United States
Environmental Protection Agency

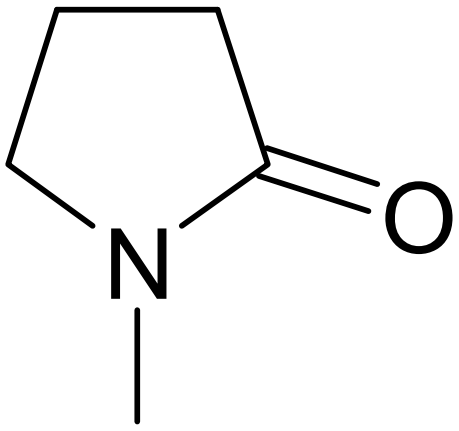
Office of Chemical Safety and
Pollution Prevention

Final Risk Evaluation for n-Methylpyrrolidone

Systematic Review Supplemental File:

Data Quality Evaluation of Ecological Hazard Studies

CASRN: 872-50-4



December 2020

EPA's Office of Pollution Prevention and Toxics (OPPT) developed data quality criteria for ecological hazard studies, presented in the *Application of Systematic Review in TSCA Risk Evaluations* document (EPA Document #740-P1-8001).

This document presents data quality evaluation results for ecological hazard studies evaluated for the NMP Risk Evaluation.

Table of Contents

Study Citation:	C. H. Lan, C. Y. Peng, T. S. Lin. 2004. Acute aquatic toxicity of N-methyl-2-pyrrolidinone to Daphnia magna. Bulletin of Environmental Contamination and Toxicology 73:392-397
Data Type:	Acute (0-96 hour); Aquatic; Invertebrates
Hero ID:	3539870

Domain	Metric		Rating†	MWF⋆	Score	Comments††
Domain 1: Test Substance						
	Metric 1:	Test Substance Identity	High	× 2	2	The test substance is NMP.
	Metric 2:	Test Substance Source	High	× 1	1	The NMP (test substance) was purchased from Sigma- Aldrich.
	Metric 3:	Test Substance Purity	High	× 1	1	The purity is reported as >99.9 percent.
Domain 2: Test Design						
	Metric 4:	Negative Controls	Medium	× 2	4	A negative control was included as the dilution water. Information on the condition of the test organisms was not provided to assess any difference between those allocated to treatment groups versus controls.
	Metric 5:	Negative Control Response	Low	× 1	3	The control results were only in the text and as always being "100 percent" and "meeting EPA criteria".
	Metric 6:	Randomized Allocation	Low	× 1	3	The study did not report any information on the allocation of test organisms. Further the study provided little to no information on the study design except for referencing two different EPA acute study manuals.
Domain 3: Exposure Characterization						
	Metric 7:	Experimental System/Test Media Preparation	Unacceptable	× 2	8	NMP test exposure concentrations were not measured. NMP is reported to degrade rapidly in the aquatic environment and measurements should be made to ensure that nominal (targeted exposure concentrations) were obtained during the test period over 48 hours. NMP was measured only in the stock solution used to prepare the nominal dilution series nominal test exposure concentrations. NMP concentrations were not measured in each of the test exposures. The test system did not consider the physical-chemical properties of NMP.

Continued on next page . . .

. . . continued from previous page

Study Citation:	C. H. Lan, C. Y. Peng, T. S. Lin. 2004. Acute aquatic toxicity of N-methyl-2-pyrrolidinone to Daphnia magna. Bulletin of Environmental Contamination and Toxicology 73:392-397
Data Type:	Acute (0-96 hour); Aquatic; Invertebrates
Hero ID:	3539870

Domain	Metric		Rating†	MWF⋆	Score	Comments††
	Metric 8:	Consistency of Exposure Administration	Low	× 1	3	The details of exposure conditions for testing are not reported in detail. There is not enough information to assess if exposure administration was consistent across treatment groups and the control. The study does report some general information on temperature, pH, dissolved oxygen and conductivity of the test exposures but numerical values are not reported. There is only a statement in the text that these measurements were "stable".
	Metric 9:	Measurement of Test Substance Concentration	Unacceptable	× 1	4	Exposure test concentrations were not measured. NMP is reported to degrade rapidly in water.
	Metric 10:	Exposure Duration and Frequency	High	× 2	2	The duration of exposure was included (24-h and 48-h).
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	Low	× 1	3	The text reports exposure groups as "five organisms per five different NMP concentrations in quadruple groups". The authors did not provide a rationale for selection of the range of tested nominal NMP concentrations (06, 1.25, 2.5, 5, and 10 mg/L) in the dilution series. Other available acute and chronic toxicity studies do not show effects within this range of NMP concentrations (effects are observed at much higher concentrations >500 mg/L.
	Metric 12:	Testing at or Below Solubility Limit	High	× 1	1	Tested below the water solubility of NMP (1000 g/L).
Domain 4: Test Organism						
	Metric 13:	Test Organism Characteristics	Medium	× 2	4	The authors report that the test organisms were originally obtained from LUZCOGI Inc., Germany and were cultured in their laboratory over "many generations" and were subjected to reference toxicity testing using sodium chloride but the results of this testing are not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	× 1	2	Some pretreatment conditions are described for the test organisms including photoperiod and temperature. "Growth and life span were stable" is reported in the text but data are not provided. Acclimation is not discussed and data are not provided to assessment any pretreatment differences between control and test exposure treatment groups.

Continued on next page . . .

. . . continued from previous page

Study Citation: C. H. Lan, C. Y. Peng, T. S. Lin. 2004. Acute aquatic toxicity of N-methyl-2-pyrrolidinone to Daphnia magna. Bulletin of Environmental Contamination and Toxicology 73:392-397
Data Type: Acute (0-96 hour); Aquatic; Invertebrates
Hero ID: 3539870

Domain	Metric	Rating†	MWF*	Score	Comments††
	Metric 15: Number of Organisms and Replicates per Group	Low	× 1	3	The number of test organisms and replicates are reported in the text as 5 organisms per exposure chamber with 4 replicates per nominal treatment concentration. However, the quantitative responses of the test organisms (deaths) between replicates and NMP treatment groups are not reported. There is not sufficient information to assess if the number of organisms and/or replicates are sufficient to provide power for statistical analyses.
	Metric 16: Adequacy of Test Conditions	Unacceptable	× 1	4	Organism housing, environmental conditions, food, photoperiod, and temperature were adequately described to maintain the health of test organisms. The handling of test organisms is not described, nor the type of exposure chamber (vessel). The dilution water is only described in the text as being prepared according to an EPA guideline. The text does not describe feeding, nutrients, and maintenance of the test organism cultures. Feeding is described in the text as "minimal algae food".
Domain 5: Outcome Assessment					
	Metric 17: Outcome Assessment Methodology	Unacceptable	× 2	8	The outcome assessment methodology was not reported and the results are not reported.
	Metric 18: Consistency of Outcome Assessment	Unacceptable	× 1	4	Outcome assessments were not adequately reported for interpretation of the results.
Domain 6: Confounding / Variable Control					
	Metric 19: Confounding Variables in Test Design and Procedures	Unacceptable	× 2	8	The study did not report results by control, treatment group or replicate group. It is not possible to assess confounding variables in the test design and procedures.
	Metric 20: Outcomes Unrelated to Exposure	Unacceptable	× 1	4	The study did not report results by control, treatment group or replicate group. It is not possible to assess outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis					
	Metric 21: Statistical Methods	Low	× 1	3	The text states that statistical analysis was conducted using the Probit Procedure according to Gulley 1996. However there are no results reported making an independent statistical analyses impossible.

Continued on next page . . .

. . . continued from previous page

Study Citation:	C. H. Lan, C. Y. Peng, T. S. Lin. 2004. Acute aquatic toxicity of N-methyl-2-pyrrolidinone to Daphnia magna. Bulletin of Environmental Contamination and Toxicology 73:392-397
Data Type:	Acute (0-96 hour); Aquatic; Invertebrates
Hero ID:	3539870

Domain	Metric		Rating†	MWF⋆	Score	Comments††
	Metric 22:	Reporting of Data	Unacceptable	× 2	8	The results of the testing are not reported for any of the treatment groups or control groups. The text only states that the authors calculated 24 and 48 hour EC50 values.
	Metric 23:	Explanation of Unexpected Outcomes	Unacceptable	× 1	4	The results of the testing are not reported for any of the treatment groups or control groups. It is not possible to assess the occurrence of unexpected outcomes.
Overall Quality Determination‡			Unacceptable		4.0	Metric mean score⋆⋆: 2.8.
Extracted			No			

⋆⋆ Consistent with our *Application of Systematic Review in TSCA Risk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, nine of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

⋆ MWF = Metric Weighting Factor

† High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

‡ The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

$$\text{Overall rating} = \begin{cases} 4 & \text{if any metric is Unacceptable} \\ \left\lfloor \sum_i (\text{Metric Score}_i \times \text{MWF}_i) \,/\, \sum_j \text{MWF}_j \right\rceil_{0.1} & \text{(round to the nearest tenth) otherwise} \end{cases},$$

where High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3. If the reviewer determines that the overall rating needs adjustment, the original rating is crossed out and an arrow points to the new rating.

†† Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation: BASF AG. 1983. Unpublished data, study No. 83/112, 31 Aug 1983.
Data Type: Acute (0-96 hour); Aquatic; Fish
Hero ID: 4259519

Domain	Metric		Rating†	MWF⋆	Score	Comments††
Domain 1: Test Substance						
	Metric 1:	Test Substance Identity	High	× 2	2	N- Methylpyrrolidone (NMP) was identified as the test substance..
	Metric 2:	Test Substance Source	Low	× 1	3	The source of test substance was not provided.
	Metric 3:	Test Substance Purity	High	× 1	1	The test substance's purity was reported as 99.8 percent.
Domain 2: Test Design						
	Metric 4:	Negative Controls	High	× 2	2	The control (0 mg/L) was used.
	Metric 5:	Negative Control Response	High	× 1	1	The control results were reported.
	Metric 6:	Randomized Allocation	Low	× 1	3	The randomized allocation was not mentioned in the report.
Domain 3: Exposure Characterization						
	Metric 7:	Experimental System/Test Media Preparation	High	× 2	2	The experimental system and methods for preparation of test media were described in adequate detail in the report.
	Metric 8:	Consistency of Exposure Administration	High	× 1	1	Exposure information was reported and exposures were consistent across the study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	× 1	2	This fish test was a limit test, but the measurement of test substance was taken.
	Metric 10:	Exposure Duration and Frequency	High	× 2	2	The duration of exposure and frequency were reported appropriately for the study (acute fish study 96-hour duration).
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	Low	× 1	3	This fish test was a limit test. The centrations tested were 0 mg/L (control) and 500 mg/L.
	Metric 12:	Testing at or Below Solubility Limit	High	× 1	1	Exposure concentrations were at below the water solubility of NMP (1000 g/L).
Domain 4: Test Organism						
	Metric 13:	Test Organism Characteristics	High	× 2	2	The test organisms were described adequately and appropriate for this study.

Continued on next page ...

. . . continued from previous page

Study Citation: BASF AG. 1983. Unpublished data, study No. 83/112, 31 Aug 1983.
Data Type: Acute (0-96 hour); Aquatic; Fish
Hero ID: 4259519

Domain	Metric		Rating†	MWF⋆	Score	Comments††
	Metric 14:	Acclimatization and Pretreatment Conditions	High	× 1	1	The test organisms were acclimatized to test conditions and all the pretreatment conditions were the same.
	Metric 15:	Number of Organisms and Replicates per Group	Low	× 1	3	This test was a limit test (one control of 0 mg/L and three replicates for 500 mg/L).
	Metric 16:	Adequacy of Test Conditions	High	× 1	1	Organisms housing, conditions, food, and test media were described and adequate to maintain the health of test organisms.
Domain 5: Outcome Assessment						
	Metric 17:	Outcome Assessment Methodology	High	× 2	2	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 18:	Consistency of Outcome Assessment	High	× 1	1	The outcome assessment was carried out consistently across study groups. using the same protocol in all study groups.
Domain 6: Confounding / Variable Control						
	Metric 19:	Confounding Variables in Test Design and Procedures	High	× 2	2	No reported differences were noted among the study groups in environmental conditions or any other factors.
	Metric 20:	Outcomes Unrelated to Exposure	High	× 1	1	No report or details were noted for test organism attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis						
	Metric 21:	Statistical Methods	High	× 1	1	The statistical method was used (probit analysis Finney (1971)).
	Metric 22:	Reporting of Data	High	× 2	2	Data for exposure-related findings were presented for the treatment and control group and were adequate to determine the endpoint..
	Metric 23:	Explanation of Unexpected Outcomes	High	× 1	1	There were no unexpected outcomes.
Overall Quality Determination‡			High		1.3	
Extracted			Yes			

Continued on next page . . .

. . . continued from previous page

Study Citation:	BASF AG. 1983. Unpublished data, study No. 83/112, 31 Aug 1983.
Data Type:	Acute (0-96 hour); Aquatic; Fish
Hero ID:	4259519

Domain	Metric	Rating†	MWF⋆	Score	Comments††

⋆ MWF = Metric Weighting Factor
† High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.
‡ The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

$$\text{Overall rating} = \begin{cases} 4 & \text{if any metric is Unacceptable} \\ \left\lfloor \sum_i (\text{Metric Score}_i \times \text{MWF}_i) \,/\, \sum_j \text{MWF}_j \right\rceil_{0.1} & \text{(round to the nearest tenth) otherwise} \end{cases},$$

where High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3. If the reviewer determines that the overall rating needs adjustment, the original rating is crossed out and an arrow points to the new rating.
†† Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation: BASF AG. 1986. Department of Toxicology study no. 85/289, 05 Feb 1986 (unpublished).
Data Type: Acute (0-96 hour); Aquatic; Fish
Hero ID: 4259520

Domain		Metric	Rating†	MWF*	Score	Comments††
Domain 1: Test Substance						
	Metric 1:	Test Substance Identity	High	× 2	2	N- Methylpyrrolidone (NMP) was identified as the test substance..
	Metric 2:	Test Substance Source	Low	× 1	3	The source of test substance was not provided.
	Metric 3:	Test Substance Purity	High	× 1	1	The test substance's purity was reported as 99.8 percent.
Domain 2: Test Design						
	Metric 4:	Negative Controls	High	× 2	2	The control (0 mg/L) was used.
	Metric 5:	Negative Control Response	High	× 1	1	The control results were reported (no mortality).
	Metric 6:	Randomized Allocation	Low	× 1	3	The randomized allocation was not mentioned in the report.
Domain 3: Exposure Characterization						
	Metric 7:	Experimental System/Test Media Preparation	High	× 2	2	The experimental system and methods for preparation of test media were described in adequate detail in the report.
	Metric 8:	Consistency of Exposure Administration	High	× 1	1	Exposure information was reported and exposures were consistent across the study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	× 1	2	Test concentrations were reported as nominal concentrations. By the Henry's Law of NMP (3.2 " 10-9 atm m3/mole), the test substance is not considered to be volatile, thus, actual concentrations are likely to be similar to nominal concentrations.
	Metric 10:	Exposure Duration and Frequency	High	× 2	2	The duration of exposure and frequency were reported appropriately for the study (acute fish study 96-hour duration).
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1	The number of exposure groups and spacing of exposure levels were adequate to address the purpose of the study and to obtain the toxicity endpoint..
	Metric 12:	Testing at or Below Solubility Limit	High	× 1	1	Exposure concentrations were at below the water solubility of NMP (1000 g/L).
Domain 4: Test Organism						
	Metric 13:	Test Organism Characteristics	High	× 2	2	The test organisms were described adequately and appropriate for this study.

Continued on next page ...

. . . continued from previous page

Study Citation: BASF AG. 1986. Department of Toxicology study no. 85/289, 05 Feb 1986 (unpublished).
Data Type: Acute (0-96 hour); Aquatic; Fish
Hero ID: 4259520

Domain	Metric		Rating†	MWF*	Score	Comments††
	Metric 14:	Acclimatization and Pretreatment Conditions	High	× 1	1	The test organisms were acclimatized to test conditions and all the pretreatment conditions were the same.
	Metric 15:	Number of Organisms and Replicates per Group	Low	× 1	3	The numbers of test organisms (10/treatment) without any replicates were reported, however, the information provided were sufficient to characterize toxicological effects of test substance.
	Metric 16:	Adequacy of Test Conditions	High	× 1	1	Organisms housing, conditions, food, and test media were described and adequate to maintain the health of test organisms.
Domain 5: Outcome Assessment						
	Metric 17:	Outcome Assessment Methodology	High	× 2	2	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 18:	Consistency of Outcome Assessment	High	× 1	1	The outcome assessment was carried out consistently across study groups. using the same protocol in all study groups.
Domain 6: Confounding / Variable Control						
	Metric 19:	Confounding Variables in Test Design and Procedures	High	× 2	2	No reported differences were noted among the study groups in environmental conditions or any other factors.
	Metric 20:	Outcomes Unrelated to Exposure	High	× 1	1	No report or details were noted for test organism attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis						
	Metric 21:	Statistical Methods	High	× 1	1	The statistical method was used (probit analysis Finney (1971)).
	Metric 22:	Reporting of Data	High	× 2	2	Data for exposure-related findings were presented for the treatment and control group and were adequate to determine the endpoint..
	Metric 23:	Explanation of Unexpected Outcomes	High	× 1	1	There were no unexpected outcomes.
Overall Quality Determination‡			High		1.2	
Extracted			Yes			

Continued on next page . . .

. . . continued from previous page

Study Citation:	BASF AG. 1986. Department of Toxicology study no. 85/289, 05 Feb 1986 (unpublished).
Data Type:	Acute (0-96 hour); Aquatic; Fish
Hero ID:	4259520

Domain	Metric	Rating†	MWF⋆	Score	Comments††

⋆ MWF = Metric Weighting Factor
† High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.
‡ The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

$$\text{Overall rating} = \begin{cases} 4 & \text{if any metric is Unacceptable} \\ \left\lfloor \sum_i (\text{Metric Score}_i \times \text{MWF}_i) \,/\, \sum_j \text{MWF}_j \right\rceil_{0.1} & \text{(round to the nearest tenth) otherwise} \end{cases},$$

where High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3. If the reviewer determines that the overall rating needs adjustment, the original rating is crossed out and an arrow points to the new rating.
†† Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation:	GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type:	Acute (0-96 hour); Aquatic; other NMP- Dap (original)
Hero ID:	5079088

Domain	Metric		Rating†	MWF*	Score	Comments††
Domain 1: Test Substance						
	Metric 1:	Test Substance Identity	High	× 2	2	NMP was identified as the test substance..
	Metric 2:	Test Substance Source	High	× 1	1	The test substance was provided by GAF Corporation.
	Metric 3:	Test Substance Purity	Low	× 1	3	The test substance's purity was not reported.
Domain 2: Test Design						
	Metric 4:	Negative Controls	High	× 2	2	The control (0 mg/L) was used.
	Metric 5:	Negative Control Response	High	× 1	1	The control results were reported (no mortality).
	Metric 6:	Randomized Allocation	Low	× 1	3	The randomized allocation was not mentioned in the report.
Domain 3: Exposure Characterization						
	Metric 7:	Experimental System/Test Media Preparation	High	× 2	2	The experimental system and methods for preparation of test media were described in adequate detail in the report.
	Metric 8:	Consistency of Exposure Administration	High	× 1	1	Exposure information was reported and exposures were consistent across the study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	× 1	2	Test concentrations were reported as nominal concentrations. By the Henry's Law of NMP (3.2 " 10-9 atm m3/mole), the test substance is not considered to be volatile, thus, actual concentrations are likely to be similar to nominal concentrations.
	Metric 10:	Exposure Duration and Frequency	High	× 2	2	The duration of exposure and frequency were reported appropriately for the study (acute daphnid study 48-hour duration).
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1	The number of exposure groups and spacing of exposure levels were adequate to address the purpose of the study and to obtain the toxicity endpoint..
	Metric 12:	Testing at or Below Solubility Limit	High	× 1	1	Exposure concentrations were at below the water solubility of NMP (1000 g/L).
Domain 4: Test Organism						
	Metric 13:	Test Organism Characteristics	High	× 2	2	The test organisms were adequately described and obtained from a reliable source. The test organisms were appropriate for this study.

Continued on next page ...

. . . continued from previous page

Study Citation: GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type: Acute (0-96 hour); Aquatic; other NMP- Dap (original)
Hero ID: 5079088

Domain	Metric		Rating†	MWF⋆	Score	Comments††
	Metric 14:	Acclimatization and Pretreatment Conditions	High	× 1	1	The test organisms were acclimatized to test conditions and all the pretreatment conditions were the same.
	Metric 15:	Number of Organisms and Replicates per Group	High	× 1	1	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
	Metric 16:	Adequacy of Test Conditions	High	× 1	1	Organisms housing, conditions, food, and test media were described and adequate to maintain the health of test organisms.
Domain 5: Outcome Assessment						
	Metric 17:	Outcome Assessment Methodology	High	× 2	2	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 18:	Consistency of Outcome Assessment	High	× 1	1	The outcome assessment was carried out consistently across study groups. using the same protocol in all study groups.
Domain 6: Confounding / Variable Control						
	Metric 19:	Confounding Variables in Test Design and Procedures	High	× 2	2	No reported differences were noted among the study groups in environmental conditions or any other factors.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	× 1	2	No report or details were noted for test organism attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis						
	Metric 21:	Statistical Methods	High	× 1	1	The statistical method was used (moving average method of Thompson (1947)).
	Metric 22:	Reporting of Data	High	× 2	2	Data for exposure-related findings were presented for each treatment and control group and were adequate to determine the endpoint values..
	Metric 23:	Explanation of Unexpected Outcomes	High	× 1	1	The unexpected outcomes were satisfactorily explained.
Overall Quality Determination‡			High		1.2	
Extracted			Yes			

Continued on next page . . .

. . . continued from previous page

Study Citation:	GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type:	Acute (0-96 hour); Aquatic; other NMP- Dap (original)
Hero ID:	5079088

Domain	Metric	Rating†	MWF⋆	Score	Comments††

⋆ MWF = Metric Weighting Factor
† High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.
‡ The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

$$\text{Overall rating} = \begin{cases} 4 & \text{if any metric is Unacceptable} \\ \left\lfloor \sum_i (\text{Metric Score}_i \times \text{MWF}_i) \,/\, \sum_j \text{MWF}_j \right\rceil_{0.1} & \text{(round to the nearest tenth) otherwise} \end{cases},$$

where High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3. If the reviewer determines that the overall rating needs adjustment, the original rating is crossed out and an arrow points to the new rating.
†† Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation: GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type: Acute (0-96 hour); Aquatic; other NMP- fathead minnows (Pimephales promelas)
Hero ID: 5079088

Domain	Metric		Rating†	MWF*	Score	Comments††
Domain 1: Test Substance						
	Metric 1:	Test Substance Identity	High	× 2	2	NMP was identified as the test substance..
	Metric 2:	Test Substance Source	High	× 1	1	The test substance was provided by GAF Corporation.
	Metric 3:	Test Substance Purity	Low	× 1	3	The test substance's purity was not reported.
Domain 2: Test Design						
	Metric 4:	Negative Controls	High	× 2	2	The control (0 mg/L) was used.
	Metric 5:	Negative Control Response	High	× 1	1	The control results were reported (no mortality).
	Metric 6:	Randomized Allocation	Low	× 1	3	The randomized allocation was not mentioned in the report.
Domain 3: Exposure Characterization						
	Metric 7:	Experimental System/Test Media Preparation	High	× 2	2	The experimental system and methods for preparation of test media were described in adequate detail in the report.
	Metric 8:	Consistency of Exposure Administration	High	× 1	1	Exposure information was reported and exposures were consistent across the study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	× 1	2	Test concentrations were reported as nominal concentrations. By the Henry's Law of NMP (3.2 " 10-9 atm m3/mole), the test substance is not considered to be volatile, thus, actual concentrations are likely to be similar to nominal concentrations.
	Metric 10:	Exposure Duration and Frequency	High	× 2	2	The duration of exposure and frequency were reported appropriately for the study (acute fish study 96-hour duration).
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1	The number of exposure groups and spacing of exposure levels were adequate to address the purpose of the study and to obtain the toxicity endpoint..
	Metric 12:	Testing at or Below Solubility Limit	High	× 1	1	Exposure concentrations were at below the water solubility of NMP (1000 g/L).
Domain 4: Test Organism						
	Metric 13:	Test Organism Characteristics	High	× 2	2	The test organisms were adequately described and obtained from a reliable source. The test organisms were appropriate for this study.

Continued on next page ...

. . . continued from previous page

Study Citation:	GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type:	Acute (0-96 hour); Aquatic; other NMP- fathead minnows (Pimephales promelas)
Hero ID:	5079088

Domain	Metric		Rating†	MWF⋆	Score	Comments††
	Metric 14:	Acclimatization and Pretreatment Conditions	High	× 1	1	The test organisms were acclimatized to test conditions and all the pretreatment conditions were the same.
	Metric 15:	Number of Organisms and Replicates per Group	High	× 1	1	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
	Metric 16:	Adequacy of Test Conditions	High	× 1	1	Organisms housing, conditions, food, and test media were described and adequate to maintain the health of test organisms.
Domain 5: Outcome Assessment						
	Metric 17:	Outcome Assessment Methodology	High	× 2	2	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 18:	Consistency of Outcome Assessment	High	× 1	1	The outcome assessment was carried out consistently across study groups. using the same protocol in all study groups.
Domain 6: Confounding / Variable Control						
	Metric 19:	Confounding Variables in Test Design and Procedures	High	× 2	2	No reported differences were noted among the study groups in environmental conditions or any other factors.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	× 1	2	No report or details were noted for test organism attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis						
	Metric 21:	Statistical Methods	High	× 1	1	The statistical method was used (moving average method of Thompson (1947)).
	Metric 22:	Reporting of Data	High	× 2	2	Data for exposure-related findings were presented for each treatment and control group and were adequate to determine the endpoint values..
	Metric 23:	Explanation of Unexpected Outcomes	High	× 1	1	The unexpected outcomes were satisfactorily explained.
Overall Quality Determination‡			High		1.2	
Extracted			Yes			

Continued on next page . . .

. . . continued from previous page

Study Citation:	GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type:	Acute (0-96 hour); Aquatic; other NMP- fathead minnows (Pimephales promelas)
Hero ID:	5079088

Domain	Metric	Rating†	MWF⋆	Score	Comments††

⋆ MWF = Metric Weighting Factor
† High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.
‡ The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

$$\text{Overall rating} = \begin{cases} 4 & \text{if any metric is Unacceptable} \\ \left\lfloor \sum_i (\text{Metric Score}_i \times \text{MWF}_i) \,/\, \sum_j \text{MWF}_j \right\rceil_{0.1} & \text{(round to the nearest tenth) otherwise} \end{cases},$$

where High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3. If the reviewer determines that the overall rating needs adjustment, the original rating is crossed out and an arrow points to the new rating.
†† Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation: GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type: Acute (0-96 hour); Aquatic; other NMP- Rainbow trout (Salmo gairdneri)
Hero ID: 5079088

Domain	Metric		Rating†	MWF*	Score	Comments††
Domain 1: Test Substance						
	Metric 1:	Test Substance Identity	High	× 2	2	NMP was identified as the test substance..
	Metric 2:	Test Substance Source	High	× 1	1	The test substance was provided by GAF Corporation.
	Metric 3:	Test Substance Purity	Low	× 1	3	The test substance's purity was not reported.
Domain 2: Test Design						
	Metric 4:	Negative Controls	High	× 2	2	The control (0 mg/L) was used.
	Metric 5:	Negative Control Response	High	× 1	1	The control results were reported (no mortality).
	Metric 6:	Randomized Allocation	Low	× 1	3	The randomized allocation was not mentioned in the report.
Domain 3: Exposure Characterization						
	Metric 7:	Experimental System/Test Media Preparation	High	× 2	2	The experimental system and methods for preparation of test media were described in adequate detail in the report.
	Metric 8:	Consistency of Exposure Administration	High	× 1	1	Exposure information was reported and exposures were consistent across the study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	× 1	2	Test concentrations were reported as nominal concentrations. By the Henry's Law of NMP (3.2 " 10-9 atm m3/mole), the test substance is not considered to be volatile, thus, actual concentrations are likely to be similar to nominal concentrations.
	Metric 10:	Exposure Duration and Frequency	High	× 2	2	The duration of exposure and frequency were reported appropriately for the study (acute fish study 96-hour duration).
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1	The number of exposure groups and spacing of exposure levels were adequate to address the purpose of the study and to obtain the toxicity endpoint..
	Metric 12:	Testing at or Below Solubility Limit	High	× 1	1	Exposure concentrations were at below the water solubility of NMP (1000 g/L).
Domain 4: Test Organism						
	Metric 13:	Test Organism Characteristics	High	× 2	2	The test organisms were adequately described and obtained from a reliable source. The test organisms were appropriate for this study.

Continued on next page ...

. . . continued from previous page

Study Citation: GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type: Acute (0-96 hour); Aquatic; other NMP- Rainbow trout (Salmo gairdneri)
Hero ID: 5079088

Domain	Metric		Rating†	MWF*	Score	Comments††
	Metric 14:	Acclimatization and Pretreatment Conditions	High	× 1	1	The test organisms were acclimatized to test conditions and all the pretreatment conditions were the same.
	Metric 15:	Number of Organisms and Replicates per Group	Low	× 1	3	The number of test organisms or replicates was not reported. However, the results were reported..
	Metric 16:	Adequacy of Test Conditions	High	× 1	1	Organisms housing, conditions, food, and test media were described and adequate to maintain the health of test organisms.
Domain 5: Outcome Assessment						
	Metric 17:	Outcome Assessment Methodology	High	× 2	2	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 18:	Consistency of Outcome Assessment	High	× 1	1	The outcome assessment was carried out consistently across study groups. using the same protocol in all study groups.
Domain 6: Confounding / Variable Control						
	Metric 19:	Confounding Variables in Test Design and Procedures	High	× 2	2	No reported differences were noted among the study groups in environmental conditions or any other factors.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	× 1	2	No report or details were noted for test organism attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis						
	Metric 21:	Statistical Methods	High	× 1	1	The statistical method was used (moving average method of Thompson (1947)).
	Metric 22:	Reporting of Data	High	× 2	2	Data for exposure-related findings were presented for each treatment and control group and were adequate to determine the endpoint values..
	Metric 23:	Explanation of Unexpected Outcomes	High	× 1	1	The unexpected outcomes were satisfactorily explained.
Overall Quality Determination‡			High		1.3	
Extracted			Yes			

Continued on next page . . .

. . . continued from previous page

Study Citation:	GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type:	Acute (0-96 hour); Aquatic; other NMP- Rainbow trout (Salmo gairdneri)
Hero ID:	5079088

Domain	Metric	Rating†	MWF⋆	Score	Comments††

⋆ MWF = Metric Weighting Factor
† High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.
‡ The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

$$\text{Overall rating} = \begin{cases} 4 & \text{if any metric is Unacceptable} \\ \left\lfloor \sum_i (\text{Metric Score}_i \times \text{MWF}_i) \,/\, \sum_j \text{MWF}_j \right\rceil_{0.1} & \text{(round to the nearest tenth) otherwise} \end{cases},$$

where High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3. If the reviewer determines that the overall rating needs adjustment, the original rating is crossed out and an arrow points to the new rating.
†† Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation: GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type: Acute (0-96 hour); Aquatic; other NMP- Gammarus sp (scud)
Hero ID: 5079088

Domain	Metric		Rating†	MWF*	Score	Comments††
Domain 1: Test Substance						
	Metric 1:	Test Substance Identity	High	× 2	2	NMP was identified as the test substance..
	Metric 2:	Test Substance Source	High	× 1	1	The test substance was provided by GAF Corporation.
	Metric 3:	Test Substance Purity	Low	× 1	3	The test substance's purity was not reported.
Domain 2: Test Design						
	Metric 4:	Negative Controls	High	× 2	2	The control (0 mg/L) was used.
	Metric 5:	Negative Control Response	High	× 1	1	The control results were reported (no mortality).
	Metric 6:	Randomized Allocation	Low	× 1	3	The randomized allocation was not mentioned in the report.
Domain 3: Exposure Characterization						
	Metric 7:	Experimental System/Test Media Preparation	High	× 2	2	The experimental system and methods for preparation of test media were described in adequate detail in the report.
	Metric 8:	Consistency of Exposure Administration	High	× 1	1	Exposure information was reported and exposures were consistent across the study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	× 1	2	Test concentrations were reported as nominal concentrations. By the Henry's Law of NMP (3.2 " 10-9 atm m3/mole), the test substance is not considered to be volatile, thus, actual concentrations are likely to be similar to nominal concentrations.
	Metric 10:	Exposure Duration and Frequency	High	× 2	2	The duration of exposure and frequency were reported appropriately for the study (acute scud study 96-hour duration).
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1	The number of exposure groups and spacing of exposure levels were adequate to address the purpose of the study and to obtain the toxicity endpoint..
	Metric 12:	Testing at or Below Solubility Limit	High	× 1	1	Exposure concentrations were at below the water solubility of NMP (1000 g/L).
Domain 4: Test Organism						
	Metric 13:	Test Organism Characteristics	High	× 2	2	The test organisms were adequately described and obtained from a reliable source. The test organisms were appropriate for this study.

Continued on next page ...

. . . continued from previous page

Study Citation: GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type: Acute (0-96 hour); Aquatic; other NMP- Gammarus sp (scud)
Hero ID: 5079088

Domain	Metric		Rating†	MWF*	Score	Comments††
	Metric 14:	Acclimatization and Pretreatment Conditions	High	× 1	1	The test organisms were acclimatized to test conditions and all the pretreatment conditions were the same.
	Metric 15:	Number of Organisms and Replicates per Group	High	× 1	1	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
	Metric 16:	Adequacy of Test Conditions	High	× 1	1	Organisms housing, conditions, food, and test media were described and adequate to maintain the health of test organisms.
Domain 5: Outcome Assessment						
	Metric 17:	Outcome Assessment Methodology	High	× 2	2	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 18:	Consistency of Outcome Assessment	High	× 1	1	The outcome assessment was carried out consistently across study groups. using the same protocol in all study groups.
Domain 6: Confounding / Variable Control						
	Metric 19:	Confounding Variables in Test Design and Procedures	High	× 2	2	No reported differences were noted among the study groups in environmental conditions or any other factors.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	× 1	2	No report or details were noted for test organism attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis						
	Metric 21:	Statistical Methods	High	× 1	1	The statistical method was used (moving average method of Thompson (1947)).
	Metric 22:	Reporting of Data	High	× 2	2	Data for exposure-related findings were presented for each treatment and control group and were adequate to determine the endpoint values..
	Metric 23:	Explanation of Unexpected Outcomes	High	× 1	1	The unexpected outcomes were satisfactorily explained.
Overall Quality Determination‡			High		1.2	
Extracted			Yes			

Continued on next page . . .

. . . continued from previous page

Study Citation:	GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type:	Acute (0-96 hour); Aquatic; other NMP- Gammarus sp (scud)
Hero ID:	5079088

Domain	Metric	Rating†	MWF⋆	Score	Comments††

⋆ MWF = Metric Weighting Factor
† High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.
‡ The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

$$\text{Overall rating} = \begin{cases} 4 & \text{if any metric is Unacceptable} \\ \left\lfloor \sum_i (\text{Metric Score}_i \times \text{MWF}_i) \,/\, \sum_j \text{MWF}_j \right\rceil_{0.1} & \text{(round to the nearest tenth) otherwise} \end{cases},$$

where High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3. If the reviewer determines that the overall rating needs adjustment, the original rating is crossed out and an arrow points to the new rating.
†† Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation: GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type: Acute (0-96 hour); Aquatic; other NMP- mud crabs (Neopanope texana sayi)
Hero ID: 5079088

Domain		Metric	Rating†	MWF*	Score	Comments††
Domain 1: Test Substance						
	Metric 1:	Test Substance Identity	High	× 2	2	NMP was identified as the test substance..
	Metric 2:	Test Substance Source	High	× 1	1	The test substance was provided by GAF Corporation.
	Metric 3:	Test Substance Purity	Low	× 1	3	The test substance's purity was not reported.
Domain 2: Test Design						
	Metric 4:	Negative Controls	High	× 2	2	The control (0 mg/L) was used.
	Metric 5:	Negative Control Response	High	× 1	1	The control results were reported (no mortality).
	Metric 6:	Randomized Allocation	Low	× 1	3	The randomized allocation was not mentioned in the report.
Domain 3: Exposure Characterization						
	Metric 7:	Experimental System/Test Media Preparation	High	× 2	2	The experimental system and methods for preparation of test media were described in adequate detail in the report.
	Metric 8:	Consistency of Exposure Administration	High	× 1	1	Exposure information was reported and exposures were consistent across the study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	× 1	2	Test concentrations were reported as nominal concentrations. By the Henry's Law of NMP (3.2 " 10-9 atm m3/mole), the test substance is not considered to be volatile, thus, actual concentrations are likely to be similar to nominal concentrations.
	Metric 10:	Exposure Duration and Frequency	High	× 2	2	The duration of exposure and frequency were reported appropriately for the study (acute study 96-hour duration).
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1	The number of exposure groups and spacing of exposure levels were adequate to address the purpose of the study and to obtain the toxicity endpoint..
	Metric 12:	Testing at or Below Solubility Limit	High	× 1	1	Exposure concentrations were at below the water solubility of NMP (1000 g/L).
Domain 4: Test Organism						
	Metric 13:	Test Organism Characteristics	High	× 2	2	The test organisms were adequately described and obtained from a reliable source. The test organisms were appropriate for this study.

Continued on next page ...

. . . continued from previous page

Study Citation: GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type: Acute (0-96 hour); Aquatic; other NMP- mud crabs (Neopanope texana sayi)
Hero ID: 5079088

Domain	Metric		Rating†	MWF*	Score	Comments††
	Metric 14:	Acclimatization and Pretreatment Conditions	High	× 1	1	The test organisms were acclimatized to test conditions and all the pretreatment conditions were the same.
	Metric 15:	Number of Organisms and Replicates per Group	High	× 1	1	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
	Metric 16:	Adequacy of Test Conditions	High	× 1	1	Organisms housing, conditions, food, and test media were described and adequate to maintain the health of test organisms.
Domain 5: Outcome Assessment						
	Metric 17:	Outcome Assessment Methodology	High	× 2	2	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 18:	Consistency of Outcome Assessment	High	× 1	1	The outcome assessment was carried out consistently across study groups. using the same protocol in all study groups.
Domain 6: Confounding / Variable Control						
	Metric 19:	Confounding Variables in Test Design and Procedures	High	× 2	2	No reported differences were noted among the study groups in environmental conditions or any other factors.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	× 1	2	No report or details were noted for test organism attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis						
	Metric 21:	Statistical Methods	High	× 1	1	The statistical method was used (moving average method of Thompson (1947)).
	Metric 22:	Reporting of Data	High	× 2	2	Data for exposure-related findings were presented for each treatment and control group and were adequate to determine the endpoint values..
	Metric 23:	Explanation of Unexpected Outcomes	High	× 1	1	The unexpected outcomes were satisfactorily explained.
Overall Quality Determination‡			High		1.2	
Extracted			Yes			

Continued on next page . . .

. . . continued from previous page

Study Citation:	GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type:	Acute (0-96 hour); Aquatic; other NMP- mud crabs (Neopanope texana sayi)
Hero ID:	5079088

Domain	Metric	Rating†	MWF⋆	Score	Comments††

⋆ MWF = Metric Weighting Factor
† High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.
‡ The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

$$\text{Overall rating} = \begin{cases} 4 & \text{if any metric is Unacceptable} \\ \left\lfloor \sum_i (\text{Metric Score}_i \times \text{MWF}_i) \,/\, \sum_j \text{MWF}_j \right\rceil_{0.1} & \text{(round to the nearest tenth) otherwise} \end{cases},$$

where High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3. If the reviewer determines that the overall rating needs adjustment, the original rating is crossed out and an arrow points to the new rating.
†† Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation: GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type: Acute (0-96 hour); Aquatic; other NMP- grass shrimp (Palaemonetes vulgaris)
Hero ID: 5079088

Domain	Metric		Rating†	MWF⋆	Score	Comments††
Domain 1: Test Substance						
	Metric 1:	Test Substance Identity	High	× 2	2	NMP was identified as the test substance..
	Metric 2:	Test Substance Source	High	× 1	1	The test substance was provided by GAF Corporation.
	Metric 3:	Test Substance Purity	Low	× 1	3	The test substance's purity was not reported.
Domain 2: Test Design						
	Metric 4:	Negative Controls	High	× 2	2	The control (0 mg/L) was used.
	Metric 5:	Negative Control Response	High	× 1	1	The control results were reported (no mortality).
	Metric 6:	Randomized Allocation	Low	× 1	3	The randomized allocation was not mentioned in the report.
Domain 3: Exposure Characterization						
	Metric 7:	Experimental System/Test Media Preparation	High	× 2	2	The experimental system and methods for preparation of test media were described in adequate detail in the report.
	Metric 8:	Consistency of Exposure Administration	High	× 1	1	Exposure information was reported and exposures were consistent across the study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	× 1	2	Test concentrations were reported as nominal concentrations. By the Henry's Law of NMP (3.2 " 10-9 atm m3/mole), the test substance is not considered to be volatile, thus, actual concentrations are likely to be similar to nominal concentrations.
	Metric 10:	Exposure Duration and Frequency	High	× 2	2	The duration of exposure and frequency were reported appropriately for the study (acute study 96-hour duration).
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1	The number of exposure groups and spacing of exposure levels were adequate to address the purpose of the study and to obtain the toxicity endpoint..
	Metric 12:	Testing at or Below Solubility Limit	High	× 1	1	Exposure concentrations were at below the water solubility of NMP (1000 g/L).
Domain 4: Test Organism						
	Metric 13:	Test Organism Characteristics	High	× 2	2	The test organisms were adequately described and obtained from a reliable source. The test organisms were appropriate for this study.

Continued on next page . . .

. . . continued from previous page

Study Citation:	GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type:	Acute (0-96 hour); Aquatic; other NMP- grass shrimp (Palaemonetes vulgaris)
Hero ID:	5079088

Domain	Metric		Rating†	MWF⋆	Score	Comments††
	Metric 14:	Acclimatization and Pretreatment Conditions	High	× 1	1	The test organisms were acclimatized to test conditions and all the pretreatment conditions were the same.
	Metric 15:	Number of Organisms and Replicates per Group	High	× 1	1	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
	Metric 16:	Adequacy of Test Conditions	High	× 1	1	Organisms housing, conditions, food, and test media were described and adequate to maintain the health of test organisms.
Domain 5: Outcome Assessment						
	Metric 17:	Outcome Assessment Methodology	High	× 2	2	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 18:	Consistency of Outcome Assessment	High	× 1	1	The outcome assessment was carried out consistently across study groups. using the same protocol in all study groups.
Domain 6: Confounding / Variable Control						
	Metric 19:	Confounding Variables in Test Design and Procedures	High	× 2	2	No reported differences were noted among the study groups in environmental conditions or any other factors.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	× 1	2	No report or details were noted for test organism attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis						
	Metric 21:	Statistical Methods	High	× 1	1	The statistical method was used (moving average method of Thompson (1947)).
	Metric 22:	Reporting of Data	High	× 2	2	Data for exposure-related findings were presented for each treatment and control group and were adequate to determine the endpoint values..
	Metric 23:	Explanation of Unexpected Outcomes	High	× 1	1	The unexpected outcomes were satisfactorily explained.
Overall Quality Determination‡			High		1.2	
Extracted			Yes			

Continued on next page . . .

. . . continued from previous page

Study Citation:	GAF. 1979. Aquatic Toxicology Laboratory, contract No. L1393-05.
Data Type:	Acute (0-96 hour); Aquatic; other NMP- grass shrimp (Palaemonetes vulgaris)
Hero ID:	5079088

Domain	Metric	Rating†	MWF⋆	Score	Comments††

⋆ MWF = Metric Weighting Factor
† High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.
‡ The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

$$\text{Overall rating} = \begin{cases} 4 & \text{if any metric is Unacceptable} \\ \left\lfloor \sum_i (\text{Metric Score}_i \times \text{MWF}_i) \,/\, \sum_j \text{MWF}_j \right\rceil_{0.1} & \text{(round to the nearest tenth) otherwise} \end{cases},$$

where High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3. If the reviewer determines that the overall rating needs adjustment, the original rating is crossed out and an arrow points to the new rating.
†† Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation:	BASF AG. 2001. Department of Experimental Toxicology and Ecology, unpublished data, project No. 00/0969/51/1.
Data Type:	Chronic (>21 days); Aquatic; Invertebrates
Hero ID:	5079089

Domain	Metric		Rating†	MWF⋆	Score	Comments††
Domain 1: Test Substance						
	Metric 1:	Test Substance Identity	High	× 2	2	The test substance is identified as N-Methylpyrrolidon, NMP, CAS No. 872-50-4.
	Metric 2:	Test Substance Source	High	× 1	1	The test substance's date of production and Batch number are provided.
	Metric 3:	Test Substance Purity	High	× 1	1	The purity is reported as 98.8 area percent.
Domain 2: Test Design						
	Metric 4:	Negative Controls	High	× 2	2	The control (0 mg/L) was used.
	Metric 5:	Negative Control Response	High	× 1	1	The control results are reported and adequately described (parent survival and reproduction rates).
	Metric 6:	Randomized Allocation	Low	× 1	3	Researcher did not report the randomized allocation of test organisms.
Domain 3: Exposure Characterization						
	Metric 7:	Experimental System/Test Media Preparation	High	× 2	2	The experimental system and methods for preparation of test media were described in adequate detail in the report.
	Metric 8:	Consistency of Exposure Administration	High	× 1	1	Exposure information was reported and exposures were consistent across the study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	× 1	1	Test concentrations were reported. Control, 100 mg/L, 12.5 mg/L and 1.56 mg/L were analyzed as concentration control analysis.
	Metric 10:	Exposure Duration and Frequency	High	× 2	2	The duration of exposure and frequency were reported appropriately for the study (chronic daphnid study 21-day duration).
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1	The number of exposure groups and spacing of exposure levels were adequate to address the purpose of the study and to obtain the toxicity endpoints..
	Metric 12:	Testing at or Below Solubility Limit	High	× 1	1	Exposure concentrations were at below the water solubility of NMP (1000 g/L).
Domain 4: Test Organism						
	Metric 13:	Test Organism Characteristics	High	× 2	2	The test organisms were adequately described and obtained from a reliable source. The test organisms were appropriate for this study.

Continued on next page . . .

. . . continued from previous page

Study Citation: BASF AG. 2001. Department of Experimental Toxicology and Ecology, unpublished data, project No. 00/0969/51/1.
Data Type: Chronic (>21 days); Aquatic; Invertebrates
Hero ID: 5079089

Domain	Metric		Rating†	MWF⋆	Score	Comments††
	Metric 14:	Acclimatization and Pretreatment Conditions	High	× 1	1	The test organisms were acclimatized to test conditions (the 3rd breed of parent animals were used) and all the pretreatment conditions were the same.
	Metric 15:	Number of Organisms and Replicates per Group	High	× 1	1	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
	Metric 16:	Adequacy of Test Conditions	High	× 1	1	Organisms housing, conditions, food, and test media were described and adequate to maintain the health of test organisms.
Domain 5: Outcome Assessment						
	Metric 17:	Outcome Assessment Methodology	High	× 2	2	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 18:	Consistency of Outcome Assessment	High	× 1	1	The outcome assessment was carried out consistently across study groups. using the same protocol in all study groups.
Domain 6: Confounding / Variable Control						
	Metric 19:	Confounding Variables in Test Design and Procedures	High	× 2	2	No reported differences were noted among the study groups in environmental conditions or any other factors.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	× 1	2	No report or details were noted for test organism attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis						
	Metric 21:	Statistical Methods	High	× 1	1	The statistical evaluation was used (Duncan's multiple range test).
	Metric 22:	Reporting of Data	High	× 2	2	Data for exposure-related findings were presented for each treatment and control group and were adequate to determine the endpoint values..
	Metric 23:	Explanation of Unexpected Outcomes	High	× 1	1	There were no unexpected outcomes..
Overall Quality Determination‡			High		1.1	
Extracted			Yes			

Continued on next page . . .

. . . continued from previous page

Study Citation:	BASF AG. 2001. Department of Experimental Toxicology and Ecology, unpublished data, project No. 00/0969/51/1.
Data Type:	Chronic (>21 days); Aquatic; Invertebrates
Hero ID:	5079089

Domain	Metric	Rating†	MWF⋆	Score	Comments††

⋆ MWF = Metric Weighting Factor
† High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.
‡ The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

$$\text{Overall rating} = \begin{cases} 4 & \text{if any metric is Unacceptable} \\ \left\lfloor \sum_i (\text{Metric Score}_i \times \text{MWF}_i) \,/\, \sum_j \text{MWF}_j \right\rceil_{0.1} & \text{(round to the nearest tenth) otherwise} \end{cases},$$

where High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3. If the reviewer determines that the overall rating needs adjustment, the original rating is crossed out and an arrow points to the new rating.
†† Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation: BASF AG. 1989. Department of Ecology, unpublished data, project No. 1035/88.
Data Type: Acute (0-96 hour); Aquatic; Plants
Hero ID: 5079090

Domain		Metric	Rating†	MWF*	Score	Comments††
Domain 1: Test Substance						
	Metric 1:	Test Substance Identity	High	× 2	2	1-Methyl-2-pyrrolidone was identified as the test substance..
	Metric 2:	Test Substance Source	Low	× 1	3	The source of test substance was not provided.
	Metric 3:	Test Substance Purity	Low	× 1	3	It is reported as the purity was not stated.
Domain 2: Test Design						
	Metric 4:	Negative Controls	High	× 2	2	The control (0 mg/L) was used.
	Metric 5:	Negative Control Response	High	× 1	1	The control results were reported.
	Metric 6:	Randomized Allocation	Low	× 1	3	The randomized allocation was not mentioned in the report.
Domain 3: Exposure Characterization						
	Metric 7:	Experimental System/Test Media Preparation	High	× 2	2	The experimental system and methods for preparation of test media were described in adequate detail in the report.
	Metric 8:	Consistency of Exposure Administration	High	× 1	1	Exposure information was reported and exposures were consistent across the study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	× 1	2	Test concentrations were reported as nominal concentrations. By the Henry's Law of NMP (3.2 " 10-9 atm m3/mole), the test substance is not considered to be volatile, thus, actual concentrations are likely to be similar to nominal concentrations.
	Metric 10:	Exposure Duration and Frequency	High	× 2	2	The duration of exposure and frequency were reported appropriately for the study (algal study 72-hour duration).
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1	The number of exposure groups and spacing of exposure levels were adequate to address the purpose of the study and to obtain the toxicity endpoint..
	Metric 12:	Testing at or Below Solubility Limit	High	× 1	1	Exposure concentrations were at below the water solubility of NMP (1000 g/L).
Domain 4: Test Organism						
	Metric 13:	Test Organism Characteristics	High	× 2	2	The test organisms were described adequately and appropriate for this study.

Continued on next page ...

. . . continued from previous page

Study Citation: BASF AG. 1989. Department of Ecology, unpublished data, project No. 1035/88.
Data Type: Acute (0-96 hour); Aquatic; Plants
Hero ID: 5079090

Domain	Metric		Rating†	MWF*	Score	Comments††
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	× 1	3	The test organisms were acclimatized to test conditions and all the pretreatment conditions were the same.
	Metric 15:	Number of Organisms and Replicates per Group	High	× 1	1	The numbers of test organisms (10000 cells/mL) and replicates (4) were reported and sufficient to characterize toxicological effects.
	Metric 16:	Adequacy of Test Conditions	High	× 1	1	OECD culture medium, test conditions, and test duration were described and adequate to maintain the health of test organisms.
Domain 5: Outcome Assessment						
	Metric 17:	Outcome Assessment Methodology	High	× 2	2	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 18:	Consistency of Outcome Assessment	High	× 1	1	The outcome assessment was carried out consistently across study groups. using the same protocol in all study groups.
Domain 6: Confounding / Variable Control						
	Metric 19:	Confounding Variables in Test Design and Procedures	High	× 2	2	No reported differences were noted among the study groups in environmental conditions or any other factors.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	× 1	2	No report or details were noted for test organism attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis						
	Metric 21:	Statistical Methods	High	× 1	1	The statistical method was used (ToxRat Pro (Version 2.08)).
	Metric 22:	Reporting of Data	High	× 2	2	Data for exposure-related findings were presented for the treatment and control group and were adequate to determine the endpoint..
	Metric 23:	Explanation of Unexpected Outcomes	High	× 1	1	There were no unexpected outcomes.
Overall Quality Determination‡			High		1.3	
Extracted			Yes			

Continued on next page . . .

. . . continued from previous page

Study Citation:	BASF AG. 1989. Department of Ecology, unpublished data, project No. 1035/88.
Data Type:	Acute (0-96 hour); Aquatic; Plants
Hero ID:	5079090

Domain	Metric	Rating†	MWF⋆	Score	Comments††

⋆ MWF = Metric Weighting Factor
† High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.
‡ The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

$$\text{Overall rating} = \begin{cases} 4 & \text{if any metric is Unacceptable} \\ \left\lfloor \sum_i (\text{Metric Score}_i \times \text{MWF}_i) \,/\, \sum_j \text{MWF}_j \right\rceil_{0.1} & \text{(round to the nearest tenth) otherwise} \end{cases},$$

where High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3. If the reviewer determines that the overall rating needs adjustment, the original rating is crossed out and an arrow points to the new rating.
†† Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.