DP Barcode : D180706
PC Code No : 111601
EEB Out : OCT 1 1993

To: Bruce Sidwell
Product Manager 53
Special Review and Reregistration Division (H7508W)

From: Anthony F. Maciorowski, Chief
Ecological Effects Branch/EFED (H7507C)

Attached, please find the EEB review of...

Reg./File # : 111601-000707
Chemical Name : Oxyfluorfen
Type Product : Herbicide
Product Name : Goal Technical Herbicide
Company Name : Rohm and Haas Company
Purpose : Submission of oyster shell deposition study in support of reregistration of List B, Case No. 2490. (Submitted as 6(a)(2) data.)
Action Code : 625 Date Due : 08/10/92
Reviewer : R. Felthousen Date In : 07/02/92

EEB Guideline/MRID Summary Table: The review in this package contains an evaluation of the following:

GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT
71-1(A)			72-2(A)			72-7(A)		
71-1(B)			72-2(B)			72-7(B)		
71-2(A)			72-3(A)			122-1(A)		
71-2(B)			72-3(B)	423789-01	Y	122-1(B)		
71-3			72-3(C)			122-2		
71-4(A)			72-3(D)			123-1(A)		
71-4(B)			72-3(E)			123-1(B)		
71-5(A)			72-3(F)			123-2		
71-5(B)			72-4(A)			124-1		
72-1(A)			72-4(B)			124-2		
72-1(B)			72-5			141-1		
72-1(C)			72-6			141-2		
72-1(D)						141-5		

Y=Acceptable (Study satisfied Guideline)/Concur
P=Partial (Study partially fulfilled Guideline but additional information is needed
S=Supplemental (Study provided useful information but Guideline was not satisfied)
N=Unacceptable (Study was rejected)/Nonconcur

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DP BARCODE: D180706 REREG CASE # 2490

CASE: 816380 DATA PACKAGE RECORD DATE: 07/16/92
SUBMISSION: S421969 BEAN SHEET Page 1 of 1

* * * CASE/SUBMISSION INFORMATION * * *

CASE TYPE: REREGISTRATION ACTION: 625 6(A)(2) REREG. SPE. REVI
CHEMICALS: 111601 Oxyfluorfen (ANSI) 100.00 %

ID#: 111601-000707
COMPANY: 000707 ROHM & HAAS COMPANY
PRODUCT MANAGER: 53 BRUCE SIDWELL 703-308-8078 ROOM: CS1 3E3
PM TEAM REVIEWER: MARK WILHITE 703-308-8586 ROOM: CS1 3RD FL
RECEIVED DATE: 06/30/92 DUE OUT DATE: 07/30/92

* * * DATA PACKAGE INFORMATION * * *

DP BARCODE: 180706 EXPEDITE: N DATE SENT: 07/16/92 DATE RET.: / /
CHEMICAL: 111601 Oxyfluorfen (ANSI)
DP TYPE: 999 Miscellaneous Data Package
ADMIN DUE DATE: 08/10/92 CSF: N LABEL: N

ASSIGNED TO	DATE IN	DATE OUT
DIV : EFED	07/12/92	/ /
BRAN: EEB	07/12/92	/ /
SECT:	/ /	/ /
REVR :	/ /	/ /
CONTR:	/ /	/ /

* * * DATA REVIEW INSTRUCTIONS * * *

6a2 study gdln 72-3b MRID 42378901- Please review.

* * * ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION * * *

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL

2

ECOLOGICAL EFFECTS BRANCH

Chemical: Oxyfluorfen, Goal

100.0 Purpose of Submission

The Registrant (Rohm & Haas), has submitted a 96-hour shell deposition test for the eastern oyster (Crassostrea virginica) under Section 6(a)(2) of FIFRA, because the results indicate that oxyfluorfen, under the conditions of the test, was very highly toxic. The study is entitled: " Goal Technical Herbicide: A 96-Hour Shell Deposition Test with the Eastern Oyster (MRID# 42378901)."

101.0 Study Results

Based on mean measured concentrations and growth, relative to pooled control data, the 96-hour EC50 for eastern oysters exposed to Goal Technical was 0.0693 mg a.i./l. Therefore, Goal Technical is classified as very highly toxic to the eastern oyster. The NOEC was 0.0375 mg a.i./l.

102.0 Adequacy of Study

The study is scientifically sound and meets the 72-3(b) guideline requirement for a 96-hour flow-through mollusc shell deposition acute toxicity test (See attached DER).

103.0 Discussion

In accordance with Standard Operating Procedure (SOP) for reviewing Section 6(a)(2) data, the EEB must determine whether or not the results of the data indicate a presumption of high risk for the pesticide (See attached EEB memo dated 9/16/93). In this case, the EEB had previously presumed that Oxyfluorfen was toxic to mollusks (See previous EEB reviews as well as the USEPA Position Document No. 1-2-3 published in March, 1981). In addition, the Agency believed that there was cause for concern with regard to certain endangered mollusks found throughout the Mississippi River Basin. Therefore, results of this study support EEB's previous presumption of high risk, especially for endangered species.

The EEB has previously conducted a Section 7 formal consultation with the USFWS relative to the use of Goal herbicide (Larry Turner, personnel communication). The consultation was based upon the SWRBS/EXAMS II pond/stream exposure scenario, which indicated residues of 4.2 , 3.1 and 2.4 ppb are likely to occur in the pond, and stream sections 1 and 2, respectively.

Based upon the toxicity value obtained in this study (i.e., 69.3 ppb) the endangered species trigger would be 3.5 ppb (i.e., 69.3/20=3.5). As such, only residues in the pond (4.2 ppb) would exceed the endangered species criteria. However, because the endangered mussels primarily inhabit lotic environments (i.e., moving waters such as streams and rivers), the likelihood of exposure, as indicated in the pond scenario, is unlikely. In addition, chemistry data suggest that Oxyfluorfen binds tightly to soil thus further reducing exposure. As such, the EEB does not believe that there is any imminent and/or severe environmental deprivation to either endangered mussels/ mollusks or their environments.

As previously mentioned, the USFWS has rendered a biological opinion for Goal. This opinion did not find jeopardy for any endangered species (See EEB Endangered Species Biological Opinions). However, it is important to note, the opinion was based upon fish toxicity data (LC50 =1.5 ppm) and aquatic invertebrate data, for the <u>daphnia magna</u>(EC50 >200 ppb), which are considerably greater than the toxicity value for the oyster. Because the new data greatly changes the level of concern for endangered mussels/mollusks, and because the NOEC is less than EECs in lentic environments, a "may effect" situation exists and the Agency should reinitiate Section 7 consultation prior to the completion of the Reregistration Eligibility Document (RED) for Goal.

Richard W. Felthousen 9/28/93
Richard W. Felthousen, Wildlife Biologist
EFED/EEB

Norman J. Cook 09.29.93
Norm Cook, Head-Section 2
EFED/EEB

for Douglas D. Urban 10/1/93
Anthony F. Maciorowski, Chief
EFED/EEB

INDEPENDENCE MALL WEST PHILADELPHIA, PA. 19105, U.S.A. TELEPHONE (215) 592-3000
CABLE ADDRESS: ROHMHAAS TELEX 845-247 TWX 710-670-5335 TELECOPIER (215) 592-3377

ROHM AND HAAS COMPANY

June 25, 1992

423789- ØØ

U. S. Environmental Protection Agency
Document Processing Desk -6(a)(2)
Office of Pesticide Programs - H7504C
401 M Street, S.W.
Washington, D.C. 20460-0001

Gentlemen:

Subject: .Chemical Number 111601
.Chemical Name - Oxyfluorfen (GOAL®)
.Case Number 2490
.Report of Adverse Effect in The Eastern Oyster (Crassotrea virginica)

The attached report:

William C. Graves and James P. Swigert - GOAL® Technical Herbicide: A 96-Hour Shell Deposition Test with The Eastern Oyster (Crassostrea virginica) - Rohm and Haas Report No. 91RC-0175 - June 4, 1992 42378901

is submitted under FIFRA § 6(a)(2) since the results indicate oxyfluorfen, under the conditions of the test, was very highly toxic to the Eastern Oyster. The adverse effects described in this report are being submitted because oxyfluorfen is currently in reregistration.

Oxyfluorfen is highly toxic to many aquatic organisms in standard laboratory tests. However, oxyfluorfen binds tightly to soil and was not toxic to benthic organisms when they were exposed to soil treated with oxyfluorfen. Therefore, oxyfluorfen is not expected to pose an unreasonable risk to aquatic organisms when used according to label directions.

Sincerely,

W. T. Lynch

W. T. Lynch, Ph.D.
Product Registration Manager
Agricultural Chemicals Registration
and Regulatory Affairs Department

cc: Ms. Joanne I. Miller
U.S. EPA

Mr. Mark E. Wilhite
U.S. EPA

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MEMORANDUM SEP 16 1993

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

SUBJECT: Standard Operating Procedure for Reviewing 6a2 Studies

FROM: Anthony F. Maciorowski, Chief
Ecological Effects Branch

TO: Scientists,
Ecological Effects Branch
Environmental Fate and Effects Division (H7507)

When EEB receives the 6a2 studies for scientific review from SRRD or RD, a copy of the screen is attached to the action before it is distributed to the scientist for review. See guidance dated August 10, 1993 (attached).

The scientific review of 6a2 data may be documented in a memorandum format and should answer the following questions.

A. Do the results indicate a presumption of high risk for that pesticide?

1. If the answer to A is yes, do they:
   a. change the presumption of risk (i.e. indicate potential for high risk where previously risk was presumed to be low),
   b. support a previous presumption of high risk, or
   c. indicate the potential for high risk not previously concluded from data?

2. If the answer to A is yes, does the risk warrant immediate notification of the PM or RM? This may be the case if the risk, represented by the data, suggests imminent and severe environmental deprivation such as major dieoffs, massive habitat impact or adverse impacts to regional or national ecological populations or communities.

3. If the answer to A is no, include a statement that the results do not indicate high risk and that the results will be incorporated in future reviews

B. Do the results, by themselves, trigger need for higher tier testing?

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C. If the scientific review shows that the submitted 6a2 study is incomplete or supplemental, thereby rendering it less useful for assessing risk, identify the deficiencies and any additional information about the study that could enhance its usefulness.

D. Do the results from the scientific review differ from the original screen of the data (refer to copy of screen provided with review)? It is expected that occasionally the science review will arrive at a different conclusion that the initial screen since it involves a more in-depth analysis. In this case, the scientist should specifically note how their conclusions differ from the initial screen.

If you have questions, please contact Dan Rieder.

9/29/1993

MRID No. 423789-01

DATA EVALUATION RECORD

1. **CHEMICAL:** Oxyfluorfen. Shaughnessey Number: 111601.

2. **TEST MATERIAL:** Goal® Technical Herbicide; Lot No. 2-0956; TD No. 90-001; 71.4% active ingredient; red-brown semi-solid.

3. **STUDY TYPE:** 72-3. Mollusc 96-Hour, Flow-Through Shell Deposition Study. Species Tested: Eastern Oyster (*Crassostrea virginica*).

4. **CITATION:** Graves, W.C. and J.P. Swigert. 1992. Goal® Technical Herbicide: A 96-Hour Shell Deposition Test with the Eastern Oyster (*Crassostrea virginica*). Laboratory Project No. 129A-111A. Performed by Wildlife International Ltd., Easton, MD. Submitted by Rohm and Haas Company, Spring House, PA. EPA MRID No. 423789-01.

5. **REVIEWED BY:**

Rosemary Graham Mora, M.S.
Associate Scientist
KBN Engineering and
Applied Sciences, Inc.

Signature: Rosemary Graham Mora
Date: 9/21/93

6. **APPROVED BY:**

Louis M. Rifici, M.S.
Associate Scientist
KBN Engineering and
Applied Sciences, Inc.

Signature: Louis M Rifici
Date: 9/23/93

Henry T. Craven, M.S.
Supervisor, EEB/EFED
USEPA

Signature: Henry T. Craven
Date: 9/29/93

7. **CONCLUSIONS:** This study is scientifically sound and meets the guideline requirements for a 96-hour flow-through mollusc shell deposition acute toxicity test. Based on mean measured concentrations and growth relative to pooled control data, the 96-hour EC_{50} for eastern oysters exposed to Goal® Technical was 0.0693 mg a.i./l. Therefore, Goal® Technical is classified as very highly toxic to *Crassostrea virginica*. The NOEC was 0.0375 mg a.i./l.

8. **RECOMMENDATIONS:** N/A.

9. **BACKGROUND:**

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10. **DISCUSSION OF INDIVIDUAL TESTS:** N/A.

11. **MATERIALS AND METHODS:**

A. **Test Animals:** Eastern oysters (*Crassostrea virginica*) were obtained from P. Cummins Oyster Company, Pasadena, MD. The oysters appeared to be in good physical condition and showed no signs of stress or disease. The oysters were maintained for at least 10 days in unfiltered natural seawater with a salinity of 23-25 parts per thousand (ppt), a pH of 7.8-8.0, and a temperature of 21.4-23.1°C. During holding and throughout the study, supplemental algae (*Thalassiosira sp.*) were added to enhance the condition and growth of the oysters. The oysters had a mean length of 33 mm (range of 28 to 45 mm). Pre-test mortality was 1%.

B. **Test System:** The test system consisted of a continuous-flow, proportional diluter and 7 test vessels. The test chambers were Teflon-lined 56-l polyethylene aquaria containing 12.6 l of test solution (solution depth of 7 cm). A peristaltic pump was used to deliver each stock solution to a mixing chamber where it was mixed with dilution water. One liter of solution/oyster/hour was delivered to each test chamber which was equivalent to 38 exchanges/day. The test system was operated for 67 hours prior to test initiation.

Test aquaria were randomly positioned in a temperature-controlled water bath (22 ±1°C) which was enclosed in a ventilation hood to minimize potential cross-contamination. The test was conducted under fluorescent lighting on a 16-hour light (30 footcandles) and 8-hour dark photoperiod. Thirty-minute dawn and dusk transition periods were provided.

The dilution water was natural unfiltered seawater from the Indian River Inlet, DE, diluted with well water to a salinity of 24-25 ppt. The pH was 8.0.

One stock solution was prepared for each test concentration. A primary stock solution (7.48 mg a.i./ml) was prepared in acetone and constituted one diluter stock solution. This primary stock solution was diluted with acetone to prepare the four remaining diluter stock solutions.

C. **Dosage:** Ninety-six-hour flow-through acute test. The nominal concentration series selected for this study

was 0.0518, 0.0866, 0.1438, 0.2400, and 0.3998 mg a.i./l. A dilution water control and a solvent control (0.07 ml acetone/l) were also included.

D. **Design:** Immediately prior to test initiation, 1-7 mm of the shell periphery of the oysters were removed. The test was initiated when 20 oysters were impartially selected, by twos, and distributed to each test chamber. One replicate was used per concentration.

Measurements of new shell growth (to the nearest 0.05 mm) were recorded at 96 hours. Dissolved oxygen concentration (DO), salinity, and pH were measured in each chamber at 0, 48, and 96 hours. Temperature was measured in each chamber at 0 and 96 hours, and was also monitored continuously in the control.

Samples collected at 0, 48, and 96 hours were analyzed, using gas chromatography, to determine concentration of test material in the exposure solutions.

E. **Statistics:** There was no significant difference between the dilution water control and the solvent control growth (t-test), therefore, the control data were pooled. New shell growth inhibition for each treatment was determined relative to pooled control data. The 96-hour EC_{50} value and its 95% confidence intervals were calculated using a computer program developed by C.E. Stephan.

12. **REPORTED RESULTS:** Mean measured concentrations were 0.0375, 0.0622, 0.0985, 0.1892, and 0.2197 mg a.i./l (Table 1, attached). Mean measured concentrations represent 55-79% of nominal concentrations. "Although there was a film on the surface of the water in the mixing chambers, all test chambers appeared to be free of colloidal and particulate materials."

Following 96 hours of exposure, the dilution water control and solvent control oysters had a mean new shell growth of 3.90 and 3.39 mm, respectively (Table 4, attached). Based on mean measured concentrations and growth inhibition relative to pooled control data, the 96-hour EC_{50} (95% confidence interval) was 0.0693 (0.0622-0.0985) mg a.i./l.

During the test period, the pH was 7.8-8.1, DO was 6.3-7.5 mg/l (>60% of saturation), the temperature was 20.4-22.6°C, and the salinity was 25-27 ppt.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:** No conclusions were made by the authors.

GLP Compliance and Quality Assurance Statements were included in the report, indicating that the study was conducted in accordance with 40 CFR, Part 160.

14. **REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:**

A. **Test Procedure:** The test procedures were generally in accordance with the SEP, but deviated as follows:

In this study, the flow rate of the test solution to each test chamber was 1 l/oyster/hour. According to protocols recommended by the SEP (APHA, 1981 and EPA, 1976) each oyster should receive a minimum of 5 l of "once-through" flow through test solution per hour. However, for this study it is acceptable since the control oysters met the minimum new shell growth requirement (2 mm).

The dimensions of the test vessels were not reported.

B. **Statistical Analysis:** EPA's Toxanal computer program was used to calculate the 96-hour EC_{50} and its 95% confidence interval using percentage growth reduction relative to the solvent control. The 96-hour EC_{50} (95% confidence interval) was 0.0714 (0.066-0.077) mg a.i./l (printout, attached). This EC_{50} value is similar to that presented by the authors.

The new shell growth data failed the assumptions of homogeneity of variances and normality (Hartley or Bartlett's test and chi-square test, respectively). Therefore, the reviewer determined the NOEC using Steel's Many-One Rank test (printouts, attached). Based on new shell growth relative to the solvent control oysters, the NOEC was 0.0375 mg a.i./l. The author did not report an NOEC.

C. **Discussion/Results:** This study is scientifically sound and meets the guideline requirements for a 96-hour flow-through mollusc shell deposition acute toxicity test. Based on mean measured concentrations and growth relative to pooled control data, the EC_{50} for eastern oysters exposed to Goal® Technical was 0.0693 mg a.i./l. Therefore, Goal® Technical is classified as very highly toxic to *Crassostrea virginica*. The NOEC was 0.0375 mg a.i./l.

D. **Adequacy of the Study:**

(1) **Classification:** Core.

(2) **Rationale:** N/A.

(3) **Repairability:** N/A.

15. **COMPLETION OF ONE-LINER:** Yes, September 9, 1992.

RIN 0637-00

EFED Review - Oxyfluorfen

Page____ is not included in this copy.

Pages 13 through 15 are not included.

The material not included contains the following type of information:

____ Identity of product inert ingredients.

____ Identity of product impurities.

____ Description of the product manufacturing process.

____ Description of quality control procedures.

____ Identity of the source of product ingredients.

____ Sales or other commercial/financial information.

____ A draft product label.

____ The product confidential statement of formula.

____ Information about a pending registration action.

X FIFRA registration data.

____ The document is a duplicate of page(s) _____.

____ The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

Shaughnessey # 111601 Chemical Name Oxyfluorfen Chemical Class _____ Page 1 of 1

Study/Species/Lab/ MRID #	Chemical % a.i.	Results	Reviewer/ Date	Validation Status
48-Hour EC_{50}	_____	EC_{50} = pp 95% C.L. ( ) Control Mortality (%) = Solvent Control Mortality (%) = Slope = # Animals/Level = Temperature = 48-Hour Dose Level pp /(% Effect) ( ), ( ), ( ), ( ), ( ) Comments:	_____	_____
96-Hour EC_{50}	71.4%	EC_{50} = 0.0693 pp m* 95% C.L. binomial (0.0622 – 0.0985) Control Mortality (%) = 0 Solvent Control Mortality (%) = 0 Slope = NA # Animals/Level = 20 Temperature = 25-27°C 9/9/92 Core Lab: Wildlife International 96-Hour Dose Level pp m*/(% Effect)@ 0.0375(17.7), 0.0622(43.1), 0.0985(71.2), 0.1892(100), 0.2197(98.4) Comments: * Mean measured concentrations. @ Relative to pooled control data.		

Species: Crassostrea virginica

MRID # 423789-01

Goal Technical: GROWTH OF EXPOSED EASTERN OYSTERS
File: c:42378901.oys Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	9.380	33.880	53.480	33.880	9.380
OBSERVED	3	30	74	22	11

Calculated Chi-Square goodness of fit test statistic = 17.1028
Table Chi-Square value (alpha = 0.01) = 13.277

Data FAIL normality test. Try another transformation.

Warning - The two homogeneity tests are sensitive to non-normal data and should not be performed.

Goal Technical: GROWTH OF EXPOSED EASTERN OYSTERS
File: c:42378901.oys Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

Goal Technical: GROWTH OF EXPOSED EASTERN OYSTERS
File: c:42378901.oys Transform: NO TRANSFORMATION

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	Solvent Control	3.390				
2	D.W. Control	3.898	450.00	325.00	20.00	
3	0.0375 mg/l	3.000	376.00	325.00	20.00	
4	0.0622 mg/l	2.067	292.00	325.00	20.00	*
5	0.0985 mg/l	1.050	231.00	325.00	20.00	*
6	0.1892 mg/l	0.000	210.00	325.00	20.00	*
7	0.2197 mg/l	0.077	210.00	325.00	20.00	*

Critical values use k = 6, are 1 tailed, and alpha = 0.05

Goal Technical C.virginica

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.2197	100	98	98	0
.1892	100	100	100	0
.0985	100	69	69	0
.0622	100	39	39	0
.0375	100	12	12	0

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 7.348741E-02

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	1.131244E-02	7.128738E-02	6.566384E-02	7.679081E-02

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
3	2.150214E-02	1	.2053817

SLOPE = 4.521994
95 PERCENT CONFIDENCE LIMITS = 3.858906 AND 5.185081

LC50 = 7.141678E-02
95 PERCENT CONFIDENCE LIMITS = 6.604758E-02 AND 7.699871E-02

LC10 = 3.740681E-02
95 PERCENT CONFIDENCE LIMITS = .0323001 AND 4.198503E-02

TITLE: Goal Technical: GROWTH OF EXPOSED EASTERN OYSTERS
FILE: c:42378901.oys
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 7

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Solvent Control	1	2.7000	2.7000
1	Solvent Control	2	2.2500	2.2500
1	Solvent Control	3	2.1000	2.1000
1	Solvent Control	4	4.2500	4.2500
1	Solvent Control	5	4.6500	4.6500
1	Solvent Control	6	2.2500	2.2500
1	Solvent Control	7	1.8500	1.8500
1	Solvent Control	8	4.0000	4.0000
1	Solvent Control	9	5.9500	5.9500
1	Solvent Control	10	2.8500	2.8500
1	Solvent Control	11	4.2500	4.2500
1	Solvent Control	12	4.0500	4.0500
1	Solvent Control	13	3.3000	3.3000
1	Solvent Control	14	3.6000	3.6000
1	Solvent Control	15	2.1000	2.1000
1	Solvent Control	16	2.0000	2.0000
1	Solvent Control	17	2.4500	2.4500
1	Solvent Control	18	4.1500	4.1500
1	Solvent Control	19	6.0000	6.0000
1	Solvent Control	20	3.0500	3.0500
2	D.W. Control	1	3.9000	3.9000
2	D.W. Control	2	4.6500	4.6500
2	D.W. Control	3	4.0500	4.0500
2	D.W. Control	4	3.8500	3.8500
2	D.W. Control	5	6.9000	6.9000
2	D.W. Control	6	3.6000	3.6000
2	D.W. Control	7	3.2000	3.2000
2	D.W. Control	8	4.0500	4.0500
2	D.W. Control	9	3.0500	3.0500
2	D.W. Control	10	2.2500	2.2500
2	D.W. Control	11	4.4500	4.4500
2	D.W. Control	12	3.5000	3.5000
2	D.W. Control	13	4.4000	4.4000
2	D.W. Control	14	1.7000	1.7000
2	D.W. Control	15	2.7000	2.7000
2	D.W. Control	16	7.6000	7.6000
2	D.W. Control	17	3.4500	3.4500
2	D.W. Control	18	3.9000	3.9000
2	D.W. Control	19	2.8000	2.8000
2	D.W. Control	20	3.9500	3.9500
3	0.0375 mg/l	1	3.2500	3.2500
3	0.0375 mg/l	2	3.6500	3.6500
3	0.0375 mg/l	3	1.4500	1.4500
3	0.0375 mg/l	4	5.9500	5.9500
3	0.0375 mg/l	5	3.6000	3.6000
3	0.0375 mg/l	6	2.5500	2.5500
3	0.0375 mg/l	7	2.4500	2.4500
3	0.0375 mg/l	8	2.9000	2.9000
3	0.0375 mg/l	9	3.4000	3.4000

3	0.0375 mg/l	10	1.7000	1.7000
3	0.0375 mg/l	11	1.9500	1.9500
3	0.0375 mg/l	12	3.6500	3.6500
3	0.0375 mg/l	13	2.3500	2.3500
3	0.0375 mg/l	14	3.3500	3.3500
3	0.0375 mg/l	15	2.3000	2.3000
3	0.0375 mg/l	16	3.6000	3.6000
3	0.0375 mg/l	17	4.0500	4.0500
3	0.0375 mg/l	18	2.7500	2.7500
3	0.0375 mg/l	19	2.0500	2.0500
3	0.0375 mg/l	20	3.0500	3.0500
4	0.0622 mg/l	1	2.7000	2.7000
4	0.0622 mg/l	2	1.6000	1.6000
4	0.0622 mg/l	3	1.6500	1.6500
4	0.0622 mg/l	4	1.8500	1.8500
4	0.0622 mg/l	5	1.2000	1.2000
4	0.0622 mg/l	6	3.3000	3.3000
4	0.0622 mg/l	7	2.2000	2.2000
4	0.0622 mg/l	8	3.4000	3.4000
4	0.0622 mg/l	9	1.9500	1.9500
4	0.0622 mg/l	10	2.7000	2.7000
4	0.0622 mg/l	11	2.3000	2.3000
4	0.0622 mg/l	12	2.1000	2.1000
4	0.0622 mg/l	13	2.7500	2.7500
4	0.0622 mg/l	14	2.5500	2.5500
4	0.0622 mg/l	15	2.5000	2.5000
4	0.0622 mg/l	16	0.8500	0.8500
4	0.0622 mg/l	17	1.1000	1.1000
4	0.0622 mg/l	18	2.9000	2.9000
4	0.0622 mg/l	19	0.0000	0.0000
4	0.0622 mg/l	20	1.7500	1.7500
5	0.0985 mg/l	1	0.0000	0.0000
5	0.0985 mg/l	2	1.0000	1.0000
5	0.0985 mg/l	3	0.7000	0.7000
5	0.0985 mg/l	4	1.1000	1.1000
5	0.0985 mg/l	5	0.0000	0.0000
5	0.0985 mg/l	6	0.4000	0.4000
5	0.0985 mg/l	7	1.6500	1.6500
5	0.0985 mg/l	8	0.0000	0.0000
5	0.0985 mg/l	9	3.0500	3.0500
5	0.0985 mg/l	10	0.8500	0.8500
5	0.0985 mg/l	11	1.5000	1.5000
5	0.0985 mg/l	12	0.0000	0.0000
5	0.0985 mg/l	13	1.9000	1.9000
5	0.0985 mg/l	14	2.0500	2.0500
5	0.0985 mg/l	15	1.2500	1.2500
5	0.0985 mg/l	16	0.0000	0.0000
5	0.0985 mg/l	17	1.7000	1.7000
5	0.0985 mg/l	18	1.0000	1.0000
5	0.0985 mg/l	19	0.0000	0.0000
5	0.0985 mg/l	20	2.8500	2.8500
6	0.1892 mg/l	1	0.0000	0.0000
6	0.1892 mg/l	2	0.0000	0.0000
6	0.1892 mg/l	3	0.0000	0.0000
6	0.1892 mg/l	4	0.0000	0.0000
6	0.1892 mg/l	5	0.0000	0.0000
6	0.1892 mg/l	6	0.0000	0.0000
6	0.1892 mg/l	7	0.0000	0.0000
6	0.1892 mg/l	8	0.0000	0.0000
6	0.1892 mg/l	9	0.0000	0.0000

6	0.1892 mg/l	10	0.0000	0.0000
6	0.1892 mg/l	11	0.0000	0.0000
6	0.1892 mg/l	12	0.0000	0.0000
6	0.1892 mg/l	13	0.0000	0.0000
6	0.1892 mg/l	14	0.0000	0.0000
6	0.1892 mg/l	15	0.0000	0.0000
6	0.1892 mg/l	16	0.0000	0.0000
6	0.1892 mg/l	17	0.0000	0.0000
6	0.1892 mg/l	18	0.0000	0.0000
6	0.1892 mg/l	19	0.0000	0.0000
6	0.1892 mg/l	20	0.0000	0.0000
7	0.2197 mg/l	1	0.5000	0.5000
7	0.2197 mg/l	2	0.5000	0.5000
7	0.2197 mg/l	3	0.4000	0.4000
7	0.2197 mg/l	4	0.1500	0.1500
7	0.2197 mg/l	5	0.0000	0.0000
7	0.2197 mg/l	6	0.0000	0.0000
7	0.2197 mg/l	7	0.0000	0.0000
7	0.2197 mg/l	8	0.0000	0.0000
7	0.2197 mg/l	9	0.0000	0.0000
7	0.2197 mg/l	10	0.0000	0.0000
7	0.2197 mg/l	11	0.0000	0.0000
7	0.2197 mg/l	12	0.0000	0.0000
7	0.2197 mg/l	13	0.0000	0.0000
7	0.2197 mg/l	14	0.0000	0.0000
7	0.2197 mg/l	15	0.0000	0.0000
7	0.2197 mg/l	16	0.0000	0.0000
7	0.2197 mg/l	17	0.0000	0.0000
7	0.2197 mg/l	18	0.0000	0.0000
7	0.2197 mg/l	19	0.0000	0.0000
7	0.2197 mg/l	20	0.0000	0.0000