

5. PRODUCTION, IMPORT/EXPORT, USE, AND DISPOSAL

5.1 PRODUCTION

Table 5-1 lists the number of facilities in each state that manufacture or process phenol, the intended use, and the range of maximum amounts of phenol that are stored onsite. The data listed in Table 5-1 are derived from the Toxics Release Inventory (TRI) (TRI05 2007). Only certain types of facilities were required to report. Therefore, this is not an exhaustive list.

Phenol has been obtained by distillation from petroleum and synthesis by oxidation of cumene or toluene, and by vapor-phase hydrolysis of chlorobenzene (Wallace 1998). In 2004, nearly 98% of U.S. phenol production was based on oxidation of cumene except at one company that used toluene oxidation and a few companies that distilled phenol from petroleum (CMR 2005). In 2004, the total annual capacity of phenol production approached 6.6 billion pounds (CMR 2005). A list of current U.S. producers of phenol is found in Table 5-2.

5.2 IMPORT/EXPORT

According to the National Trade Data Bank (USITC 2008), exports of phenol were 503 million kg (1,110 million pounds) (USITC 2008). The major importer of phenol from the United States was Canada, with an import value of 117 million kg during 2007. The total amount of phenol imported to the United States was 1.3 million kg (2.8 million pounds) in 2005. The largest exporter of phenol to the United States was South Africa, which exported 1 million kg of phenol (USITC 2008).

5.3 USE

The two major uses of phenol in 2004 were the production of bisphenol-A (48%) and the production of phenolic resins (25%) (CMR 2005). The largest use for bisphenol-A is as an intermediate in the production of epoxy resins (Thurman 1982). Phenol-formaldehyde resins comprise over 95% of this market (Thurman 1982). Other major uses of phenol include the production of caprolactam (11%), aniline (2%), alkylphenols (4%), xlenols (4%), and miscellaneous uses (6%) (CMR 2005). Phenol is used as a slimicide (a chemical toxic to bacteria and fungi characteristic of aqueous slimes) and as a general disinfectant in solution or mixed with slaked lime for toilets, stables, cesspools, floors, drains, and other areas (Budavari et al. 1989; Hawley 1981).

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Table 5-1. Facilities that Produce, Process, or Use Phenol

State ^a	Number of facilities	Minimum amount on site in pounds ^b	Maximum amount on site in pounds ^b	Activities and uses ^c
AK	1	100	999	1, 13
AL	93	0	49,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
AR	39	0	49,999,999	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
AZ	17	0	9,999,999	1, 5, 6, 7, 8, 11, 12
CA	122	0	9,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
CO	6	0	99,999	1, 2, 5, 6, 9, 10, 11
CT	24	0	999,999	2, 3, 6, 7, 8, 10, 11, 12, 14
DE	10	1,000	999,999	1, 3, 5, 6, 7, 12, 13
FL	27	0	9,999,999	1, 5, 6, 7, 8, 11, 12, 13
GA	68	0	49,999,999	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14
GU	2	0	9,999	9
IA	31	0	999,999	2, 3, 5, 6, 7, 8, 10, 11, 12
ID	6	0	9,999	1, 2, 3, 5, 7, 11, 13
IL	105	0	49,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
IN	126	0	49,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
KS	36	0	9,999,999	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13
KY	51	0	9,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
LA	100	0	99,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
MA	38	0	499,999,999	1, 2, 3, 5, 6, 7, 8, 10, 11, 12, 13
MD	19	0	999,999	1, 2, 3, 4, 5, 6, 7, 8, 11, 13
ME	23	0	999,999	1, 2, 3, 5, 6, 7, 8, 10, 12, 13, 14
MI	88	0	9,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
MN	41	0	9,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
MO	42	0	9,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
MS	49	0	49,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
MT	15	0	9,999,999	1, 2, 3, 5, 6, 9, 13, 14
NC	69	0	49,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
ND	3	0	99,999	1, 5, 7
NE	9	100	999,999	1, 3, 5, 6, 8, 11, 12
NH	11	0	999,999	1, 2, 3, 5, 7, 8, 10, 11, 12, 13
NJ	47	0	49,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
NM	3	10,000	999,999	1, 2, 3, 7, 10, 12, 13
NV	2	1,000	99,999	7
NY	62	0	9,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
OH	122	0	499,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
OK	45	0	9,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
OR	50	0	49,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
PA	108	0	99,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

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State ^a	Number of facilities	Minimum amount on site in pounds ^b	Maximum amount on site in pounds ^b	Activities and uses ^c
PR	15	0	999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13
RI	5	100	99,999	6, 7, 8
SC	53	0	49,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
SD	1	1,000	9,999	3, 6, 10, 11
TN	72	0	9,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
TX	155	0	10,000,000,000	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
UT	25	0	999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
VA	41	0	49,999,999	1, 2, 3, 5, 6, 7, 8, 10, 11, 12, 13, 14
VI	4	100	999,999	1, 2, 3, 4, 5, 6, 7, 9
VT	6	1,000	9,999	2, 3, 6, 8, 10
WA	58	0	9,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
WI	60	0	9,999,999	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13
WV	27	0	49,999,999	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13
WY	13	0	999,999	1, 3, 4, 5, 6, 7, 12, 13

^aPost office state abbreviations used

^bAmounts on site reported by facilities in each state

^cActivities/Uses:

- | | | |
|--------------------------|--------------------------|-----------------------------|
| 1. Produce | 6. Impurity | 11. Chemical Processing Aid |
| 2. Import | 7. Reactant | 12. Manufacturing Aid |
| 3. Onsite use/processing | 8. Formulation Component | 13. Ancillary/Other Uses |
| 4. Sale/Distribution | 9. Article Component | 14. Process Impurity |
| 5. Byproduct | 10. Repackaging | |

Source: TRI05 2007 (Data are from 2005)

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Table 5-2. Current U.S. Producers of Phenol

Company	Location	Capacity (millions of pounds)
Dakota Gasification Company	Beulah, North Dakota	35
The Dow Chemical Company	Oyster Creek, Texas	650
General Electric Company, GE Advanced Materials Plastics	Mount Vernon, Indiana	750
Georgia Gulf Corporation	Pasadena, Texas	160
Georgia Gulf Corporation	Plaquemine, Louisiana	500
INOES Phenol Inc.	Theodore, Alabama	1200
JLM Chemicals	Blue Island, Illinois	100
Merisol USA LLC	Houston, Texas	25
Noveon Inc.	Kalama, Washington	75
Shell Chemical Company	Deer Park, Texas	1,180
Sunoco Inc.	Haverhill, Ohio	1,000
Sunoco Inc.	Philadelphia, Pennsylvania	1,115

Source: Derived from SRI 2006

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5.4 DISPOSAL

Phenol is listed as a toxic substance under Section 313 of the Emergency Planning and Community Right to Know Act (EPCRA) under Title III of the Superfund Amendments and Reauthorization Act (SARA) (EPA 1998c). Disposal of wastes containing phenol is controlled by a number of federal regulations (see Chapter 8).