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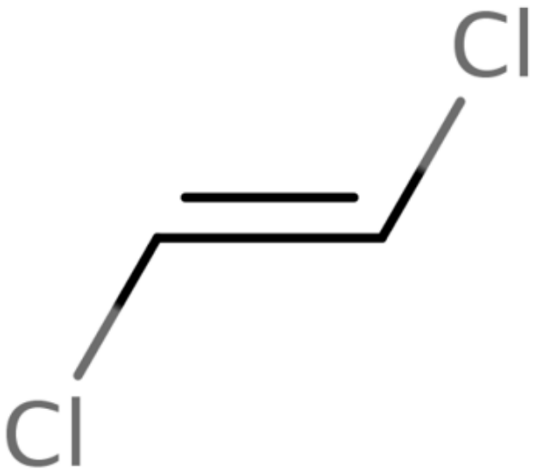
Office of Chemical Safety and
Pollution Prevention

Draft Data Quality Evaluation Information for General Population, Consumer, and Environmental Exposure for *trans*-1,2-Dichloroethylene

Systematic Review Support Document for the Draft Risk Evaluation

CASRN: 156-60-5



July 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 trans-1,2-Dichloroethylene (TDCE)* U.S. EPA, 2023, 11151779. 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* U.S. EPA, 2021, 10415760. The systematic review steps are further described in the *Draft Risk Evaluation for trans-1,2-Dichloroethylene (TDCE) – Systematic Review Protocol* U.S. EPA, 2023, 11151744.

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 may also be referred to as TDCE Data Quality Evaluation Information for General Population, Consumer, and Environmental Exposure.

Table of Contents

Study Citation:	Smith, S. A., Mecham, C. C., Schimmoller, B. J., Wheeler, M. H. (1997.0). Using measured contaminant concentrations versus modeling for CERCLA-related air pathway risk assessments. Toxicology and Industrial Health 13(2-3):231-245.
HERO ID:	84433

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Limited description, cited EPA method TO-14
	Metric 2:	Analytical Methodology	High	Detailed analytical methodology
	Metric 3:	Biomarker Selection	N/A	Did not test for biomarkers
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Utah, USA
	Metric 5:	Currency	Low	Sampling in 1993 and 1994
	Metric 6:	Spatial and Temporal Variability	Low	15 samples, no replicate sites
	Metric 7:	Exposure Scenario	High	Data closely represents a relevant exposure scenario
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	9 chlorinated VOCs were measured, but only 3 had measurements above the LODs (TCE, TCA, and Chloroform). The paper however only reports results for two in a table: TCE and Chloroform, to compare with modeled results. The results are reported as ranges for two time periods (March and July) in 1994. Background concentration ranges for 5 VOCs were also reported from a distance far away from the study area, although there is no other detail of where the background samples were collected. Indoor air results for TDCE are reported as below the detection limit.
	Metric 9:	Quality Assurance	Low	Limited description of QA QC techniques, analyzed control samples
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Variability was not characterized, uncertainties were discussed

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:	Fan, C., Wang, G. S., Chen, Y. C., Ko, C. H. (2009.0). Risk assessment of exposure to volatile organic compounds in groundwater in Taiwan. Science of the Total Environment 407(7):2165-2174.
HERO ID:	631540

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	The authors did not describe the sampling procedure in detail, but cited protocols from the Taiwan EPA.
	Metric 2:	Analytical Methodology	High	The analytical methods and instrument were described, including recoveries and LOD. Analytical methods conducted by TEPA (NIEA W785.54B).
	Metric 3:	Biomarker Selection	N/A	The authors analyzed environmental samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Taiwan
	Metric 5:	Currency	Medium	The samples were collected in 2005.
	Metric 6:	Spatial and Temporal Variability	High	n=54, with samples collected on three separate occasions in duplicates.
	Metric 7:	Exposure Scenario	High	The data closely represent relevant exposure scenarios related to o-DCB present in groundwater samples from remediation sites in Taiwan.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Only individual sample concentrations were reported. Summary statistics not reported.
	Metric 9:	Quality Assurance	Medium	QA/QC techniques were briefly described, including the use of control samples. Recoveries between 90%-110%.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability was not characterized. Uncertainties and limitations were briefly discussed.

Overall Quality Determination Medium

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 in blood samples.
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:	Götz, R., Bauer, O., Friesel, P., Roch, K. (1998.0). Organic trace compounds in the water of the River Elbe near Hamburg: Part I. Chemosphere 36(9):2085-2101.
HERO ID:	644836

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling procedure, sample storage, site characteristics are described in detail.
	Metric 2:	Analytical Methodology	High	analytical methods well described. LOD reported.
	Metric 3:	Biomarker Selection	N/A	Study measured parent chemical in surface water.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The two locations of sampling in Germany are well described.
	Metric 5:	Currency	Low	Samples were collected in 1992-1993.
	Metric 6:	Spatial and Temporal Variability	Medium	20 samples were collected over the two year period in each of the two locations. No replicates
	Metric 7:	Exposure Scenario	High	The River Elbe is an appropriate site for environmental exposures.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	The median, minimum and maximum concentrations are provided. The raw data is not provided.
	Metric 9:	Quality Assurance	High	The study provided QA/QC measures.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Some variability discussed in Tables 2a, 2b, and 5, but limited discussion of uncertainties.

Overall Quality Determination High

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:	Rosen, M. E., Pankow, J. F., Gibs, J., Imbrigiotta, T. E. (1992.0). Comparison of downhole and surface sampling for the determination of volatile organic compounds VOCs in ground water. Ground Water Monitoring and Remediation 12(1):126-133.
HERO ID:	660459

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling methods for downhole ATD, surface ATD, and surface P&T sampling reported. Equipment, storage, and other details reported.
	Metric 2:	Analytical Methodology	Low	Analytical methods briefly described with references. LOD not reported.
	Metric 3:	Biomarker Selection	N/A	Parent chemical in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	New Jersey, USA
	Metric 5:	Currency	Low	June 1986
	Metric 6:	Spatial and Temporal Variability	Medium	8 total samples for both ATD methods (4 samples in 2 rounds). 24 total samples for P&T method (12 samples in 2 rounds).
	Metric 7:	Exposure Scenario	Medium	Measuring contaminants in groundwater.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Raw data not reported. Only mean, SD, and RSD reported.
	Metric 9:	Quality Assurance	Low	QA not directly reported but can be inferred through study's methods.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Variation in comparison of 3 sampling methods. Gaps and limitations not reported.

Overall Quality Determination Medium

Study Citation:	Assmuth, T., Kalevi, K. (1992.0). Concentrations and toxicological significance of trace organic compounds in municipal solid waste landfill gas. Chemosphere 24(9):1207-1216.
HERO ID:	660779

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling protocol described sampling equipment, regimen, site characteristics, and more.
	Metric 2:	Analytical Methodology	Low	No detection or reporting limits provided
	Metric 3:	Biomarker Selection	N/A	Study measured parent chemicals in gas samples from landfills.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Finland
	Metric 5:	Currency	Low	Data collected in 1989 and 1990
	Metric 6:	Spatial and Temporal Variability	Low	We can infer that there were at least 4 samples collected in replicates because the study analyzed 4 landfills. Table 2 also as a column header "n" for each landfill site that might indicate the number of samples per landfill.
	Metric 7:	Exposure Scenario	High	Exposure scenario is through landfill gas
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Raw data not reported. Missing most summary statistics. Only min and max are provided.
	Metric 9:	Quality Assurance	Low	QA/QC implied
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	No gaps, limitations, or characterization of variance reported

Overall Quality Determination Medium

Study Citation: Lorah, M. M., Olsen, L. D. (1999.0). Degradation of 1,1,2,2-tetrachloroethane in a freshwater tidal wetland: Field and laboratory evidence. Environmental Science & Technology 33(2):227-234.

HERO ID: 661103

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	The authors reported the sampling equipment and the study site characteristics. They did not give many details on the sampling methodology, but they did describe the sampling set-up and procedure for obtaining the samples.
	Metric 2:	Analytical Methodology	High	The authors reported using EPA Method 524.2 to analyze the samples for VOCs
	Metric 3:	Biomarker Selection	N/A	Water sampling
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The authors report the geographic area where the study took place.
	Metric 5:	Currency	Low	Samples were collected in the fall of 1995 and the spring/summer of 1996.
	Metric 6:	Spatial and Temporal Variability	Low	A clear sample size is not reported by authors. Can be inferred from 25 piezometers. No indication of replicates.
	Metric 7:	Exposure Scenario	Medium	The authors describe the study site and it is a plausible exposure scenario.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Critically Deficient	Results are only shown in figures. It is difficult to tell exact concentrations and the entire dataset is not provided neither are summary statistics. Additionally, Figure 2 which is supposed to show the sample sites is unreadable and therefore the results become meaningless.
	Metric 9:	Quality Assurance	Low	The authors used a standard analytical method but did not discuss QA/QC procedures.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	The authors have a limited discussion on the uncertainty in the results but they do not report a standard deviation.

Overall Quality Determination Uninformative

Study Citation:	Wilson, S. C., Burnett, V., Waterhouse, K. S., Jones, K. C. (1994.0). Volatile organic compounds in digested United Kingdom sewage sludges. Environmental Science & Technology 28(2):259-266.
HERO ID:	661596

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	digested sewage sludge collected from 12 treatment works (specific location not provided, but characteristic of each works described in table 3); 60mL sludge measured directly into screw-cap flasks; 3 samples of each sludge and a blank; kept at 4C in dark
	Metric 2:	Analytical Methodology	High	liquid-liquid extraction method; GC-ECD/FID; recovery Table 2; MDL 18.9 ug/L wet sludge (p. 262)
	Metric 3:	Biomarker Selection	N/A	Sewage sludge sampling
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	northwest England
	Metric 5:	Currency	Low	date of sampling not provided; published in 1994
	Metric 6:	Spatial and Temporal Variability	Medium	12 sludge treatment works; 3 samples per site; description of sampling period and timing not provided
	Metric 7:	Exposure Scenario	High	digested sludges from rural, urban and industrial treatment works (Table 3 provides characteristics of each treatment works)
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Table 3 provides mean concentration (dry weight and wet volume) at each site; individual sample concentrations not provided
	Metric 9:	Quality Assurance	High	93.5 % recovery, SD, and % coeff variation provided Table 2; blanks measured
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	discusses variability between different catchment characteristics and treatment processes that affect concentrations detected in sludge (p. 262-264); discusses uncertainty in results

Overall Quality Determination Medium

Study Citation:	Schrab, G. E., Brown, K. W., Donnelly, K. C. (1993.0). Acute and genetic toxicity of municipal landfill leachate. Water, Air, and Soil Pollution 69(1-2):99-112.
HERO ID:	661846

Domain	Metric		Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Described some sampling methodology (e.g., equipment, site characteristics) but nothing about storage conditions
	Metric 2:	Analytical Methodology	Low	equipment described; EPA protocol referenced; no LOD
	Metric 3:	Biomarker Selection	N/A	Study measured parent chemicals in landfill leachate
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	U.S.
	Metric 5:	Currency	Low	published 1992
	Metric 6:	Spatial and Temporal Variability	Low	Five samples total - one each from four landfills and one groundwater monitoring well. No replicates
	Metric 7:	Exposure Scenario	High	Potential contamination of groundwater by landfill leachate is relevant if there are drinking water wells.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	average and range provided. no raw data
	Metric 9:	Quality Assurance	Low	QA not discussed
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	variability and uncertainty not discussed

Overall Quality Determination Medium

Study Citation:	Huff, G. F., Braun, C. L., Lee, R. W. (2000.0). Assessment of potential for natural attenuation of chlorinated ethenes and ethanes in ground water at a petrochemical reclamation site, Harris County, Texas.
HERO ID:	664358

Domain	Metric		Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Groundwater collected from wells using peristaltic pump after pumping for min of 30 minutes at 0.5 L/min prior. Figure 3 depicted locations of wells. Table 2 listed the vertical screening intervals per well. Further details pertaining to measuring concentration in the groundwater is not provided.
	Metric 2:	Analytical Methodology	Low	Extraction performed by USGS GC/MS and method 8260. Detection limits for this chemical was not reported.
	Metric 3:	Biomarker Selection	N/A	Study measured parent chemicals in groundwater.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Samples were collected in Harris County, Texas.
	Metric 5:	Currency	Low	Samples were collected in 1999.
	Metric 6:	Spatial and Temporal Variability	Medium	Sixteen wells were measured between Feb 8-10 without replicates.
	Metric 7:	Exposure Scenario	Medium	Report describes groundwater conditions at a petrochemical reclamation site and and discusses evidence for the occurrence and rates of natural attenuation in groundwater. However, populations of interest and how the groundwater is used were not defined.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Table 3 provides concentration per well but not summary statistics.
	Metric 9:	Quality Assurance	Medium	Table 3 provided field blank, triple blank, and method blank; recoveries were not discussed/provided.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	The spatial distribution of chemical between the wells (Fig 3) and along groundwater flowpath (fig 4) were characterized. However, paper was missing a characterization of data variance and discussion of limitations/uncertainties.

Overall Quality Determination Medium

Study Citation:	Moon, S., Adamski, J. M., Lichtman, A. (1990.0). Profile of volatile organic chemicals in Nassau county groundwater. ASTM Special Technical Publication No. 1062 :50-63.
HERO ID:	666861

Domain	Metric		Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	The authors reported that the samples were collected from the Nassau County Health Department's Bureau of Public Water Supply and they gave examples of the types of sampling points (e.g., for "drinking water samples," wellheads, taps selected randomly from private residences, hydrants, and other access points in the distribution system), but they did not provide a map of the specific sampling sites or other details on how sampling locations were selected or how many distinct locations there were. The vessels used for sample collection, sample collection procedure, and sample storage conditions and duration were reported.
	Metric 2:	Analytical Methodology	High	The method used was recommended by the NY Dept. of Health. The authors reported the analytical equipment used and the detection limits. They analyzed each sample in duplicate and reported doing recovery experiments daily and calibration experiments once a month.
	Metric 3:	Biomarker Selection	N/A	Parent chemicals were analyzed in water.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The authors described the geographic location, Nassau County, NY.
	Metric 5:	Currency	Low	"Most" of the samples were collected in 1987. The paper was published in 1990.
	Metric 6:	Spatial and Temporal Variability	Medium	Replicate samples were not reported, but a total of 973 groundwater samples were collected in 1987. It was unclear the exact timing of sample collection (e.g., over how many months the samples were collected). Samples came from an entire county, a relatively large geographic area.
	Metric 7:	Exposure Scenario	Medium	Drinking water is a relevant exposure scenario. There were no exposure "controls," and the sources of this chemical were not assessed.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	The authors reported the frequency of detection in graphical form, and they reported the number of samples within a range of concentrations but not clear summary statistics characterizing the concentration data (no average, SD, etc.). They also did not report individual sample concentrations.
	Metric 9:	Quality Assurance	High	The authors cited that they carried out the analysis according to the New York State's quality assurance requirements. Samples were analyzed in duplicate. They also measured recoveries daily and recalibrated using standards monthly. They did not report any QC issues.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	No standard deviation was reported, but some information about variability was included in the text and figures. The authors did not discuss study limitations or uncertainty.

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:	Hartenstein H-U (1994.0). Fixed bed activated coke filters for the control of toxic metals and organics from waste incinerators- the second generation. Chemosphere 29(9-11):9-11.
HERO ID:	1268067

Domain	Metric		Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	The volatile halogenated hydrocarbons were sampled according to VDI method 3482. Sampling procedure, equipment were described.
	Metric 2:	Analytical Methodology	Low	Extraction and analytical methods, instrument (GC/ECD was used to analyze organic pollutants) described. LOD was not provided.
	Metric 3:	Biomarker Selection	N/A	Chemical is in an environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Germany
	Metric 5:	Currency	Low	1992
	Metric 6:	Spatial and Temporal Variability	Low	2 samples for organic compounds. No replicates.
	Metric 7:	Exposure Scenario	Medium	Releases from waste incinerator. Unclear what the exposed population is.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Individual sample concentration was provided, but lacked summary statistics.
	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 has little to no discussion of key uncertainties, limitations, and data gaps.

Overall Quality Determination Medium

Study Citation:	PFAUDLER CO, (1985.0). Comments to reports of groundwater contamination at Pfaudler plant site with attached hydrogeologic report.
HERO ID:	1269532

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	The sampling methodology is described in the field investigation section
	Metric 2:	Analytical Methodology	Medium	LOD is not reported, analytical methodology described in table 3
	Metric 3:	Biomarker Selection	N/A	TDCE in groundwater
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Wheatfield, N.Y.
	Metric 5:	Currency	Low	1984
	Metric 6:	Spatial and Temporal Variability	Medium	10 samples , sample triplicates
	Metric 7:	Exposure Scenario	High	Ground water contamination from a graphite plant
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Table 3, VI and XI presents summary of data, but there is not report on the statistics analysis
	Metric 9:	Quality Assurance	High	QA parameter presented in table XI
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	No information on variability or key limitations

Overall Quality Determination Medium

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:	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:	Ciba-Geigy, (1987.0). Briefing for the assistant administrator - Record for decision on the Lone Pine Landfill.
HERO ID:	1316232

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Critically Deficient	Sampling methodology not described
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methodology 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	Published in 1987
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size is not reported
	Metric 7:	Exposure Scenario	Low	Data may represent a relevant exposure scenario but lacks key data details to support its validity
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Only reported maximum concentrations detected, no summary statistics
	Metric 9:	Quality Assurance	Low	QA/QC details not discussed
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability, uncertainties and limitations were not characterized

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:	ERM, (1988.0). Hydrogeological investigation at the Union Carbide solvents and materials coating plant with cover letter dated 070688.
HERO ID:	1332986

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Only briefly 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.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	USA
	Metric 5:	Currency	Low	Sampling began in 1985
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size not reported
	Metric 7:	Exposure Scenario	Low	The exposure scenario is unclear
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	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 uncertainties were not characterized

Overall Quality Determination Uninformative

Study Citation:	Enwright Associates, (1985.0). Groundwater {\&} wastewater monitoring report with cover letter dated 120385.
HERO ID:	1335577

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sample containers, preparation, and collection procedures followed a 1977 EPA method where applicable.
	Metric 2:	Analytical Methodology	High	Analytical procedures followed various EPA approved methods for NPDES sampling and analysis
	Metric 3:	Biomarker Selection	N/A	The study tested parent chemicals in the environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Testing took place in the US.
	Metric 5:	Currency	Low	Samples were collected in 1984.
	Metric 6:	Spatial and Temporal Variability	Medium	Samples were collected in duplicates at 8 locations.
	Metric 7:	Exposure Scenario	Medium	Data may represent a relevant exposure scenario, but details about the population of interest are missing.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Individual sample concentrations are provided. Summary statistics are missing.
	Metric 9:	Quality Assurance	High	QA/QC techniques, which consisted of blanks, spiked samples, field replicates, duplicate analysis, and analysis of standards, were described.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variance and uncertainties were not discussed

Overall Quality Determination Medium

Study Citation:	NUS, (1987.0). Preliminary investigation at the Hranica waste disposal site - Sarver, Penn.
HERO ID:	1335585

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Critically Deficient	No description of sampling methods, including equipment, sampling procedures/regime, sample storage conditions or duration, and performance/calibration of samplers. The paper starts on page 2-20 and may be missing pages.
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methods not described. The paper starts on page 2-20 and may be missing pages.
	Metric 3:	Biomarker Selection	N/A	All samples were from environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Pennsylvania, USA
	Metric 5:	Currency	Low	Published in 1982
	Metric 6:	Spatial and Temporal Variability	Medium	Not stated, can be inferred from tables. 9 soil samples, 10 surface water samples, 14 groundwater samples. No replicates.
	Metric 7:	Exposure Scenario	Low	Missing details about the population of interest and the microenvironment.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Individual sample concentrations reported. No summary statistics.
	Metric 9:	Quality Assurance	Critically Deficient	QA/QC techniques were not described and cannot be inferred without sampling and analytical procedures.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability, limitations, and uncertainty were not characterized.

Overall Quality Determination Uninformative

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:	ERM, (1989.0). Endangerment assessment, on-site conditions on seven chemicals with cover letter dated 022489.
HERO ID:	1356167

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	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	USA
	Metric 5:	Currency	Low	Study was conducted in 1988.
	Metric 6:	Spatial and Temporal Variability	Medium	>10 samples were collected but there were not replicates.
	Metric 7:	Exposure Scenario	High	The exposure source was characterized
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Raw data were reported.
	Metric 9:	Quality Assurance	Low	Limited QA were reported.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Few gaps and limitations were reported

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:	van De Meent, D., Den Hollander, H. A., Pool, W. G., Vredenbregt, M. J., van Oers, H. A. M., de Greef, E., Luijten, J. A. (1986.0). Organic micropollutants in Dutch coastal waters. Water Science and Technology 18(4-5):73-81.
HERO ID:	1441544

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sampling method, analytical method, site characteristics are well described. Some information, like storage is missing.
	Metric 2:	Analytical Methodology	Medium	Analytical methods well described- some details missing, like equipment and procedure. LODs provided.
	Metric 3:	Biomarker Selection	N/A	Parent chemical in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Details on the sampling locations are provided- Dutch costal waters.
	Metric 5:	Currency	Low	Samples were collected in 1983-1984.
	Metric 6:	Spatial and Temporal Variability	High	Total of 108 observations (6 cruises x 9 locations x 2 samples) over 2 years
	Metric 7:	Exposure Scenario	High	The scenario is relevant for environmental exposures during that time period
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Raw data is not reported. But the mean, median, minimum and maximum are 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."However, not all locations could be sampled at all cruises due to heavy weather, and some samples were lost during transportation. This resulted in 21% missing values."
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	High	There is a detailed analysis of spatial and temporal variability and discussion of uncertainties.

Overall Quality Determination Medium

Study Citation:	Harding Lawson Associates, (1986.0). Site assessment report - amphenol products (Garden Grove, California) with cover letter dated 050986.
HERO ID:	1481067

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Only briefly discussed
	Metric 2:	Analytical Methodology	Low	Not described but cited EPA methods, LOD reported on page 16
	Metric 3:	Biomarker Selection	N/A	The authors analyzed environmental samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	California
	Metric 5:	Currency	Low	Sampling in 1985
	Metric 6:	Spatial and Temporal Variability	Low	7 sample sites, no replicates
	Metric 7:	Exposure Scenario	Medium	Data may represent a relevant exposure scenario, missing details about the population of interest and exposure characteristics
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 described
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability, uncertainties and limitations were not characterized

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	Critically Deficient	Data reported in Table 5A 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), November (but not analyzed for this chemical), and January (4 samples 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:	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	Medium	Sampling approach poorly captures variability of environmental contamination. There were 9 samples from April 1984 (pp. 27, 29, 31), including 3 of effluent on 3 consecutive dates and 3 from two other locations on the same 3 days. Also, results were reported from 4 water samples from May 1984 (p. 42) and 8 water samples from June 1984 (pp. 54 and 56). Only one duplicate was collected, in June 1984 (see p. 60).
	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:	ATSDR, (1994.0). Petitioned public health assessment: E. I. du Pont de Nemours, Pompton Lakes, Passaic County, New Jersey.
HERO ID:	1741389

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sampling procedure was not directly described but can be inferred that it was done according to the NJDEP standards.
	Metric 2:	Analytical Methodology	Low	Analysis was not mentioned in the report but can be inferred. LOD was not 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	Pompton Lakes, NJ
	Metric 5:	Currency	Low	No sampling date was provided, an onsite investigation date was available - 1989.
	Metric 6:	Spatial and Temporal Variability	Medium	3 surface water bodies were monitored from 1984-1988, 15 wells were monitored. 5000 soil samples were taken in the area. 93 fish samples were obtained.
	Metric 7:	Exposure Scenario	High	The exposure scenario seems to be highly relevant (covers surface water, groundwater, soil, dietary exposure).
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Average concentrations were reported without summary statistics.
	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 some discussion of the variability and uncertainties.

Overall Quality Determination Medium

Study Citation:	Yamasaki, T., Oki, N., Okuno, T. (1992.0). Cycle of halocarbons in the air-water phase. Water Science and Technology 25(11):33-39.
HERO ID:	1742404

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	Japan
	Metric 5:	Currency	Low	Study published in 1992
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Number of samples not reported
	Metric 7:	Exposure Scenario	Medium	Exposure scenario not well characterized
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	raw data not provided
	Metric 9:	Quality Assurance	Low	Limited QA reported
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	No gaps or limitations reported

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:	ERM, (1984.0). Preliminary hydrogeologic evaluation of on-site and off-site ground water contamination at the hill site with cover letter.
HERO ID:	1745526

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Sampling methods only briefly described and missing details
	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 York, USA
	Metric 5:	Currency	Low	Sampling in 1983
	Metric 6:	Spatial and Temporal Variability	Low	7 sampling sites, only one with duplicate samples
	Metric 7:	Exposure Scenario	Medium	Data may represent a relevant exposure scenario, but report lacks sufficient details about methods for data reliability
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Individual data points only, no summary statistics
	Metric 9:	Quality Assurance	Low	QA/QC details not described
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability not characterized, uncertainties and limitations were briefly discussed

Overall Quality Determination Uninformative

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:	SC DHEC, (1987.0). Investigation of groundwater at South Carolina Recycling and Disposal Company Bluff Road site, Richland County, South Carolina.
HERO ID:	1745613

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Sampling methodology only briefly described missing details about storage conditions, volume of sample.
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methodology not described
	Metric 3:	Biomarker Selection	N/A	Biomarkers of interest were not addressed in this reference.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	South Carolina, USA
	Metric 5:	Currency	Low	Sampling in 1980
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size not reported
	Metric 7:	Exposure Scenario	Medium	Missing details about the population and microenvironment of interest
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Only presence/absence
	Metric 9:	Quality Assurance	Low	QA/QC techniques were not discussed
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability not characterized, limitations were briefly described

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:	Aeroject General Corp, (1979.0). Letter from Aeroject general corporation to USEPA regarding information on trichloroethylene with attachments.
HERO ID:	1745640

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	Parent chemical
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Sacramento, CA
	Metric 5:	Currency	Low	1979
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size was not reported
	Metric 7:	Exposure Scenario	Medium	Contamination near Aeroject Center
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	No summary of statistics, only individual data points
	Metric 9:	Quality Assurance	Critically Deficient	No report regarding QA/QC
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability and Uncertainty not discussed

Overall Quality Determination Uninformative

Study Citation:	Motorola Inc, (1991.0). Initial submission from Motorola Inc to USEPA submitting information and enclosed summary of Arcade Phase II conclusions and recommendations with attachment.
HERO ID:	1745670

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Critically Deficient	This is only a letter and the sampling methodology is not reported.
	Metric 2:	Analytical Methodology	Critically Deficient	This is only a letter and the analytical methodology is not reported.
	Metric 3:	Biomarker Selection	N/A	Chemical was measured in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Site was in NY, US.
	Metric 5:	Currency	Low	Date inferred from letter data (1991).
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Number of samples was not reported. It cannot be inferred either.
	Metric 7:	Exposure Scenario	Low	No information provided on the source of contamination.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Only a range is provided in text.
	Metric 9:	Quality Assurance	Critically Deficient	No QA mentioned in the letter.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Critically Deficient	No uncertainties or limits or variance was discussed.

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:	Pilko & Assoc. Inc., (1995.0). Initial submission: Preliminary findings of soil and groundwater sampling, phase 2 investigation - BP chemicals (HITCO) Inc., Gardena Calif., with cover letter dated 07/03/95.
HERO ID:	1745857

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Limited description of methods, missing details on sampling storage, quantity, sample handling
	Metric 2:	Analytical Methodology	Medium	Analytical methods only briefly discussed citing EPA methods, LOD 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	California, USA
	Metric 5:	Currency	Low	Sampling in 1995
	Metric 6:	Spatial and Temporal Variability	Low	25 sampling sites, no replicates
	Metric 7:	Exposure Scenario	Medium	Data likely represent a relevant exposure scenario, missing details about the population of interest and the microenvironment
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, limitations and uncertainties were not discussed

Overall Quality Determination Low

Study Citation:	T A Gleason Assoc, (1986.0). Hydrological and groundwater quality investigations (final report) with cover letter dated 071587.
HERO ID:	1973128

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	The method is described
	Metric 2:	Analytical Methodology	High	The study followed the USA EPA method 1624
	Metric 3:	Biomarker Selection	N/A	Parent chemical in ground water
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Fostoria OH
	Metric 5:	Currency	Low	1987
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Number of samples not reported
	Metric 7:	Exposure Scenario	High	Off site ground water contamination from Autolite
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Only individual data reported, no summary of statistics. The data can not be read do to the quality of the scan
	Metric 9:	Quality Assurance	Critically Deficient	QA/QC not reported
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability and uncertainty is nor discussed

Overall Quality Determination Uninformative

Study Citation:	T A Gleason Assoc, (1990.0). Letter from Allied Signal Inc to US EPA regarding well water test result data from a closed landfill site with attachment.
HERO ID:	1973153

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Limited description of sampling methods
	Metric 2:	Analytical Methodology	Low	Analytical methods only briefly discussed
	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	South Bend, Indiana
	Metric 5:	Currency	Low	Sampling in1990
	Metric 6:	Spatial and Temporal Variability	Low	12 sampling sites, no replicates
	Metric 7:	Exposure Scenario	Medium	Missing details about the population of interest and exposure characteristics
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, analyzed control samples
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability, study limitations and uncertainties were not discussed

Overall Quality Determination Low

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:	Brenner, D. (2010.0). Results of a long-term study of vapor intrusion at four large buildings at the NASA Ames research center. Journal of the Air and Waste Management Association (1990-1992) 60(6):747-758.
HERO ID:	2127874

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling methods and approaches described.
	Metric 2:	Analytical Methodology	Medium	Analytical methods provided, LOD missing.
	Metric 3:	Biomarker Selection	N/A	The authors analyzed air samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	NASA, Research Park site, located in Moffett Field, CA, US
	Metric 5:	Currency	Low	Data collected in 2004
	Metric 6:	Spatial and Temporal Variability	High	Over 10 samples collected
	Metric 7:	Exposure Scenario	High	The data closely represent relevant exposure scenarios related to indoor and outdoor air in and near NASA Ames Research Center buildings.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	No raw data provided, only summary statistics.
	Metric 9:	Quality Assurance	Medium	Missing recoveries and blanks. Mentioned doing them, but not reported or summarized.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	No gaps nor limitations reported. Variability was characterized (SD).

Overall Quality Determination Medium

Study Citation:	Yamamoto, K., Fukushima, M., Kakutani, N., Tsuruho, K. (2001.0). Contamination of vinyl chloride in shallow urban rivers in Osaka, Japan. Water Research 35(2):561-566.
HERO ID:	2310570

Domain	Metric		Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling procedure, equipment, storage, and sites were described.
	Metric 2:	Analytical Methodology	Medium	The authors reported the method of extraction and analysis (GC-MS). The method detection limit for this chemical was reported in an earlier paper, along with method accuracy and precision.
	Metric 3:	Biomarker Selection	N/A	Chemicals of interest were analyzed in parent media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Osaka, Japan
	Metric 5:	Currency	Low	Samples were collected in 1995-1997.
	Metric 6:	Spatial and Temporal Variability	Low	There were 106 samples. 1,1-DCA and cis-DCE were among the most frequently detected chemicals. Since trans-DCE and 1,1,2-TCA were detected in less than 66% of samples, details about the levels of these chemicals detected were not included. Thus, I rated this metric as low. There was no mention of replicates, but that may have been addressed in prior papers.
	Metric 7:	Exposure Scenario	High	The data likely represent the relevant exposure scenario (surface water). Possible sources of the primary chemicals discussed (but not all chemicals) were hypothesized.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Data were log-transformed and presented in a figure for some chemicals, but not for this one. Also, the top of p. 564 reports the frequency of detection (pr), range, mean (”m”), SD, and median (”me”) for cis-1,2-DCE and 1,1-DCA. No individual data were presented for this chemical either.
	Metric 9:	Quality Assurance	Medium	There is discussion of using standards for calibration, but no mention of determining recoveries. The paper says the accuracy and precision of the methods were discussed in detail elsewhere. While specific quality assurance/quality control techniques and results were not discussed further, they are implied through the study’s use of standard field and laboratory protocols and the language included in this paper. Site 1 had no detection of the four VOCs that were discussed at greatest length in this paper, serving as something of a ”control” location.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	The study had some discussion of temporal and spatial variability. The only uncertainty mentioned was whether contaminated groundwater might be responsible for the detections in surface water. Gaps and limitations were not discussed.

Overall Quality Determination Medium

Study Citation:	Ras-Mallorqui, M. R., Marce-Recasens, R. M., Borrull-Ballarin, 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:	Martí, V., Jubany, I., Pérez, C., Rubio, X., De Pablo, J., Giménez, J. (2014.0). Human health risk assessment of a landfill based on volatile organic compounds emission, immission and soil gas concentration measurements. Applied Geochemistry 49:218-224.
HERO ID:	2517712

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	The air sampling methodology, sites and equipment was well described. Some information missing such as storage conditions.
	Metric 2:	Analytical Methodology	Medium	The analytical methods and equipment were described, but the LOD were only reported as a range and not for each chemical.
	Metric 3:	Biomarker Selection	N/A	The authors analyzed air samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The study was conducted in Barcelona, Spain.
	Metric 5:	Currency	Medium	The samples were collected in 2012.
	Metric 6:	Spatial and Temporal Variability	Medium	36 samples for RH2. No replicates taken.
	Metric 7:	Exposure Scenario	Medium	The data likely represent relevant exposure scenarios at a landfill and affected populations, but the small sample size limited the results' generalizability.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	The authors only reported summary statistics. Point values not reported.
	Metric 9:	Quality Assurance	Medium	QA/QC techniques were discussed by the authors. Recoveries were not reported.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Variability was characterized (SD) and different scenarios tested. The uncertainties were briefly discussed. Limitations were not reported.

Overall Quality Determination Medium

Study Citation:	Bookman-Edmonston, (1986.0). Annual report on results of water quality monitoring water year 1984-85 on 4 chemicals with attachments.
HERO ID:	2799637

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	The sampling methodology is reported. Table A-4 sampling locations
	Metric 2:	Analytical Methodology	Low	LOD reported in table 4, analytical methodology not discussed
	Metric 3:	Biomarker Selection	N/A	Parent chemical in environmental media
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Los Angeles, CA. Montebello Forebay
	Metric 5:	Currency	Low	1986
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size not reported
	Metric 7:	Exposure Scenario	High	Montebello forebay wells contamination
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	There is no summary of statistics, only individual points
	Metric 9:	Quality Assurance	Critically Deficient	QA/QC was not discussed
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	No summary of statistics, no information regarding variability or uncertainty.

Overall Quality Determination Uninformative

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:	Yokouchi, Y., Barrie, L. A., Toom, D., Akimoto, H. (1996.0). The seasonal variation of selected natural and anthropogenic halocarbons in the Arctic troposphere. Atmospheric Environment 30(10-11):1723-1727.
HERO ID:	3248260

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sampling equipment, procedure, and study site reported. Sample storage not reported.
	Metric 2:	Analytical Methodology	Low	Extraction, instrumentation, calibration were reported. Recoveries were reported as a range. No LOD/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	Canadian Arctic (Alert)
	Metric 5:	Currency	Low	Samples collected from 1992 to 1994
	Metric 6:	Spatial and Temporal Variability	Medium	Measurements made continuously from 1992 to 1994, but not in replicate.
	Metric 7:	Exposure Scenario	High	Study setting described in detail.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	No raw data reported, but summary statistics include weekly and seasonal averages and overall maximum, minimum, mean, median.
	Metric 9:	Quality Assurance	High	Laboratory recoveries reported and are very high (94-98%).
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	Study structure measures temporal variability, but there is no standard deviation of samples or other quantitative measure of variance.

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:	Ellis, P. A., Rivett, M. O. (2007.0). Assessing the impact of VOC-contaminated groundwater on surface water at the city scale. Journal of Contaminant Hydrology 91(1-2):107-127.
HERO ID:	3544475

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sampling method was generally described, lacking some details but expected to have no major impacts on the results.
	Metric 2:	Analytical Methodology	Medium	Method was generally described (GC-MS); Detection limits reported as a range- more information on DL referenced in another study (Ellis 2003).
	Metric 3:	Biomarker Selection	N/A	Study measured parent chemical in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Sampling was conducted in Birmingham, UK.
	Metric 5:	Currency	Medium	Specific sampling through piezometers was conducted in summer and fall of 2001.
	Metric 6:	Spatial and Temporal Variability	Medium	The study reported that ”samples were taken at up to 35 river sites over a day” for 3 days. Unclear if there are replicates.
	Metric 7:	Exposure Scenario	High	The exposure scenario was relevant (surface water).
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	The data were reported as mean and maximum. No individual data were reported.
	Metric 9:	Quality Assurance	Low	Quality assurance was not directly discussed.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	High	The study discussed variability about the different methods used to estimate the environmental concentrations.

Overall Quality Determination Medium

Study Citation:	Hopple, J. A., Delzer, G. C., Kingsbury, J. A. (2009.0). Anthropogenic organic compounds in source water of selected community water systems that use groundwater, 2002-05. SIR 2009-5200 :76.
HERO ID:	3975066

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling methods for source groundwater and finished drinking water samples prior to distribution were described in detail.
	Metric 2:	Analytical Methodology	High	Analytical methods were described and detailed as using USGS approved analytical methods. Laboratory reporting limits were provided within tables.
	Metric 3:	Biomarker Selection	N/A	Study tested parent chemicals in selected community water systems.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Sampling was conducted across the U.S. (Fig 1).
	Metric 5:	Currency	Medium	Sampling was conducted October 2002 through July 2005.
	Metric 6:	Spatial and Temporal Variability	High	Sampling was conducted within 12 principal aquifers across the United States within about 15 wells in each SWQA study with 221 well samples. Replicate sampling was conducted.
	Metric 7:	Exposure Scenario	High	Exposure sources were described for contamination in source water (groundwater) and finished water (drinking water) across the U.S.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Summary statistic data was provided in Table 5, Appendix 1, and Appendix 3 and included detection frequency, number of samples, maximum concentration in source water (groundwater) and finished water (drinking water). Raw data was not provided.
	Metric 9:	Quality Assurance	Medium	Quality assurance was detailed within descriptions of use of field blanks, replicate samples, and recoveries. Recoveries were generally within acceptable limits for most compounds but actual numbers were not provided.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Authors did not provide measures of variance within statistical summary measures of results, but maximum groundwater concentrations were presented. There was little discussion of limitations, uncertainties, or data gaps.

Overall Quality Determination High

Study Citation:	Monsanto, (1987.0). Integrated ground water assessment with cover letter dated 072287.
HERO ID:	4213833

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling reported in page 14
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methodology not described.
	Metric 3:	Biomarker Selection	N/A	Parent chemical in water
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Nitro water treatment plant, WV
	Metric 5:	Currency	Low	1983
	Metric 6:	Spatial and Temporal Variability	Low	Sample size not directly reported, table 1 reports data prior treatment for one site
	Metric 7:	Exposure Scenario	High	Concentration prior treatment
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	One data point
	Metric 9:	Quality Assurance	Low	No QA/QC reported
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Key limitations not reported, only one data point

Overall Quality Determination Uninformative

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:	UT Austin, (1987.0). Analysis and interpretation of batch equilibrium and column studies of the partitioning of chlorinated hydrocarbons to soil materials from the PPG Lake Charles site.
HERO ID:	4213876

Domain	Metric		Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	sampling procedure, equipment were described, lacking calibration and storage conditions
	Metric 2:	Analytical Methodology	Low	GC was used for analysis, LOD was not reported.
	Metric 3:	Biomarker Selection	N/A	NA - soil samples no need for biomarkers
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Lake Charles, LA
	Metric 5:	Currency	Low	No sampling date is provided, but a publication date is available - 1987.
	Metric 6:	Spatial and Temporal Variability	Low	Sample amount was not reported, but at least 2 boring sites were reported.
	Metric 7:	Exposure Scenario	Low	Exposure scenario lacks detailed description, but mainly focused on soil.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Some individual data were reported, but it was not clear whether full sampling results were 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 study has limited discussion of key uncertainties, limitations.

Overall Quality Determination Low

Study Citation:	Ken E Davis Assoc, (1984.0). Investigation of contamination at the North Dock Storage Area phase I - PPG Industries, Lake Charles, LA.
HERO ID:	4213877

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Critically Deficient	Sampling methods not described. Only states that soil and water samples were taken.
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methods not described
	Metric 3:	Biomarker Selection	N/A	Environmental media
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Louisiana
	Metric 5:	Currency	Low	Sampling in 1984
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size not reported
	Metric 7:	Exposure Scenario	Medium	Lacking details about the population of interest, exposure characteristics
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 discussed
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Did not characterize variability, limitations and uncertainties

Overall Quality Determination Uninformative

Study Citation:	Ken E Davis Assoc, (1983.0). Field investigation in the northeast portion of the south terminal - Addendum I to phase VI.
HERO ID:	4213878

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Only briefly discussed
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methods not described
	Metric 3:	Biomarker Selection	N/A	Environmental media
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 be of relevance but report lacks details on methods, sample size, population of interest and exposure characteristics
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	individual sample concentrations only, no summary statistics
	Metric 9:	Quality Assurance	Low	QA/QC was not discussed
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability and uncertainties were not characterized or discussed

Overall Quality Determination Uninformative

Study Citation:	D'Appolonia Consulting Eng, (1987.0). Phase II - Hydrogeological impact assessment - Waste disposal facilities.
HERO ID:	4213879

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	The sampling methodology is described at the methods of investigation section
	Metric 2:	Analytical Methodology	Medium	Table 1, ground water quality parameter and analytical methods. LOD not reported
	Metric 3:	Biomarker Selection	N/A	Parent chemical in groundwater
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Barberton plant at Ohio
	Metric 5:	Currency	Low	1983
	Metric 6:	Spatial and Temporal Variability	Low	Single sample collected per site. A total of 15 samples collected
	Metric 7:	Exposure Scenario	High	waste disposal facility groundwater contamination
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	Table 12 reports individual data points. No statistics
	Metric 9:	Quality Assurance	Medium	Sample duplicates collected for QA
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	variability across wells, no uncertainty reported

Overall Quality Determination Medium

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:	ERM-Northeast, (1992.0). ECRA sampling and analysis plan report - AlliedSignal Aerospace Company Bendix Electric Power Division with cover letter dated 111693.
HERO ID:	4213973

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 discussed
	Metric 3:	Biomarker Selection	N/A	Not applicable
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	NJ, USA
	Metric 5:	Currency	Low	Published in 1992
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size was not reported
	Metric 7:	Exposure Scenario	Medium	Did not describe 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	High	Analyzed control samples, described QA/QC techniques
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Limited description of uncertainties, no characterization of variability

Overall Quality Determination Uninformative

Study Citation:	PFAUDLER CO, (1984.0). Results of analytical data with attached tables.
HERO ID:	4214049

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	Not applicable, did not test for biomarkers
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	New York, USA
	Metric 5:	Currency	Low	Report from 1984
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size was not reported
	Metric 7:	Exposure Scenario	Low	Data may represent a relevant exposure scenario, lacking details about microenvironment and population of interest
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Individual sample concentrations only, 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 and uncertainty were not characterized

Overall Quality Determination Uninformative

Study Citation:	DERS, (1991.0). Environmental site assessment report for Vista Chemical Company Facility Aberdeen, Mississippi with cover letter.
HERO ID:	4214058

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Critically Deficient	Sampling methodology not described
	Metric 2:	Analytical Methodology	Low	Analytical methods not described, cited EPA methods
	Metric 3:	Biomarker Selection	N/A	The study is testing for the parent chemical.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Mississippi, USA
	Metric 5:	Currency	Low	Sampling in 1991
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size not reported
	Metric 7:	Exposure Scenario	Medium	Missing methodological details, sample size, population of interest and exposure characteristics
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Individual sample concentrations, no summary statistics
	Metric 9:	Quality Assurance	Low	Analyzed control samples, did not describe QA/QC
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:	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

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, Virgina 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:	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:	Dow Chemical, (2000.0). Introductory study of the biodegradation of the chlorinated methane, ethane and ethene compounds: Progress report CR806890-01 coop agreement.
HERO ID:	4215582

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Critically Deficient	The sampling methodology is not discussed
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methodology not described
	Metric 3:	Biomarker Selection	N/A	parent chemical in water
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Miami, Florida
	Metric 5:	Currency	Low	1982
	Metric 6:	Spatial and Temporal Variability	Medium	No sample replicates, 116 samples at the water treatment plants
	Metric 7:	Exposure Scenario	High	Volatile organic compounds in raw, lime softened and finished water
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	No individual data points reported, only average concentrations
	Metric 9:	Quality Assurance	Critically Deficient	QA/QC procedures not mentioned in the document
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	No sample variability or discussion of key limitations

Overall Quality Determination Uninformative

Study Citation:	Ciba-Geigy, (1984.0). Memo from S. Workman to C. Staton on Scrdi Dreyfus street site dated September 24, 1984 on one chemical.
HERO ID:	4215637

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Critically Deficient	There is no information on sampling methods included; this document cites a memo to the file (not attached) that describes sampling methodology.
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methods were not described, but the sample was analyzed by South Carolina Department of Health and Environmental Control, Analytical Services Division, suggesting the analytical methods were scientifically sound and accepted, as of that time. The LODs were not specified.
	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	South Carolina
	Metric 5:	Currency	Low	Sample was from May 1984.
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	The paper notes that the well was sampled after it was installed, and the analytical data shows only a single sample from a single date.
	Metric 7:	Exposure Scenario	Low	The memo lacked details about the exposure source(s) and microenvironment. There was mention of the groundwater likely impacting a nearby creek, but no samples were collected from the creek. It was not specified whether the groundwater was being used for drinking water.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	They provided individual sample concentrations. No summary statistics could be calculated given that there was only 1 sample.
	Metric 9:	Quality Assurance	Low	QA/QC techniques were not described.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Variability and uncertainty were not characterized, but it was suggested they resample the well in the future, for verification.

Overall Quality Determination Uninformative

Study Citation:	ENSR, (1987.0). Environmental soil investigation AT{\&}T Kansas City works {\&} quality assurance plan for identifying contaminants around underground storage tanks w-attachments, cover sheet {\&} letter.
HERO ID:	4215685

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling procedures, equipment, and calibration were reported.
	Metric 2:	Analytical Methodology	High	GC/FID was used to analyze the samples. Reporting limit was reported.
	Metric 3:	Biomarker Selection	N/A	No biomarkers used.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Kansas City
	Metric 5:	Currency	Low	1987
	Metric 6:	Spatial and Temporal Variability	High	36 soil samples were collected.
	Metric 7:	Exposure Scenario	Medium	Exposure scenario was relevant (soil).
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Average data were reported, individual data were not reported.
	Metric 9:	Quality Assurance	Medium	QA/QC was performed. And there was no major concerns.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	The study discussed variability among the different sampling sites.

Overall Quality Determination Medium

Study Citation:	NJ DEP, (1987.0). Data generated from three water departments on untreated well water, plant delivered water and distribution system with cover letter dated 030387.
HERO ID:	4290379

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Critically Deficient	Sampling methodology not described
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methodology not described
	Metric 3:	Biomarker Selection	N/A	Parent chemical in groundwater
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	State of New Jersey
	Metric 5:	Currency	Low	1987
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size is not reported
	Metric 7:	Exposure Scenario	Medium	Raw water quality from three different areas the State of New Jersey
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Critically Deficient	Data reported but it is not possible to read it
	Metric 9:	Quality Assurance	Critically Deficient	QA/QC not reported
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Critically Deficient	Estimates are highly uncertain since there is not enough information from the study

Overall Quality Determination Uninformative

Study Citation:	Geosciences Research Assoc, (1987.0). Identification of ground water characteristics at the Knauf Fiberglass Company plant - Shelbyville, Indiana (final report).
HERO ID:	4412645

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Sampling methods only briefly described
	Metric 2:	Analytical Methodology	Critically Deficient	Analytical methods not described
	Metric 3:	Biomarker Selection	N/A	Did not test for biomarkers
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Indiana, USA
	Metric 5:	Currency	Low	Sampling began in 1983
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Sample size not reported
	Metric 7:	Exposure Scenario	Medium	Data may represent a relevant exposure scenario, missing details about the population and microenvironment of interest
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Individual sample concentrations only, 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 and uncertainty were not characterized

Overall Quality Determination — Uninformative

Study Citation:	Assmuth, T. W. (1996.0). Comparative risk analysis of waste site toxicants by indices based on concentration distributions, fluxes, environmental fate and critical effects. Journal of Hazardous Materials 48(1-3):121-135.
HERO ID:	5066259

Domain	Metric		Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Some sampling methods were not reported such as sample storage conditions and sampler calibration
	Metric 2:	Analytical Methodology	Critically Deficient	Recovery samples were not reported; analytical methodology not described in this paper. The study simply states that "Standardized and established analytical methods were used."
	Metric 3:	Biomarker Selection	N/A	Biomarkers of interest were not addressed in this reference.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Finland
	Metric 5:	Currency	Low	Study was published in 1995
	Metric 6:	Spatial and Temporal Variability	Medium	>10 samples were collected but there were no replicates collected.
	Metric 7:	Exposure Scenario	High	The exposure source was well characterized
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Raw data were not reported
	Metric 9:	Quality Assurance	Low	Limited QA was reported
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	Few gaps and limitations were reported

Overall Quality Determination Uninformative

Study Citation:	Williams, D. T., Coburn, J. A., Bancsi, J. J. (1984.0). Study of total organic halogen as a means to detect groundwater contamination. Environment International 10(1):39-44.
HERO ID:	5096383

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	The sampling collection procedure, equipment, storage conditions were provided. Calibration is not mentioned.
	Metric 2:	Analytical Methodology	Low	Analytical method was described - GC/MS. LOD was not reported.
	Metric 3:	Biomarker Selection	N/A	Parent chemical is in an environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	10 landfill sites; not specified where it is. It was assumed to be in Canada.
	Metric 5:	Currency	Low	May and June 1982
	Metric 6:	Spatial and Temporal Variability	Medium	10 sites were sampled, 2-3 samples were collected from each site.
	Metric 7:	Exposure Scenario	Low	Groundwater is the media of exposure, but an assessment was not conducted
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Average concentrations were presented for each site; no individual raw data were 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 has limited discussion of variability; it compared the TOX analyses to GC-MS analyses.

Overall Quality Determination Low

Study Citation:	Zimmerman, M. J., Massey, A. J., Campo, K. W. (2005.0). Pushpoint sampling for defining spatial and temporal variations in contaminant concentrations in sediment pore water near the ground-water / surface-water interface. :1-75.
HERO ID:	5258475

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	The study detailed a validation study of a new sampler, a push point sampler. The method was not compared to standard methods within this study. The sampling procedures and storage conditions were reported by the authors. Storage duration times were not reported.
	Metric 2:	Analytical Methodology	Low	The authors refer to analytical methods listed in an appendix that was not part of the pdf. The article refers to the samples being analyzed by an USEPA laboratory so one could assume that standard analytical methods were used but it is unclear from the main text. Reporting level was reported by authors.
	Metric 3:	Biomarker Selection	N/A	Biomarkers of interest were not addressed in this reference.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The authors report the study location.
	Metric 5:	Currency	Low	Data was collected in 2002 and 2003.
	Metric 6:	Spatial and Temporal Variability	High	The authors collected replicate samples, at two different sampling sites and over multiple time points. The reported total sample size for location A was 148 and for location B 159.
	Metric 7:	Exposure Scenario	Medium	The study site was a river where ground-water discharge of pollutants was known.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	The authors provide the individual samples concentrations, range of concentration, detection frequency, number of samples within the dataset. They did not report a standard deviation or measure of central tendency.
	Metric 9:	Quality Assurance	Medium	The authors reported detailed results of trip blanks, replicates, and equipment blanks. Recovery tests were not reported. Chemical of interest was not detected in trip or laboratory blanks.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	The authors do not report a standard deviation. The authors discussed variability in the data, but did not discuss gaps or limitations.

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:	Lorah, M. M., Olsen, L. D., Smith, B. L. (1997.0). Natural attenuation of chlorinated hydrocarbons in a freshwater wetland. 4(3)(3):207-212.
HERO ID:	5433584

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	groundwater in a small section of wetland sampled from 87 piezometers using stainless-steel bailers or pumps; kept on ice; sampling procedure not discussed
	Metric 2:	Analytical Methodology	Low	USGS analyzed the samples; detection limits not provided
	Metric 3:	Biomarker Selection	N/A	Biomarkers of interest were not addressed in this reference.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Aberdeen Proving Grounds, US Army Base, Maryland
	Metric 5:	Currency	Low	June to October 1995
	Metric 6:	Spatial and Temporal Variability	High	87 piezometers sampled June to October
	Metric 7:	Exposure Scenario	High	contamination in shallow groundwater that discharges to freshwater wetlands on an Army base
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Low	no data provided in table form or text; only pictured in Fig 1 and 2
	Metric 9:	Quality Assurance	Low	QA/QC not discussed but implied since study conducted by USGS
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	variability and uncertainty not discussed

Overall Quality Determination Medium

Study Citation:	Scheepers, P. T. J., Graumans, M. H. F., van Dael, M., de Werdt, L., Pinckaers, N., Beckmann, G., Anzion, R. (2019.0). Intrusion of chlorinated hydrocarbons and their degradation products from contaminated soil. Measurement of indoor air quality and biomonitoring by analysis of end-exhaled air. Science of the Total Environment 653:223-230.
HERO ID:	5433717

Domain	Metric		Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling methodology is discussed and is generally appropriate (i.e., scientifically sound) for the chemical and media of interest. Sample collection described in section 2.4.
	Metric 2:	Analytical Methodology	Medium	Analytical methodology is discussed in detail and is clear and appropriate (i.e., scientifically sound) for the chemical and media of interest; however, the use of recoveries is not reported. LOD reported in table S3.
	Metric 3:	Biomarker Selection	N/A	Study tested for the parent chemical in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Samples were collected in the Netherlands.
	Metric 5:	Currency	High	Indoor air, outdoor air, and exhaled air samples were collected in June 2016 and December 2017.
	Metric 6:	Spatial and Temporal Variability	High	At least 20 samples of exhaled air collected over a period of five days in June and December (10 days total) and duplicate samples collected some of those days (score high). Indoor air samples collected continuously over a period of 7 days in June and December (14 days total) at six different spots, so at least 84 samples collected; no collection of replicates reported (score medium). The number of outdoor air samples collected was unclear; no collection of replicates reported (score low).
	Metric 7:	Exposure Scenario	Medium	Exposure to TDCE from contaminated soil from subsurface storage tank. The data likely represent relevant/realistic exposure scenario, but the use of expose controls was not described.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Raw data from December is reported in SI and summary statistics reported in tables 2 and 3. Indoor air and outdoor air samples do not have raw data reported and summary statistics reported in table 1 are missing a measure of variation.
	Metric 9:	Quality Assurance	Low	Limited discussion of QA/QC techniques and results. The use of recoveries, blank samples, and baseline samples were not reported.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	High	The study characterizes variability by collecting samples across several days, during two seasons, and at different spots within the bookshop. Limitations are addressed such as the small sample size of exhaled air.

Overall Quality Determination High

Study Citation:	Buscheck, T. E., O'Reilly, K. T., Hickman, G. (1997.0). Intrinsic anaerobic biodegradation of chlorinated solvents at a manufacturing plant. Bioremediation Series 3(3):149-154.
HERO ID:	5433831

Domain	Metric		Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Critically Deficient	The groundwater sampling methodology was not reported by the authors.
	Metric 2:	Analytical Methodology	Critically Deficient	The analytical methods were not described.
	Metric 3:	Biomarker Selection	N/A	The authors reported TDCE concentrations in groundwater.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The study was conducted in San Francisco, CA, USA.
	Metric 5:	Currency	Low	The TDCE data reported dates back to 1986 to 1996.
	Metric 6:	Spatial and Temporal Variability	Medium	n=28 (estimated from Figure 2). N=14 according to Tables 1 and 2. The number of replicates is unclear.
	Metric 7:	Exposure Scenario	Low	The data may represent a relevant exposure scenario related to groundwater contaminated with TDCE, but the lack of methodological details limits the results validity.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Only individual sample concentrations were reported, 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 were not discussed.

Overall Quality Determination Uninformative

Study Citation:	Giger, W., Molnar-Kubica, E., Wakeham, S. (1978.0). Volatile chlorinated hydrocarbons in ground and lake waters. :101-123.
HERO ID:	5434129

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	The sampling methodology was described in detail.
	Metric 2:	Analytical Methodology	Medium	The analytical methods were reported, including LOD but not recoveries.
	Metric 3:	Biomarker Selection	N/A	The authors analyzed environmental samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	The study was conducted in Zurich, Switzerland
	Metric 5:	Currency	Low	The data was collected in 1977.
	Metric 6:	Spatial and Temporal Variability	Medium	n=31 samples. No replicates were taken.
	Metric 7:	Exposure Scenario	Medium	Exposure through groundwater and lake water use, but a detailed assessment was not conducted.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	raw data reported
	Metric 9:	Quality Assurance	Low	Limited QA/QC reported
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	No limitations reported

Overall Quality Determination Medium

Study Citation:	Roy F. Weston Inc, (1986.0). Installation restoration program phase ii-confirmation/quantification, stage 1. Final report for Burlington Air national guard base, Burlington, Vermont.
HERO ID:	5436115

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sampling equipment, procedure were described in details for the samples in groundwater and surface water.
	Metric 2:	Analytical Methodology	High	GC/MS was used to analyze the chemicals, detection limits was reported - 10 ug/L.
	Metric 3:	Biomarker Selection	N/A	The authors analyzed environmental samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Burlington Air National Guard Base, Vermont
	Metric 5:	Currency	Low	In 1984, soil and surface water samples from the site were collected.
	Metric 6:	Spatial and Temporal Variability	Medium	5 monitoring wells and 3 existing wells, 6 surface water stations were sampled.
	Metric 7:	Exposure Scenario	Medium	Exposure scenario was about an Airforce base.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Individual data were reported for each chemical at each sampling location, though no summary statistics were provided.
	Metric 9:	Quality Assurance	High	QA/QC measures were performed and all pertinent quality assurance information is provided in the data source or companion source.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	The study is a site investigation, not having much discussion on study limitations or variability because the study followed standard procedure.

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
	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:	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:	Hunt, J., Birch, G., Warne, M. S. J. (2007.0). Deriving trigger values for, and assessing hazard posed by, volatile chlorinated hydrocarbons in a sydney estuary. Australasian Journal of Ecotoxicology 13(1):33-42.
HERO ID:	5438705

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling procedure and program designs were described in details. Site matrix was provided, including graphs and maps.
	Metric 2:	Analytical Methodology	High	Analytical procedure was reported to follow EPA methodology (USEPA 5030B)
	Metric 3:	Biomarker Selection	N/A	The authors analyzed environmental samples.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Penrhyn Estuary, Sydney, Australia
	Metric 5:	Currency	Medium	2004-2005
	Metric 6:	Spatial and Temporal Variability	High	5 rounds of samples were collected every 3 months from 7 sites along the estuary and 2 storm water sites in the span of 1 year.
	Metric 7:	Exposure Scenario	High	Exposure scenario was closely related to the chemicals of interest - surface water and storm water drainage.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Mean concentrations for each site were reported along with summary statistics.
	Metric 9:	Quality Assurance	High	Quality control was undertaken; recovery rates were acceptable (80% to 120%). No major concerns were noticed.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	High	The study had a robust discussion about the limitation and uncertainty of the hazard assessment conducted in this study.

Overall Quality Determination High

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:	USGS, (1989.0). Inorganic and organic ground-water chemistry in the Canal Creek area of Aberdeen Proving Ground, Maryland.
HERO ID:	5443295

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Description of sampling area was well described.
	Metric 2:	Analytical Methodology	High	GC/FID was used perform the analysis of chemicals. Detection limits were reported (page 59).
	Metric 3:	Biomarker Selection	N/A	The study is testing for the parent chemicals.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Canal Creek, Maryland
	Metric 5:	Currency	Low	1986 - 1987
	Metric 6:	Spatial and Temporal Variability	High	Water samples were collected from 87 wells; at least 2 well volumes of water were collected from each well.
	Metric 7:	Exposure Scenario	High	Exposure scenarios were highly related - groundwater from the aquifer (sources were discussed).
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Individual data were provided for each well in Table 10.
	Metric 9:	Quality Assurance	High	Quality control and assurance measures were performed and no major concerns were seen.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	The study characterizes variability in the media studied.

Overall Quality Determination High

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
	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:	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:	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 study is testing for the parent chemical in an environmental media (water and soil).
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Ohio River and McCool's Creek in Midland, MI. Approximate location provided in Figure 1.
	Metric 5:	Currency	Low	Sampling in 1992
	Metric 6:	Spatial and Temporal Variability	Low	According to Appendix B 4 water samples and 4 soil samples were collected/analyzed.
	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:	Bechtel Environmental, (1988.0). Final site investigation report for the Rohm and Haas Redwood City Facility.
HERO ID:	6307465

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling methodology is discussed and is generally appropriate (i.e., scientifically sound) for the chemical and media of interest. Details regarding soil sampling page 18-23, 28; groundwater sampling page 37-38, 41-47; monitoring well sampling page 48-58; concrete and asphalt sampling page 60-64.
	Metric 2:	Analytical Methodology	High	Samples were analyzed according to EPA Methods. Table 2-2 reports EPA methods followed for each contaminant.
	Metric 3:	Biomarker Selection	N/A	Study tested for the parent chemical in environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Samples were collected in California, USA.
	Metric 5:	Currency	Low	Samples were collected in 1986-1987.
	Metric 6:	Spatial and Temporal Variability	High	Duplicate samples were collected for all media types; 95 soil samples, 53 groundwater samples, 26 monitoring well samples, and 55 concrete and asphalt samples.
	Metric 7:	Exposure Scenario	Medium	The data likely represent relevant/realistic exposure scenario, but the use of expose controls was not described.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Raw data reported in Tables 4-1, 5-1, 5-2, A-1, B-1, C-1, C-2. No summary statistics reported.
	Metric 9:	Quality Assurance	Medium	The use of QA/QC techniques were described such as the use of standards, blanks, laboratory duplicates, field duplicates, and spikes. However, recovery values and baseline samples were not reported.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	The study has limited characterization of variability and no measure of variance is provided. Key uncertainties, limitations, and data gaps are not discussed.

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:	Vu, D. C., Ho, T., Vo, P. H., Bayati, M., Davis, A. N., Gulseven, Z., Carlo, G., Palermo, F., McElroy, J. A., Nagel, S. C., Lin, C. H. (2019.0). Assessment of indoor volatile organic compounds in Head Start child care facilities. Atmospheric Environment 215:116900.
HERO ID:	6952657

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Sampling methods described, including study site characteristics, procedures, equipment, and storage.
	Metric 2:	Analytical Methodology	High	The analytical methodology is sufficiently described. LOD and LOQ reported in Table S2.
	Metric 3:	Biomarker Selection	N/A	Study measured parent chemical in indoor air.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Samples were collected in Kansas City, Missouri.
	Metric 5:	Currency	High	Samples collected from mid-October in 2014 to late January in 2015.
	Metric 6:	Spatial and Temporal Variability	Medium	50 indoor air samples collected from 10 classrooms in four facilities and across multiple microenvironments. No replicate samples were collected.
	Metric 7:	Exposure Scenario	High	Samples collected indoor air from child care facilities, including playrooms and learning rooms.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	All samples were ND. Raw data are not reported.
	Metric 9:	Quality Assurance	Medium	Key QA reported, including the use of field blanks, laboratory blanks, and reference standards. Analytical method also included acceptable correlation coefficients (R^2 = 0.982–0.999). However, recoveries not reported.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	High	Characterizes spatial differences across buildings and rooms, and seasonal differences between fall and winter. SD also reported. Several uncertainties are noted including temporal replication, lack of ventilation data, absence of outdoor comparison samples, and facility-level generalizability.

Overall Quality Determination High

Study Citation:	Han, F., Chen, J., Jiang, Z., Chen, L., Ji, W. (2013.0). Volatile and semi-volatile organic compounds in the lower Yangtze River and surface waters of three Chinese provinces. Polish Journal of Environmental Studies 22(3):683-690.
HERO ID:	6968122

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sampling procedure lacked a few details including sampling procedure and equipment.
	Metric 2:	Analytical Methodology	High	Analytical method of the pollutants were described (GC-MS) and LOD was reported for each chemical.
	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	Yangtzs River, China
	Metric 5:	Currency	Medium	Sampling date was from April to May 2008.
	Metric 6:	Spatial and Temporal Variability	Medium	Sampling approach accurately captures variability of environmental contamination in population/scenario/media of interest. The study used a large sample size (21 samples) and replicate samples. However, sampling did not occurred over a sufficient period of time (only during Apr-May) to characterize seasonal trends.
	Metric 7:	Exposure Scenario	High	Exposure scenario was highly relevant (surface water).
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	Medium	Statistics were described. Individual data were not reported.
	Metric 9:	Quality Assurance	High	The study conducted quality control measures.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Medium	The study reported standard deviation to measure variability, but lacked discussion about its limitation.

Overall Quality Determination High

Study Citation:	COWI AS, (2018.0). Screening programme 2017: Suspected PBT compounds. :0-0.
HERO ID:	7303021

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	The sampling methodology is clear and appropriate. Details such as sample storage, sampling protocol, and sampling personnel were described.
	Metric 2:	Analytical Methodology	Low	The analytical methodology is clear and appropriate; however, the LOQ is not provided. The calculation to obtain the LOQ is described, but the LOQ itself is not given.
	Metric 3:	Biomarker Selection	N/A	Study is testing for parent chemical in an environmental media.
Domain 2: Representativeness				
	Metric 4:	Geographic Area	High	Samples were collected in Norway.
	Metric 5:	Currency	High	Samples were collected in 2017.
	Metric 6:	Spatial and Temporal Variability	Critically Deficient	Samples size is not provided for all media.
	Metric 7:	Exposure Scenario	Medium	The exposure scenario is the parent chemical in marine and freshwater environments. Although this is a scenario of interest, the exposure pathway is not well characterized.
Domain 3: Accessibility/Clarity				
	Metric 8:	Reporting of Results	High	Data are provided in the attachments section. Some of the data is clearly raw data; while other data are unclear.
	Metric 9:	Quality Assurance	Medium	The use of controls and blanks is reported in the methods and results section. QA/QC issues were not identified.
Domain 4: Variability and Uncertainty				
	Metric 10:	Variability and Uncertainty	Low	The characterization of variability is absent. No standard deviations were provided.

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, (2019). Air Quality System (AQS) [database]: CASRNs 106-99-0, 75-34-3, 78-87-5, 106-93-4, 50-00-0, 106-46-7, and 79-00-5.
HERO ID:	6514358

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	The data were collected by EPA, state, local, and tribal air pollution control agencies from over thousands of monitors. No specific sampling procedures provided but assumed to be collected using standard methodologies.
	Metric 2:	Analytical Methodology	Medium	The data were collected by EPA, state, local, and tribal air pollution control agencies from over thousands of monitors. The data sheets provide sampling instruments, MDL, and qualifiers.
Domain 2: Representative				
	Metric 3:	Geographic Area	High	Samples were collected in the US.
	Metric 4:	Temporal	High	The data was collected in 2017.
	Metric 5:	Exposure Scenario	Medium	The monitors were located throughout the US. Information characterizing monitoring conditions or position relative to chemical releases is not provided.
Domain 3: Accessibility/Clarity				
	Metric 6:	Availability of Database and Supporting Documents	High	Extensive User Guide and other supporting materials are available at https://www.epa.gov/aqs/aqs-manuals-and-guides.
	Metric 7:	Reporting Results	High	Hourly, daily, and annual concentrations are available in the database.
Domain 4: Variability and Uncertainty				
	Metric 8:	Variability and Uncertainty	Low	Key uncertainties, limitations, and data gaps have not been identified. Variability is not characterized.

Overall Quality Determination High

Study Citation:	U.S. EPA, U.,.S.G.S. and National Water Quality Monitoring Council (2022). Trans-1,2-dichloroethylene (TDCE) (CAS RN: 156-60-5): WQP Output (NWIS, STEWARDS {\&} STORET), Site data {\&} sample results (physical/chemical metadata).
HERO ID:	10709391

Domain	Metric		Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Medium	Sampling methodology information is provided in columns AF to AJ, including the sampling method code and the equipment used. No information was provided on transportation or storage conditions for any sample. Note that for a large portion of the samples the sampling methodology was reported as "UNKNOWN".
	Metric 2:	Analytical Methodology	High	Numerous analytical method codes are reported in column BO, BQ, and BS. Numerous point values do not have an analytical method. Description of the methods reported in column BQ and detection limit in column BY. A detection limit was not provided for all samples. While there is heterogeneity in the information provided, the confidence rating of high is based on the samples with the most complete data.
Domain 2: Representative				
	Metric 3:	Geographic Area	High	Column X reports the location identifier code. All samples are from the U.S. The station.xlsx file included as part of the HERO reference provides detailed information on the sites sampled. The information of each code can be found at https://waterdata.usgs.gov/nwis/si
	Metric 4:	Temporal	High	Data reported from 1988 to 2022. The date is reported in column G.
	Metric 5:	Exposure Scenario	Medium	Media are reported in column E and F; location and time are also reported. The station.xlsx file included as part of the HERO reference provides, for some samples, more detailed information on the sites sampled, such as sample depth. There is no information provided on sources of chemicals.
Domain 3: Accessibility/Clarity				
	Metric 6:	Availability of Database and Supporting Documents	High	The database is widely accepted, and a user guide is available which describes all of the data fields.
	Metric 7:	Reporting Results	Medium	The database does not report summary of statistics, only point values. While the data are well organized, since the data originates from numerous different entities (states) and monitoring programs, some data may be difficult to interpret due to the lack of populated data fields or discrepancies between columns.
Domain 4: Variability and Uncertainty				
	Metric 8:	Variability and Uncertainty	Medium	Uncertainty is characterized by the inclusion of data qualifier column AR; however, it was not expected for all rows to have a data qualifier code. Column AS reports the results status identifier that indicates the acceptability of the result with respect to QA/QC criteria.

Overall Quality Determination High

Study Citation:	Centers for Disease Control and Prevention : CDC (2022). trans-1,2-Dichloroethylene (TDCE) (CAS RN: 156-60-5): NHANES Biomonitoring Data (Blood).
HERO ID:	10709914

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	High	Widely accepted sampling methodology from a source known to use sound approaches. Information on sampling design can be found at https://wwwn.cdc.gov/nchs/nhanes/tutorials/SampleDesign.aspx.
	Metric 2:	Analytical Methodology	High	Widely accepted analytical methodology, outlined at https://www.cdc.gov/exposurereport/data_sources_analysis.html. Additional detail is listed in references listed at https://www.cdc.gov/exposurereport/biomonitoring_references.html.
Domain 2: Representative				
	Metric 3:	Geographic Area	High	Samples were collected from the US population.
	Metric 4:	Temporal	Medium	Data reported from 2011 to 2012.
	Metric 5:	Exposure Scenario	Medium	Exposure to TDCE for the civilian, noninstitutionalized population in the United States based on age, gender, and race/ethnicity. There is no information provided on sources of exposure to the chemical, amount of exposure, or microenvironments.
Domain 3: Accessibility/Clarity				
	Metric 6:	Availability of Database and Supporting Documents	High	The database is widely accepted and well known. There is an abundance of information online about the database.
	Metric 7:	Reporting Results	High	The database reports summary statistics (geometric mean, 50th/75th/90th/95th percentiles). The years of collection and sample size is reported for each row. Raw data can be downloaded from the CDC website https://wwwn.cdc.gov/nchs/nhanes/default.aspx
Domain 4: Variability and Uncertainty				
	Metric 8:	Variability and Uncertainty	High	There is no characterization of uncertainty. Variability reported as summary of statistics and the analysis of data by age, gender, and race/ethnicity. NHANES does not include state-level data. Considerations related to the data are discussed at https://www.cdc.gov/exposurereport/data_interpretation.html

Overall Quality Determination High

Study Citation:	U.S. EPA, (2016). Six-Year Review 3 compliance monitoring data (2006-2011): trans-1,2-Dichloroethylene.
HERO ID:	11145485

Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Sampling Methodology	Low	Limited sampling methodology information is provided in columns L to O, without sampling method code or the equipment used. No information was provided on transportation or storage conditions for any sample. Note that for a large portion of the samples the sampling point type did not have data.
	Metric 2:	Analytical Methodology	Low	Analytical method information is reported in column P, Q, R. Analytical method codes were not included. Detection limit value, units and code reported in columns T, U, V. A detection limit was not provided for more than 1000 samples.
Domain 2: Representative				
	Metric 3:	Geographic Area	High	All samples are from the U.S. Columns C, D, E and J include location data, including State Code, Public Water System ID, System name and the Water Facility ID.
	Metric 4:	Temporal	Medium	The data is from 2006-2011. The sample collection date is reported in column S.
	Metric 5:	Exposure Scenario	Medium	Media are not reported but it is implied that the media is water; location and time are also reported. There is no information provided on sources of chemicals.
Domain 3: Accessibility/Clarity				
	Metric 6:	Availability of Database and Supporting Documents	High	The database is widely accepted, and a user guide is available which describes all of the data fields.
	Metric 7:	Reporting Results	Medium	The database does not report summary of statistics, only point values in column X. While the data are well organized, since the data originates from numerous different entities (states) and monitoring programs, some data may be difficult to interpret due to the lack of populated data fields or discrepancies between columns.
Domain 4: Variability and Uncertainty				
	Metric 8:	Variability and Uncertainty	Low	Variability and Uncertainty details were not included.

Overall Quality Determination Medium

Study Citation:	PRC Environmental Management, (1995). Final baseline risk assessment for the Jayhawk Plant in Jayhawk, Kansas, with cover letter dated 02/22/95.
HERO ID:	666891

Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	The assessment uses techniques that are from reliable sources and are generally accepted by the scientific community; however, a discussion of sampling methodology for data previously collected is limited.
Domain 2: Representative	Metric 2:	Exposure Scenario	Medium	Characterization of geographic area with maps provided of site exposure sources, details and modeling of potential exposure, media of interest described, summary statistics and number of samples lacking within most tables, although raw data printouts provided. Data printout tables difficult to read at times.
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, robust discussion of limitations lacking, however model and exposure data uncertainties discussed.

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:	Wehran-New York,, Inc., (1990). Risk assessment for Buffalo Color area D.
HERO ID:	1335671

Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	The assessment describes sampling methodology in detail and uses technical approaches generally accepted by the scientific community with assumptions, measurements and models documented and described and no perceived errors in logic.
Domain 2: Representative	Metric 2:	Exposure Scenario	Medium	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 lacking in terms of demographics however detailed discussion of potential pathways of exposure.
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 some 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:	Chemical Manufacturers Association, (1988). Petitioners and exhibits to petitioners memorandums in support of their motion for a remand with attachments and cover letter dated 012389 (Part b).
HERO ID:	1481091

Domain	Metric		Rating	Comments
Domain 1: Reliability				
	Metric 1:	Methodology	High	The assessment methodology is described
Domain 2: Representative				
	Metric 2:	Exposure Scenario	High	The data represent the exposure scenario of interest
Domain 3: Accessibility/Clarity				
	Metric 3:	Documentation of References	Critically Deficient	the reported data is not legible
Domain 4: Variability and Uncertainty				
	Metric 4:	Variability and Uncertainty	Low	No summary of statistics or report of key limitations

Overall Quality Determination Uninformative

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:	Rohm and Haas, (1988). Biological risk assessment for the Redwood City facility {\&} final site investigation report for the Rohm and Haas Redwood City facility with attachments {\&} cover letter dated 092588 (Part a).
HERO ID:	1745617

Domain	Metric		Rating	Comments
Domain 1: Reliability				
	Metric 1:	Methodology	High	The methodology for the risk assessment is well described. Soil and groundwater monitoring methods in sections 2.1 and 2.2. Air quality methodology in section 6
Domain 2: Representative				
	Metric 2:	Exposure Scenario	High	Fish and wildlife exposure to selected contaminants in the groundwater beneath the Rohm and Hass facility in Redwood City
Domain 3: Accessibility/Clarity				
	Metric 3:	Documentation of References	High	Data inputs, references all reported in the study
Domain 4: Variability and Uncertainty				
	Metric 4:	Variability and Uncertainty	Medium	Variability across matrices not reported in terms of summary of statistics . Limitations reported in the text

Overall Quality Determination High

Study Citation:	DERS, (1995). Corrective measures study for SWMU Nos. 2, 3, 16, and 21: DuPont Beaumont Works: Beaumont, Texas.
HERO ID:	5068379

Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	Description of exposure sampling data collection and contaminant concentration modeling procedures with assumptions detailed and some references to USEPA methods and requirements, however actual name of sampling method or standard procedures not referenced within sections describing sampling procedures.
Domain 2: Representative	Metric 2:	Exposure Scenario	Medium	Characterization of geographic area with maps provided of site exposure sources, details and modeling of potential exposure, media of interest described, number of samples lacking within most tables, although some raw data printouts provided for some sampling media.
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, robust discussion of limitations lacking, however model and exposure data uncertainties discussed.

Overall Quality Determination Medium

Study Citation:	ATSDR, (1994). Public health assessment for Otis Air National Guard Base/Camp Edwards, Falmouth, Barnstable County, Massachusetts, Region 1. MA2570024487. Final rept.
HERO ID:	5451606

Domain	Metric		Rating	Comments
Domain 1: Reliability				
	Metric 1:	Methodology	Critically Deficient	The study reports field data quality, laboratory data quality and sample design. However, no information reported on sample methodology and analytical methods.
Domain 2: Representative				
	Metric 2:	Exposure Scenario	High	Health risk assessment for a surrounding community from a superfund site.
Domain 3: Accessibility/Clarity				
	Metric 3:	Documentation of References	Medium	References are available for all reported data, inputs, and defaults; however, some references may not be publicly available or are not from peer reviewed sources. References for background concentrations, and comparison values for both cancerous and non-cancerous effects reported.
Domain 4: Variability and Uncertainty				
	Metric 4:	Variability and Uncertainty	High	Variability reported in terms of different sites. Page 81 includes recommendations for future studies

Overall Quality Determination Uninformative

Study Citation:	Anderson, D., Dicianna, D., Yance, J., Tarnay, A. (1989). Preliminary data summary for the solvent recycling industry.
HERO ID:	5478191

Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	Sampling are referenced in other sources for each plant in section 5.3.1. Analytical methods and instrument are reported, including detection limit range. Simple standard dilution model used to calculate effluent concentrations in Section 6, although effluent concentrations don't appear to reported.
Domain 2: Representative	Metric 2:	Exposure Scenario	Medium	The study measured chemicals in wastewater. However, the study and sampling dates are old (1986 and 1987).
Domain 3: Accessibility/Clarity	Metric 3:	Documentation of References	Low	Document is well referenced, but many references don't appear to be published.
Domain 4: Variability and Uncertainty	Metric 4:	Variability and Uncertainty	Medium	Data specifically examined for three facilities. Some discussions of analytical uncertainties provided.

Overall Quality Determination Medium

Table 141: Glossary of Select Terms for Data Evaluation

Term	Definition
mu-	Micro-
1,1-DCA or DCE	1,1-Dichloroethane
1,2-DCA or EDC	1,2-Dichloroethane
ADD	Average Daily Dose
AFB	Air Force Base
ATD	Adsorption thermal desorption
ATSDR	Agency for Toxic Substances and Disease Registry
CA	Canada
CA, USA	California
CI	Confidence Interval
CV	Coefficient of Variation
DC	District of Columbia
DCB	Dichlorobenzene
DI	Daily Intake
DOH	Department of Health
DWTP	Drinking Water Treatment Plant
ECD	Electron Capture Detector
EDI	Estimated Daily Intake
EI-MS	Electron Ionization Mass Spectrometry
EPA	Environmental Protection Agency
FAQ	Frequently Asked Question
FDA	Food and Drug Administration
FID	Flame Ionization Detector
FPD	Flame Photometric Detector
g	Gram
GC	Gas Chromatography
GSD	Geometric Standard Deviation
HPLC	High Performance Liquid Chromatography
HR-MS	Hi-Resolution Mass Spectrometry
ICI	Imperial Chemical Industries
IEC	International Chemical Industries
IMS	Ion Mobility Spectrometry
ISO	International Organization for Standardization
L	Liter
LA	Louisiana
LC	Liquid Chromatography
LDL	Lower Detection Limit
LLE	Liquid-Liquid Extraction
LOD	Limit of Detection

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Table 141 . . . continued from previous page

Term	Definition
LOQ	Limit of Quantification
LRL	Lowest Reportable Level
m-	milli-
m^3	cubic meter
MCL	Maximum Containment Level
MCLG	Maximum Containment Level Goal
MD	Maryland
MDL	Method Detection Limit
MDNR	Michigan Department of Natural Resources
MI	Michigan
Min	Minute
MLQ	Method Limit of Quantification
MN	Minnesota
MRL	Method Reporting Limit
MS	Mass Spectrometry
MSW	Municipal Solid Waste
n	Sample Size
N/A	Not Applicable
NASA	National Aeronautics and Space Administration
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
PM	Particulate Matter
PTI	Purge and Trap Injection
QA/QC	Quality Assurance/Quality Control
RfD	Reference Dose
RL	Reporting Limit
RSD	Relative Standard Deviation
SC	South Carolina
SD	Standard Deviation
SE	Standard Error
SI	Supplemental Information
SIM	Selected Ion Monitoring
SM	Supplemental Material
SOP	Standard Operating Procedure
SPE	Solid Phase Extraction
SPME	Solid Phase Micro-Extraction
SRM	Standard Reference Manual

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Table 141 . . . continued from previous page

Term	Definition
STP	Sewage Treatment Plant
SVOC	Semi-Volatile Organic Compound
SWMU	Solid Waste Management Unit
TCA	Trichloroethane
TCE	Trichloroethylene
TDCE	Trans-1,2-Dichloroethylene
TEPA	Taiwan Environmental Protection Agency
TSCA	Toxic Substances Control Act
TX	Texas
UK	United Kingdom
UPLC	Ultra Performance Liquid Chromatography
US or USA	United States
USAF	United States Air Force
USGS	United States Geological Survey
VDI	Verein Deutscher Ingenieure
VOC	Volatile Organic Compound
WV	West Virginia
WWTP	Wastewater Treatment Plant