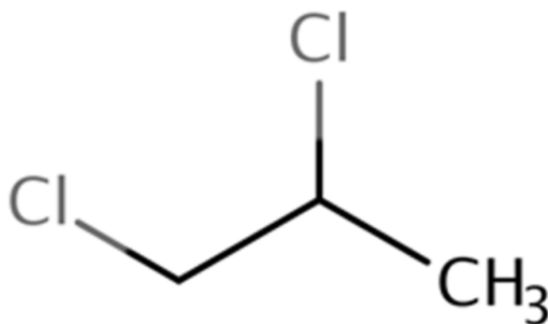

**Draft Data Quality Evaluation Information for
General Population, Consumer, and Environmental Exposure for
1,2-Dichloropropane (1,2-DCP)**

Systematic Review Support Document for the Draft Risk Evaluation

CASRN: 78-87-5



May 2026

This supplemental file contains information regarding the data quality evaluation results for data sources that met the PECO screening criteria for the *Draft Risk Evaluation for 1,2-Dichloropropane*. EPA conducted data quality evaluation and extraction based on author-reported descriptions and results; additional analyses (e.g., statistical analyses) potentially conducted by EPA are not contained in this supplemental file. EPA performs data quality evaluation as a part of the TSCA systematic review process described in the *Draft Systematic Review Protocol Supporting TSCA Risk Evaluations for Chemical Substances*. The systematic review steps are further described in the *Draft Systematic Review Protocol for 1,2-Dichloropropane*.

Additionally, the overall quality determination (OQD) for each reference represents the data as a whole for each evidence stream, not for individual scenarios described within a study. For example, a reference that has both monitoring and experimental data would have OQDs using the data quality evaluation metrics for monitoring and experimental data, respectively. An OQD utilizing the data quality evaluation metrics for monitoring data, or any other single evidence stream, would consider all data pertinent to that evidence stream in the reference. Acronyms and abbreviations used within this supplemental file are defined in the table at the end of this file. This supplemental file is referred to as *Data Quality Evaluation Information for General Population, Consumer, and Environmental Exposure for 1,2-Dichloropropane*.

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HERO ID	Reference	Page
Monitoring		
28993	Ferrario, J. B., Lawler, G. C., Deleon, I. R., Laseter, J. L. (1985.0). Volatile organic pollutants in biota and sediments of Lake Pontchartrain. <i>Bulletin of Environmental Contamination and Toxicology</i> 34(1):246-255.	9
29196	Westrick, J. J., Mello, J. W., Thomas, R. F. (1984.0). The groundwater supply survey. <i>Journal of the American Water Works Association</i> 76(5):52-59.	10
83230	Bouhamra, W. S., Buhamra, S. S., Thomson, M. S. (1997.0). Determination of volatile organic compounds in indoor and ambient air of residences in Kuwait. <i>Environment International</i> 23(2):197-204.	11
195913	Lesage, S., Jackson, R. E., Priddle, M. W., Riemann, P. G. (1990.0). Occurrence and fate of organic solvent residues in anoxic groundwater at the Gloucester Landfill, Canada. <i>Environmental Science & Technology</i> 24(4):559-566.	12
632318	Choi, D. W., Moon, K. W., Byeon, S. H., Lee, E. I., Sul, D. G., Lee, J. H., Oh, E. H., Kim, Y. H. (2009.0). Indoor volatile organic compounds in atopy patients' houses in South Korea. <i>Indoor and Built Environment</i> 18(2):144-154.	13
632720	Wu, T., Bhanegaonkar, A. J., Flowers, J. W. (2006.0). Blood concentrations of selected volatile organic compounds and neurobehavioral performance in a population-based sample. <i>Archives of Environmental & Occupational Health</i> 61(1):17-25.	14
644898	Kawata, K., Tanabe, A., Saito, S., Sakai, M., Yasuhara, A. (1997.0). Screening of volatile organic compounds in river sediment. <i>Bulletin of Environmental Contamination and Toxicology</i> 58(6):893-900.	15
645755	Rockwell, D. C., Claff, R. E., Kuehl, D. W. (1984.0). 1981 Buffalo, New York, area sediment survey (Bass).	16
645789	Yamamoto, K., Fukushima, M., Kakutani, N., Kuroda, K. (1997.0). Volatile organic compounds in urban rivers and their estuaries in Osaka, Japan. <i>Environmental Pollution</i> 95(1):135-143.	17
658661	Bell, J., Melcer, H., Monteith, H., Osinga, I., Steel, P. (1993.0). Stripping of volatile organic compounds at full-scale municipal wastewater treatment plants. <i>Water Environment Research</i> 65(6):708-716.	18
658797	Stubin, A. I., Brosnan, T. M., Porter, K. D., Jimenez, L., Lochan, H. (1996.0). Organic priority pollutants in New York City municipal wastewaters: 1989-1993. <i>Water Environment Research</i> 68(6):1037-1044.	19
659838	Brack, W., Rottler, H., Frank, H. (1998.0). Volatile fractions of landfill leachates and their effect on <i>Chlamydomonas reinhardtii</i> : In vivo chlorophyll a fluorescence. <i>Environmental Toxicology and Chemistry</i> 17(10):1982-1991.	20
659873	Chen, C. S., Zoltek, J., Jr (1995.0). Organic priority pollutants in wetland-treated leachates at a landfill in central Florida. <i>Chemosphere</i> 31(6):3455-3464.	21
660096	Huybrechts, T., Dewulf, J., Van Langenhove, H. (2005.0). Priority volatile organic compounds in surface waters of the southern North Sea. <i>Environmental Pollution</i> 133(2):255-264.	22
660097	Huybrechts, T., Dewulf, J., Van Langenhove, H. (2004.0). Spatial and temporal variability of priority volatile organic compounds in the Scheldt estuary. <i>Water Research</i> 38(14-15):3241-3250.	23
660234	Liska, I., Barcelo, D., Grasserbauer, M. (1996.0). Strategy for the screening of organic pollutants in a river basin: An overview of the Nitra river monitoring programme. <i>Trends in Analytical Chemistry</i> 15(8):326-334.	24
664403	Fast, T., Kliet, J., Boleij, J. S. M., Slingerland, P. (1988.0). The influence of soil pollution on the indoor air quality. 1:441-449.	25
697407	Sakai, K., Kamijima, M., Shibata, E., Ohno, H., Nakajima, T. (2009.0). Annual transition and seasonal variation of indoor air pollution levels of 2-ethyl-1-hexanol in large-scale buildings in Nagoya, Japan. <i>Journal of Environmental Monitoring</i> 11(11):2068-2076.	26
724484	Sabel, G. V., Clark, T. P. (1984.0). Volatile organic compounds as indicators of municipal solid waste leachate contamination. <i>Waste Management & Research</i> 2(2):119-130.	27

737432	Blount, B. C., Mcelprang, D. O., Chambers, D. M., Waterhouse, M. G., Squibb, K. S., Lakind, J. S. (2010.0). Methodology for collecting, storing, and analyzing human milk for volatile organic compounds. <i>Journal of Environmental Monitoring</i> 12(6):1265-1273.	28
824416	Yamaguchi, T., Nakajima, D., Ezoe, Y., Fujimaki, H., Shimada, Y., Kozawa, K., Arashidani, K., Goto, S. (2006.0). Measurement of volatile organic compounds (VOCs) in new residential buildings and VOCs behavior over time. <i>Journal of UOEH</i> 28(1):13-27.	29
1057342	Zhang, Y., Li, C., Wang, X., Guo, H., Feng, Y., Chen, J. (2012.0). Rush-hour aromatic and chlorinated hydrocarbons in selected subway stations of Shanghai, China. <i>Journal of Environmental Sciences</i> 24(1):131-141.	30
1255270	Logue, J. M., Small, M. J., Stern, D., Maranche, J., Robinson, A. L. (2010.0). Spatial variation in ambient air toxics concentrations and health risks between industrial-influenced, urban, and rural sites. <i>Journal of the Air and Waste Management Association</i> 60(3):271-286.	31
1270143	AT&T, (1990.0). Letter from AT&T to USEPA submitting enclosed initial submission concerning the preliminary soil contamination study with attachments.	32
1313544	Takigawa, T., Wang, B. L., Saijo, Y., Morimoto, K., Nakayama, K., Tanaka, M., Shibata, E., Yoshimura, T., Chikara, H., Ogino, K., Kishi, R. (2010.0). Relationship between indoor chemical concentrations and subjective symptoms associated with sick building syndrome in newly built houses in Japan. <i>International Archives of Occupational and Environmental Health</i> 83(2):225-235.	33
1316229	Hazleton Labs, (1986.0). Pollutant analyses on effluent discharge - phenol - with cover letter dated 072387.	34
1316237	Geraghty & Miller Inc, (1990.0). Phase II - Site investigation: Borden site Carson, California (volume I) with attached appendices and cover letter dated 032790.	35
1316245	Ecology and Environment, (1991.0). Letter from Vulcan Chemicals to USEPA submitting enclosed final report concerning RCRA facility assessment with tetrachloroethylene and trichloromethane with attachments.	36
1333014	Roy F. Weston Inc, (1980.0). Characterization and fate of the discharge of priority pollutants from the Rohm and Haas Philadelphia plant into the Delaware low level collector of the Philadelphia sewer.	37
1335589	Versar, (1983.0). Final report on existing environmental conditions of the upper Manasquan River, New Jersey.	38
1335590	Chem-Dyne, (1987.0). CRA sampling and analytical tables on nine chemicals with attachments.	39
1356129	Hargis, (1986.0). Phase III: Investigation of groundwater quality and hydrogeologic conditions, Summa Corporation Facility, Culver City, California (final report) with attach and letter dated 013192.	40
1356133	Westinghouse Electric Corporation, (1991.0). Hydrogeological investigation of the Hoechst Celanese facility Spartanburg, South Carolina - Westinghouse project 4122-90-022A with attachments and cover letter dated 052291.	41
1356151	ERT, (1990.0). Results of site investigation at the Cleveland Service Center Solon, Ohio with attachments, cover sheet and letter dated 020690.	42
1356178	Great Lakes Chemical Corp, (1987.0). Exposure assessment for hazardous waste landfill with cover letter dated 072187.	43
1358515	Ghassemi, M., Quinlivan, S., Bachmaier, J. (1984.0). Characteristics of leachates from hazardous waste landfills. <i>Journal of Environmental Science and Health, Part A: Environmental Science and Engineering</i> 19(5):579-620.	44
1481714	U.S. EPA, (1988.0). Preliminary results summary: Indoor air monitoring phase II & data for warehouse and navy yard & evaluation of selected heating, ventilation & air conditioning system with attachments.	45
1481739	ICI Americas Inc, (1990.0). Letter from ICI Americas Inc to USEPA submitting initial submission concerning phenol in groundwater with attachments.	46
1482322	Johnson, R. L., Cherry, J. A., Pankow, J. F. (1989.0). Diffusive contaminant transport in natural clay: A field example and implications for clay-lined waste disposal sites. <i>Environmental Science & Technology</i> 23(3):340-349.	47
1488836	Bi, E., Liu, Y., He, J., Wang, Z., Liu, F. (2012.0). Screening of emerging volatile organic contaminants in shallow groundwater in East China. <i>Ground Water Monitoring and Remediation</i> 32(1):53-58.	48
1629033	Shell Oil, (1986.0). Fate of some specific compounds in the Norco chemical biotreater and their effect on the outcome of effluent bioassays.	49

1740826	Westinghouse Savannah River Company, (1997.0). Sanitary landfill groundwater monitoring report. Fourth quarter 1996 and 1996 summary. 14(GRA and I):506.	50
1740870	Westinghouse Savannah River Company, (1992.0). Sanitary Landfill 1991 annual groundwater monitoring report.	51
1745520	Geraghty & Miller Inc, (1983.0). Hydrogeology of the Hill Site: The Bendix corporation: Sidney, New York with cover letter.	52
1745530	Allied, (1984.0). Hydrogeologic investigation summary report with cover letter.	53
1745594	DEE, (1984.0). State purgeable organic testing program (spot) quarterly report from April 1, 1987 to July 31, 1987 with cover letter dated 080387.	54
1745597	Ciba-Geigy, (1987.0). Annual report on results of water quality monitoring water year 1985-86 with cover letter dated 082887.	55
1745610	CA State Dept of Health Services, (1986.0). Organic chemical contamination of large public water systems in California April 1986 on seven chemicals with attachments.	56
1745619	Geraghty & Miller Inc, (1988.0). Results of the second phase of a hydrogeologic investigation at the Allied-Signal Inc facility, Morristown, New Jersey with cover letter dated 012089.	57
1745621	Dames & Moore, (1989.0). Ground water and soils data summary report with attachments, appendices, cover sheets and letter dated 080989.	58
1745693	HSWMR, (1993.0). Toxicological evaluation of sampling data for Little Rocky Creek, Greenville, South Carolina with cover letter dated 050793.	59
1745841	ERM-Northeast, (1994.0). Hydrogeologic investigation (including ground water quality) north of Husky Brook Eatontown, New Jersey, with cover letter dated 011894.	60
1787932	Shin, S. H., Jo, W. K. (2012.0). Volatile organic compound concentrations, emission rates, and source apportionment in newly-built apartments at pre-occupancy stage. Chemosphere 89(5):569-578.	61
1949033	Yoshida, T., Matsunaga, I., Tomioka, K., Kumagai, S. (2006.0). Interior air pollution in automotive cabins by volatile organic compounds diffusing from interior materials: I. Survey of 101 types of Japanese domestically produced cars for private use. Indoor and Built Environment 15(5):425-444.	62
1973144	Bookman-Edmonston, (1985.0). Annual report on results of water quality monitoring water year 1983-84 on seven chemicals with attachments.	63
1985112	Ongwandee, M., Moonrinta, R., Panyametheekul, S., Tangbanluekal, C., Morrison, G. (2011.0). Investigation of volatile organic compounds in office buildings in Bangkok, Thailand: Concentrations, sources, and occupant symptoms. Building and Environment 46(7):1512-1522.	64
2048351	Dames & Moore, (1988.0). Report of hydrogeologic and environmental assessment for sixteen chemicals at the former Allied Automotive Plant with cover letter dated 033188.	65
2095300	Yoshida, T., Matsunaga, I. (2006.0). A case study on identification of airborne organic compounds and time courses of their concentrations in the cabin of a new car for private use. Environment International 32(1):58-79.	66
2228538	Merriman, J. C., Struger, J., Szawiola, R. S. (1991.0). Distribution of 1,3-dichloropropene and 1,2-dichloropropane in Big Creek watershed. Bulletin of Environmental Contamination and Toxicology 47(4):572-579.	67
2443817	Ras-Mallorqui, M. R., Marce-Recasens, R. M., Borrull-Ballarín, F. (2007.0). Determination of volatile organic compounds in urban and industrial air from Tarragona by thermal desorption and gas chromatography-mass spectrometry. Talanta 72(3):941-950.	68
2529812	Kuo, M. C. T., Chen, C. M., Lin, C. H., Fang, H. C., Lee, C. H. (2000.0). Surveys of volatile organic compounds in soil and groundwater at industrial sites in Taiwan. Bulletin of Environmental Contamination and Toxicology 65(5 (Nov 2000)):654..	69
2801400	Bean, R. M., Thomas, B. L., Neitzel, D. A. (1985.0). Analysis of sediment matter for halogenated products from chlorination of power plant cooling water. 5(ED.):1357-1370.	70
2859218	Nikolaou, A. D., Golfinopoulos, G., Kostopoulou, M. N., Kolokythas, G. A., Lekkas, T. D. (2002.0). Determination of volatile organic compounds in surface waters and treated wastewater in Greece. Water Research 36(11):2883-2890.	71

2956688	Liu, B., Chen, L., Huang, L., Wang, Y., Li, Y. (2015.0). Distribution of volatile organic compounds (VOCs) in surface water, soil, and groundwater within a chemical industry park in Eastern China. <i>Water Science and Technology</i> 71(2):259-267.	72
3227643	Wallace, L., Zweidinger, R., Erickson, M., Cooper, S., Whitaker, D., Pellizzari, E. (1982.0). Monitoring individual exposure. Measurements of volatile organic compounds in breathing-zone air, drinking water, and exhaled breath. <i>Environment International</i> 8(1/6):269-282.	73
3364193	Kingsbury, J. A., Delzer, G. C., Hopple, J. A. (2008.0). Anthropogenic organic compounds in source water of nine community water systems that withdraw from streams, 2002–05. <i>Scientific Investigations Report 2008-5208</i> :68.	74
3453725	Dai, H., Jing, S., Wang, H., Ma, Y., Li, L., Song, W., Kan, H. (2017.0). VOC characteristics and inhalation health risks in newly renovated residences in Shanghai, China. <i>Science of the Total Environment</i> 577(Elsevier):73-83.	75
3488897	Ma, H., Zhang, H., Wang, L., Wang, J., Chen, J. (2014.0). Comprehensive screening and priority ranking of volatile organic compounds in Daliao River, China. <i>Environmental Monitoring and Assessment</i> 186(5):2813-2821.	76
4213875	OBG, (1987.0). Waste disposal sites assessment.	77
4213880	ESC, (1985.0). Groundwater monitoring summary - Hranica Landfill, Sarver, Penn.	78
4214163	Geraghty & Miller Inc, (1982.0). Ground-water quality conditions in the vicinity of waste oil disposal facilities at the Sidney, New York, plant.	79
4214323	Allied Signal, (1990.0). Letter from Allied-Signal Inc notifying USEPA of their intentions to conduct an environmental assessment pursuant to the Environment Cleanup Responsibility Act with attachments.	80
4214419	ICI Americas Inc, (1991.0). Letter from ICI Americas Inc to USEPA submitting follow-up information concerning phenol and other chemicals in groundwater at the facility in Hopewell, Virginia with attachments.	81
4214434	Rhone-Poulenc, (1993.0). Initial submission: Notice of monitored concentrations of 1,1-dichloroethane, 1,2-dichloropropane, trichlor* in local wells by letter from Rhone-Poulenc inc to USEPA dated 11/15/93.	82
4214480	Battelle Ocean Sciences, (1987.0). Draft final report on the fate and effects of produced water discharges in nearshore marine waters (volume I & II) with cover letter dated 091187.	83
4215688	Allied Signal, (1990.0). Results of the phase III hydrogeologic investigation report with attachments and cover letter dated 020890.	84
4697151	Xing, L., Wang, L., Zhang, R. (2018.0). Characteristics and health risk assessment of volatile organic compounds emitted from interior materials in vehicles: a case study from Nanjing, China. <i>Environmental Science and Pollution Research</i> 25(15):14789-14798.	85
4912133	Buszka, P. M., Yeskis, D. J., Kolpin, D. W., Furlong, E. T., Zaugg, S. D., Meyer, M. T. (2009.0). Waste-indicator and pharmaceutical compounds in landfill-leachate-affected ground water near Elkhart, Indiana, 2000-2002. <i>Bulletin of Environmental Contamination and Toxicology</i> 82(6):653-659.	86
4912389	Tanaka-Kagawa, T., Uchiyama, S., Matsushima, E., Sasaki, A., Kobayashi, H., Kobayashi, H., Yagi, M., Tsuno, M., Arao, M., Ikemoto, K., Yamasaki, M., Nakashima, A., Shimizu, Y., Otsubo, Y., Ando, M., Jinno, H., Tokunaga, H. (2005.0). Survey of volatile organic compounds found in indoor and outdoor air samples from Japan. <i>Kokuritsu Yakuhin Shokuhin Eisei Kenkyūjo Hōkoku / Bulletin of the National Institute of Health Sciences</i> 123(123):27-31.	87
4914425	Huang, L., Qian, H.,ui, Deng, S., Guo, J., Li, Y., Zhao, W., Yue, Y. (2018.0). Urban residential indoor volatile organic compounds in summer, Beijing: Profile, concentration and source characterization. <i>Atmospheric Environment</i> 188:1-11.	88
5018334	van Drooge, B. L., Marco, E., Perez, N., Grimalt, J. O. (2018.0). Influence of electronic cigarette vaping on the composition of indoor organic pollutants, particles, and exhaled breath of bystanders. <i>Environmental Science and Pollution Research</i> 26(5):4654-4666.	89
5239410	Kliest, J., Fast, T., Boley, J. S. M., van de Wiel, H., Bloemen, H. (1989.0). The relationship between soil contaminated with volatile organic compounds and indoor air pollution. <i>Environment International</i> 15(1-6):419-426.	90
5245153	Kuo, H. W., Lo, I. I., Chan, C. C., Lai, J. S., Wang, J. D. (1996.0). Volatile organic compounds in water near petrochemical factories in Taiwan. <i>Chemosphere</i> 33(5):913-920.	91
5255865	Purtymun, W. D., Ferenbaugh, R. W., Maes, M. (1988.0). Quality of surface and ground water at and adjacent to the Los Alamos National Laboratory: Reference organic compounds.	92

5276359	Pellizzari, E. D., Hartwell, T. D., Perritt, R. L., Sparacino, C. M., Sheldon, L. S., Zelon, H. S., Whitmore, R. W., Breen, J. J., Wallace, L. (1986.0). Comparison of indoor and outdoor residential levels of volatile organic chemicals in five usa geographical areas. <i>Environment International</i> 12(6):619-624.	93
5344296	Hanazato, M., Suzuki, N., Koga, C., Nakaoka, H., Mori, C. (2018.0). A study of design for reduction and monitoring of volatile organic compounds in indoor air: The case of a commercial bank in Japan. <i>Journal of Asian Architecture and Building Engineering</i> 17(3):573-579.	94
5419284	Qin, P.,an, Cao, F., Lu, S., Li, L., Guo, X., Zhao, B.,in, Wan, Z., Bi, B.,in (2019.0). Occurrence and health risk assessment of volatile organic compounds in the surface water of Poyang Lake in March 2017. <i>RSC Advances</i> 9(39):22609-22617.	95
5431563	Huang, Y., Su, T., Wang, L., Wang, N., Xue, Y., Dai, W., Lee, S. C., Cao, J., Ho, S. S. H. (2019.0). Evaluation and characterization of volatile air toxics indoors in a heavy polluted city of northwestern China in wintertime. <i>Science of the Total Environment</i> 662:470-480.	96
5436270	Ambrose, R. B. (1987.0). Modeling volatile organics in the Delaware estuary. <i>Journal of Environmental Engineering</i> 113(4):703-721.	97
5436763	Buzska, P. M. (1987.0). Relation of water chemistry of the Edwards aquifer to hydrogeology and land use, San Antonio Region, Texas.	98
5437962	Fusillo, T. V., Voronin, L. M. (1981.0). Water-quality data for the Potomac-Raritan-Magothy aquifer system, Trenton to Pennsville, New jersey, 1980.	99
5438106	Glass, R. L. (1996.0). Hydrologic and water-quality data for U.S. Coast Guard Support Center Kodiak, Alaska, 1987-89. :1-73.	100
5438210	Guimaraes, W. B. (1995.0). Water quality in the Withers Swash Basin, with emphasis on enteric bacteria, Myrtle Beach, South Carolina, 1991-93. :1-102.	101
5438509	Heck, B. A., Myers, N. C., Hargadine, D. A. (1992.0). Hydrogeology and ground-water quality conditions at the Reno County Landfill, South-Central Kansas, 1990-91.	102
5440304	Mack, T. J. (1997.0). Design of monitoring wells, hydrogeology, and ground-water quality beneath Country Pond, Kingston, New Hampshire.	103
5440660	Miermans, C. J. H., Van Der Velde, L. E., Frintrop, P. C. M. (2000.0). Analysis of volatile organic compounds, using the purge and trap injector coupled to a gas chromatograph ion-trap mass spectrometer review of the results in Dutch surface water of the Rhine, Meuse, Northern Delta area and Westerscheldt, over the period 1992-1997. <i>Chemosphere</i> 40(1):39-48.	104
5440990	Naber, S., Verducci, J. (1988.0). Statistical analysis of ground water contamination of the Alert Apron and northern landfill areas of Wurtsmith AFB, Michigan.	105
5443405	Watts, K. R., Ortiz, R. F. (1990.0). Geohydrology and ground-water quality at the pueblo depot activity landfill near Pueblo, Colorado.	106
5449639	Bigsby, P. R., Myers, N. C. (1989.0). Hydrogeology and ground-water-quality conditions at the Geary County landfill, northeast Kansas, 1988.	107
5452031	Westinghouse Savannah River Company, (1993.0). Mixed Waste Management Facility (MWMF) groundwater monitoring report (U): Fourth quarter 1992 and 1992 summary.	108
5471952	Dreisch, F. A., Gower, M., Munson, T. O. (1980.0). Survey of the Huntington and Philadelphia River water supplies for purgeable organic contaminants.	109
5476013	Kaiser, K. L. E., Comba, M. E. (1986.0). Volatile halocarbon contaminant survey of the St. Clair river. <i>Water Pollution Research Journal of Canada</i> 21(3):323-331.	110
5489294	Campbell, T. R. (1997.0). Soil, water, and streambed quality at a demolished asphalt plant, Fort Bragg, North Carolina, 1992-94.	111
5553456	Rowe, B. L., Toccalino, P. L., Moran, M. J., Zogorski, J. S., Price, C. V. (2007.0). Occurrence and potential human-health relevance of volatile organic compounds in drinking water from domestic wells in the United States. <i>Environmental Health Perspectives</i> 115(11):1539-1546.	112
5608960	Garcia, C., Tiedra, P. G., Ruano, A., Gomez, J. A., Garcia-Villanova, R. J. (1992.0). Volatile halo-organic compounds in treated waters of the province of Salamanca (Spain). <i>European Water Pollution Control</i> 2(4):46-49.	113

5639273	Landmeyer, J. E., Campbell, B. G. (2014.0). Assessment of ethylene dibromide, dibromochloropropane, other volatile organic compounds, radium isotopes, radon, and inorganic compounds in groundwater and spring water from the Crouch Branch and McQueen Branch aquifers near McBee, South Carolina, 2010-2012.	114
5885319	LTI Limno-Tech, (1993.0). Preliminary evaluation of Dow Corning Carrollton, Kentucky environmental effects to surface waters with cover letter dated 04/20/94.	115
6311565	Hargis & Montgomery Inc, (1984.0). Phase I Investigation of Groundwater Quality and Hydrogeological Conditions Summa Corporation Facility Culver City, California.	116
6574972	McKesson Environmental Services, (1984.0). Priority pollutant analysis.	117
11273432	CTEH, (2021.0). Shell Puget Sound Refinery 9-29-2020 flaring event: Supplemental report.	118
11273457	U.S. EPA, (2006.0). Air toxics field investigation report: EPA Method TO-15/Cerex UV Sentry comparison.	119
12795200	Bugher, N. A., Xiong, B., Gentles, R. I., Glist, L. D., Siegel, H. G., Johnson, N. P., Clark, C. J., Deziel, N. C., Saiers, J. E., Plata, D. L. (2024.0). Domestic groundwater wells in Appalachia show evidence of low-dose, complex mixtures of legacy pollutants. Environmental Science: Processes & Impacts 26(12):2250-2263.	120
Experimental		
1512515	Kim, S., Kim, J. A., An, J. Y., Kim, H. J., Kim, S. D., Park, J. C. (2007). TVOC and formaldehyde emission behaviors from flooring materials bonded with environmental-friendly MF/PVAc hybrid resins. Indoor Air 17(5):404-415.	121
2655174	Ho, D. X., Kim, K. H., Sohn, J. R., Oh, Y. H., Ahn, J. W. (2011). Emission rates of volatile organic compounds released from newly produced household furniture products using a large-scale chamber testing method. The Scientific World Journal 11:1597-1622.	122
5967010	Kim, S., Park, J. C. (2010). Environment-friendly Hwangtoh composite materials using water soluble resin for indoor air quality and human health. Journal of Composite Materials 44(8):905-913.	123
Database		
11195094	U.S. EPA, (2022). Ambient Monitoring Technology Information Center (AMTIC) - Ambient Monitoring Archive for HAPs.	124
Completed Assessment		
18900	U.S. EPA, (1987). Occurrence of synthetic organic chemicals in drinking water, food and air: Revised draft report.	125
1316231	Monsanto, (1988). Monsanto Pensacola plant ground water assessment feasibility study on nineteen chemicals with attachments and cover letter dated 02/03/1989.	126
1333013	Woodward-Clyde Consultants, (1993). BFGoodrich Akron plant risk assessment with cover letter dated 01/06/1994.	127
1335695	Dow Environmental Inc, (1996). The Dow Chemical Company Slaughter Road site baseline risk assessment report with cover letter dated 01/05/96.	128
1482017	Radian Corp, (1995). Initial submission: Baseline risk assessment for the Jayhawk site Galena, Kansas with attachments and cover letter dated 03/01/95.	129
5113338	U.S. EPA, (2015). Technical support document, EPA's 2011 National-scale Air Toxics Assessment, 2011 NATA TSD.	130
5262199	Fang, L., Norris, C., Johnson, K., Cui, X. X., Sun, J. Q., Teng, Y. B., Tian, E. Z., Xu, W., Li, Z., Mo, J. H., Schauer, J. J., Black, M., Bergin, M., Zhang, J., Zhang, Y. P. (2019). Toxic volatile organic compounds in 20 homes in Shanghai: Concentrations, inhalation health risks, and the impacts of household air cleaning. Building and Environment 157(Elsevier):309-318.	131
Modeling		
5436270	Ambrose, R. B. (1987). Modeling volatile organics in the Delaware estuary. Journal of Environmental Engineering 113(4):703-721.	132
Glossary of Select Terms for Data Evaluation Tables		133

Study Citation:		Ferrario, J. B., Lawler, G. C., Deleon, I. R., Laseter, J. L. (1985.0). Volatile organic pollutants in biota and sediments of Lake Pontchartrain. Bulletin of Environmental Contamination and Toxicology 34(1):246-255.		
HERO ID:		28993		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Sizes of collected oysters and clams not reported; depth and method of sediment sampling not reported; location of sampling only broadly described.
	Metric 2:	Analytical Methodology	Low	GC-MS. Highly modified version of National Bureau of Standards procedure for organics (1976). Described analysis methods adequately. LOD not explicitly specified.
	Metric 3:	Biomarker Selection	N/A	Parent chemical analyzed in environmental media; tissue analyzed was not specified; presumably whole animal (they are consumed whole).
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Louisiana, New Orleans, Lake Pontchartrain
	Metric 5:	Currency	Low	1980, May, June
	Metric 6:	Spatial and Temporal Variability	Low	Only 5 oyster samples and 1 composite clam sample analyzed per location; 4 areas sampled.
	Metric 7:	Exposure Scenario	High	Clam and oyster tissues sampled and analyzed for organic chemicals; relevant to both human and biota exposure scenarios.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Oysters: only the mean of 5 samples (at least 4 g tissue each) reported for each location. Clams: single composite sample sample (4 g tissue) per location.
	Metric 9:	Quality Assurance	Medium	Three recovery standards; 1 system blank for every 4 samples;
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Few sampling locations, single concentration reported for clams and for oysters per location, single sampling season.
Overall Quality Determination			Low	

Study Citation:		Westrick, J. J., Mello, J. W., Thomas, R. F. (1984.0). The groundwater supply survey. Journal of the American Water Works Association 76(5):52-59.		
HERO ID:		29196		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	sampling equipment, log procedure, and map included
	Metric 2:	Analytical Methodology	High	USEPA methods 502.1 and 503.1; quantitation limits in tables
	Metric 3:	Biomarker Selection	N/A	groundwater
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	U.S.
	Metric 5:	Currency	Low	published 1984
	Metric 6:	Spatial and Temporal Variability	High	n = ~500 broken into groups, replicates for a percentage of samples
	Metric 7:	Exposure Scenario	Medium	groundwater
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	median and max
	Metric 9:	Quality Assurance	High	QA discussed
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	variability discussed
Overall Quality Determination			High	

Study Citation:		Bouhamra, W. S., Buhamra, S. S., Thomson, M. S. (1997.0). Determination of volatile organic compounds in indoor and ambient air of residences in Kuwait. Environment International 23(2):197-204.		
HERO ID:		83230		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Limited information reported about sampling methodology (such as sampling procedures, performance of the sampler)
	Metric 2:	Analytical Methodology	Low	LOD nor LOQ reported
	Metric 3:	Biomarker Selection	N/A	Biomarkers of interest were not addressed in this reference.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Kuwait
	Metric 5:	Currency	Low	Data collected December 1994 to January 1995
	Metric 6:	Spatial and Temporal Variability	Medium	no replicates
	Metric 7:	Exposure Scenario	High	Indoor and ambient air
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	no raw data provided
	Metric 9:	Quality Assurance	Low	Limited QA/QC reported
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Limited information provided on gaps and limitations
Overall Quality Determination			Medium	

Study Citation:		Lesage, S., Jackson, R. E., Priddle, M. W., Riemann, P. G. (1990.0). Occurrence and fate of organic solvent residues in anoxic groundwater at the Gloucester Landfill, Canada. Environmental Science & Technology 24(4):559-566.		
HERO ID:		195913		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	groundwater collected in May from selected monitoring wells (Fig 3); set of 5 samples collected from piezometers; others from bundle-type multilevel samples by peristaltic pumps; collected in glass vials and kept on ice
	Metric 2:	Analytical Methodology	Low	EPA method 624; GC/MS; no detection limits provided
	Metric 3:	Biomarker Selection	N/A	the study is testing for the parent chemical in an environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Ottawa, Ontario, Canada (Fig 1)
	Metric 5:	Currency	Low	May 1988
	Metric 6:	Spatial and Temporal Variability	Medium	37 samples, collected in May, from selected monitoring points within the monitoring well network (Fig 3)
	Metric 7:	Exposure Scenario	High	contaminated aquifer from disposal of organic chemicals (incinerated laboratory organic solvents and wood preservatives) in trenches at a waste disposal site; disposal took place from 1969-1980
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Table 1 provides a range and DF; Table III provides concentration per monitoring well; individual data not provided; no SI
	Metric 9:	Quality Assurance	Low	QA/QC not discussed but implied by standard lab protocols
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	minimal discussion of variation p.564
Overall Quality Determination			Medium	

Study Citation: Choi, D. W., Moon, K. W., Byeon, S. H., Lee, E. I., Sul, D. G., Lee, J. H., Oh, E. H., Kim, Y. H. (2009.0). Indoor volatile organic compounds in atopy patients{\textquoteright} houses in South Korea. Indoor and Built Environment 18(2):144-154.				
HERO ID: 632318				
Domain		Metric	Rating	Comments
Domain 1: Reliability				
Metric 1:		Sampling Methodology	High	Detailed sampling methodology
Metric 2:		Analytical Methodology	Medium	Limited description of analytical methods, mentioned LOD but it is not reported
Metric 3:		Biomarker Selection	N/A	Indoor air sampling
Domain 2: Representativeness				
Metric 4:		Geographic Area	High	South Korea
Metric 5:		Currency	Medium	Sampling in 2006
Metric 6:		Spatial and Temporal Variability	Medium	114 sampling sites, no replicates
Metric 7:		Exposure Scenario	High	Data closely represent relevant exposure scenarios
Domain 3: Accessibility/Clarity				
Metric 8:		Reporting of Results	Medium	Only summary statistics
Metric 9:		Quality Assurance	Low	QA/QC techniques were not directly discussed
Domain 4: Variability and Uncertainty				
Metric 10:		Variability and Uncertainty	Medium	Characterized variability, limited discussion of uncertainties and study limitations

Overall Quality Determination	Medium
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Study Citation:		Wu, T., Bhanegaonkar, A. J., Flowers, J. W. (2006.0). Blood concentrations of selected volatile organic compounds and neurobehavioral performance in a population-based sample. Archives of Environmental & Occupational Health 61(1):17-25.		
HERO ID:		632720		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Blood specimen collection procedures briefly described, but NHANES methodology with known validated publicly available methods.
	Metric 2:	Analytical Methodology	High	Blood specimen sample analysis procedures briefly described, but NHANES methodology with known validated publicly available methods.
	Metric 3:	Biomarker Selection	N/A	Sampling for parent chemicals of interest.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	NHANES III US sampling
	Metric 5:	Currency	Low	Dates of samples not specifically stated, but NHANES III sampling 1988-1994.
	Metric 6:	Spatial and Temporal Variability	Medium	Spatial variability across NHANES nationwide sampling, however single blood samples provided by each participant for 1,018 participants.
	Metric 7:	Exposure Scenario	Medium	Participant characteristics summarized for nationwide NHANES sample.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Most key criteria met. Lack of frequency of detection and raw data.
	Metric 9:	Quality Assurance	Medium	NHANES Q/A methodologies, although not detailed within study.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Most key criteria met, authors briefly discussed study limitations of lack of accounting for complex sampling design of NHANES due to random sample of NHANES participants.
Overall Quality Determination			Medium	

Study Citation:		Kawata, K., Tanabe, A., Saito, S., Sakai, M., Yasuhara, A. (1997.0). Screening of volatile organic compounds in river sediment. Bulletin of Environmental Contamination and Toxicology 58(6):893-900.		
HERO ID:		644898		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Sampling details lacking. Sample storage described but no description of how sediment samples were collected.
	Metric 2:	Analytical Methodology	High	GC/MS method described and LODs reported with results.
	Metric 3:	Biomarker Selection	N/A	River sediment
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Niigata, Japan
	Metric 5:	Currency	Low	Samples collected in September 1995.
	Metric 6:	Spatial and Temporal Variability	Medium	7 samples were prepared per sediment.
	Metric 7:	Exposure Scenario	Medium	VOCs from sediment were measured in headspace.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Raw data not provided but summary data is adequate.
	Metric 9:	Quality Assurance	High	Recoveries listed in detail.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Limitations were discussed briefly.
Overall Quality Determination			Medium	

Study Citation:		Rockwell, D. C., Claff, R. E., Kuehl, D. W. (1984.0). 1981 Buffalo, New York, area sediment survey (Bass).		
HERO ID:		645755		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	The sediment sampling methodology was well described.
	Metric 2:	Analytical Methodology	Medium	The analytical methods were described, including the LOD but not recoveries.
	Metric 3:	Biomarker Selection	N/A	The authors analyzed environmental samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	United States.
	Metric 5:	Currency	Low	Samples were collected in 1981.
	Metric 6:	Spatial and Temporal Variability	Low	Over 150 samples were collected from different sites along the river bank sites were rarely sampled more than once. Not all site samples were analyzed. The data reported used 77 samples from 65 sites.
	Metric 7:	Exposure Scenario	High	The data closely represent relevant exposure scenarios related to polluted sediments.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	The raw data is presented in the supplemental materials in table 1 (Appendix C). Summary statistics were not reported.
	Metric 9:	Quality Assurance	High	Methods detailed in Appendix F.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability was not characterized, nor is uncertainty discussed or characterized.
Overall Quality Determination			Medium	

Study Citation:		Yamamoto, K., Fukushima, M., Kakutani, N., Kuroda, K. (1997.0). Volatile organic compounds in urban rivers and their estuaries in Osaka, Japan. Environmental Pollution 95(1):135-143.		
HERO ID:		645789		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Site description was provided in details. But the sampling process lacked the description about calibration of sampler.
	Metric 2:	Analytical Methodology	Low	Analytical method was described (GC-MS). MDLs were reported in Figure 1 for select chemicals. However, no MDLs were available for 1,2-dichlorobenzene, 1,4-dichlorobenzene, trans-1,2-dichloroethene (TDCE), and 1,1,2-trichloroethane.
	Metric 3:	Biomarker Selection	N/A	Study measured parent chemicals in urban rivers and their estuaries.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Osaka, Japan
	Metric 5:	Currency	Low	August 1993 to February 1995
	Metric 6:	Spatial and Temporal Variability	Medium	30 sites all over the rivers and their estuaries. No replicates
	Metric 7:	Exposure Scenario	High	The data closely represent relevant exposure scenario: drinking water and wastewater were identified.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Supplementary or raw data were not reported.
	Metric 9:	Quality Assurance	Low	Quality assurance/quality control techniques and results were not directly discussed, but can be implied through the study’s method and protocol.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	The study has limited characterization of variability in the population/media studied and discussion of uncertainties, limitations, or gaps.
Overall Quality Determination			Medium	

Study Citation:		Bell, J., Melcer, H., Monteith, H., Osinga, I., Steel, P. (1993.0). Stripping of volatile organic compounds at full-scale municipal wastewater treatment plants. Water Environment Research 65(6):708-716.		
HERO ID:		658661		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Appropriate methodology and clearly described
	Metric 2:	Analytical Methodology	High	Appropriate methodology and clearly described
	Metric 3:	Biomarker Selection	N/A	Testing for parent chemical in environmental media
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Geographic area clearly reported
	Metric 5:	Currency	Low	Sampling date not reported, but likely between 1988 and 1993.
	Metric 6:	Spatial and Temporal Variability	Medium	8 (4 in duplicate) samples, each 24-hour composites, at each of 4 sampling locations to account for variability.
	Metric 7:	Exposure Scenario	Medium	Primarily addresses air pathway, additional monitoring of wastewater effluent, both routes of potential exposure.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Raw data not reported
	Metric 9:	Quality Assurance	Medium	More thorough QA documentation previously published (Bell et al. 1988)
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	More thorough QA documentation previously published (Bell et al. 1988)
Overall Quality Determination			Medium	

Study Citation:		Stubin, A. I., Brosnan, T. M., Porter, K. D., Jimenez, L., Lochan, H. (1996.0). Organic priority pollutants in New York City municipal wastewaters: 1989-1993. Water Environment Research 68(6):1037-1044.		
HERO ID:		658797		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling procedure was well described (sampling condition, equipment, storage, study site description).
	Metric 2:	Analytical Methodology	Low	Analytical method was described, however, method detection limit was not provided.
	Metric 3:	Biomarker Selection	N/A	the study is testing for the parent chemical in an environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	New York City water pollution control plants
	Metric 5:	Currency	Low	Sampling was performed from 1989 to 1993.
	Metric 6:	Spatial and Temporal Variability	High	Volatile samples were collected 3 times within the same 24-hr period. Semi-volatile samples were collected 8 times within the course of 24-hr.
	Metric 7:	Exposure Scenario	Medium	The data likely represent the relevant exposure scenario.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Supplementary or raw data were not reported.
	Metric 9:	Quality Assurance	Medium	The study applied and documented quality assurance/quality control measures.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	The study has limited characterization of variability in the population/media studied.
Overall Quality Determination			Medium	

Study Citation:		Brack, W., Rottler, H., Frank, H. (1998.0). Volatile fractions of landfill leachates and their effect on Chlamydomonas reinhardtii: In vivo chlorophyll a fluorescence. Environmental Toxicology and Chemistry 17(10):1982-1991.		
HERO ID:		659838		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sampling methodology is discussed and is generally appropriate for the chemical and media of interest, however, one or more pieces of sampling information is not described such as sample filtration. The missing information is unlikely to have a substantial impact on results.
	Metric 2:	Analytical Methodology	Low	Analytical methodology including equipment and reagents is discussed in detail and is clear and appropriate for the chemical and media of interest; however, one or more pieces of analytical information is not described such as LOQ, LOD, detection limits, and/or reporting limits is not reported.
	Metric 3:	Biomarker Selection	N/A	The study is testing for the parent chemical in leachates from three hazardous waste sites.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Geographic location is reported; Germany.
	Metric 5:	Currency	Low	Collection date not reported but publication date provided (1997).
	Metric 6:	Spatial and Temporal Variability	Low	Sampling approach poorly captures variability of environmental contamination in population/scenario/media of interest. For example, the study used a low sample size (n= 4), and replicate samples were collected only from one hazardous waste site.
	Metric 7:	Exposure Scenario	Medium	The data likely represent the relevant exposure scenario. A few key pieces of information such as use of exposure controls, microenvironment may not be described but the deficiencies are unlikely to have a substantial impact on the characterization of the exposure scenario.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Individual sample concentrations reported in the study (Table 4) allowing summary statistics to be reproduced.
	Metric 9:	Quality Assurance	Low	Quality assurance/quality control techniques and results were not directly discussed, but can be implied through the study’s use of standard field and laboratory protocols.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability and uncertainty not discussed.
Overall Quality Determination			Medium	

Study Citation:		Chen, C. S., Zoltek, J., Jr (1995.0). Organic priority pollutants in wetland-treated leachates at a landfill in central Florida. Chemosphere 31(6):3455-3464.		
HERO ID:		659873		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sampling methodology is only briefly discussed, lacking essential information about equipment, conditions, and storage.
	Metric 2:	Analytical Methodology	Low	GC/MS was used for the analysis; however, LOD was not provided.
	Metric 3:	Biomarker Selection	N/A	Study measured parent chemical in groundwater, surface water, and sediment.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Orange County, Orlando, Florida
	Metric 5:	Currency	Low	The study provided the first year sampling date as 1989-1990, and second year sampling occurred April 1992 to March 1993.
	Metric 6:	Spatial and Temporal Variability	Low	Study reported on the number of monitoring wells (n=4), surface water (n=7), and wetland sampling stations (n=7). However, it is unclear how many samples were collected from each.
	Metric 7:	Exposure Scenario	Medium	The data likely represent the relevant exposure scenario (surface water/groundwater).
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Supplementary or raw data were not reported.
	Metric 9:	Quality Assurance	Medium	The study provided quality control measures; however, one or more pieces of QA/QC information was not described.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Key uncertainties, limitations, and data gaps were not discussed.
Overall Quality Determination			Low	

Study Citation:		Huybrechts, T., Dewulf, J., Van Langenhove, H. (2005.0). Priority volatile organic compounds in surface waters of the southern North Sea. Environmental Pollution 133(2):255-264.		
HERO ID:		660096		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sample method and equipment, sample storage, and site characteristics are well described.
	Metric 2:	Analytical Methodology	High	Analytical methods well described. LOD provided. Replicate samples analyzed.
	Metric 3:	Biomarker Selection	N/A	Surface water sampling
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Details of the sampling sites in the North Sea are provided.
	Metric 5:	Currency	Low	Samples were collected 1998-2000.
	Metric 6:	Spatial and Temporal Variability	Medium	Samples were collected from 10 locations over two years for a total of 47 samples. No indication of replicate analysis of samples.
	Metric 7:	Exposure Scenario	High	Location is relevant for environmental exposures.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Raw data are not provided. The mean, median, maximum, 25th percentile and 75th percentile are provided.
	Metric 9:	Quality Assurance	High	QA/QC methods were described in detail.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Variability is discussed but limited discussion of uncertainties.
Overall Quality Determination			High	

Study Citation:		Huybrechts, T., Dewulf, J., Van Langenhove, H. (2004.0). Spatial and temporal variability of priority volatile organic compounds in the Scheldt estuary. Water Research 38(14-15):3241-3250.		
HERO ID:		660097		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	The authors reported study site characteristics, sampling equipment, procedure, design, and storage conditions.
	Metric 2:	Analytical Methodology	High	The authors report the extraction method, analytical instruction, recovery results and LODs.
	Metric 3:	Biomarker Selection	N/A	Water samples
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The authors report the study location.
	Metric 5:	Currency	Low	Samples were collected between 1998-2000.
	Metric 6:	Spatial and Temporal Variability	High	The authors collected 84 samples total over different sites and different sampling years. The authors collected multiple samples from the same estuary at the same time point (replicates).
	Metric 7:	Exposure Scenario	Medium	The authors describe the microenvironment.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	The authors reported summary statistics including minimums, maximums, mean, standard deviation, median, 25th and 75th percentile, detection frequency and the number of samples. The authors did not report individual sample data.
	Metric 9:	Quality Assurance	High	The authors reported following standard European QA methods. They reported recovery results, they analyzed reference materials,
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	The authors discussed the variability in the concentrations across the sampling locations and time, but they did not discuss the uncertainty of the study, data gaps, or limitations.
Overall Quality Determination			Medium	

Study Citation:		Liska, I., Barcelo, D., Grasserbauer, M. (1996.0). Strategy for the screening of organic pollutants in a river basin: An overview of the Nitra river monitoring programme. Trends in Analytical Chemistry 15(8):326-334.		
HERO ID:		660234		
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling Methodology	Medium	Some water sampling methods were not reported, e.g., sample storage conditions.
	Metric 2:	Analytical Methodology	Medium	The analytical methods were described but did not include LOD or recoveries.
	Metric 3:	Biomarker Selection	N/A	The authors analyzed water samples.
Domain 2: Representativeness	Metric 4:	Geographic Area	High	Slovakia
	Metric 5:	Currency	Low	The study was published in 1996.
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	The number of samples and their concentrations were not reported.
	Metric 7:	Exposure Scenario	Low	The study may be relevant to exposure to surface water in Slovakia, but the lack of data makes the study uninformative for such purposes.
Domain 3: Accessibility/Clarity	Metric 8:	Reporting of Results	Critically Deficient	Monitoring concentrations were not reported.
	Metric 9:	Quality Assurance	Medium	QA/QC techniques were briefly discussed.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Variability was not characterized. Some limitations were reported.
Overall Quality Determination		Uninformative		

Study Citation:		Fast, T., Kliest, J., Boleij, J. S. M., Slingerland, P. (1988.0). The influence of soil pollution on the indoor air quality. 1:441-449.		
HERO ID:		664403		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Multiple information missing- equipment details used for soil and air sampling, storage, procedure, calibration. More methodology information might be in the referenced study- (Fast et.al. ,1983).
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methodology not described- instrumentation only listed in table 1. LOD/LOQ not reported
	Metric 3:	Biomarker Selection	N/A	Chemical measured in soil
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The Netherlands
	Metric 5:	Currency	Low	May 1984 to November 1985
	Metric 6:	Spatial and Temporal Variability	Medium	Measurements were carried out in 77 houses on 11 locations with different types of soil pollution and in 20 houses on two reference locations. Some replicates- "In 12 houses the program of measurements was repeated 2 to 6 times to examine seasonal variation."
	Metric 7:	Exposure Scenario	High	Samples were taken from homes. Sites well described.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Individual data points are not reported. Missing multiple summary statistics.
	Metric 9:	Quality Assurance	Low	QA/QC techniques were not directly discussed- unclear if this would interfere with study.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Some characterization of variability in seasons. No limitations mentioned.
Overall Quality Determination			Uninformative	

Study Citation:		Sakai, K., Kamijima, M., Shibata, E., Ohno, H., Nakajima, T. (2009.0). Annual transition and seasonal variation of indoor air pollution levels of 2-ethyl-1-hexanol in large-scale buildings in Nagoya, Japan. Journal of Environmental Monitoring 11(11):2068-2076.		
HERO ID:		697407		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sampling method including device and sampling location described. Handling and transport of samples post-collection was not described.
	Metric 2:	Analytical Methodology	Medium	Sample extraction and analysis described. Limit of detection defined as 10 times standard deviation of response of lowest standard but not reported.
	Metric 3:	Biomarker Selection	N/A	Air sampling
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Nagoya, Japan
	Metric 5:	Currency	Low	Sampling conducted between 2004 and 2007
	Metric 6:	Spatial and Temporal Variability	Medium	67 rooms sampled in winter and summer. No indication of replicate sampling or analysis.
	Metric 7:	Exposure Scenario	High	Indoor air
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	No raw data
	Metric 9:	Quality Assurance	Low	Limited QA/QC reported. No discussion of recovery rates, replicate analysis, or use of blanks and controls
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	High	Variability in results and limitation of study discussed.
Overall Quality Determination			Medium	

Study Citation:		Sabel, G. V., Clark, T. P. (1984.0). Volatile organic compounds as indicators of municipal solid waste leachate contamination. Waste Management & Research 2(2):119-130.		
HERO ID:		724484		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Leachate and groundwater from 20 MSW landfills and two dumps (Fig 1 shows location of sampling sites) that described in detail. Section 2 - Methods; samples collected in 40-ml glass vials without head space; 4 vials per sample; samples iced and analyzed within 48 hr; P.122 describes collection of leachate and groundwater samples.
	Metric 2:	Analytical Methodology	Low	Analyses followed USEPA Method 601. Detection limits not provided.
	Metric 3:	Biomarker Selection	N/A	Parent chemical in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Minnesota, USA (Fig 1)
	Metric 5:	Currency	Low	Study published in 1984.
	Metric 6:	Spatial and Temporal Variability	Medium	6 leachate samples; 45 groundwater wells at 13 landfills; 21 groundwater at 8 landfills and 2 dumps. Replicate samples.
	Metric 7:	Exposure Scenario	High	Leachate and groundwater contamination at MSW landfill sites in MN. Table 3 indicates if area is urban or rural.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Table 2 provides DF and range for leachate and groundwater. No individual data reported.
	Metric 9:	Quality Assurance	Medium	Field blank carried out at all times. Recoveries not discussed.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	The study mentions that the data is limited. There is comparison of results to other leachate data.
Overall Quality Determination			Medium	

Study Citation:		Blount, B. C., Mcelprang, D. O., Chambers, D. M., Waterhouse, M. G., Squibb, K. S., Lakind, J. S. (2010.0). Methodology for collecting, storing, and analyzing human milk for volatile organic compounds. Journal of Environmental Monitoring 12(6):1265-1273.		
HERO ID:		737432		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Breast milk sampling procedures and equipment described in detail as manual expression directly into pre-cleaned Vacutainer with immediate replacement of stopper following collection or manual expression into pre-cleaned wide-mouth glass jars with subsequent transfer to low headspace Vacutainer for storage and shipment. Samples stored at 4°C for less than two weeks prior to analysis for most samples. Insufficient information on number of samples expressed into Vacutainer versus those expressed into wide-mouth glass jars. Insufficient information on number of samples stored for longer than two weeks prior to analyses.
	Metric 2:	Analytical Methodology	Low	Method detection limit calculations described, however chemical-specific limits of detection not reported or referenced. Analytical and extraction methodology noted as modified from existing SPME-GC-MS methodology and referenced (Blount et al., 2006) and described in detail. Authors noted a full set of eight calibrators, including one blank, was analyzed with each set of samples to generate calibration curves for each analytical run. Authors report concentrations for the 10 of the 36 original chemicals with median concentrations higher than the lowest reportable level (LRL), but chemical-specific LRL’s and recoveries not reported.
	Metric 3:	Biomarker Selection	N/A	Sampling for parent chemical of interest.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Samples collected from participants in Baltimore, MD.
	Metric 5:	Currency	Low	Insufficient information on dates of sample collection, 2010 publication date.
	Metric 6:	Spatial and Temporal Variability	Low	Single samples from 12 participating women for reported total of twelve samples from a convenience, non-statistical sampling approach at single time.
	Metric 7:	Exposure Scenario	Medium	Data likely represent relevant, non-occupational exposure scenario—authors note participants completed questionnaire, however insufficient information on whether data on occupation was collected.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Median reported as below the lowest reportable level (LRL). Insufficient information regarding chemical-specific frequency of detection, dates of sampling, raw data and lipid-adjustment for breast milk samples.
	Metric 9:	Quality Assurance	Medium	Chemical-specific recoveries not detailed, however extensive details on quality control measures for sampling, extraction and analyses—characterized control human milk sample described as left exposed to room air while breast milk sample expressed with final sample concentrations corrected for the background air VOC levels derived from the control open-air sample. Each analysis batch described as evaluated at two blind QC-concentration levels and evaluated by an independent, blinded QC officer. Lab blanks utilized with blanks described as prepared from VOC-free blank water.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Study characterized sample variability in terms of concentration range, with detailed discussion regarding potential uncertainties derived from sampling, extraction and analysis procedures. Authors discussed differences in reported concentrations between this pilot study and previous reports, however additional potential limitations, such as sample size, not discussed (although this was noted as a pilot study).
Overall Quality Determination			Low	

Study Citation:		Yamaguchi, T., Nakajima, D., Ezoe, Y., Fujimaki, H., Shimada, Y., Kozawa, K., Arashidani, K., Goto, S. (2006.0). Measurement of volatile organic compounds (VOCs) in new residential buildings and VOCs behavior over time. Journal of UOEH 28(1):13-27.		
HERO ID:		824416		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Some sampling methods not reported, such as storage conditions
	Metric 2:	Analytical Methodology	Medium	Some analytical methods not reported, such as recovery samples
	Metric 3:	Biomarker Selection	N/A	Air sampling
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Japan
	Metric 5:	Currency	Low	Data collected between 2003 and 2004
	Metric 6:	Spatial and Temporal Variability	Medium	24 total samples collected at two locations. No indication of replicate sampling or analysis.
	Metric 7:	Exposure Scenario	High	Potential exposure sources identified in indoor environments. Indoor and outdoor air measured as a comparison.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	no raw data
	Metric 9:	Quality Assurance	Low	Limited QA/QC reported
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	No gaps or limitations reported. Limited information provided on variability and uncertainty.
Overall Quality Determination			Medium	

Study Citation:		Zhang, Y., Li, C., Wang, X., Guo, H., Feng, Y., Chen, J. (2012.0). Rush-hour aromatic and chlorinated hydrocarbons in selected subway stations of Shanghai, China. Journal of Environmental Sciences 24(1):131-141.		
HERO ID:		1057342		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sampling methodology is discussed and is generally appropriate (i.e., scientifically sound), however, one or more pieces of sampling information is not described such as the sample storage conditions/duration and calibration of sampler.
	Metric 2:	Analytical Methodology	Medium	Analytical methodology is discussed in detail and is clear and appropriate, however, recovery samples are not discussed.
	Metric 3:	Biomarker Selection	N/A	Study tested for the parent chemical in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Shanghai, China
	Metric 5:	Currency	Medium	Samples collected July 25, 2007.
	Metric 6:	Spatial and Temporal Variability	Medium	Total forty-five air samples were collected from the campaign. No replicate samples reported.
	Metric 7:	Exposure Scenario	High	The data closely represent relevant/realistic exposure scenario (i.e., the population/scenario/media of interest).
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Raw data were not reported. Summary statistics are missing some parameters.
	Metric 9:	Quality Assurance	Low	QA/QC techniques and results were discussed, however, some key measures were not reported such as recovery samples.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	The study has limited discussion of key uncertainties, limitations, and data gaps.
Overall Quality Determination			Medium	

Study Citation:		Logue, J. M., Small, M. J., Stern, D., Maranche, J., Robinson, A. L. (2010.0). Spatial variation in ambient air toxics concentrations and health risks between industrial-influenced, urban, and rural sites. Journal of the Air and Waste Management Association 60(3):271-286.		
HERO ID:		1255270		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling procedure was described, and calibration was carried out. Sampling sites were described,
	Metric 2:	Analytical Methodology	Medium	GC-MS was used to analyze the samples, LOD was not reported.
	Metric 3:	Biomarker Selection	N/A	Paper measures concentration of parent compound in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Pittsburgh, PA
	Metric 5:	Currency	Medium	2006 to 2008
	Metric 6:	Spatial and Temporal Variability	High	4 sites in Pittsburgh were sampled. And each site has 70 days of samples, and 103 days of samples were available for at least 3 sites.
	Metric 7:	Exposure Scenario	Medium	Ambient air
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Average concentrations were reported with summary statistics; no individual data were reported.
	Metric 9:	Quality Assurance	High	The study reported that it followed QA.QC procedures outlined in EPA methods TO-11A and TO-15.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	The study addressed spatial variability but lacked discussion on limitations.
Overall Quality Determination			High	

Study Citation:	AT&T, (1990.0). Letter from AT\&T to USEPA submitting enclosed initial submission concerning the preliminary soil contamination study with attachments.
HERO ID:	1270143

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Sampling Methodology	Critically Deficient	Sampling methodology not reported
	Metric 2: Analytical Methodology	High	Methodology summary reported in page 7
	Metric 3: Biomarker Selection	N/A	Parent chemical in soils
Domain 2: Representativeness	Metric 4: Geographic Area	Critically Deficient	Geographic location not reported
	Metric 5: Currency	Low	Samples collected in 1990
	Metric 6: Spatial and Temporal Variability	Low	4 samples
	Metric 7: Exposure Scenario	Critically Deficient	Exposure scenario not reported
Domain 3: Accessibility/Clarity	Metric 8: Reporting of Results	Medium	Raw data reported in page 24
	Metric 9: Quality Assurance	High	The study used standardized EPA methods
Domain 4: Variability and Uncertainty	Metric 10: Variability and Uncertainty	Critically Deficient	Variability and uncertainty can't be assessed

Overall Quality Determination**Uninformative**

Study Citation:		Takigawa, T., Wang, B. L., Saijo, Y., Morimoto, K., Nakayama, K., Tanaka, M., Shibata, E., Yoshimura, T., Chikara, H., Ogino, K., Kishi, R. (2010.0). Relationship between indoor chemical concentrations and subjective symptoms associated with sick building syndrome in newly built houses in Japan. International Archives of Occupational and Environmental Health 83(2):225-235.		
HERO ID:		1313544		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Some sampling methods not reported, such as sample storage conditions and sampler calibration
	Metric 2:	Analytical Methodology	Medium	Some analytical methods not reported, such as recovery samples
	Metric 3:	Biomarker Selection	N/A	The study is testing for the parent chemical.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Japan
	Metric 5:	Currency	Low	Data were collected in 2003 and 2004
	Metric 6:	Spatial and Temporal Variability	Medium	2297 households. No replicate samples collected.
	Metric 7:	Exposure Scenario	High	Relationship between indoor chemical concentrations and sick building syndrome in newly built houses
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	No raw data reported
	Metric 9:	Quality Assurance	Low	No QA/QC reported
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Variability not well characterized (e.g. no standard deviation, variance reported)
Overall Quality Determination			Medium	

Study Citation:		Hazleton Labs, (1986.0). Pollutant analyses on effluent discharge - phenol - with cover letter dated 072387.		
HERO ID:		1316229		
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling Methodology	Critically Deficient	Sampling methods not described
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methods not described
	Metric 3:	Biomarker Selection	N/A	The authors analyzed environmental media.
Domain 2: Representativeness	Metric 4:	Geographic Area	High	Wisconsin, USA
	Metric 5:	Currency	Low	Sampling in 1986
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size is not reported
	Metric 7:	Exposure Scenario	Low	Data lacks key pieces of information and this impacts the exposure scenario characterization
Domain 3: Accessibility/Clarity	Metric 8:	Reporting of Results	Medium	Only individual sample concentrations, no summary statistics
	Metric 9:	Quality Assurance	Low	QA/QC techniques were not discussed
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability was not characterized, uncertainties and limitations were not discussed
Overall Quality Determination		Uninformative		

Study Citation:		Geraghty & Miller Inc, (1990.0). Phase II - Site investigation: Borden site Carson, California (volume I) with attached appendices and cover letter dated 032790.		
HERO ID:		1316237		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Sampling methodology only briefly described
	Metric 2:	Analytical Methodology	Critically Deficient	Not described
	Metric 3:	Biomarker Selection	N/A	the study is testing for the parent chemical in an environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	California
	Metric 5:	Currency	Low	Sampling began in 1987
	Metric 6:	Spatial and Temporal Variability	Low	10 soil samples, 15 water samples
	Metric 7:	Exposure Scenario	High	Provided an exposure assessment
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Individual sample concentrations, no summary statistics
	Metric 9:	Quality Assurance	High	Detailed QA/QC description
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability was not characterized, uncertainties were briefly discussed
Overall Quality Determination			Uninformative	

Study Citation:	Ecology and Environment, (1991.0). Letter from Vulcan Chemicals to USEPA submitting enclosed final report concerning RCRA facility assessment with tetrachloroethylene and trichloromethane with attachments.
HERO ID:	1316245

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Sampling Methodology	High	Well described sampling methods
	Metric 2: Analytical Methodology	Critically Deficient	Analytical methodology was not described
	Metric 3: Biomarker Selection	N/A	The study is testing for the parent chemical.
Domain 2: Representativeness	Metric 4: Geographic Area	High	Samples collected in USA
	Metric 5: Currency	Low	Published in 1991
	Metric 6: Spatial and Temporal Variability	Low	n=15, no replicates
	Metric 7: Exposure Scenario	Medium	Limited description about the population of interest
Domain 3: Accessibility/Clarity	Metric 8: Reporting of Results	Medium	Only individual sample concentrations, no summary statistics
	Metric 9: Quality Assurance	Low	Only briefly described
Domain 4: Variability and Uncertainty	Metric 10: Variability and Uncertainty	Low	Did not characterize variability or discussed uncertainties and limitations

Overall Quality Determination

Uninformative

Study Citation:		Roy F. Weston Inc, (1980.0). Characterization and fate of the discharge of priority pollutants from the Rohm and Haas Philadelphia plant into the Delaware low level collector of the Philadelphia sewer.		
HERO ID:		1333014		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling performed according to an EPA protocol from 1977 - Sampling and Analysis Procedures for Screening of Industrial Effluents for Priority Pollutants.
	Metric 2:	Analytical Methodology	High	Four standard protocols were followed - three from EPA and one from the American Public Health Association.
	Metric 3:	Biomarker Selection	N/A	Measured parent chemicals in wastewater
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Philadelphia, PA
	Metric 5:	Currency	Low	April 1979 and December 1979
	Metric 6:	Spatial and Temporal Variability	Medium	No replicate samples
	Metric 7:	Exposure Scenario	High	Samples collected from contaminated effluent, city water, and river water
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Individual data points are not reported.
	Metric 9:	Quality Assurance	Low	QA/QC techniques are not directly discusses. Can be implied through study’s use of standard protocols.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Characterization of variability is absent
Overall Quality Determination			Medium	

Study Citation:		Versar, (1983.0). Final report on existing environmental conditions of the upper Manasquan River, New Jersey.		
HERO ID:		1335589		
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Sampling Methodology	Critically Deficient	Sampling methods not described
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methods not described
	Metric 3:	Biomarker Selection	N/A	the study is testing for the parent chemical in an environmental media.
Domain 2: Representativeness	Metric 4:	Geographic Area	High	New Jersey
	Metric 5:	Currency	Low	Report from 1983
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size not reported
	Metric 7:	Exposure Scenario	Low	Missing sufficient details about methods, sample size, limiting the reliability of the data to represent an exposure scenario of interest
Domain 3: Accessibility/Clarity	Metric 8:	Reporting of Results	Low	Only individual sample concentrations, no summary statistics
	Metric 9:	Quality Assurance	Low	QA/QC was not described
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability was not characterized, limited discussion on uncertainties and limitations
Overall Quality Determination		Uninformative		

Study Citation:		Chem-Dyne, (1987.0). CRA sampling and analytical tables on nine chemicals with attachments.		
HERO ID:		1335590		
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling Methodology	Critically Deficient	Sampling methodology not reported
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methodology is not described
	Metric 3:	Biomarker Selection	N/A	Parent chemical in environmental media
Domain 2: Representativeness	Metric 4:	Geographic Area	High	Hamilton, Ohio
	Metric 5:	Currency	Low	1984
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size not reported or hard to read
	Metric 7:	Exposure Scenario	Critically Deficient	The exposure scenario is not reported
Domain 3: Accessibility/Clarity	Metric 8:	Reporting of Results	Critically Deficient	There is no explanation regarding the data
	Metric 9:	Quality Assurance	Medium	the study reports key QA parameters
Domain 4: Variability and Uncertainty	Metric 10:	Variability and Uncertainty	Critically Deficient	Key limitations or sample variability not reported
Overall Quality Determination		Uninformative		

Study Citation:	Hargis, (1986.0). Phase III: Investigation of groundwater quality and hydrogeologic conditions, Summa Corporation Facility, Culver City, California (final report) with attach and letter dated 013192.
HERO ID:	1356129

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Sampling Methodology	Low	Sampling methods briefly described
	Metric 2: Analytical Methodology	Medium	Cited EPA method 624, included LOD, did not describe the method
	Metric 3: Biomarker Selection	N/A	Did not test for biomarkers
Domain 2: Representativeness	Metric 4: Geographic Area	High	California, USA
	Metric 5: Currency	Low	Samples from 1985
	Metric 6: Spatial and Temporal Variability	Critically Deficient	Sample size was not reported
	Metric 7: Exposure Scenario	Medium	Data may represent a relevant exposure scenario but the report doesn't have details about the population or microenvironment of interest
Domain 3: Accessibility/Clarity	Metric 8: Reporting of Results	Medium	Individual sample concentrations, no summary statistics
	Metric 9: Quality Assurance	Medium	Limited description of QA/QC techniques
Domain 4: Variability and Uncertainty			
	Metric 10: Variability and Uncertainty	Low	Variability and uncertainty were not characterized

Overall Quality Determination**Uninformative**

Study Citation: Westinghouse Electric Corporation, (1991.0). Hydrogeological investigation of the Hoechst Celanese facility Spartanburg, South Carolina - Westinghouse project 4122-90-022A with attachments and cover letter dated 052291.

HERO ID: 1356133

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Sampling Methodology	High	Well described sampling methods
	Metric 2: Analytical Methodology	Low	Limited description of analytical methods
	Metric 3: Biomarker Selection	N/A	The study is testing for the parent chemical.
Domain 2: Representativeness	Metric 4: Geographic Area	High	USA
	Metric 5: Currency	Low	Report from 1991
	Metric 6: Spatial and Temporal Variability	Critically Deficient	Sample size not reported
	Metric 7: Exposure Scenario	Medium	Missing details about the population of interest
Domain 3: Accessibility/Clarity	Metric 8: Reporting of Results	Medium	Individual sample concentrations only
	Metric 9: Quality Assurance	Medium	Analyzed control samples, techniques briefly described
Domain 4: Variability and Uncertainty	Metric 10: Variability and Uncertainty	Low	Variability and uncertainties were not characterized

Overall Quality Determination

Uninformative

Study Citation:		ERT, (1990.0). Results of site investigation at the Cleveland Service Center Solon, Ohio with attachments, cover sheet and letter dated 020690.		
HERO ID:		1356151		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Only briefly described
	Metric 2:	Analytical Methodology	High	Analytical Reports included containing information on QA/QC, methods, and LoD/RL
	Metric 3:	Biomarker Selection	N/A	Did not test for biomarker
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Solon, OH
	Metric 5:	Currency	Low	1988
	Metric 6:	Spatial and Temporal Variability	Low	Small sample size: 4 soil borings and 1 GW sample with a duplicate
	Metric 7:	Exposure Scenario	Medium	Data may represent relevant exposure scenarios, missing details about the population of interest and microenvironment
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Independent sample concentrations only, no summary statistics
	Metric 9:	Quality Assurance	High	Well described QA/QC techniques
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Did not characterize variability or uncertainty
Overall Quality Determination			Medium	

Study Citation:		Great Lakes Chemical Corp. (1987.0). Exposure assessment for hazardous waste landfill with cover letter dated 072187.		
HERO ID:		1356178		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Sampling methodology not described, only briefly mentioned
	Metric 2:	Analytical Methodology	High	Analytical reports included in the appendix
	Metric 3:	Biomarker Selection	N/A	Biomarkers of interest were not addressed in this reference.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	El Dorado, AR
	Metric 5:	Currency	Low	1986
	Metric 6:	Spatial and Temporal Variability	Medium	7 waste samples analyzed along with air samples collected in the months of Jan-March (33 samples) and May 1985 (14 days). No replicates.
	Metric 7:	Exposure Scenario	High	Report characterizes facility and sources as well as nearby residential communities and explores various exposure pathways through different medias.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Individual data points available for waste samples but only monthly averages and summaries available for air samples. No other statistics were used
	Metric 9:	Quality Assurance	Low	QA/QC was not mentioned but lab reports for analyses and air data from the Arkansas Dept of Pollution Control Ecology imply SOP and methods.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Key limitations and data gaps not addressed.
Overall Quality Determination			Medium	

Study Citation:		Ghassemi, M., Quinlivan, S., Bachmaier, J. (1984.0). Characteristics of leachates from hazardous waste landfills. Journal of Environmental Science and Health, Part A: Environmental Science and Engineering 19(5):579-620.		
HERO ID:		1358515		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Sampling method was not directly mentioned in the report, but can be inferred that the sampling was done in manners according to U.S EPA standards.
	Metric 2:	Analytical Methodology	Low	Analytical method was not directly mentioned in the report, but can be inferred that the analysis was done in manners according to U.S EPA standards.
	Metric 3:	Biomarker Selection	N/A	Tested for parent chemicals in landfill leachate
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The leachate site was not mentioned, but can be inferred that it’s in the US because these landfills are subject to EPA regulations.
	Metric 5:	Currency	Low	No sampling date is provided, but a publication date is available - 1984.
	Metric 6:	Spatial and Temporal Variability	Medium	30 leachate data sets, 11 leachate sites, no replicates
	Metric 7:	Exposure Scenario	High	Exposure scenario was described and relevant (leachate, landfill). See Table 1 for more details.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Some individual data were reported, but not all. Summary statistics were not reported.
	Metric 9:	Quality Assurance	Low	Quality assurance/quality control techniques and results were not directly discussed, but can be implied through the study’s use of standard field and laboratory protocols.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	The report compared results among municipal leachates and limited discussion of variability. No discussion of limitations, uncertainties, and data gaps.
Overall Quality Determination			Low	

Study Citation:		U.S. EPA, (1988.0). Preliminary results summary: Indoor air monitoring phase II {\&} data for warehouse and navy yard {\&} evaluation of selected heating, ventilation {\&} air conditioning system with attachments.		
HERO ID:		1481714		
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Sampling Methodology	High	Samples were collected according to NISOH method and/or EPA TO-1. Table I reports sampling locations.	
	Metric 2: Analytical Methodology	Low	Samples were analyzed according to NISOH method and/or EPA TO-1. LOD or LOQ were not reported. Appendix A reports the analytical methods.	
	Metric 3: Biomarker Selection	N/A	The study tested for the parent chemical in environmental media (air).	
Domain 2: Representativeness	Metric 4: Geographic Area	High	The samples were collected in Washington, DC.	
	Metric 5: Currency	Low	The samples were collected in May 1988.	
	Metric 6: Spatial and Temporal Variability	Critically Deficient	The collection of replicates was not reported and sample size is not reported and cannot be inferred.	
	Metric 7: Exposure Scenario	Medium	Data may represent relevant exposure scenarios related to indoor air collected in offices, but the use of exposure controls is not reported.	
Domain 3: Accessibility/Clarity	Metric 8: Reporting of Results	Low	Data is reported in Tables I and III as an isomer mixture. Additional data may be reported in Table 5A, but the table is illegible.	
	Metric 9: Quality Assurance	Low	QA/QC techniques and results were not directly discussed, but can be implied through the study's use of standard field and laboratory protocols.	
Domain 4: Variability and Uncertainty	Metric 10: Variability and Uncertainty	Low	The characterization of variability is absent (no measure of variance reported). Key uncertainties, limitations, and data gaps are not discussed.	

Overall Quality Determination **Uninformative**

Study Citation:		ICI Americas Inc, (1990.0). Letter from ICI Americas Inc to USEPA submitting initial submission concerning phenol in groundwater with attachments.		
HERO ID:		1481739		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	No aspects of sampling methodology are described, but field and trip blanks are reported.
	Metric 2:	Analytical Methodology	Low	September samples show method of analysis as "EPA, GC." EPA method 624, LOD reported in page 10, for November samples. January samples list method of analysis as "EPA." Instrument calibration and recoveries are not discussed.
	Metric 3:	Biomarker Selection	N/A	They analyzed parent chemicals in water.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Hopewell, Virginia
	Metric 5:	Currency	Low	1990
	Metric 6:	Spatial and Temporal Variability	Low	Samples were collected in September (but none were analyzed for this chemical), December (of the 8 samples reported, 5 appear to have been analyzed for this chemical, along with 2 blanks), and January (4 samples, all analyzed for this chemical, along with 2 blanks). No replicates identified.
	Metric 7:	Exposure Scenario	High	Primarily groundwater monitoring at ICI Americas, Inc., along with monitoring for VOCs in a potable water tank and water from a water fountain.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Only individual data reported for the 3 monitoring surveys, no summary statistics.
	Metric 9:	Quality Assurance	Low	The report doesn't include any QA/QC parameter for sample analysis, but does mention they followed an EPA method.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability is shown in the concentrations across three monitoring studies, but it is not discussed. There is not information regarding key limitations.
Overall Quality Determination			Low	

Study Citation:		Johnson, R. L., Cherry, J. A., Pankow, J. F. (1989.0). Diffusive contaminant transport in natural clay: A field example and implications for clay-lined waste disposal sites. Environmental Science & Technology 23(3):340-349.		
HERO ID:		1482322		
Domain		Metric	Rating	Comments
Domain 1: Reliability		Metric 1: Sampling Methodology	High	Sampling equipment, procedure, storage conditions and study site characteristics are all reported in detail.
		Metric 2: Analytical Methodology	Medium	Sample extraction, analytical instrumentation, and use of internal standards were reported. Instrument calibration and internal standard recovery values were not reported. LOD reported broadly as less than 1ug/L for all compounds.
		Metric 3: Biomarker Selection	N/A	Biomarkers of interest were not addressed in this reference.
Domain 2: Representativeness		Metric 4: Geographic Area	High	Ontario
		Metric 5: Currency	Low	Paper published in 1989.
		Metric 6: Spatial and Temporal Variability	Low	Three sample cores were used.
		Metric 7: Exposure Scenario	High	Landfill setting described in detail.
Domain 3: Accessibility/Clarity		Metric 8: Reporting of Results	Low	Raw data was reported, but no summary statistics were reported.
		Metric 9: Quality Assurance	Low	Internal standards were used but their efficiencies were not reported.
Domain 4: Variability and Uncertainty		Metric 10: Variability and Uncertainty	Low	No standard deviation or other measure of variance was reported.
Overall Quality Determination			Medium	

Study Citation:		Bi, E., Liu, Y., He, J., Wang, Z., Liu, F. (2012.0). Screening of emerging volatile organic contaminants in shallow groundwater in East China. Ground Water Monitoring and Remediation 32(1):53-58.		
HERO ID:		1488836		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling methodology and sites described.
	Metric 2:	Analytical Methodology	High	Analytical methods mentioned, described and briefly summarized.
	Metric 3:	Biomarker Selection	N/A	Ground water samples no biomarker needed.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The study was conducted in China
	Metric 5:	Currency	Medium	The study took place in 2008 and 2009
	Metric 6:	Spatial and Temporal Variability	Medium	n=130 samples (from Table 2). No replicate samples.
	Metric 7:	Exposure Scenario	High	The data closely represent relevant exposure scenarios related to polluted ground water in China.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Maximum concentrations reported, no raw data.
	Metric 9:	Quality Assurance	High	QA/QC was described, including MDLs and recoveries.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability and uncertainty sources were not discussed or attributed to anything.
Overall Quality Determination			High	

Study Citation:		Shell Oil, (1986.0). Fate of some specific compounds in the Norco chemical biotreater and their effect on the outcome of effluent bioassays.		
HERO ID:		1629033		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	There is limited description included. It says water samples were daily composites, but there is little other information about water sampling protocol. Missing information includes sampling equipment for water, sampling procedures, sample storage, and performance/calibration of sampler. Page 35 explains in some detail sampling and analysis procedures for the vapor samples collected with TENAX traps, including calibration information.
	Metric 2:	Analytical Methodology	Medium	There is limited description included. They used GC/MS. MDLs listed for water samples listed as 10 ppb, based on EPA published values, but for some samples detections down to 1 ppb were listed in parentheses next to "<MDL." Analytical methodologies for water samples were EPA-approved. It appears standards were used, but their use is not well-explained. Recoveries are only mentioned for SVOCs. Spiking is only mentioned for the June 1984 samples. Although MDLs are not listed for air samples, p. 35 explains in some detail sampling and analysis procedures for the vapor samples collected with TENAX traps, including calibration information. Medium applies to water, the primary medium analyzed; low applies to air samples due to missing MDLs and generally limited information.
	Metric 3:	Biomarker Selection	N/A	Samples were from environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	USA
	Metric 5:	Currency	Low	Sampling began in 1984
	Metric 6:	Spatial and Temporal Variability	Low	Sampling approach poorly captures variability of environmental contamination. Samples collected from 8 locations on June 11, 1984 (see p. 44) were analyzed for this chemical. For results, see pp. 49 and 51. However, there were no replicates/duplicates.
	Metric 7:	Exposure Scenario	Medium	Data may represent a relevant exposure scenario, but come from "pilot plants," with different aeration methods and temperatures to actual WWTPs. Data are missing details about the population of interest, the climate, and contextual information such as what types of manufacturing facilities the wastewater treated is coming from.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Only individual sample concentrations are provided, no summary statistics.
	Metric 9:	Quality Assurance	Low	There was only one blank water sample, from June 1984. Spiking of a blank air sample for calibration is mentioned too. Recoveries are only discussed for samples analyzed for SVOCs but were from 11 to 38 percent. They did not correct for low recoveries.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability was not characterized, and there was minimal discussion of uncertainties. No standard deviations were reported.
Overall Quality Determination			Low	

Study Citation:		Westinghouse Savannah River Company, (1997.0). Sanitary landfill groundwater monitoring report. Fourth quarter 1996 and 1996 summary. 14(GRA and I):506.		
HERO ID:		1740826		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Some sampling methods not reported such as sample storage conditions and sampler calibration
	Metric 2:	Analytical Methodology	High	Key analytical methods reported
	Metric 3:	Biomarker Selection	N/A	the study is testing for the parent chemical in an environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	USA
	Metric 5:	Currency	Low	Samples collected in 1996
	Metric 6:	Spatial and Temporal Variability	Medium	>10 samples; no replicates
	Metric 7:	Exposure Scenario	High	Exposure source characterized
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Raw data reported
	Metric 9:	Quality Assurance	High	Key QA reported
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Few gaps and limitations reported
Overall Quality Determination			Medium	

Study Citation:		Westinghouse Savannah River Company, (1992.0). Sanitary Landfill 1991 annual groundwater monitoring report.		
HERO ID:		1740870		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Sampling methodology is only briefly discussed, therefore, most sampling information is missing and likely to have a substantial impact on results. The type of monitoring wells are reported.
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methodology was not described, including analytical instrumentation.
	Metric 3:	Biomarker Selection	N/A	The study tested for the parent chemical in environmental media (groundwater).
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The samples were collected in Savannah River Site, Aiken, SC.
	Metric 5:	Currency	Low	The samples were collected in 1991.
	Metric 6:	Spatial and Temporal Variability	Low	The collection of replicates was not reported. Fifty-seven wells were sampled, but sample size is not reported. It's inferred that at least one sample was collected from each well.
	Metric 7:	Exposure Scenario	Medium	Groundwater samples were collected from monitoring wells beneath a sanitary landfill. The use of exposure controls are not described.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Raw data is reported in tables for each monitoring well starting on page 168. Summary statistics are not reported.
	Metric 9:	Quality Assurance	Low	QA/QC techniques and results were not directly discussed and recoveries were not reported.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	The characterization of variability is absent (no measure of variance reported). Key uncertainties, limitations, and data gaps are not discussed.
Overall Quality Determination			Uninformative	

Study Citation:		Geraghty & Miller Inc, (1983.0). Hydrogeology of the Hill Site: The Bendix corporation: Sidney, New York with cover letter.		
HERO ID:		1745520		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	There is some (limited) sampling methodology reported for soil collection on pg 62, but half of that page is illegible. Sampling methods for groundwater were almost nonexistent, as the report primarily focused on boring installation.
	Metric 2:	Analytical Methodology	High	Volatile organic compounds analyzed by EPA method 601. LODs are reported in Appendix E at the bottom of the table on page 81.
	Metric 3:	Biomarker Selection	N/A	Parent chemicals were tested in soil and water.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Sampling conducted at the Bendix Corporation plant in Sidney, New York.
	Metric 5:	Currency	Low	Samples collected in 1983.
	Metric 6:	Spatial and Temporal Variability	Low	Samples were collected from the wells five times as the drillings proceeded. There is no report of number of samples. Duplicate sampling occurred some but not all of the time.
	Metric 7:	Exposure Scenario	High	Soil and ground water were sampled to investigate the extent of contamination at this site.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Table 3 presents the results but due to the quality of the scan it is impossible to read. Appendix E contains the laboratory reports.
	Metric 9:	Quality Assurance	Low	The laboratory followed an EPA method so QA/QC can be inferred.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	There is no information on sample variability or statistics. The document reports the need to keep monitoring the next steps.
Overall Quality Determination			Low	

Study Citation:		Allied, (1984.0). Hydrogeologic investigation summary report with cover letter.		
HERO ID:		1745530		
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling Methodology	Critically Deficient	Sampling methodology was not described
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methodology was not described
	Metric 3:	Biomarker Selection	N/A	the study is testing for the parent chemical in an environmental media.
Domain 2: Representativeness	Metric 4:	Geographic Area	High	Michigan, USA
	Metric 5:	Currency	Low	Report from 1984
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size not reported
	Metric 7:	Exposure Scenario	Medium	Missing details about methods, population and microenvironment of interest
Domain 3: Accessibility/Clarity	Metric 8:	Reporting of Results	Medium	Individual sample concentrations, no summary statistics
	Metric 9:	Quality Assurance	Low	QA/QC techniques were not described
Domain 4: Variability and Uncertainty	Metric 10:	Variability and Uncertainty	Low	Variability was not characterized, uncertainties and limitations were not discussed
Overall Quality Determination		Uninformative		

Study Citation:	DEE, (1984.0). State purgeable organic testing program (spot) quarterly report from April 1, 1987 to July 31, 1987 with cover letter dated 080387.
HERO ID:	1745594

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Sampling Methodology	Critically Deficient	The sampling methodology is not discussed in the data source or companion source
	Metric 2: Analytical Methodology	Critically Deficient	Analytical methodology is not described
	Metric 3: Biomarker Selection	N/A	Parent chemical in an environmental media
Domain 2: Representativeness	Metric 4: Geographic Area	High	Massachusetts, US
	Metric 5: Currency	Low	1987
	Metric 6: Spatial and Temporal Variability	Low	There is no information regarding the samples, the sample size could be around 600 samples
	Metric 7: Exposure Scenario	Critically Deficient	The exposure scenario is not reported or discussed
Domain 3: Accessibility/Clarity	Metric 8: Reporting of Results	Low	Since there is no information regarding the samples, it is possible that the tables only report raw data
	Metric 9: Quality Assurance	Critically Deficient	There is no information regarding QA/QC procedures
Domain 4: Variability and Uncertainty	Metric 10: Variability and Uncertainty	Critically Deficient	There is no information regarding variability or uncertainty

Overall Quality Determination**Uninformative**

Study Citation: Ciba-Geigy, (1987.0). Annual report on results of water quality monitoring water year 1985-86 with cover letter dated 082887.
HERO ID: 1745597

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Sampling Methodology	High	Monitoring methods reported in appendix A
	Metric 2: Analytical Methodology	Critically Deficient	Analytical methods not reported
	Metric 3: Biomarker Selection	N/A	Parent chemical in water samples
Domain 2: Representativeness	Metric 4: Geographic Area	High	Montebello Forebay, California
	Metric 5: Currency	Low	Water quality data 1985-1986
	Metric 6: Spatial and Temporal Variability	High	Samples collected in 20 wells in Montebello Bay, 170 wells for basin wide ground water
	Metric 7: Exposure Scenario	High	Water quality data from Montebello Bay
Domain 3: Accessibility/Clarity	Metric 8: Reporting of Results	Medium	Table 4 reports raw data, no statistics calculated
	Metric 9: Quality Assurance	Low	No information on analytical methods, but sampling program well described
Domain 4: Variability and Uncertainty	Metric 10: Variability and Uncertainty	Medium	Variability reported in ranges in page 49

Overall Quality Determination **Uninformative**

Study Citation:		CA State Dept of Health Services, (1986.0). Organic chemical contamination of large public water systems in California April 1986 on seven chemicals with attachments.		
HERO ID:		1745610		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Sampling methodology is not described, but the report is from the California State Department of Health Services.
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methodology was not described, including analytical instrumentation.
	Metric 3:	Biomarker Selection	N/A	The study tested for the parent chemical in environmental media (groundwater).
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The samples were collected in several locations across California.
	Metric 5:	Currency	Low	The samples were collected in 1984 and 1985.
	Metric 6:	Spatial and Temporal Variability	Medium	The collection of replicates was not reported. 2947 groundwater wells were sampled. The report lists only positive test results and Table E-1 lists how many wells tested positively for the contaminant. Negative test results are on file at the SEB district offices.
	Metric 7:	Exposure Scenario	Medium	Groundwater samples were collected from light industrial/residential, heavy industrial, agricultural and contamination free settings in California. The use of exposure controls are not described.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Raw data is reported in Table II-22 (pg 107). Summary statistics (concentration range and median concentration) are reported in the text on pg 18.
	Metric 9:	Quality Assurance	Low	QA/QC techniques and results were not directly discussed, but can be implied through the study’s use of standard field and laboratory protocols. Certified laboratories analyzed the samples (pg 6).
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	The characterization of variability is absent (no measure of variance reported).Key uncertainties, limitations, and data gaps are not discussed.
Overall Quality Determination			Uninformative	

Study Citation:		Geraghty & Miller Inc, (1988.0). Results of the second phase of a hydrogeologic investigation at the Allied-Signal Inc facility, Morristown, New Jersey with cover letter dated 012089.		
HERO ID:		1745619		
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling Methodology	Critically Deficient	The study did not report storage conditions, sampling equipment or procedures.
	Metric 2:	Analytical Methodology	Low	The study did not describe analytical methods or reported LODs however it cited EPA Method 601.
	Metric 3:	Biomarker Selection	N/A	The study is testing for the parent chemical in an environmental media (water).
Domain 2: Representativeness	Metric 4:	Geographic Area	High	Geographic location is reported; New Jersey, USA.
	Metric 5:	Currency	Low	Timing of sample collection for monitoring data is not consistent with when current exposures (sampling occurred in 1987; >15 years old) may be expected and likely to have a substantial impact on results.
	Metric 6:	Spatial and Temporal Variability	Low	Sampling approach does not captures variability of environmental contamination in population/scenario/media of interest. The study used 20 samples and no replicates.
	Metric 7:	Exposure Scenario	Medium	The study did not provide details about the population of interest or exposure assessment.
Domain 3: Accessibility/Clarity	Metric 8:	Reporting of Results	Medium	Individual sample concentrations (raw data) reported but there is no summary statistics.
	Metric 9:	Quality Assurance	Medium	Limited description of QA/QC techniques.
Domain 4: Variability and Uncertainty	Metric 10:	Variability and Uncertainty	Low	Did not characterize variability, or discussed uncertainties and limitations.
Overall Quality Determination		Uninformative		

Study Citation:		Dames & Moore, (1989.0). Ground water and soils data summary report with attachments, appendices, cover sheets and letter dated 080989.		
HERO ID:		1745621		
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling Methodology	Medium	Limited description of sampling methodology
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methods not described
	Metric 3:	Biomarker Selection	N/A	Did not sample for biomarkers
Domain 2: Representativeness	Metric 4:	Geographic Area	High	Illinois, USA
	Metric 5:	Currency	Low	Samples from 1987
	Metric 6:	Spatial and Temporal Variability	Low	5 samples, no replicates
	Metric 7:	Exposure Scenario	Medium	Data likely represents a relevant exposure scenario, missing details about the population of interest and microenvironment
Domain 3: Accessibility/Clarity	Metric 8:	Reporting of Results	Medium	Only individual sample concentrations, no summary statistics
	Metric 9:	Quality Assurance	Medium	Limited description of QA/QC techniques, analyzed control samples
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability and uncertainty were not characterized or described
Overall Quality Determination		Uninformative		

Study Citation:	HSWMR, (1993.0). Toxicological evaluation of sampling data for Little Rocky Creek, Greenville, South Carolina with cover letter dated 050793.
HERO ID:	1745693

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Sampling Methodology	Low	Only briefly described
	Metric 2: Analytical Methodology	Critically Deficient	Analytical methods were not described
	Metric 3: Biomarker Selection	N/A	Did not test for biomarkers
Domain 2: Representativeness	Metric 4: Geographic Area	High	USA
	Metric 5: Currency	Low	Samples taken in 1990
	Metric 6: Spatial and Temporal Variability	Low	82 samples from 20 locations, <5 samples per site
	Metric 7: Exposure Scenario	Medium	Data likely represents relevant exposure scenarios, missing methodological details
Domain 3: Accessibility/Clarity	Metric 8: Reporting of Results	Medium	Only summary statistics
	Metric 9: Quality Assurance	Low	QA/QC techniques were not described
Domain 4: Variability and Uncertainty	Metric 10: Variability and Uncertainty	Medium	Limited characterization of variability, did not discuss uncertainties and limitations

Overall Quality Determination**Uninformative**

Study Citation:		ERM-Northeast, (1994.0). Hydrogeologic investigation (including ground water quality) north of Husky Brook Eatontown, New Jersey, with cover letter dated 011894.		
HERO ID:		1745841		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling methodology followed NJDEPE’s (NJ Department of Environmental Protection) Field Sampling Procedures Manual published in 1992.
	Metric 2:	Analytical Methodology	High	Followed EPA 624+15. Detection limits reported on page 80.
	Metric 3:	Biomarker Selection	N/A	Study measured parent chemical in ground water.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Study was performed in Eatontown, New Jersey, USA.
	Metric 5:	Currency	Low	Sampling was performed in 1993.
	Metric 6:	Spatial and Temporal Variability	Medium	Samples were collected from six new and existing monitoring wells. While the number of samples collected from each well was not reported, we can infer that there were at least 12 samples. Surface water samples collected from 3 wells. No replicates were collected.
	Metric 7:	Exposure Scenario	Medium	On-site ground and surface water quality was assessed for the conditions AlliedSignal Aerospace Company. The population of interest is not described.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Only individual data points and no statistics were provided.
	Metric 9:	Quality Assurance	Medium	Some QA/QC parameters reported in the laboratory reports. Through the use of EPA methods, QA/QC was also implied.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	There is no characterization of variance or report of uncertainties, limitations, and gaps.
Overall Quality Determination			Medium	

Study Citation:		Shin, S. H., Jo, W. K. (2012.0). Volatile organic compound concentrations, emission rates, and source apportionment in newly-built apartments at pre-occupancy stage. Chemosphere 89(5):569-578.		
HERO ID:		1787932		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Some sampling methods not reported, such as sample storage conditions
	Metric 2:	Analytical Methodology	High	GC/MS and GC/FID method described. Method detection limit reported.
	Metric 3:	Biomarker Selection	N/A	Indoor and outdoor air sampling
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Metropolitan and Rural areas in Korea
	Metric 5:	Currency	Low	Timing of sample collection for monitoring data is not directly reported but is inferred by discussion of 2003 building standards that sampling occurred after 2003. Publication date is 2012
	Metric 6:	Spatial and Temporal Variability	High	107 buildings sampled
	Metric 7:	Exposure Scenario	High	Sources of potential exposure in buildings such as building material and proximity to roadways identified.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	No raw data reported. Statistical summaries presented.
	Metric 9:	Quality Assurance	High	QA/QC conducted including blanks, spiked samples, and duplicate sample analysis.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	No gaps or limitations reported
Overall Quality Determination			High	

Study Citation:		Yoshida, T., Matsunaga, I., Tomioka, K., Kumagai, S. (2006.0). Interior air pollution in automotive cabins by volatile organic compounds diffusing from interior materials: I. Survey of 101 types of Japanese domestically produced cars for private use. Indoor and Built Environment 15(5):425-444.		
HERO ID:		1949033		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	A detailed description of sampling methodology is provided.
	Metric 2:	Analytical Methodology	Low	The description of the analytical methodology provided has a few flaws.
	Metric 3:	Biomarker Selection	N/A	The study is testing for the parent chemical in an environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The study was conducted in Japan.
	Metric 5:	Currency	Low	The study was conducted in the summer season (June–September) of 2001 (n=14), 2002 (n=28), 2003 (n=47) or 2004 (n=12).
	Metric 6:	Spatial and Temporal Variability	High	There were ≥ 10 samples for a single scenario.
	Metric 7:	Exposure Scenario	High	The exposure scenario discussed in the monitored study represents the exposure scenario of interest for the chemical.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	The presentation of results was good.
	Metric 9:	Quality Assurance	Low	The description of QA/QC was poor.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	The presentation of variability and uncertainty was good.
Overall Quality Determination			Medium	

Study Citation:		Bookman-Edmonston, (1985.0). Annual report on results of water quality monitoring water year 1983-84 on seven chemicals with attachments.		
HERO ID:		1973144		
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling Methodology	Critically Deficient	Sampling methods were not described.
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methods were not described.
	Metric 3:	Biomarker Selection	N/A	They did not test for biomarkers, but rather for parent chemicals in water.
Domain 2: Representativeness	Metric 4:	Geographic Area	High	California, USA
	Metric 5:	Currency	Low	Sampling was conducted in 1983 and 1984.
	Metric 6:	Spatial and Temporal Variability	Low	I found it difficult to ascertain the total number of samples analyzed for this chemical, but it was more than 10, as there were more than 10 locations (wells) sampled, some "intensively." There were no replicates.
	Metric 7:	Exposure Scenario	Low	Data likely represents a relevant exposure scenario, but methodological details are missing to describe the reliability of the data. Exposure sources are not well-characterized. It's a bit unclear whether the samples analyzed for this chemical came from ground water or drinking water wells.
Domain 3: Accessibility/Clarity	Metric 8:	Reporting of Results	Medium	For 16 samples from October 1984, Table B-4 shows individual sample concentrations from Montebello Forebay, without summary statistics. Table IV-6 summarizes the range of detections in samples of local storm water, reclaimed water, imported water, unchlorinated well water, and chlorinated well water, respectively. It says there were 57 samples of reclaimed water, but the number of samples of water in other categories is not specified.
	Metric 9:	Quality Assurance	Low	Little to no discussed of QA/QC techniques was included.
Domain 4: Variability and Uncertainty	Metric 10:	Variability and Uncertainty	Low	Uncertainty and gaps were not characterized, and there was minimal discussion of variability (see p. 15, which is the 25th page of the PDF, and the tables with data on this chemical).

Overall Quality Determination**Uninformative**

Study Citation:		Ongwandee, M., Moonrinta, R., Panyametheekul, S., Tangbanluekal, C., Morrison, G. (2011.0). Investigation of volatile organic compounds in office buildings in Bangkok, Thailand: Concentrations, sources, and occupant symptoms. Building and Environment 46(7):1512-1522.		
HERO ID:		1985112		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling methodology is clear, appropriate (i.e., scientifically sound), and similar to widely accepted protocols for the chemical and media of interest. All pertinent sampling information is provided.
	Metric 2:	Analytical Methodology	Medium	Analytical methodology is discussed in detail and is clear and appropriate, however, recovery samples are not discussed.
	Metric 3:	Biomarker Selection	N/A	Study tested for the parent chemical in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Samples collected in Bangkok, Thailand.
	Metric 5:	Currency	Medium	Samples were collected in 2009.
	Metric 6:	Spatial and Temporal Variability	High	>10 samples were collected as were replicates.
	Metric 7:	Exposure Scenario	High	The data closely represent relevant/realistic exposure scenario. Exposure sources were characterized.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Raw data were not reported. Summary statistics are missing some parameters.
	Metric 9:	Quality Assurance	Medium	QA/QC techniques and results were discussed, however, some key measures were not reported such as recovery samples.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	The study has limited discussion of key uncertainties, limitations, and data gaps.
Overall Quality Determination			High	

Study Citation:		Dames & Moore, (1988.0). Report of hydrogeologic and environmental assessment for sixteen chemicals at the former Allied Automotive Plant with cover letter dated 033188.		
HERO ID:		2048351		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Samples were collected according to publicly available SOPs that are scientifically sound and widely accepted. VOCs were collected according to EPA Analytical Methods 601 and 602. Base/neutral extractable organic compounds were collected according to EPA Analytical Method 625 for groundwater and Method 8270 for soil. Sampling methodology described in section 1.1, groundwater sampling methods in section 1.1.2, and soil in section 1.1.3.
	Metric 2:	Analytical Methodology	High	Samples were analyzed according to publicly available analytical methods. VOCs were analyzed according to EPA Analytical Methods 601 and 602. Base/neutral extractable organic compounds were analyzed according to EPA Analytical Method 625 for groundwater and Method 8270 for soil. The detection level used is specified in the standard methods, but the values are listed in the report.
	Metric 3:	Biomarker Selection	N/A	The study tested for the parent chemical in environmental media (groundwater and soil).
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The samples were collected in Port Huron, Michigan.
	Metric 5:	Currency	Low	The samples were collected in 1987.
	Metric 6:	Spatial and Temporal Variability	Medium	The collection of replicates was not reported. Composite soil samples were collected from five sites at three different depths. One sample was collected from three different monitoring wells.
	Metric 7:	Exposure Scenario	Medium	Groundwater and soil samples were collected from monitoring wells and the land on the site of a former automotive plant with previous contamination. The use of exposure controls are not described.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Raw data is reported in Appendix C for groundwater and Appendix D for soil samples. Summary statistics are not reported.
	Metric 9:	Quality Assurance	Low	The study applied QA/QC measures like preventing cross contamination while collecting samples; however, recoveries and baseline samples are not reported. It's implied that QA/QC techniques were used through the study's use of standard field and laboratory protocols.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	The characterization of variability is absent (no measure of variance reported). Key uncertainties, limitations, and data gaps are not discussed.
Overall Quality Determination			Medium	

Study Citation:		Yoshida, T., Matsunaga, I. (2006.0). A case study on identification of airborne organic compounds and time courses of their concentrations in the cabin of a new car for private use. Environment International 32(1):58-79.		
HERO ID:		2095300		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling methods described for all air pollutants of interest.
	Metric 2:	Analytical Methodology	Low	LOD not reported
	Metric 3:	Biomarker Selection	N/A	Air sampling
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Cars in Osaka, Japan
	Metric 5:	Currency	Low	Data collected in 1999
	Metric 6:	Spatial and Temporal Variability	Medium	Sampling done 44 times during time period. No indication of replicate sampling for all samples or replicate analysis.
	Metric 7:	Exposure Scenario	High	Car interior
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Note raw data reported in a figure so will be difficult to extract
	Metric 9:	Quality Assurance	Low	QA/QC not explicitly described. Detection limits for instruments and recovery not measured.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	No limitations nor gaps reported
Overall Quality Determination			Medium	

Study Citation:		Merriman, J. C., Struger, J., Szawiola, R. S. (1991.0). Distribution of 1,3-dichloropropene and 1,2-dichloropropane in Big Creek watershed. Bulletin of Environmental Contamination and Toxicology 47(4):572-579.		
HERO ID:		2228538		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling equipment, procedure, storage conditions/duration, and study site characteristics are all reported.
	Metric 2:	Analytical Methodology	Medium	Extraction procedure, instrumentation, LOD reported. No information on instrument calibration. No recovery samples reported.
	Metric 3:	Biomarker Selection	N/A	Biomarkers of interest were not addressed in this reference.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Ontario, Canada
	Metric 5:	Currency	Low	Paper published in 1991
	Metric 6:	Spatial and Temporal Variability	Medium	Seven sampling locations taken over four months before/during/after application of fumigant. No replicates.
	Metric 7:	Exposure Scenario	High	Samples taken before/during/after chemical application in the form of a fumigant. Type of chemical, source of exposure, method of application, microenvironments reported.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Raw data reported, but no summary statistics reported as all DCP samples were less than detection.
	Metric 9:	Quality Assurance	Low	QA/QC not discussed but can be implied through the study's use of standard field and laboratory procedures.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	No quantitative measure of variability but a qualitative discussion of spatial variability is reported.
Overall Quality Determination			Medium	

Study Citation:		Ras-Mallorqui, M. R., Marce-Recasens, R. M., Borrull-Ballarín, F. (2007.0). Determination of volatile organic compounds in urban and industrial air from Tarragona by thermal desorption and gas chromatography-mass spectrometry. Talanta 72(3):941-950.		
HERO ID:		2443817		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	air samples by active collection on multisorbent tubes; air sampling pump; tubes transported in glass jars; analyzed as soon as possible or kept refrigerated during storage and analyzed day after sampling (Section 2.1)
	Metric 2:	Analytical Methodology	High	thermal desorption and GC-MS; compounds quantified by a target ion and identified by qualifier ions and retention time; Table 1 provides MDL and MQL; recoveries
	Metric 3:	Biomarker Selection	N/A	The study is testing for the parent chemical.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Tarragona, Spain
	Metric 5:	Currency	Medium	December 2005 and January 2006
	Metric 6:	Spatial and Temporal Variability	High	urban samples (4sites) taken every 2 hrs from 8AM-8PM; industrial samples (3 sites) taken in morning, mid-day, and afternoon;
	Metric 7:	Exposure Scenario	High	samples in urban and industrial areas
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Table 1 provides MDL and MQL; only chemicals detected were presented; this chemical was not one of the chemicals detected; chemical not listed in Table 2
	Metric 9:	Quality Assurance	High	recoveries higher than 98.9%; linearity I the responses and the repeatability was also good; analyzed blanks
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	discussed variability throughout the day and between urban and industrial areas
Overall Quality Determination			High	

Study Citation:		Kuo, M. C. T., Chen, C. M., Lin, C. H., Fang, H. C., Lee, C. H. (2000.0). Surveys of volatile organic compounds in soil and groundwater at industrial sites in Taiwan. Bulletin of Environmental Contamination and Toxicology 65(5 (Nov 2000)):654..		
HERO ID:		2529812		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	30 sites (fig 1 shows locations); 3-6 soil sampling points randomly selected within each site at 3 depths (0.5, 1.5, and 3 m); direct push sampling method; gw samples from existing monitoring wells at each site; each soil and gw sample taken twice at two different times; samples stored at 4C
	Metric 2:	Analytical Methodology	Low	analyzed according to EPA SW846 Method 5035 using purge and trap and Method 8260B using GC/MD reported- references could provide more information on methodology; LOD not provided.
	Metric 3:	Biomarker Selection	N/A	Parent chemical in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Taiwan
	Metric 5:	Currency	Low	Table 1 indicates gw samples taken 1999
	Metric 6:	Spatial and Temporal Variability	High	30 industrial sites (8 chemical and petrochemical districts, 2 technology industrial parks, 11 general industrial districts, 2 metal processing areas, 2 oil refinery plants, 1 pesticide manufacturing, and 4 landfills); 3 to 6 sampling points within each site
	Metric 7:	Exposure Scenario	High	soil and groundwater samples from various industrial sites in Taiwan
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Fig 2 and 3 show DF; Table 1 show concentrations in gw wells; soil concentrations not reported
	Metric 9:	Quality Assurance	Low	QA/QC is not discussed but can be implied through the study's use of EPA analysis methods
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	discusses variability in gw by location; no apparent correlation of chemicals in gw and soil samples from a particular site; may be due to large areas studies and relatively small sample sizes within a site. No limitation discussion.
Overall Quality Determination			Medium	

Study Citation:		Bean, R. M., Thomas, B. L., Neitzel, D. A. (1985.0). Analysis of sediment matter for halogenated products from chlorination of power plant cooling water. 5(ED.):1357-1370.		
HERO ID:		2801400		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Some sampling methods not reported such as sample storage conditions and sampler calibration
	Metric 2:	Analytical Methodology	High	Key analytical methods reported
	Metric 3:	Biomarker Selection	N/A	Biomarkers of interest were not addressed in this reference.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Redondo Beach, California QC: plant locations provided p 1358 (PA, MI, OR)
	Metric 5:	Currency	Low	Study published in 1985
	Metric 6:	Spatial and Temporal Variability	Low	<5 samples; no replicates
	Metric 7:	Exposure Scenario	Medium	Exposure source not well characterized
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Raw data not reported
	Metric 9:	Quality Assurance	Low	No QA reported
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	No gaps nor limitations reported
Overall Quality Determination			Medium	

Study Citation:		Nikolaou, A. D., Golfinopoulos, G., Kostopoulou, M. N., Kolokythas, G. A., Lekkas, T. D. (2002.0). Determination of volatile organic compounds in surface waters and treated wastewater in Greece. Water Research 36(11):2883-2890.		
HERO ID:		2859218		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling was performed seasonally at 10 rivers, 2 sampling points in each river. Three sampling points were established in seawater areas. Samples were also collected from three municipal wastewater treatment plants and in wastewater from two industries.
	Metric 2:	Analytical Methodology	High	Samples were analyzed using a Hewlett Packard Purge and Trap Concentrator 7695 and a Hewlett Packard Gas Chromatograph 5890 Series II FMass Spectrometer HP 5971. QA/QC described, reported, including detection limits.
	Metric 3:	Biomarker Selection	N/A	NA - water samples no biomarker needed.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Greece
	Metric 5:	Currency	Low	Data collected from October 1998 to September 1999
	Metric 6:	Spatial and Temporal Variability	High	Sampling was performed seasonally, from October 1998 to September 1999, at 10 rivers. Duplicate samples for VOCs measurement were collected (sample size is unclear).
	Metric 7:	Exposure Scenario	High	The data closely represent exposure scenarios from various water bodies in Greece.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	no raw data reported. Limited summary statistics were reported.
	Metric 9:	Quality Assurance	Medium	Some analytical QA reported in Table 2, missing information about blanks
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability among locations was not addressed, only providing range of concentrations. Uncertainty sources were not identified.
Overall Quality Determination			Medium	

Study Citation:		Liu, B., Chen, L., Huang, L., Wang, Y., Li, Y. (2015.0). Distribution of volatile organic compounds (VOCs) in surface water, soil, and groundwater within a chemical industry park in Eastern China. Water Science and Technology 71(2):259-267.		
HERO ID:		2956688		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Authors reported sampling collection procedures, storage conditions and storage duration. They cited following standard Chinese Geological Survey sampling procedures. They also described the study site characteristics.
	Metric 2:	Analytical Methodology	Medium	The authors described the extraction method, analytical instrumentation, recovery experiments, but they did not mention calibration. MDLs are listed in the supporting information
	Metric 3:	Biomarker Selection	N/A	The study is testing for the parent chemical.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Authors described the study site.
	Metric 5:	Currency	Medium	Authors reported collecting samples in 2014.
	Metric 6:	Spatial and Temporal Variability	Medium	Authors collected 4 soil samples, 7 surface water samples, 9 groundwater samples. Duplicate sample collected.
	Metric 7:	Exposure Scenario	Medium	Authors describe the study site.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Detection frequencies were reported, it appears maximum concentrations are reported in Table 2 but it is not fully clear. No measure of variation or central tendency is reported. Individual sample concentrations are not reported.
	Metric 9:	Quality Assurance	High	Duplicate samples were collected in the field, QA/QC controls outlined by EPA methods were followed. They used spiked samples to measure recoveries, lab blanks. Recovery results were above 70%.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	The authors did not report a measure of variation and did not discuss limitations, uncertainties or data gaps.
Overall Quality Determination			Medium	

Study Citation:		Wallace, L., Zweidinger, R., Erickson, M., Cooper, S., Whitaker, D., Pellizzari, E. (1982.0). Monitoring individual exposure. Measurements of volatile organic compounds in breathing-zone air, drinking water, and exhaled breath. Environment International 8(1/6):269-282.		
HERO ID:		3227643		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sample storage and instrument calibration not detailed, but study site characteristics described as campus near-industrial site and non-industrial campus area with sampling conducted for 5-9 hour/day as participants had normal daily activities with spirometry conducted at end of day when returning personal air and drinking water samples; sampling equipment/procedures for personal exposure monitoring (MSA Model C-200 pump w/Tenax cartridge), drinking water and spirometry breath samples described.
	Metric 2:	Analytical Methodology	Medium	Instrument calibration not described, but analytical instrumentation (GC/MS) described and methodology referenced (unknown if standard, accepted methods); LOD's (Table 7) and recoveries (Table 3) detailed.
	Metric 3:	Biomarker Selection	High	The authors measured DCP as parent chemical in human breath.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Lamar University campus near industrial site and UNC campus areas.
	Metric 5:	Currency	Low	March 4-5, 1980 (Lamar Univ) and June 10-11, 1980 (UNC)
	Metric 6:	Spatial and Temporal Variability	Low	Acceptable moderate sample size with 11 Lamar Univ samples and 6 UNC samples for personal air (5-9 hours for one day) and spirometry breath (single sample, for each of 11 Lamar Univ and 6 UNC participants), similar number with drinking water as samples provided for each time participant drank water during sampling day. Non-statistical sampling approach and no duplicate samples. Sampling conducted for one day for each participant.
	Metric 7:	Exposure Scenario	Medium	Exposure source/scenario described as industrial and non-industrial, field and laboratory blanks and controls described, however unable to distinguish between indoor/outdoor (ambient) sampling for breathing-zone personal air monitoring, indoor/ outdoor sampling scenario not described (building characteristics, climate, etc.), although questionnaire noting residence on/off campus, etc. administered to subjects.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Raw data from each participant noted within Tables 7-8, summary data Tables 13-14 with range, percent detected, SD, mean and sample size.
	Metric 9:	Quality Assurance	Medium	No baseline pre-exposure samples, but field and lab controls and percent recoveries detailed.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Key uncertainties and data gaps not discussed but variability characterized in summary statistics and limited discussion. Discussion of contribution to variance within regression modeling, and discrepancies between personal air monitoring and spirometry breath samples taken after personal air monitoring. Measurement of non-specific chemical isomers. Authors discuss need for additional studies to validate concentrations reported in various media.
Overall Quality Determination			Medium	

Study Citation:		Kingsbury, J. A., Delzer, G. C., Hopple, J. A. (2008.0). Anthropogenic organic compounds in source water of nine community water systems that withdraw from streams, 2002{\textendash}05. Scientific Investigations Report 2008-5208 :68.		
HERO ID:		3364193		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	The sampling methods followed standard USGS sampling protocols.
	Metric 2:	Analytical Methodology	Medium	Analyzed using USGS approved analytical methods, but recoveries and LOD were not reported.
	Metric 3:	Biomarker Selection	N/A	The authors analyzed water samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Samples were collected in United States.
	Metric 5:	Currency	Medium	Samples were collected between 2002-2005.
	Metric 6:	Spatial and Temporal Variability	High	n=12-17 source-water samples collected at each site over 12-month period; variety of flow conditions; field blanks and replicates.
	Metric 7:	Exposure Scenario	High	The data likely represent relevant exposure scenarios related to stream water collected prior to water treatment and then finished water tested at nine community water systems.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Limited summary statistics were reported DF, n, max concentration reported in appendices.
	Metric 9:	Quality Assurance	High	QA/QC techniques were described in detail, including the use of field blanks and replicates.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Variability was not characterized. Section "Changes in Concentration" address uncertainties and need for additional information.
Overall Quality Determination			High	

Study Citation:		Dai, H., Jing, S., Wang, H., Ma, Y., Li, L., Song, W., Kan, H. (2017.0). VOC characteristics and inhalation health risks in newly renovated residences in Shanghai, China. Science of the Total Environment 577(Elsevier):73-83.		
HERO ID:		3453725		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Canister sampling. Followed the national standard TechnicalSpecifications for Monitoring of Indoor Air Quality (HJ/T167-2004), however, info such as storage conditions and duration is not provided. Blanks were collected in field.
	Metric 2:	Analytical Methodology	Medium	Analysis via GC-MS/FID. Only range of LOD provided. Calibrations were linear.
	Metric 3:	Biomarker Selection	N/A	The study is testing for the parent chemical.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	China
	Metric 5:	Currency	High	2015
	Metric 6:	Spatial and Temporal Variability	Medium	8 homes sampled in only one month in one city.
	Metric 7:	Exposure Scenario	Medium	Condition of homes only briefly described - renovated in last year
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	DF, min, max, mean, median provided, but no raw data.
	Metric 9:	Quality Assurance	Medium	No QC issues specifically identified, but QC results not well described. Did use field blanks.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	High	Monte Carlo and sensitivity assessment conducted.
Overall Quality Determination			Medium	

Study Citation:		Ma, H., Zhang, H., Wang, L., Wang, J., Chen, J. (2014.0). Comprehensive screening and priority ranking of volatile organic compounds in Daliao River, China. Environmental Monitoring and Assessment 186(5):2813-2821.		
HERO ID:		3488897		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	The sampling method, sample storage, site characteristics are well described.
	Metric 2:	Analytical Methodology	High	The analytical methods are well described. LODs are reported (in supplemental file).
	Metric 3:	Biomarker Selection	N/A	Study measured parent chemical in river water.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The site locations in China are well described.
	Metric 5:	Currency	Medium	Samples were collected in October 2011.
	Metric 6:	Spatial and Temporal Variability	High	Triplicate samples were collected from 20 sites in the river for target VOCs and duplicates for non-target VOCs.
	Metric 7:	Exposure Scenario	High	Sampling from the river is relevant for environmental exposures.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	The data are pooled and the mean and maximum are provided, as well as the frequency of detection. The raw data are not provided and there is no measure of variability.
	Metric 9:	Quality Assurance	High	QA/QC procedures were described and are provided in the supplemental file.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	There is limited discussion of variability and uncertainty.
Overall Quality Determination			High	

Study Citation:		OBG, (1987.0). Waste disposal sites assessment.		
HERO ID:		4213875		
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Sampling Methodology	Critically Deficient	Sampling methodology was not described.
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methodology is not described, including analytical instrumentation, extraction method, and detection limits.
	Metric 3:	Biomarker Selection	N/A	The study tested for the parent chemical in environmental media (soil and groundwater).
Domain 2: Representativeness	Metric 4:	Geographic Area	High	The samples were collected in Ohio.
	Metric 5:	Currency	Low	The sample collection date is not reported. The document is from 1987.
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	The sample size was not reported.
	Metric 7:	Exposure Scenario	Low	Data may represent relevant exposure scenarios related to polluted soil and groundwater at waste disposal sites in the US, but the report lacks methodological, exposure and contextual descriptions.
Domain 3: Accessibility/Clarity	Metric 8:	Reporting of Results	Medium	The raw data is reported. Summary statistics are not reported.
	Metric 9:	Quality Assurance	Low	QA/QC techniques and results were not directly discussed and cannot be implied.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	The characterization of variability is absent (no measure of variance reported). Key uncertainties, limitations, and data gaps are not discussed.
Overall Quality Determination		Uninformative		

Study Citation:		ESC, (1985.0). Groundwater monitoring summary - Hranica Landfill, Sarver, Penn.		
HERO ID:		4213880		
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Sampling Methodology	Critically Deficient	Sampling methods are not described
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methods are not described
	Metric 3:	Biomarker Selection	N/A	The authors analyzed water samples.
Domain 2: Representativeness	Metric 4:	Geographic Area	High	Pennsylvania, USA
	Metric 5:	Currency	Low	Sampling in 1984 and 1985
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size not reported
	Metric 7:	Exposure Scenario	Medium	May represent a relevant exposure scenario, but lacks sufficient methodological details and population of interest
Domain 3: Accessibility/Clarity	Metric 8:	Reporting of Results	Medium	Only individual sample concentrations, no summary statistics
	Metric 9:	Quality Assurance	Low	QA/QC was not discussed
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Did not characterize variability, uncertainties or limitations
Overall Quality Determination		Uninformative		

Study Citation:		Geraghty & Miller Inc, (1982.0). Ground-water quality conditions in the vicinity of waste oil disposal facilities at the Sidney, New York, plant.		
HERO ID:		4214163		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Critically Deficient	Sampling methods not described
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methods not described
	Metric 3:	Biomarker Selection	N/A	The authors analyzed environmental samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	New York
	Metric 5:	Currency	Low	Sampling in 1982
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size not reported
	Metric 7:	Exposure Scenario	Low	Insufficient methodological details, no information about population of interest
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Individual sample concentrations, no summary statistics
	Metric 9:	Quality Assurance	Low	QA/QC techniques were not described
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability, uncertainties, and limitations were not discussed

Overall Quality Determination	Uninformative
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Study Citation:		Allied Signal, (1990.0). Letter from Allied-Signal Inc notifying USEPA of their intentions to conduct an environmental assessment pursuant to the Environment Cleanup Responsibility Act with attachments.		
HERO ID:		4214323		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling and analytical plan are described across the document from 1983 (page 168) -1986 (page 455)
	Metric 2:	Analytical Methodology	Medium	Sampling and analytical plan are described across the document from 1983 (page 168) -1986 (page 455). LOD or LOQ reported in most of the data tables
	Metric 3:	Biomarker Selection	N/A	Parent chemical in ground water and soil samples
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Eatontown, New Jersey
	Metric 5:	Currency	Low	1983-1986
	Metric 6:	Spatial and Temporal Variability	Low	Sample size in total is not reported, but the report has sampling data from 1983-1986
	Metric 7:	Exposure Scenario	High	Organic compounds contamination in ground water and solids from the Bendix- Electric Power Division facility
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Only individual data points, no summary of statistics
	Metric 9:	Quality Assurance	High	QA/QC reported for most of the sampling periods
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Sampling from 1983-1986, no report on key limitations
Overall Quality Determination			Medium	

Study Citation: ICI Americas Inc, (1991.0). Letter from ICI Americas Inc to USEPA submitting follow-up information concerning phenol and other chemicals in groundwater at the facility in Hopewell, Virginia with attachments.

HERO ID: 4214419

Domain	Metric	Rating	Comments
Domain 1: Reliability			
Metric 1:	Sampling Methodology	Critically Deficient	Sampling methods were not described
Metric 2:	Analytical Methodology	Critically Deficient	Analytical methods were not described
Metric 3:	Biomarker Selection	N/A	The authors analyzed environmental samples.
Domain 2: Representativeness			
Metric 4:	Geographic Area	High	Virginia, USA
Metric 5:	Currency	Low	Sampling in 1990
Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size is not reported
Metric 7:	Exposure Scenario	Low	Data lacks key pieces of information and this impacts the exposure scenario characterization
Domain 3: Accessibility/Clarity			
Metric 8:	Reporting of Results	Medium	No summary statistics
Metric 9:	Quality Assurance	Low	Analyzed control samples, did not describe QA/QC techniques
Domain 4: Variability and Uncertainty			
Metric 10:	Variability and Uncertainty	Low	Did not characterize variability, did not discuss uncertainties or study limitations

Overall Quality Determination

Uninformative

Study Citation:		Rhone-Poulenc, (1993.0). Initial submission: Notice of monitored concentrations of 1,1-dichloroethane, 1,2-dichloropropane, trichlor* in local wells by letter from Rhone-Poulenc inc to USEPA dated 11/15/93.		
HERO ID:		4214434		
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Sampling Methodology	Critically Deficient	This is only a letter and no sampling methodology discussed.	
	Metric 2: Analytical Methodology	Critically Deficient	Analytical methodology is not described, including analytical instrumentation, extraction method, and detection limits.	
	Metric 3: Biomarker Selection	N/A	The study tested for the parent chemical in environmental media.	
Domain 2: Representativeness	Metric 4: Geographic Area	High	The samples were collected in Gastonia, NC.	
	Metric 5: Currency	Low	The sample collection date is not reported. The letter was submitted in 1993.	
	Metric 6: Spatial and Temporal Variability	Low	The collection of replicate samples was not reported. The sample size was not specified, but assumed to be one.	
	Metric 7: Exposure Scenario	Low	Samples were from a monitoring well near a facility, but no further information is provided.	
Domain 3: Accessibility/Clarity	Metric 8: Reporting of Results	Low	No raw data or summary statistics are reported. Only one concentration value is provided on page 2 (assumed to be the only sample).	
	Metric 9: Quality Assurance	Critically Deficient	QA/QC techniques and results were not directly discussed and cannot be implied.	
Domain 4: Variability and Uncertainty	Metric 10: Variability and Uncertainty	Critically Deficient	The characterization of variability is absent (no measure of variance reported). Key uncertainties, limitations, and data gaps are not discussed. Only one sample and no other supporting information is provided, making value highly uncertain.	

Overall Quality Determination**Uninformative**

Study Citation: Battelle Ocean Sciences, (1987.0). Draft final report on the fate and effects of produced water discharges in nearshore marine waters (volume I {\& } II) with cover letter dated 091187.
HERO ID: 4214480

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Sampling Methodology	Medium	Limited description of sampling methods
	Metric 2: Analytical Methodology	Critically Deficient	No description of analytical methods
	Metric 3: Biomarker Selection	N/A	Does not measure biomarkers
Domain 2: Representativeness	Metric 4: Geographic Area	High	United States
	Metric 5: Currency	Low	Published in 1987
	Metric 6: Spatial and Temporal Variability	N/A	Sample size not reported
	Metric 7: Exposure Scenario	Medium	Data may represent relevant exposure scenarios, missing details about the population of interest
Domain 3: Accessibility/Clarity	Metric 8: Reporting of Results	Medium	Individual sample concentrations, no summary statistics
	Metric 9: Quality Assurance	Low	Techniques only briefly described
Domain 4: Variability and Uncertainty	Metric 10: Variability and Uncertainty	Low	Variability and uncertainty were not characterized

Overall Quality Determination **Uninformative**

Study Citation:		Allied Signal, (1990.0). Results of the phase III hydrogeologic investigation report with attachments and cover letter dated 020890.		
HERO ID:		4215688		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sampling methodology reported
	Metric 2:	Analytical Methodology	High	USEPA Method 601, detection limits in appendix C
	Metric 3:	Biomarker Selection	N/A	Parent chemical in groundwater
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Morris Township, New Jersey
	Metric 5:	Currency	Low	1987
	Metric 6:	Spatial and Temporal Variability	Medium	19 wells, no sample replicates
	Metric 7:	Exposure Scenario	High	Groundwater quality conditions at the Allied-Signal facility
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Raw data reported in appendix C. Summary of concentrations presented in table 3
	Metric 9:	Quality Assurance	Low	No QA/QC reported, but the laboratory followed an EPA method
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability or uncertainty not discussed
Overall Quality Determination			Medium	

Study Citation:		Xing, L., Wang, L., Zhang, R. (2018.0). Characteristics and health risk assessment of volatile organic compounds emitted from interior materials in vehicles: a case study from Nanjing, China. Environmental Science and Pollution Research 25(15):14789-14798.		
HERO ID:		4697151		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling described in detail. Additional information reported in reference (USEPA 1999) and an associated reference (Xu et al. 2016).
	Metric 2:	Analytical Methodology	Medium	Detection limits reported as a range and not for each chemical.
	Metric 3:	Biomarker Selection	N/A	Parent chemical in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Nanjing, China
	Metric 5:	Currency	High	April 2015
	Metric 6:	Spatial and Temporal Variability	Medium	Ten sets of samples. Unclear if there are replicates.
	Metric 7:	Exposure Scenario	Medium	Relevant scenario of car interiors. Missing information of car details- such as model, condition.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Summary statistics provided. Raw data not provided
	Metric 9:	Quality Assurance	Low	QA/QC not directly discussed but can be interpreted.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	No discussion of limitations or variability.
Overall Quality Determination			Medium	

Study Citation:		Buszka, P. M., Yeskis, D. J., Kolpin, D. W., Furlong, E. T., Zaugg, S. D., Meyer, M. T. (2009.0). Waste-indicator and pharmaceutical compounds in landfill-leachate-affected ground water near Elkhart, Indiana, 2000-2002. Bulletin of Environmental Contamination and Toxicology 82(6):653-659.		
HERO ID:		4912133		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Some sampling methodology parameters were missing such as sampler calibration and storage conditions. Samples were "chilled" but did not provide temperature.
	Metric 2:	Analytical Methodology	Medium	Some analytical methodology parameters were missing, such as calibration. Detailed methods were provided in references listed by the study. LOD reported (Table 3).
	Metric 3:	Biomarker Selection	N/A	Parent chemical was measured in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The samples were collected in Elkhart, Indiana.
	Metric 5:	Currency	Low	The samples were collected in 2000-2002.
	Metric 6:	Spatial and Temporal Variability	Low	Only 4 wells were sampled. No duplicates were collected.
	Metric 7:	Exposure Scenario	High	The exposure scenario represented closely the environment of wells downgradient from a landfill.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Only individual data but no summary statistics were reported. Data reported in table 2.
	Metric 9:	Quality Assurance	Low	The study reported low recoveries (<70%). Field blanks were reported.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Comparison of results were made to other studies. No sample variability and key limitations were reported.
Overall Quality Determination			Medium	

Study Citation:		Tanaka-Kagawa, T., Uchiyama, S., Matsushima, E., Sasaki, A., Kobayashi, H., Kobayashi, H., Yagi, M., Tsuno, M., Arao, M., Ikemoto, K., Yamasaki, M., Nakashima, A., Shimizu, Y., Otsubo, Y., Ando, M., Jinno, H., Tokunaga, H. (2005.0). Survey of volatile organic compounds found in indoor and outdoor air samples from Japan. Kokuritsu Iyakuhin Shokuhin Eisei Kenkyūjo Hōkoku / Bulletin of the National Institute of Health Sciences 123(123):27-31.		
HERO ID:		4912389		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Some sampling methods not reported such as sample storage conditions and performance of the sampler
	Metric 2:	Analytical Methodology	Low	LOD not reported. May be referenced in (Ando. et al., unpublishedresults).
	Metric 3:	Biomarker Selection	N/A	Parent chemical in environmental sample.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Japan
	Metric 5:	Currency	Medium	Data collected in 2005
	Metric 6:	Spatial and Temporal Variability	Medium	50 samples. No replicate samples collected
	Metric 7:	Exposure Scenario	High	Indoor and outdoor air of residences.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	No raw data reported. Summary statistics provided.
	Metric 9:	Quality Assurance	Low	No QA/QC reported
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	No limitations nor gaps reported. Variation of houses not reported.
Overall Quality Determination			Medium	

Study Citation:		Huang, L., Qian, H.,ui, Deng, S., Guo, J., Li, Y., Zhao, W., Yue, Y. (2018.0). Urban residential indoor volatile organic compounds in summer, Beijing: Profile, concentration and source characterization. Atmospheric Environment 188:1-11.		
HERO ID:		4914425		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling methods, approaches, materials and storage reported.
	Metric 2:	Analytical Methodology	Medium	US. EPA Method TO-17 and TO-11A. Recovery samples not reported
	Metric 3:	Biomarker Selection	N/A	NA - air samples no biomarker needed.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Beijing, China
	Metric 5:	Currency	Medium	Data collected in 2013
	Metric 6:	Spatial and Temporal Variability	Medium	duplicates collected in 30% of the total samples
	Metric 7:	Exposure Scenario	High	Indoor in residential.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	No raw data reported
	Metric 9:	Quality Assurance	Medium	QA/QC reported, blanks, standards, duplicates, except recoveries from internal standards that usually are part of TO-17 and TO-11A.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	High	Examined sources of variability from the indoor environment. Compared to other studies and discussed the limitations and sources of uncertainty in their measurements.
Overall Quality Determination			High	

Study Citation:		van Drooge, B. L., Marco, E., Perez, N., Grimalt, J. O. (2018.0). Influence of electronic cigarette vaping on the composition of indoor organic pollutants, particles, and exhaled breath of bystanders. Environmental Science and Pollution Research 26(5):4654-4666.		
HERO ID:		5018334		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Key sampling methods reported
	Metric 2:	Analytical Methodology	High	Key analytical methods reported
	Metric 3:	Biomarker Selection	N/A	The study is testing for the parent chemical in an environmental media (air).
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Spain
	Metric 5:	Currency	High	Samples collected in 2016
	Metric 6:	Spatial and Temporal Variability	High	>10 samples; replicates
	Metric 7:	Exposure Scenario	High	Exposure source characterized
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Raw data not reported
	Metric 9:	Quality Assurance	Medium	Key QA reported
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Few gaps and limitations reported
Overall Quality Determination			High	

Study Citation:		Kliest, J., Fast, T., Boley, J. S. M., van de Wiel, H., Bloemen, H. (1989.0). The relationship between soil contaminated with volatile organic compounds and indoor air pollution. Environment International 15(1-6):419-426.		
HERO ID:		5239410		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sample storage not described
	Metric 2:	Analytical Methodology	Low	Detection limits are not reported
	Metric 3:	Biomarker Selection	N/A	Study measured parent chemical in soil.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The Netherlands
	Metric 5:	Currency	Low	May 1984 to November 1985
	Metric 6:	Spatial and Temporal Variability	Medium	Samples were collected from 77 houses, but there were no replicate samples
	Metric 7:	Exposure Scenario	High	Samples were collected from homes
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Individual data points are not provided
	Metric 9:	Quality Assurance	Low	QA/QC techniques were not directly discussed, but can be implied
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Limited characterization, if any, of variance and discussion of limitations, uncertainties, or data gaps
Overall Quality Determination			Medium	

Study Citation:		Kuo, H. W., Lo, I. I., Chan, C. C., Lai, J. S., Wang, J. D. (1996.0). Volatile organic compounds in water near petrochemical factories in Taiwan. Chemosphere 33(5):913-920.		
HERO ID:		5245153		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling equipment, sampling procedure, sample storage duration, and study site characteristics are all reported.
	Metric 2:	Analytical Methodology	Medium	Study used EPA methods 524.2 and 624, but LODs reported as a range.
	Metric 3:	Biomarker Selection	N/A	Biomarkers of interest were not addressed in this reference.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Taiwan
	Metric 5:	Currency	Low	Paper was published in 1996.
	Metric 6:	Spatial and Temporal Variability	Low	Three to five samples were collected for each condition (wastewater, drinking water, surface water).
	Metric 7:	Exposure Scenario	Medium	Source of exposure, the petrochemical industry, described broadly.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Raw data was reported, but no summary statistics were reported.
	Metric 9:	Quality Assurance	Medium	Internal standards and surrogates were used but efficiencies were not reported.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	No measure of variance was reported.
Overall Quality Determination			Medium	

Study Citation:		Purtymun, W. D., Ferenbaugh, R. W., Maes, M. (1988.0). Quality of surface and ground water at and adjacent to the Los Alamos National Laboratory: Reference organic compounds.		
HERO ID:		5255865		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sampling methodology not described, but followed the USEPA guidelines USEPA 1983 and USEPA 1985.
	Metric 2:	Analytical Methodology	High	Analytical methods described in Appendix B. DL reported
	Metric 3:	Biomarker Selection	N/A	The study is testing for the parent chemical in an environmental media (water).
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Geographic location is reported; Alamos National Laboratory, USA.
	Metric 5:	Currency	Low	Timing of sample collection for monitoring data is not consistent with current or recent exposures may be expected (> 15years). The water samples were collected in late September and early October of 1986.
	Metric 6:	Spatial and Temporal Variability	High	Sampling approach accurately captures variability. The study used a large sample size (43 surface and ground water stations and a total of 5,676 individual analytical results), and sampling occurred over a sufficient period of time (fall of one year). Replicate samples are used.
	Metric 7:	Exposure Scenario	High	Surface and ground water samples adjacent to the Los Alamos National Laboratory.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Raw data (i.e., individual data points) are not reported , and therefore summary statistics cannot be reproduced.
	Metric 9:	Quality Assurance	Low	QA/QC describes in page 9 in QA/QC section. Recoveries are on the low side (<70%) and it is unclear if they correct for recovery.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability or uncertainty not reported.
Overall Quality Determination			Medium	

Study Citation:		Pellizzari, E. D., Hartwell, T. D., Perritt, R. L., Sparacino, C. M., Sheldon, L. S., Zelon, H. S., Whitmore, R. W., Breen, J. J., Wallace, L. (1986.0). Comparison of indoor and outdoor residential levels of volatile organic chemicals in five usa geographical areas. Environment International 12(6):619-624.		
HERO ID:		5276359		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Not all details of the sampling methodology are reported in the methods (e.g., storage conditions/duration).
	Metric 2:	Analytical Methodology	Medium	The analytical methods were discussed, but LOD and recoveries were not reported.
	Metric 3:	Biomarker Selection	N/A	The authors analyzed air samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The samples were from U.S. locations.
	Metric 5:	Currency	Low	Data were collected between 1981-1984.
	Metric 6:	Spatial and Temporal Variability	Medium	Replicates were not collected, n=281 in total (estimated from Table 1).
	Metric 7:	Exposure Scenario	High	The data closely represent relevant indoor and outdoor air exposure scenarios in the U.S.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Raw data was not reported. Only summary statistics were reported.
	Metric 9:	Quality Assurance	High	QA/QC techniques were described, including the use of blank and control samples.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Limited characterization of variability was reported (maximum values). Little information on gaps and limitations was provided.
Overall Quality Determination			Medium	

Study Citation:		Hanazato, M., Suzuki, N., Koga, C., Nakaoka, H., Mori, C. (2018.0). A study of design for reduction and monitoring of volatile organic compounds in indoor air: The case of a commercial bank in Japan. Journal of Asian Architecture and Building Engineering 17(3):573-579.		
HERO ID:		5344296		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sampling equipment described, map provided, timing included, site described, duplicates not indicated
	Metric 2:	Analytical Methodology	High	LOD provided in text, equipment described, methods described
	Metric 3:	Biomarker Selection	N/A	The study is testing for the parent chemical.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Japan
	Metric 5:	Currency	Medium	2013 and 2014
	Metric 6:	Spatial and Temporal Variability	Medium	4 locations sampled on 2 dates
	Metric 7:	Exposure Scenario	High	commercial bank indoor air
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Table 4 has individual data points.
	Metric 9:	Quality Assurance	Low	not explicitly discussed, but no obvious issues
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	not explicitly discussed, but no obvious issues
Overall Quality Determination			Medium	

Study Citation:		Qin, P.,an, Cao, F., Lu, S., Li, L., Guo, X., Zhao, B.,in, Wan, Z., Bi, B.,in (2019.0). Occurrence and health risk assessment of volatile organic compounds in the surface water of Poyang Lake in March 2017. RSC Advances 9(39):22609-22617.		
HERO ID:		5419284		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	The water sampling methodology was described and is scientifically sound. Sampling site, procedures, equipment and storage reported.
	Metric 2:	Analytical Methodology	High	The analytical methods, instrument, LOD and recoveries were reported.
	Metric 3:	Biomarker Selection	N/A	The authors analyzed water samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The study was conducted in China.
	Metric 5:	Currency	High	The samples were collected in 2017.
	Metric 6:	Spatial and Temporal Variability	Medium	n=28 samples were taken, without replicates.
	Metric 7:	Exposure Scenario	Medium	The data likely represent relevant exposure scenarios related to Poyang Lake’s water and population affected, but the small sample size and time window (March 2017) limit the study’s generalizability.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Only summary statistics were reported (range, mean). Individual points not reported.
	Metric 9:	Quality Assurance	High	QA/QC techniques were described in detail and included solvent and procedural blanks. Recoveries between 82.3–120.5%.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Variability was characterized (range). Uncertainties were briefly discussed.
Overall Quality Determination			High	

Study Citation:		Huang, Y., Su, T., Wang, L., Wang, N., Xue, Y., Dai, W., Lee, S. C., Cao, J., Ho, S. S. H. (2019.0). Evaluation and characterization of volatile air toxics indoors in a heavy polluted city of northwestern China in wintertime. Science of the Total Environment 662:470-480.		
HERO ID:		5431563		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Field blanks were used. Storage temp provided. Equipment calibration and flow rates provided. Detailed sampling procedures in other publications (Spaulding et al., 1999; Ho et al., 2011).
	Metric 2:	Analytical Methodology	Medium	Details on method shown in Dai et al., 2012, but relatively robust description provided. Limits only provided as a range.
	Metric 3:	Biomarker Selection	N/A	Paper reports chemical concentrations in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	China
	Metric 5:	Currency	High	2016-2017
	Metric 6:	Spatial and Temporal Variability	High	44 samples from 11 homes.
	Metric 7:	Exposure Scenario	High	Questionnaire provided details to characterize the building and activity patterns of occupants. No known pollution sources near buildings.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Mean and sd in main report. Individual samples appear o have been provided in SI. Conducted source apportionment for indoor sources.
	Metric 9:	Quality Assurance	Medium	Calibration curve was established. Precision was <25%. Recoveries not discussed.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Variability assessed via factor analysis. No discussion of uncertainties.
Overall Quality Determination			High	

Study Citation:		Ambrose, R. B. (1987.0). Modeling volatile organics in the Delaware estuary. Journal of Environmental Engineering 113(4):703-721.		
HERO ID:		5436270		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	The sampling methodology is briefly discussed
	Metric 2:	Analytical Methodology	High	Analytical method discussed and MDL reported
	Metric 3:	Biomarker Selection	N/A	Parent chemical in environmental media
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Delaware Estuary
	Metric 5:	Currency	Low	1983
	Metric 6:	Spatial and Temporal Variability	Medium	6 samples, no sample replicates
	Metric 7:	Exposure Scenario	High	Chemical transport in the Delaware Estuary
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	No individual data. Table 5 reports data as median (95% CI)
	Metric 9:	Quality Assurance	Low	The study doesn't discuss any QA/QC parameters, but can be implied through the study's use of laboratory protocols.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Variability presented as 95% CI, and uncertainty reported
Overall Quality Determination			Medium	

Study Citation:		Buzska, P. M. (1987.0). Relation of water chemistry of the Edwards aquifer to hydrogeology and land use, San Antonio Region, Texas.		
HERO ID:		5436763		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sampling was not performed because the study used a standard database, but no major concerns were raised.
	Metric 2:	Analytical Methodology	Medium	Analytical procedure was not performed in this study because it used a database.
	Metric 3:	Biomarker Selection	N/A	The authors analyzed environmental samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Edwards aquifer, TX
	Metric 5:	Currency	Low	Sampling occurred during 1984 and 1985.
	Metric 6:	Spatial and Temporal Variability	High	The WATSTORE database contained more than 1500 water chemistry analyses from 280 wells and 3 spring waters.
	Metric 7:	Exposure Scenario	High	The data closely represent relevant exposure scenario (surface water/groundwater in an aquifer).
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Average data with summary statistics were presented, though individual data were not reported.
	Metric 9:	Quality Assurance	Low	Quality assurance/quality control techniques and results were not directly discussed, but can be implied through the study's use of standard field and laboratory protocols.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	The study had detailed discussion of data variability and compared among each subareas.
Overall Quality Determination			Medium	

Study Citation:		Fusillo, T. V., Voronin, L. M. (1981.0). Water-quality data for the Potomac-Raritan-Magothy aquifer system, Trenton to Pennsville, New jersey, 1980.		
HERO ID:		5437962		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Some methods not reported such as sampler calibration
	Metric 2:	Analytical Methodology	Medium	Recovery samples not reported
	Metric 3:	Biomarker Selection	N/A	Biomarkers of interest were not addressed in this reference.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	New Jersey and Pennsylvania
	Metric 5:	Currency	Low	Samples collected June through December 1980
	Metric 6:	Spatial and Temporal Variability	Medium	>10 samples; no site replicates; but the sampling does cover a large spatial extent over the course of June-December
	Metric 7:	Exposure Scenario	Medium	Exposure source not well characterized; primary through groundwater use
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Raw data reported in Table 4; 1,2-Dichloropropane is below detection (< 1ug/L) for all samples, which should be included in extraction.
	Metric 9:	Quality Assurance	Low	Limited QA reported
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Few gaps and limitations reported
Overall Quality Determination			Medium	

Study Citation:		Glass, R. L. (1996.0). Hydrologic and water-quality data for U.S. Coast Guard Support Center Kodiak, Alaska, 1987-89. :1-73.		
HERO ID:		5438106		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Key sampling methods reported. Samples were collected according to publicly available SOPs that are scientifically sound and widely accepted (i.e., USEPA methods).
	Metric 2:	Analytical Methodology	High	Key analytical methods reported. Samples were analyzed according to publicly available analytical methods that are scientifically sound and widely accepted. MCLG/MCLs provided.
	Metric 3:	Biomarker Selection	N/A	The study is testing for the parent chemical in an environmental media (water).
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Kodiak, Alaska
	Metric 5:	Currency	Low	Samples collected in 1987 to 1989
	Metric 6:	Spatial and Temporal Variability	High	Sampling approach accurately captures variability of environmental contamination in media of interest. Used large sample size (Large sample size (i.e., > 10 samples for a single scenario). Used replicates.
	Metric 7:	Exposure Scenario	Medium	Exposure source not well characterized
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Supplementary or raw data (i.e., individual data points) are not reported , and therefore summary statistics cannot be reproduced.
	Metric 9:	Quality Assurance	High	Acceptable QA
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Few gaps and limitations reported
Overall Quality Determination			Medium	

Study Citation:		Guimaraes, W. B. (1995.0). Water quality in the Withers Swash Basin, with emphasis on enteric bacteria, Myrtle Beach, South Carolina, 1991-93.		
HERO ID:		:1-102. 5438210		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	The water sampling methods were discussed but didn't include procedure details. The authors cited previously published articles.
	Metric 2:	Analytical Methodology	Medium	The analytical methods were reported, including instrumentation, LOD but did not include recoveries.
	Metric 3:	Biomarker Selection	N/A	The authors analyzed water samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The study was conducted in South Carolina, USA.
	Metric 5:	Currency	Low	The samples were taken in 1991 and 1992.
	Metric 6:	Spatial and Temporal Variability	High	n≥ 10 samples for a single scenario. The sample size was not explicitly reported but the results throughout the report suggest a large sample collection from 51 sites in total.
	Metric 7:	Exposure Scenario	Medium	The data likely represent relevant exposure scenarios related to water contamination in Withers Swash and its two tributaries in Myrtle Beach, S.C, USA.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Only summary statistics were reported (median, min, max).
	Metric 9:	Quality Assurance	Low	QA/QC techniques were not discussed.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	The authors provided a limited characterization of variability (range). Uncertainties and limitations were not discussed.
Overall Quality Determination			Medium	

Study Citation:		Heck, B. A., Myers, N. C., Hargadine, D. A. (1992.0). Hydrogeology and ground-water quality conditions at the Reno County Landfill, South-Central Kansas, 1990-91.		
HERO ID:		5438509		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Some sampling methods not reported such as sampler calibration
	Metric 2:	Analytical Methodology	Low	LOD nor LOQ reported
	Metric 3:	Biomarker Selection	N/A	Biomarkers of interest were not addressed in this reference.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Reno County, Kansas
	Metric 5:	Currency	Low	Data collected in 1991
	Metric 6:	Spatial and Temporal Variability	Medium	>10 samples; no replicates
	Metric 7:	Exposure Scenario	Medium	Exposure source not well characterized. Further investigation needed to determine usefulness of information.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Raw data reported. Most summary statistics provided.
	Metric 9:	Quality Assurance	Low	Limited QA reported
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Few gaps and limitations reported
Overall Quality Determination			Medium	

Study Citation:		Mack, T. J. (1997.0). Design of monitoring wells, hydrogeology, and ground-water quality beneath Country Pond, Kingston, New Hampshire.		
HERO ID:		5440304		
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Sampling Methodology	Critically Deficient	Limited sampling methods were discussed.
	Metric 2:	Analytical Methodology	Critically Deficient	The analytical methods were not described.
	Metric 3:	Biomarker Selection	N/A	The authors analyzed water samples.
Domain 2: Representativeness	Metric 4:	Geographic Area	High	The study was conducted in New Hampshire, USA.
	Metric 5:	Currency	Low	The samples were collected in 1993.
	Metric 6:	Spatial and Temporal Variability	Low	n=17 samples were collected (two samples per location). Estimated from Table 4.
	Metric 7:	Exposure Scenario	Low	The data may represent relevant water exposure scenarios in New Hampshire, but the lack of methodological details limits the study's results.
Domain 3: Accessibility/Clarity	Metric 8:	Reporting of Results	Medium	Only individual sample concentrations were reported, without summary statistics.
	Metric 9:	Quality Assurance	Low	QA/QC techniques were not reported.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability was not characterized. Limitations were not reported.
Overall Quality Determination		Uninformative		

Study Citation:		Miermans, C. J. H., Van Der Velde, L. E., Frintrop, P. C. M. (2000.0). Analysis of volatile organic compounds, using the purge and trap injector coupled to a gas chromatograph ion-trap mass spectrometer review of the results in Dutch surface water of the Rhine, Meuse, Northern Delta area and Westerscheldt, over the period 1992-1997. Chemosphere 40(1):39-48.		
HERO ID:		5440660		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Automatic online sampling system takes composite samples on a daily basis, supplemented by manual sampling if values are high. The authors noted grab samples of volatile compounds needs to be improved.
	Metric 2:	Analytical Methodology	High	Both onsite and lab samples were analyzed with (novel) purge and trap injection (PTI) coupled to a chromatograph/ion trap mass spectrometer. Detection limits are reported.
	Metric 3:	Biomarker Selection	N/A	Environmental media
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	River sampling locations in the Netherlands are named.
	Metric 5:	Currency	Low	1992-1997
	Metric 6:	Spatial and Temporal Variability	Medium	13-14 samples per year at 11 sites. No replicates
	Metric 7:	Exposure Scenario	Medium	Timing of sampling (e.g., season) is missing. Figure 4 implies the samples may have been taken monthly.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Only maximum values are reported. No raw data
	Metric 9:	Quality Assurance	Medium	Method validation study; discussed standards, reliability, and recovery to some extent.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Quantitative and qualitative descriptions of variability are lacking for most chemicals (some have greater spatiotemporal detail in the discussion).
Overall Quality Determination			Medium	

Study Citation:		Naber, S., Verducci, J. (1988.0). Statistical analysis of ground water contamination of the Alert Apron and northern landfill areas of Wurtsmith AFB, Michigan.		
HERO ID:		5440990		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sources, sampling procedure were described in details, though calibration and storage were not mentioned.
	Metric 2:	Analytical Methodology	Low	Analysis was mentioned but not described in details.
	Metric 3:	Biomarker Selection	N/A	The authors analyzed environmental samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Wurtsmith Air Force Base, Michigan
	Metric 5:	Currency	Low	Sampling occurred from 1980 to 1987.
	Metric 6:	Spatial and Temporal Variability	Medium	3 agencies(USGS, USAF, MDNR) collected samples for the 2 sites of interest near the AFB over the sampling period.
	Metric 7:	Exposure Scenario	Medium	The exposure scenario was relevant - groundwater samples near the AFB.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Individual data were provided for each site.
	Metric 9:	Quality Assurance	Low	Quality assurance/quality control techniques and results were not directly discussed, but can be implied through the study's use of standard field and laboratory protocols.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	High	Key uncertainties and errors have been identified.
Overall Quality Determination			Medium	

Study Citation:		Watts, K. R., Ortiz, R. F. (1990.0). Geohydrology and ground-water quality at the pueblo depot activity landfill near Pueblo, Colorado.		
HERO ID:		5443405		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sample storage missing
	Metric 2:	Analytical Methodology	Medium	Some analytical methods not reported, such as recovery samples
	Metric 3:	Biomarker Selection	N/A	NA - Water samples no biomarker needed.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Colorado, USA
	Metric 5:	Currency	Low	Data collected in 1988
	Metric 6:	Spatial and Temporal Variability	Medium	Multiple wells sampled about 3-5 times each, unclear if there are replicates
	Metric 7:	Exposure Scenario	High	Proximity to landfill water. Can be used in general population, and environmental exposure scenarios.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Table 10 start after page 95 while some ranges can be found within text too.
	Metric 9:	Quality Assurance	Low	QA/QC implied
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Few limitations reported
Overall Quality Determination			Medium	

Study Citation:		Bigsby, P. R., Myers, N. C. (1989.0). Hydrogeology and ground-water-quality conditions at the Geary County landfill, northeast Kansas, 1988.		
HERO ID:		5449639		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	USGS conducted study; 7 monitoring wells sampled (MW- to MW-2); samples retrieved with a Teflon-bottom check-valve bailer and immediately put on ice; samples filtered; also samples of Smoky Hill River collected by dipping bottles into the stream and allowing to fill
	Metric 2:	Analytical Methodology	Low	Performed by Kansas Department of Health and Environment laboratory, no discussion of analytical methodology. Although missing analytical description and other QA and uncertainties in this report they have references in which this information can be found. Most of the used methodology are accepted methods performed by accredited labs.
	Metric 3:	Biomarker Selection	N/A	NA - water samples no biomarker needed.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Geary County, northeast Kansas
	Metric 5:	Currency	Low	Sept 20-22, 1988
	Metric 6:	Spatial and Temporal Variability	Medium	7 wells sampled Sept 20-22; also 3 samples from the river; no replicate samples indicated
	Metric 7:	Exposure Scenario	High	groundwater quality conditions at a county landfill
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Table 8 provides concentration per site
	Metric 9:	Quality Assurance	Low	QA/QC not reported but implied as it is a USGS investigation
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	no discussion of variability or uncertainty
Overall Quality Determination			Medium	

Study Citation:		Westinghouse Savannah River Company, (1993.0). Mixed Waste Management Facility (MWMF) groundwater monitoring report (U): Fourth quarter 1992 and 1992 summary.		
HERO ID:		5452031		
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling Methodology	Low	Sampling methodology is only briefly discussed. Described sampling locations and study site characteristics. Did not report sample storage conditions/duration or sampling equipment and procedure.
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methodology is not described, including analytical instrumentation.
	Metric 3:	Biomarker Selection	N/A	Study tested for the parent chemical in environmental media.
Domain 2: Representativeness	Metric 4:	Geographic Area	High	Savannah River Site, Aiken, SC
	Metric 5:	Currency	Low	Samples collected throughout second quarter 1992.
	Metric 6:	Spatial and Temporal Variability	Medium	>10 samples were collected but there no replicate samples collected. Several wells sampled, but only one sample per well.
	Metric 7:	Exposure Scenario	Medium	The report provides extensive background information about the sites and wells. The data likely represent the relevant exposure scenario. Routes of exposure and populations of interest not described.
Domain 3: Accessibility/Clarity	Metric 8:	Reporting of Results	High	Raw data were reported.
	Metric 9:	Quality Assurance	Low	Quality assurance/quality control techniques and results were not discussed.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	The characterization of variability is absent and key uncertainties, limitations, and data gaps are not discussed.
Overall Quality Determination		Uninformative		

Study Citation:		Dreisch, F. A., Gower, M., Munson, T. O. (1980.0). Survey of the Huntington and Philadelphia River water supplies for purgeable organic contaminants.		
HERO ID:		5471952		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling procedure and storage conditions were described.
	Metric 2:	Analytical Methodology	High	Analytical method was described (hall detector/flame ionization detector), LOD was reported in Table 2.
	Metric 3:	Biomarker Selection	N/A	environmental media
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Ohio River, Huntington, WV, and Schuylkill River, Philadelphia, PA
	Metric 5:	Currency	Low	1978-1979
	Metric 6:	Spatial and Temporal Variability	High	Quadruplicate samples were taken every 12 hours at the 2 locations. Sampling was from December 4, 1978 to January 29, 1979 for Ohio River and from November 27, 1978 to February 24, 1979.
	Metric 7:	Exposure Scenario	Medium	The data likely represent the relevant exposure scenario - surface water.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Data were reported for each sampling point with no summary reports.
	Metric 9:	Quality Assurance	Low	Quality assurance/quality control techniques and results were not directly discussed, but can be implied through the study’s use of standard field and laboratory protocols.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	High	The study provided the limitation of the study including short sampling time period, no individual sample run, and inherent time lag between sampling collection and analysis.
Overall Quality Determination			Medium	

Study Citation:		Kaiser, K. L. E., Comba, M. E. (1986.0). Volatile halocarbon contaminant survey of the St. Clair river. Water Pollution Research Journal of Canada 21(3):323-331.		
HERO ID:		5476013		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling methodology described in detail.
	Metric 2:	Analytical Methodology	Low	LOD not reported.
	Metric 3:	Biomarker Selection	N/A	Parent chemical in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	St. Clair River, Ontario, Canada
	Metric 5:	Currency	Low	November 1985
	Metric 6:	Spatial and Temporal Variability	Low	Unclear how many samples- there are 60 sample sites.
	Metric 7:	Exposure Scenario	Medium	Exposure source not well characterized.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Raw data not reported. Summary statistics not comprehensive.
	Metric 9:	Quality Assurance	Low	QC/QA not discussed.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Few gaps and limitations reported. No discussion of variation.
Overall Quality Determination			Low	

Study Citation:		Campbell, T. R. (1997.0). Soil, water, and streambed quality at a demolished asphalt plant, Fort Bragg, North Carolina, 1992-94.		
HERO ID:		5489294		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	samples were collected and handled according to procedures outlined in the work plan for Ft. Bragg SWMU's and approved by local government and EPA (p.17)
	Metric 2:	Analytical Methodology	High	samples were analyzed in accordance with the USEPA methods or ASTM standards; Table 4 provides LODs
	Metric 3:	Biomarker Selection	N/A	The authors analyzed environmental samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Ft. Bragg, Fayetteville, NC
	Metric 5:	Currency	Low	December 1992-April 1994
	Metric 6:	Spatial and Temporal Variability	Medium	7 wells for groundwater sampling; 22 soil samples at various depths; several sub-samples of streambed sediment at various locations; soil samples collected at 7 locations across the site;
	Metric 7:	Exposure Scenario	Medium	soil, ground water, surface water, and sediments in the area of a demolished asphalt plant at Ft. Bragg; aim to determine if site should added to list of solid-waste management units under the RCRA permit; p. 12-16 contains information on the area of contamination
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Table 7 provides concentrations in soil samples; no results specific to this chemical; only data is for LOD
	Metric 9:	Quality Assurance	Low	QA/QC not directly discussed but implied through standard methods and lab protocols
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	characterization of variability and uncertainties are absent
Overall Quality Determination			Medium	

Study Citation:		Rowe, B. L., Toccalino, P. L., Moran, M. J., Zogorski, J. S., Price, C. V. (2007.0). Occurrence and potential human-health relevance of volatile organic compounds in drinking water from domestic wells in the United States. Environmental Health Perspectives 115(11):1539-1546.		
HERO ID:		5553456		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	methods cited elsewhere for a USGS book on protocols and procedures
	Metric 2:	Analytical Methodology	High	MRLs reported in supporting info; method cites a USGS reference
	Metric 3:	Biomarker Selection	N/A	no biomonitoring data
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Figure 2 shows the wells in the US
	Metric 5:	Currency	Low	1985-2002
	Metric 6:	Spatial and Temporal Variability	Medium	single sample collected at each well (no replicates)
	Metric 7:	Exposure Scenario	High	Domestic well throughout the USA.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	info likely in the supporting information
	Metric 9:	Quality Assurance	Medium	quality-control samples used in this study have been reported elsewhere (USGS references); unclear what was done exactly
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	study characterizes variability around the US based on samples collected in many states but no standard deviation/measure of variation mentioned (unclear if in SI)
Overall Quality Determination			Medium	

Study Citation:		Garcia, C., Tiedra, P. G., Ruano, A., Gomez, J. A., Garcia-Villanova, R. J. (1992.0). Volatile halo-organic compounds in treated waters of the province of Salamanca (Spain). European Water Pollution Control 2(4):46-49.		
HERO ID:		5608960		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sampling procedure, equipment, and storage condition were described. Calibration was not described.
	Metric 2:	Analytical Methodology	High	Analytical process (GC with ECD) and equipment were described. Detection limit for each compound was reported in Table 2.
	Metric 3:	Biomarker Selection	N/A	Parent chemical in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Salamanca, Spain
	Metric 5:	Currency	Low	May to July 1991
	Metric 6:	Spatial and Temporal Variability	High	The study reported that a total of 117 duplicate analyses were made, corresponding to 30 raw, 30 finished and 57 distribution system water samples.
	Metric 7:	Exposure Scenario	Medium	Exposure scenario was relevant - surface and drinking water.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	It is stated that "none of the 16 halo-organic compounds were detected in any of the raw water samples" and treated water only some compounds were identified- therefore no concentrations were not reported for DCP.
	Metric 9:	Quality Assurance	Low	Quality assurance/quality control techniques and results were not directly discussed, but can be implied through the study's use of standard field and laboratory protocols.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	The study discussed variability of the data, but discussion did not involve the chemicals of interest. No discussion of limitations.
Overall Quality Determination			Medium	

Study Citation:		Landmeyer, J. E., Campbell, B. G. (2014.0). Assessment of ethylene dibromide, dibromochloropropane, other volatile organic compounds, radium isotopes, radon, and inorganic compounds in groundwater and spring water from the Crouch Branch and McQueen Branch aquifers near McBee, South Carolina, 2010-2012.		
HERO ID:		5639273		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	USGS method
	Metric 2:	Analytical Methodology	High	USGS method
	Metric 3:	Biomarker Selection	N/A	NA- water samples no biomarker needed.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	SC, USA
	Metric 5:	Currency	Medium	2010-2011
	Metric 6:	Spatial and Temporal Variability	Medium	single samples over multiple years
	Metric 7:	Exposure Scenario	High	Ground water and spring water, for environmental and general population scenarios.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	only average
	Metric 9:	Quality Assurance	High	Analytical QA/QC was reported and is reliable.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Sources or variability and uncertainly are not discussed.
Overall Quality Determination			High	

Study Citation:		LTI Limno-Tech, (1993.0). Preliminary evaluation of Dow Corning Carrollton, Kentucky environmental effects to surface waters with cover letter dated 04/20/94.		
HERO ID:		5885319		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Limited description of sampling methods
	Metric 2:	Analytical Methodology	Medium	Limited description of analytical methods
	Metric 3:	Biomarker Selection	N/A	The authors analyzed environmental samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Ohio, USA
	Metric 5:	Currency	Low	Sampling in 1992
	Metric 6:	Spatial and Temporal Variability	Low	Sample size is reported in Appendix B - Laboratory Data Report (page 74 of the 134 pages of the .PDF file). There are 4 water and 4 soil samples.
	Metric 7:	Exposure Scenario	Medium	Missing information about the population of interest, limited description of microenvironment
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Individual sample concentrations, no summary statistics
	Metric 9:	Quality Assurance	High	Described QA/QC techniques, analyzed control samples
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Did not characterize variability, or discussed uncertainties and limitations
Overall Quality Determination			Medium	

Study Citation:		Hargis & Montgomery Inc, (1984.0). Phase I Investigation of Groundwater Quality and Hydrogeological Conditions Summa Corporation Facility Culver City, California.		
HERO ID:		6311565		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Sampling methods were only briefly described.
	Metric 2:	Analytical Methodology	Low	The authors cited analytical methods from EPA with brief descriptions.
	Metric 3:	Biomarker Selection	N/A	The study is testing for the parent chemical in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The study was conducted in the USA.
	Metric 5:	Currency	Low	Samples were collected in 1983.
	Metric 6:	Spatial and Temporal Variability	High	14 monitoring wells, with replicates.
	Metric 7:	Exposure Scenario	Medium	The data may represent a relevant exposure scenario, but it's missing details about the population of interest.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Only individual sample concentrations were reported.
	Metric 9:	Quality Assurance	High	The authors described QA/QC techniques and analyzed control samples.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	The authors did not characterize variability or uncertainties.
Overall Quality Determination			Medium	

Study Citation:		McKesson Environmental Services, (1984.0). Priority pollutant analysis.		
HERO ID:		6574972		
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Sampling Methodology	Critically Deficient	The groundwater sampling methodology was not described.
	Metric 2:	Analytical Methodology	Critically Deficient	The analytical methodology was not described.
	Metric 3:	Biomarker Selection	N/A	The study is testing for the parent chemical in groundwater.
Domain 2: Representativeness	Metric 4:	Geographic Area	High	The study was conducted in California, USA.
	Metric 5:	Currency	Low	The analysis is from 1984.
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	The sample size is not reported.
	Metric 7:	Exposure Scenario	Low	The data may represent a relevant exposure scenario, but the document lacks sufficient details about sampling and analytical methods, population of interest and microenvironment characteristics.
Domain 3: Accessibility/Clarity	Metric 8:	Reporting of Results	Medium	The authors only reported individual sample concentrations, without summary statistics.
	Metric 9:	Quality Assurance	Low	QA/QC techniques were not described, control samples were not analyzed.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability was not characterized. Uncertainties and limitations were not described.
Overall Quality Determination		Uninformative		

Study Citation:		CTEH, (2021.0). Shell Puget Sound Refinery 9-29-2020 flaring event: Supplemental report.		
HERO ID:		11273432		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling was completed using 1.4 L MiniCans(TM). Sample sites are also reported.
	Metric 2:	Analytical Methodology	High	Samples were analyzed via the USEPA Method TO-15 by a third-party analytical laboratory. Reported detection limit range is referenced in each sample results.
	Metric 3:	Biomarker Selection	N/A	The parent chemical was tested in ambient air.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Samples were collected in Anacortes, Washington, USA.
	Metric 5:	Currency	High	Samples were collected in October 2020.
	Metric 6:	Spatial and Temporal Variability	Medium	Six samples were collected for a 24h period
	Metric 7:	Exposure Scenario	High	This study measures air concentrations after a flare event at a refinery.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Individual data is reported in attachment B.
	Metric 9:	Quality Assurance	High	Attachment B reports a range of laboratory quality controls.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Variability is not reported but the chemical data is all reported as ND, the study also reports qualifier of the results for uncertainty.
Overall Quality Determination			High	

Study Citation:		U.S. EPA, (2006.0). Air toxics field investigation report: EPA Method TO-15/Cerex UV Sentry comparison.		
HERO ID:		11273457		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling methodology described including equipment, procedures, conditions, and calibration following EPA methods.
	Metric 2:	Analytical Methodology	Medium	Samples analyzed by publicly available methods as described in Section 3.4, including TO-15 method. MDL is mentioned but actual number not reported.
	Metric 3:	Biomarker Selection	N/A	Study measured parent chemical in ambient air.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Samples collected in Louisville, Kentucky.
	Metric 5:	Currency	Medium	Samples collected in 2006.
	Metric 6:	Spatial and Temporal Variability	Medium	3-day study: Samples collected over a week from 3 monitoring locations over 3-hr sampling intervals. 5 sample results total in Appendix B. SEDS lab: Lab reporting sheets of App D are hard to read.
	Metric 7:	Exposure Scenario	High	Samples measuring urban ambient air from the following monitoring locations: firearms training facility, rubber company, and university with a potential to affect the general population.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Raw data provided in appendix, however quality of the PDF makes the headers unreadable. Limited concentration data provided in the text and tables.
	Metric 9:	Quality Assurance	Medium	Discussed QA/QC procedures in Section 3.5 and 5.0. Recoveries are reported.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	High	The paper discusses problems/concerns and uncertainties observed during the study and from the results. Variation accounted for different days and locations sampled.
Overall Quality Determination			Medium	

Study Citation:		Bugher, N. A., Xiong, B., Gentles, R. I., Glist, L. D., Siegel, H. G., Johnson, N. P., Clark, C. J., Deziel, N. C., Saiers, J. E., Plata, D. L. (2024.0). Domestic groundwater wells in Appalachia show evidence of low-dose, complex mixtures of legacy pollutants. Environmental Science: Processes & Impacts 26(12):2250-2263.		
HERO ID:		12795200		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
Metric 1:		Sampling Methodology	High	Wellheads were purged until pH, temperature, dissolved oxygen, and specific conductance readings stabilized and were collected in method-specific containers, as described in other sources including 1) Siegel et al 2022, 2) EPA Method 8015C: Nonhalogenated Organics by Gas Chromatography, 3) EPA Method 3510C: Separatory Funnel Liquid-Liquid Extraction, 1996, and 4) USGS, National Field Manual for the Collection of Water-Quality Data, 2018. While specifics were not provided, widely accepted USGS and EPA protocols were used. Samples were analyzed within two months following collection.
Metric 2:		Analytical Methodology	High	Water sample analysis followed EPA Method 8015C, EPA Method 3510C, and the USGS Field Manual. Quantification of VOC utilized purge and trap extraction (Teledyne Tekmar) paired with GC-FID. Authentic standards were used to confirm compound identities and calibrate the instrument following EPA-method specific requirements. Laboratory and field blanks were used for quality control. The method LOD was provided.
Metric 3:		Biomarker Selection	N/A	Analysis of TSCA chemical in environmental media.
Domain 2: Representativeness				
Metric 4:		Geographic Area	High	Samples collected in Appalachian region of Pennsylvania, Ohio, and West Virginia.
Metric 5:		Currency	High	Samples were collected between 2018 and 2020.
Metric 6:		Spatial and Temporal Variability	High	Samples were collected from 94 sites in Pennsylvania (primarily Bradford, PA), 162 sites in Ohio (primarily Belmont and Monroe Counties), and 56 sites in West Virginia (northeastern region); all areas which contain unconventional oil and gas (UOG) activities. It does not appear that multiple samples were collected from the same well, but multiple wells in the same region were sampled.
Metric 7:		Exposure Scenario	Medium	Domestic groundwater samples were collected in regions of extensive hydraulic fracturing activity, as well as other extractive and industrial technologies, in close proximity to communities reliant on private drinking water sources. The geology, environmental regulation, and legacy pollution of the three states in the study varied. No wells in areas outside of the hydraulic fracturing region were collected.
Domain 3: Accessibility/Clarity				
Metric 8:		Reporting of Results	Medium	Min, Max, Median, Mean, Standard Deviation, and % detection was provided for each state. Raw data points were not provided.
Metric 9:		Quality Assurance	Medium	Field and laboratory blanks were analyzed. VOC detection frequencies were less than 10%. However, field, laboratory, and/or storage recovery results were not reported.
Domain 4: Variability and Uncertainty				
Metric 10:		Variability and Uncertainty	High	Results were characterized with respect to locations of conventional and unconventional wells and superfund sites, and the number of compounds detected. Results were compared to those of national assessments. Measure of variance was provided.
Overall Quality Determination			High	

Study Citation:		Kim, S., Kim, J. A., An, J. Y., Kim, H. J., Kim, S. D., Park, J. C. (2007). TVOC and formaldehyde emission behaviors from flooring materials bonded with environmental-friendly MF/PVAc hybrid resins. Indoor Air 17(5):404-415.		
HERO ID:		1512515		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology and Conditions	High	The paper provided adequate discussion of sampling methodology of engineered flooring bonded with MF/PVAc hybrid resin to determine and compare the effect of PVAc content. There were five different composition blends with MF resin/PVAc content ratios of 0%, 30%, 50%, 70% and 100%, by weight of MF resin. There were three species of fancy veneers, beech, oak, and walnut, were bonded by cold and hot press.
	Metric 2:	Analytical Methodology	High	More than adequate discussion/variety of analytical methods used in the study. Discussion included 20-L chamber, field and laboratory emission cell (FLEC), VOC analyzer and standard formaldehyde emission test (desiccator method).
	Metric 3:	Biomarker Selection	N/A	No biomarkers of interest were addressed in this reference.
Domain 2: Representative				
	Metric 4:	Testing Scenario	Medium	A 20-L chamber was used in this study because it has been standardized in Korea. Testing was not conducted under a broad range of conditions but adequate based on multiple techniques utilized to measure emissions.
	Metric 5:	Sample Size and Variability	Low	There were five different composition blends with MF resin/PVAc content ratios of 0%, 30%, 50%, 70% and 100%, by weight of MF resin, across three fancy veneer types: beech, oak and walnut. No mention of replicate tests.
	Metric 6:	Temporality	Medium	The paper was published in 2007.
Domain 3: Accessibility/Clarity				
	Metric 7:	Reporting of Results	Medium	Satisfactory discussion of results but mainly for TVOC. Table 8 lists the chemical specifically with the 20 L chamber method, as detected by GC/MS analysis. There were multiple results due to sampling types and techniques, analysis of emissions and emissions rate, graph of emission with SD bars, raw data may be assessed by graph. TVOC was defined as a peak area and under 10 was defined as the limit of detection.
	Metric 8:	Quality Assurance	Medium	Multiple techniques have been covered with varying degree of quality assurance or control. The 20-L chamber has the most quality control measures in place to maintain constant conditions.
Domain 4: Variability and Uncertainty				
	Metric 9:	Variability and Uncertainty	Medium	Adequate discussion about high level of variability of emissions across analytical techniques. The formaldehyde emission results by the 20-L small-chamber and FLEC methods showed a similar tendency.
Overall Quality Determination			Medium	

Study Citation:		Ho, D. X., Kim, K. H., Sohn, J. R., Oh, Y. H., Ahn, J. W. (2011). Emission rates of volatile organic compounds released from newly produced household furniture products using a large-scale chamber testing method. The Scientific World Journal 11:1597-1622.		
HERO ID:		2655174		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology and Conditions	Medium	Sampling conditions and procedures are discussed. An overview of the sampling chamber is provided. The emission rates of each furniture type were measured following the chamber test procedure established by the Korean Institute of Environmental Research (NIER).
	Metric 2:	Analytical Methodology	High	Analytical methodology such as equipment and procedures, were discussed. The operating conditions of GC/MS and thermal desorber (TSD) system were described. The method detection limit was estimated; MDL values were typically under 2 ng.
	Metric 3:	Biomarker Selection	N/A	No biomarkers of interest were addressed in this reference.
Domain 2: Representative				
	Metric 4:	Testing Scenario	Medium	The data likely represent the relevant exposure scenario for emission rates of p-DCB and DCP from household sources. Five types of furniture products were tested.
	Metric 5:	Sample Size and Variability	Low	Sample size is large (n=35; includes ND), but it could not be determined if replicate tests were performed.
	Metric 6:	Temporality	Medium	The testing occurred between August and December 2009.
Domain 3: Accessibility/Clarity				
	Metric 7:	Reporting of Results	Medium	Table 3 reports concentrations of p-DCB and DCP measured in air from different furniture types. Supplementary or raw data, individual data points, are not reported. Table 4 provides emission rates.
	Metric 8:	Quality Assurance	Low	Quality assurance/quality control techniques and results were not directly discussed but can be implied. To reduce bias in the measurement of emission rates for various furniture types, the chamber was first cleaned and recovery rate test for blank conditions of chamber were performed.
Domain 4: Variability and Uncertainty				
	Metric 9:	Variability and Uncertainty	Medium	Key uncertainties, limitations, and data gaps are not discussed; however, temporal trends of emission rate over time were discussed. Relative emission rate comparison between different types of products was provided in figure 4.
Overall Quality Determination			Medium	

Study Citation:		Kim, S., Park, J. C. (2010). Environment-friendly Hwangtoh composite materials using water soluble resin for indoor air quality and human health. Journal of Composite Materials 44(8):905-913.		
HERO ID:		5967010		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology and Conditions	Medium	Adequate description of the samples’ components and materials blending ratio.
	Metric 2:	Analytical Methodology	Low	Some description of the approved analytical methodology utilizing TDS-GC/MS. Gives description for total VOCs but TVOC was defined by conversion of all areas of the peaks between C6 and C16 to concentrations using the toluene response factor. Not chemical-specific, no replicate trials explained, and sample specimens were removed from the 20 L small chamber after 7 days for adequate testing.
	Metric 3:	Biomarker Selection	N/A	No biomarkers of interest were addressed in this reference.
Domain 2: Representative				
	Metric 4:	Testing Scenario	Low	There is a very local geographic region impact of the study.
	Metric 5:	Sample Size and Variability	Low	Four sampling scenarios were used. The total number of replicates for each scenario was not reported.
	Metric 6:	Temporality	Medium	This paper was published in 2010.
Domain 3: Accessibility/Clarity				
	Metric 7:	Reporting of Results	Low	Table 3 may be the raw data as no replicates were described or average calculations were reported. Any peak area under ten was defined as the limit of detection, but LODs not reported. Emission factor equation described but the individual inputs were not given for the samples.
	Metric 8:	Quality Assurance	Critically Deficient	There were no replicates described, no blanks reported, and no internal standards for the GC/MS. The gas was sampled according to the regulation from the Ministry of the Environment, Korea but no specific citation given.
Domain 4: Variability and Uncertainty				
	Metric 9:	Variability and Uncertainty	Critically Deficient	No description of variation or comparison across other related studies, or uncertainty.
Overall Quality Determination			Uninformative	

Study Citation:		U.S. EPA, (2022). Ambient Monitoring Technology Information Center (AMTIC) - Ambient Monitoring Archive for HAPs.		
HERO ID:		11195094		
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Widely accepted sampling methodologies, the sampling frequency, duration, and description of sampling collection are reported in columns SAMPLING_FREQUENCY_CODE, DURATION_DESC, and SAMPLE_COLLECTION_DESC.
	Metric 2:	Analytical Methodology	High	Analytical methodology described at the SAMPLE_ANALYSIS_DESC column. A description of all the methods is reported in the compendium: https://www.epa.gov/amtic/compendium-methods-determination-toxic-organic-compounds-ambient-air .
Domain 2: Representative				
	Metric 3:	Geographic Area	High	Data was collected in the United States. Columns MONITOR_LATITUDE and MONITOR_LONGITUDE report the exact monitoring location.
	Metric 4:	Temporal	High	The database reports data from 1990-2020.
	Metric 5:	Exposure Scenario	High	The exposure scenario is the measurement of key hazardous air pollutants across cities, regions and specific areas of interest.
Domain 3: Accessibility/Clarity				
	Metric 6:	Availability of Database and Supporting Documents	High	The database is widely accepted, and guidance materials are available which describes all of the data fields.
	Metric 7:	Reporting Results	High	The database is organized, and key information is readily accessible. Raw data is provided in the output file, and a summary of statistics is presented here: https://www.epa.gov/system/files/documents/2022-10/AMA2020_annual.xlsx
Domain 4: Variability and Uncertainty				
	Metric 8:	Variability and Uncertainty	High	Variability reported in the annual statistics as variance of daily averages and percentiles. Uncertainty reported as data qualifiers.
Overall Quality Determination			High	

Study Citation:		U.S. EPA, (1987). Occurrence of synthetic organic chemicals in drinking water, food and air: Revised draft report.		
HERO ID:		18900		
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	Literature search strategies were not documented. Simple dose equations were used, with input provided (drinking water intake and inhalation rate).
Domain 2: Representative	Metric 2:	Exposure Scenario	Medium	Chemical and media of interest investigated, and relevant population (U.S.). However, data is older (1980s and before).
Domain 3: Accessibility/Clarity	Metric 3:	Documentation of References	High	References provided and appear to be publicly available.
Domain 4: Variability and Uncertainty	Metric 4:	Variability and Uncertainty	Low	Range for intake provided, but little characterization of variability and uncertainty.
Overall Quality Determination			Medium	

Study Citation:		Monsanto, (1988). Monsanto Pensacola plant ground water assessment feasibility study on nineteen chemicals with attachments and cover letter dated 02/03/1989.		
HERO ID:		1316231		
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Sampling and analytic methodologies reported as following state of Florida regulations.
Domain 2: Representative	Metric 2:	Exposure Scenario	Medium	Characterization of geographic area with maps provided of site exposure sources, media of interest described, sample sizes not noted, temporal variability limited.
Domain 3: Accessibility/Clarity	Metric 3:	Documentation of References	Medium	References are available and provided, however some references may not be publicly available or are not from peer reviewed sources.
Domain 4: Variability and Uncertainty	Metric 4:	Variability and Uncertainty	Low	Statistical summary measures of variability for concentration data lacking for most concentration data reported (some data reports concentration range). Robust discussion of uncertainties and limitations lacking.
Overall Quality Determination			Medium	

Study Citation:		Woodward-Clyde Consultants, (1993). BFGoodrich Akron plant risk assessment with cover letter dated 01/06/1994.		
HERO ID:		1333013		
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	Standard EPA methodology for modeled concentration data and risk described and referenced. Sampling methods for primary sampling data not detailed, however quality assurance review conducted.
Domain 2: Representative	Metric 2:	Exposure Scenario	High	The exposure activity assessed likely represents the population/scenario/media of interest. Characterization of geographic area with maps provided of site exposure sources, characterization of residential population at risk, and temporality consideration for risk estimations of future residential exposures.
Domain 3: Accessibility/Clarity	Metric 3:	Documentation of References	Medium	References are available and provided, however some references may not be publicly available or are not from peer reviewed sources.
Domain 4: Variability and Uncertainty	Metric 4:	Variability and Uncertainty	Medium	The study characterizes variability in the population/media studied for most reported result tables, key uncertainties in risk assessment and exposure data identified that are unlikely to have a substantial impact on results.
Overall Quality Determination			Medium	

Study Citation:		Dow Environmental Inc, (1996). The Dow Chemical Company Slaughter Road site baseline risk assessment report with cover letter dated 01/05/96.		
HERO ID:		1335695		
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	The assessment utilizes methods generally accepted by the scientific community for sampling and risk assessment. Followed EPA guideline.
Domain 2: Representative	Metric 2:	Exposure Scenario	Medium	The exposures likely represent the population scenarios of interest, with potentially exposed populations, geographic maps, and potential exposure pathways discussed.
Domain 3: Accessibility/Clarity	Metric 3:	Documentation of References	Medium	References are available and provided, however some references may not be publicly available or are not from peer reviewed sources.
Domain 4: Variability and Uncertainty	Metric 4:	Variability and Uncertainty	High	Characterization of variability within statistical summary modeled results included standard deviation, standard error, range and variation within reported results tables. Discussion of uncertainties presented.
Overall Quality Determination			High	

Study Citation:		Radian Corp, (1995). Initial submission: Baseline risk assessment for the Jayhawk site Galena, Kansas with attachments and cover letter dated 030195.		
HERO ID:		1482017		
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	The methodology is well described across the document, equations reported inside tables	
Domain 2: Representative	Metric 2: Exposure Scenario	High	Exposure to contaminants from the Jayhawk chemical site	
Domain 3: Accessibility/Clarity	Metric 3: Documentation of References	High	Reported data well documented	
Domain 4: Variability and Uncertainty	Metric 4: Variability and Uncertainty	Medium	Section 2.4.5 reports uncertainty. No statistics of variability reported	
Overall Quality Determination		High		

Study Citation:		U.S. EPA, (2015). Technical support document, EPA's 2011 National-scale Air Toxics Assessment, 2011 NATA TSD.		
HERO ID:		5113338		
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	The methods applied in conducting NATA are consistent with the general risk assessment framework used throughout EPA.
Domain 2: Representative	Metric 2:	Exposure Scenario	Medium	The presented data is for the U.S., representing point, nonpoint, and mobile sources, although the inventory year is 2011.
Domain 3: Accessibility/Clarity	Metric 3:	Documentation of References	High	References were well documented.
Domain 4: Variability and Uncertainty	Metric 4:	Variability and Uncertainty	High	Uncertainty and variability were specifically discussed at length throughout the report. There is a robust discussion of how the NATA assessment should and should not be used.
Overall Quality Determination			High	

Study Citation:		Fang, L., Norris, C., Johnson, K., Cui, X. X., Sun, J. Q., Teng, Y. B., Tian, E. Z., Xu, W., Li, Z., Mo, J. H., Schauer, J. J., Black, M., Bergin, M., Zhang, J., Zhang, Y. P. (2019). Toxic volatile organic compounds in 20 homes in Shanghai: Concentrations, inhalation health risks, and the impacts of household air cleaning. Building and Environment 157(Elsevier):309-318.		
HERO ID:		5262199		
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	High: Sampling and analytic methodology, calibration, equipment detailed and well described and utilizes generally accepted approaches with referenced analytic methods. Exposure model and equations referenced from EPA.
Domain 2: Representative	Metric 2:	Exposure Scenario	Medium	Medium: Exposure activity assessed likely represents the scenarios of interest, with geography, temporality and details of sample timing described within supplemental material. Study conducted in China with asthmatic children might not be the most representative scenario.
Domain 3: Accessibility/Clarity	Metric 3:	Documentation of References	Medium	Medium: References are available and provided, however some references may not be publicly available or are not from peer reviewed sources.
Domain 4: Variability and Uncertainty	Metric 4:	Variability and Uncertainty	High	Medium: The study characterizes variability within the population/media studied and a key uncertainty within risk estimations noted, potential limitations also detailed.
Overall Quality Determination			High	

Study Citation:		Ambrose, R. B. (1987). Modeling volatile organics in the Delaware estuary. Journal of Environmental Engineering 113(4):703-721.		
HERO ID:		5436270		
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Mathematical Equations	High	Different EPA software was used, but most of the modeling was done using TOXIWASP.
	Metric 2:	Model Evaluation	High	TOXIWASP is known to have undergone evaluation, and the paper mentions model performance statistics.
Domain 2: Representative	Metric 3:	Exposure Scenario	Low	This paper was published in 1987.
	Metric 4:	Model and Model Documentation Availability	High	TOXIWASP has model documentation that is available online.
Domain 3: Accessibility/Clarity	Metric 5:	Model Inputs and Defaults	High	All inputs are described and cited when applicable.
	Metric 6:	Variability and Uncertainty	Medium	There is discussion included on variability and uncertainty. The paper motioned effluent concentrations were a large source of uncertainty.
Overall Quality Determination			High	

Glossary of Select Terms for Data Evaluation Tables

Table 125: Glossary of Select Terms for Data Evaluation

Term	Definition
1,1,1-TCA	1,1,1-Trichloroethane
1,1-DCA or DCE	1,1-Dichloroethane
1,2-DCA or EDC	1,2-Dichloroethane
AED	Atomic Emission Detector
AFB	Air Force Base
ATD	Adsorption thermal desorption
ATSDR	Agency for Toxic Substances and Disease Registry
CA, US	California
CA	Canada
CI	Confidence Interval
CV	Coefficient of Variation
DBP	Di-Butyl Phthalate
DCB	Dichlorobenzene
DCP	1,2-Dichloropropane
DOH	Department of Health
DWTP	Drinking Water Treatment Plant
ECD	Electron Capture Detector
EDB	1,2-Dibromoethane
EI-MS	Electron Ionization Mass Spectrometry
EPA	Environmental Protection Agency
ETS	Environmental Tobacco Smoke
FAQ	Frequently Asked Question
FDA	Food and Drug Administration
FID	Flame Ionization Detector
FLEC	Field and Laboratory Emission Cell
G	Gram
GC	Gas Chromatography
GSD	Geometric Standard Deviation
HPLC	High Performance Liquid Chromatography
HR-MS	Hi-Resolution Mass Spectrometry
IMS	Ion Mobility Spectrometry
ISC2	Industrial Source Complex model
ISCLT	Individual Source Complex Long Term model
ISO	International Organization for Standardization
L	Liter
LA	Louisiana
LC	Liquid Chromatography
LDL	Lower Detection Limit
LLE	Liquid-Liquid Extraction

Continued on next page ...

Glossary of Select Terms for Data Evaluation Tables

Table 125 ...continued from previous page

Term	Definition
LOD	Limit of Detection
LOQ	Limit of Quantification
LRL	Lowest Reportable Level
m	meter
m	Meter
m-	milli-
m ³	cubic meter
MCLG	Maximum Containment Level Goal
MCL	Maximum Containment Level
MDNR	Michigan Department of Natural Resources
mg/g	milligrams per gram
MLQ	Method Limit of Quantification
MN	Minnesota
MQL	Method Quantification Limit
MRL	Method Reporting Limit
MS	Mass Spectrometry
MSW	Municipal Solid Waste
N	Sample Size
n-	Nano-
N/A	Not Applicable
NAWQA	National Water Quality Assessment Program
NASA	National Aeronautics and Space Administration
NC	North Carolina
ND	Non-detect
NHANES	National Health and Nutrition Examination Survey
NIOSH	National Institute of Occupational Safety and Health
NJ	New Jersey
NJDEP	New Jersey Department of Environmental Protection
OQD	Overall Quality Determination
P& T	Purge & Trap
PA	Pennsylvania
PFR	Organophosphorus Flame Retardant
PM	Particulate Matter
Ppb	Parts per billion
PTI	Purge and Trap Injection
PVA	Polyvinyl Alcohol
QA/QC	Quality Assurance/Quality Control
RfD	Reference Dose
RSD	Relative Standard Deviation
SC	South Carolina
SD	Standard Deviation
SE	Standard Error

Continued on next page ...

Glossary of Select Terms for Data Evaluation Tables

Table 125 ...continued from previous page

Term	Definition
SI	Supplemental Information
SM	Supplemental Material
SOP	Standard Operating Procedure
SPE	Solid Phase Extraction
SPME	Solid Phase Micro-Extraction
STP	Sewage Treatment Plant
SVOC	Semi-Volatile Organic Compound
SWQA	Stormwater Quality Assessment
TCE	Trichloroethylene
TEAM	Total Exposure Assessment Methodology
TSCA	Toxic Substances Control Act
TVOC	Total Volatile Organic Compounds
UK	United Kingdom
UPLC	Ultra Performance Liquid Chromatography
US or USA	United States
USAF	United States Air Force
USGS	United States Geological Survey
VOC	Volatile Organic Compound
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant