubChem database
PP Syracuse Research Corporation’s PhysProp database
SCDM USEPA’s Superfund Chemical Data Matrix

Basis/Comments:
EST estimated
EXP experimental
EXT extrapolated
NA not available or not applicable
NR not relevant

Section (B) Toxicity Values/Benchmarks

Sources/References:

ATSDR Agency for Toxic Substances and Disease Registry
CALEPA California Environmental Protection Agency
CAL DTSC California Department of Toxic Substances Control
CAL OEHHA CAEPA Office of Environmental Health Hazard Assessment
CCD MDEQ Chemical Criteria Database
ECHA European Chemicals Agency (REACH)
OECD HPV Organization for Economic Cooperation and Development HPV Database
HEAST USEPA’s Health Effects Assessment Summary Tables
IRIS USEPA’s Integrated Risk Information System
MADEP Massachusetts Department of Environmental Protection
MDEQ/DEQ Michigan Department of Environmental Quality
DEQ-CCD/AQD MDEQ Air Quality Division
DEQ-CCD/RRD MDEQ Remediation and Redevelopment Division
DEQ-CCD/WRD MDEQ Water Resources Division
MNDOH Minnesota Department of Health
**CHEMICAL UPDATE WORKSHEET**

Di-n-octyl phthalate (117-84-0)

<table>
<thead>
<tr>
<th>NJDEP</th>
<th>New Jersey Department of Environmental Protection</th>
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<tr>
<td>NYDEC</td>
<td>New York State Department of Environmental Conservation</td>
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<tr>
<td>OPP/OPPT</td>
<td>USEPA’s Office of Pesticide Programs</td>
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<tr>
<td>PPRTV</td>
<td>USEPA’s Provisional Peer Reviewed Toxicity Values</td>
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<tr>
<td>RIVM</td>
<td>The Netherlands National Institute of Public Health and the Environment</td>
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<td>Texas Commission on Environmental Quality</td>
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<td>USEPA</td>
<td>United States Environmental Protection Agency</td>
</tr>
<tr>
<td>USEPA OSWER</td>
<td>USEPA Office of Solid Waste and Emergency Response</td>
</tr>
<tr>
<td>USEPA MCL</td>
<td>USEPA Maximum Contaminant Level</td>
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<td>WHO</td>
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<td>WHO IPCS</td>
<td>International Programme on Chemical Safety (IPCS/INCHEM)</td>
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<td>WHO IARC</td>
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<td>NA</td>
<td>Not Available.</td>
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<td>NR</td>
<td>Not Relevant.</td>
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</table>

**Toxicity terms:**

- **BMC** Benchmark concentration
- **BMCL** Lower bound confidence limit on the BMC
- **BMD** Benchmark dose
- **BMDL** Lower bound confidence limit on the BMD
- **CSF** Cancer slope Factor
- **CNS** Central nervous system
- **IURF or IUR** Inhalation unit risk factor
- **LOAEL** Lowest observed adverse effect level
- **LOEL** Lowest observed effect level
- **MRL** Minimal risk level (ATSDR)
- **NOAEL** No observed adverse effect level
- **NOEL** No observed effect level

**Section (C) Chemical-specific Absorption Factors**

| MDEQ | Michigan Department of Environmental Quality |

**Section (D) Rule 57 Water Quality Values and GSI Criteria**

| GSI | Groundwater-surface water interface |
| NA | A value is not available or not applicable. |
| ID | Insufficient data to derive value |
| NLS | No literature search has been conducted |