

US EPA ARCHIVE DOCUMENT

## IRB BRANCH REVIEW - TSS

Record Number(s)

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D227692  
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7/2/96  
IN 8/8/96 COT 10/3/96

EFFICACY

66550-1  
FILE OR REG. NO.

PETITION OR EXP. PERMIT NO.

4/17/96, 5/14/96, 6/26/96, 7/11/96  
DATE DIV. RECEIVED

4/9/96, 5/10/96, 6/18/96, 7/6/96  
DATE OF SUBMISSION

7/2/96, 10/3/96  
DATE SUBMISSION ACCEPTED

TYPE PRODUCTS(S): I, D, E, F, N, R<sub>x</sub> S

440554-01  
DATA ACCESSION NO(S)

PRODUCT MER. NO.

BIRD SHIELD® BIRD REPELLENT CONCENTRATE  
PRODUCT NAME(S)

Bird Shield Repellent Corporation  
COMPANY NAME

Add claims to label, show us labels now being used  
SUBMISSION PURPOSE

26.4% Methyl Anthranilate liquid concentrate  
CHEMICAL & FORMULATION

Efficacy Review: BIRD SHIELD REPELLENT CONCENTRATE, 66550-1

Applicant:

Dolphin Trust  
Pullman, WA 99163

Producer:

Bird Shield Repellent Corporation  
Pullman, WA 99163

200.0 INTRODUCTION

200.1 Uses

A 26.4% Methyl Anthranilate concentrate Federally registered to

"limit feeding by robins (*Turdus migratorius*), starlings (*Sturnus vulgaris*), Cedar waxwings (*Bombycilla cedrorum*), jays, magpies and crows (*Corvidae*), ravens (*Corvus spp.*), finches and sparrows (*Fringillidae*) and other types of fruit-eating birds on ripening cherries, blueberries, and grapes.

Applications to ripening fruit are to be made by a "commercial or back-pack sprayer" or by "hand-held hose or pressure applicator."

200.2 Background Information

See efficacy reviews of 6/9/93, 5/5/95, and 9/28/95. In the first of these reviews, I accepted claims for repelling robins, starlings, cedar waxwings, and "native sparrows (Family *Fringillidae*)" from blueberries, cherries, and grapes. As the data examined were very limited in scope, my acceptance of these claims was most generous and a bit foolhardy.

In the efficacy review of 5/5/95, I examined data pertaining to a proposed use in water impoundments but did not accept any such claims at that time, noting various insufficiencies in the reporting of the data. I also noted that no data had been submitted to support the formerly proposed claim that the product repels starlings and swallows "from structures, roost and nest sites." I consider these to be public health claims which must be supported by efficacy data.

The efficacy review of 9/28/95 considered another efficacy report (MRID# 437202-01, submitted 7/10/95) pertaining to the proposed water impoundment use, the applicant's

submission of 9/22/94 (which pertained to the study reported under MRID# 437202-01), and assorted other items. In that review, I concluded that the data reported suggested that concentration-dependent repellency of ducks (mallards) and geese (Canada) did occur. The effect clearly was present when at least 500 ml of concentrate were used for every 190 gallons of water in the body being treated. I reached no conclusions (as none were possible) with respect to the effects of this product, at any concentration, on pelicans, loons, grebes, cormorants, swans, albatrosses, or on any "other water using birds" (see below).

This product was conditionally registered on 10/3/95. Subsequently, other labels submitted for this product were "ACCEPTED with COMMENTS" on 11/15/95 (when most of us were furloughed) and 3/28/96. The registrant was required to delete from the label "ACCEPTED with COMMENTS" on 3/28/96 all claims and directions pertaining to proposed claims for use of the product in

"non-fishbearing bodies of water at, on or within airports."

This review addresses the items listed below.

1. A submission of 4/9/96 which includes copies of a proposed revised label and a brief technical report (no MRID#) pertaining to tank mixing of 66550-1 with "*Bacillus thuringensis* formulations."
2. A submission of 5/10/96 which includes copies of "two labels as they appear on the finished product" (which, as noted by the PM Team staffer, do not correspond to the last accepted label).
3. A submission of 6/25/96 which includes copies of a proposed revised label pertaining to use of the product "on non-fishbearing bodies of water (airports)" and what appear to be copies of items related to the study that was discussed in the efficacy review of 9/18/95.
4. A submission of 7/6/96 which includes a proposed revised label and efficacy information pertaining to a proposed use of the product "on turfgrass to reduce feeding by birds".

Methyl Anthranilate (MA, hereafter) is a GRAS listed material which, nevertheless, poses certain ocular, oral, and inhalation hazards. The current accepted label for 66550-1 states that the product "Causes substantial but temporary eye injury" and is "Harmful if swallowed." The

label also requires handlers to wear safety glasses and a specific type of respirator. OPP has determined that MA is a "biochemical" worthy of reduced registration data requirements. However, the signal word on the accepted label for 66550-R is "WARNING".

## 201.0 DATA SUMMARY

In addition to MA, this product also would contain

Ingredients which perform only these functions are considered to be inerts.

### Tank Mixing with B. t.

The materials submitted to support this change consist of a cover letter from Sandoz Agro, Inc. with two pages of attachments which appear to describe the methods and results of a trial which, according to the cover letter,

"shows potential for future use but it is not intended to support a formal label use change by Bird Shield."

The attachment page which shows trials results states that there was "NO EFFECT ON POTENCY OR LC50" (presumably of the B.t. component) for a mixture of Bird Shield with a B.t. product. There certainly is no information here to suggest that Bird Shield weakens B.t., but there is no information at all on the issue of whether the two products might interact in ways that might diminish the effectiveness of the mixture as a bird repellent, that might cause problems with spray equipment, or that might cause other problems. As I have not been considering the fruit-protection uses of this product to be of significance to public health, these are not areas in which acceptance of label changes normally would be delayed pending receipt of data addressing the physical and bird-repellent properties of mixture. Prior to the implementation of EPA's original efficacy waiver policy in 1979, such data would have been expected to be part of the amendment request.

On the proposed revised label submitted with respect to this issue, the non-sentence

\*Inert ingredient information may be entitled to confidential treatment\*

"May be mixed with *Bacillus thuringensis* formulations."

has been inserted near the end of the "Preparation and Mixing Directions" paragraph in the "DIRECTIONS FOR USE", immediately in front of the sentence

"Do not mix with other pesticides or fertilizers."

Another differences between that proposed revised label and the one which EPA "ACCEPTED with COMMENTS" on 3/28/95 is the moving of the last two sentences of the second paragraph of the application directions for "Blueberries, cherries and grapes" to make a third paragraph under the same subheading.

I have no strong objections to either of these changes, but I would prefer that the B.t. item be expressed as a complete sentence, such as

"This product may be mixed with *Bacillus thuringensis* formulations."

#### Labels Submitted on 5/10/96

The labels submitted on 5/10/96 include one, for 66550-1, on which Bird Shield Repellent Corporation is identified as the company and another, for 66550-1-6438, which is attributed to Schall Chemical, Inc., of Monte Vista, CO. While these labels mimic one another in most respects, both differ in many respects from the label that was "ACCEPTED with COMMENTS" on 3/28/96. These labels also do not correspond to the labels "ACCEPTED with COMMENTS" on 10/3/95 or on 11/15/95. Therefore, the "labels as they appear on the finished product" submitted on 5/10/96 never were accepted. It appears to me, therefore, that any sale or distribution of this product under either of these labels would be illegal as both labels would misbrand the product. Probably the worst problem on the labels submitted on 5/10/96 is the altering of the required signal word headings to the precautionary labeling from

**"WARNING  
KEEP OUT OF REACH OF CHILDREN"**

to

**"WARNING: BIODEGRADABLE MATERIAL  
Use by 6/1/97"**

**KEEP OUT OF REACH OF CHILDREN".**

By virtue of this alteration, what was intended to be a stern introduction to information about the product's potential risks to humans was transformed into language which applies that the main reason for the "WARNING" is the likelihood that the product will only remain good for a year or so.

If such has not occurred already, Bird Shield Corporation must be told immediately that all sale and distribution of 66550-1, or any other pesticide product, under either of the labels submitted on 5/10/96 is illegal. I am not going to dwell on other problems with these labels as I feel that my review time would be more productively and appropriately spent on the changes proposed by Bird Shield to the label text that EPA accepted on 3/28/96. Should an enforcement action be initiated against Bird Shield for use of improper labels such as those submitted on 5/10/96, I will review and discuss all discrepancies at that time, if requested to do so.

Use "on non-fishbearing bodies of water (airports)"

The items in the efficacy volume (MRID# 437202-01) included in the submission of 7/10/95 were discussed individually in the efficacy review of 9/28/95. For the sake of convenience, the discussions from that review are repeated below.

The citation for the each item in that volume is given, followed by a separate discussion of the item.

1. Askham, L.R. (1995a) Effective repellency concentration (EC<sub>50</sub>) of Bird Shield Repellent\* with Methyl Anthranilate to exclude ducks and geese from water impoundments. Ms., Dept. Horticulture and Landscape Architecture, Washington State University, Pullman, WA.

The text of this document corresponds very closely to the document discussed in the efficacy review of 5/5/95. The version reviewed earlier (MRID# 435528-01), was a 5-page document presented in a form intended for publication in: Masters, R. (ed.) Proceedings: 12th Great Plains Wildlife Damage Control Workshop. The version submitted on 7/10/95 appears to be an earlier draft of the same report which lacks a few footnotes and thus is reduced to 4 pages in length. However, the version submitted on 7/10/95 also includes 16 pages of raw data sheets, assorted "GLP" items, and an "APPENDIX" which consists of a separate published report on another company's MA products. In this review, I have elected to discuss that report as a separate document.

As noted in the efficacy review of 5/5/95, the first page and some of the second page of Askham's report are devoted to the abstract and introduction sections. The "meat" of the report ("**Materials and methods**", "**Results**", and "**Discussion**" sections) comprises less than 2 pages of text, with no data tables or figures being presented. I noted in the earlier review that the addition of raw data and other information regarding this study might make it sufficient to support some sort of claim, but allowed that any such claim might be quite limited.

The trials were conducted in two outdoor aviaries ("12.5 ft. X 7.0 ft. X 42 ft." in size). Three circular "children's wading pools" 4'8" in diameter were placed in the aviaries. Five barnyard geese (Anser? domesticus) were placed in one aviary and 9 mallards (Anas platyrhynchos) were placed in the other. Initially, untreated water (50 gal, or 190 L) was placed in each pool. During treatment phases, measured amounts of Bird Shield were added to two of the pools, while the third remained untreated. Periods of time in which some or all of the pools were treated with one or another amount of product occasionally were interrupted by "buffer" periods in which all three pools in each aviary were filled with untreated water. The locations of treatments and the amounts of product added to the various pools were changed from time to time.

The various test phases run gave Askham the opportunity to load the 25% MA product into pools in both aviaries once, according to the report, in each of the following amounts: 31 ml, 63 ml, 125 ml, 250 ml, 500 ml, and 1000 ml. According to notes appended to the report and to materials included with the submission of 9/22/95, the two lowest amounts added were 40 ml and 75 ml. Effects on pool use reportedly were assessed by direct(?) and videotaped observations, and

"by the amount of soil deposited from the feet of the birds in the bottoms and the number of feathers floating on the water of each pool."

Askham writes that essentially no effects on pool use were observed for the three lowest doses, which he calculated to have provided 90 ppm, 180 ppm, and 360 ppm, respectively, of MA(?). At the three highest doses (claimed to yield MA[?] concentrations of 727 ppm, 1445 ppm, and 2890 ppm), Askham writes that the total amount of pool use was reduced and



"Significant differences ( $p=0.01$ ) were recorded between the number of times both test species used the untreated pools and the treated pools. After an initial head dunking or drink all of the birds avoided the pools treated with the latter concentrations for the remainder of each trial period."

In the version of this report discussed in the efficacy review of 5/5/95, Askham did not present the numbers that were used to calculate the reported "Significant differences". If the second sentence quoted above describes what actually happened, the differences in data collected from treated and untreated pools should have been dramatic (all the more reason to wonder why the data were not shown). From his results, Askham reports that the EC<sub>50</sub> for Bird Shield (or MA?) "appears to be 727 ppm or greater" when the product is used "in standing pools of water".

I have examined the extra pages appended to the version of this report (MRID# 437202-01) in an effort to gain more information about how the research was conducted and what the results were.

The first document appended to Askham's report in MRID# 437202-01) is a 3-page item entitled

**"EFFECTIVE REPELLENCY CONCENTRATION EC<sub>50</sub> OF BIRD SHIELD REPELLENT<sup>(tm)</sup> WITH METHYL ANTHRANILATE TO EXCLUDE DUCKS AND GEESE FROM WATER IMPOUNDMENT'S.**

**Research Treatment and Observation Summary".**

This item presents a printed narrative of the schedule of events in the study, along with occasional qualitative descriptions of its results. This document is followed by three pages of "DAILY INSPECTION/FEEDING RECORD" forms on which longhand entries (check marks, brief statements, and initials) appear for 78 study days. Askham's initials appear on the forms for 67 days; initials of 4 other people appear for 10 other study days, including one stretch of 5 days in a row; and a check mark appears in the initials column for one day. Not all information appearing in the forms appears in the printed narrative (and *vice versa*). The sources of information in the narrative reportedly include "field notes and videotape on June 28" in addition to information on the "daily" forms. The forms indicate that the aforementioned videotaping occurred on 6/29/94 and dealt with "feeding & bathing activity." There reportedly was no Bird Shield in any pool in either aviary on 6/28 or 6/29/94.

From these documents, I have learned that 11 ducks and 5 geese originally were obtained from the Army Corps of Engineers, but that 3 ducks "died from Alpha-chloralose trt by Corps." One goose was reported to be "slow to recover", but the next day's report said "all birds O.K." (Alpha-chloralose, a tranquilizer used in bird collection and control work, has been classified as an animal drug rather than as a vertebrate pesticide.) This left 8 ducks and 5 geese for the study. A duck and its two newly hatched ducklings were removed from the pen prior to the end of the study. Askham fooled around a bit with diets during the acclimation periods and subsequently, ultimately feeding the birds wheat, rabbit chow, fresh lettuce, and cabbage (which the birds "Don't like").

The water in the little pools was changed every 1-8 days, apparently depending upon the whether there was to be a change in treatment condition or whether there was considerable fouling of the water by "soil, feathers, food, and feces". Due apparently to differential rates of contamination, untreated pools were changed more often than treated ones.

The Bird Shield product was added to the three pools in various amounts according to the schedule indicated below.

DATE	VOLUME OF BIRD SHIELD ADDED		
	<u>Pool #1</u>	<u>Pool #2</u>	<u>Pool #3</u>
5/24/94	75 ml	125 ml	0
6/3/94	1000 ml	1000 ml	0
6/15/94	0	500 ml	500 ml
6/25/94	500 ml	500 ml	0
6/30/94	250 ml	0	250 ml
7/1/94	40 ml	75 ml	125 ml
7/12/94	250 ml	500 ml	0
7/17/94	0	0	250 ml

I searched the daily narrative report document and the "DAILY INSPECTION/FEEDING RECORD" forms in vain for any quantitative information which might have been used in the statistical analysis mentioned in Askham's report. The log documents are consistent with the qualitative descriptions in Askham's report of birds' responses to Bird Shield

treatments at the higher rates, 500 and 1000 ml of product. These descriptions include cessation of drinking after 2-3 tries, head-shaking, "honking and quacking", "bowing and rubbing" (bills?) on ground and sides of pool, and transfer of all water-related activity to untreated pools. In contrast to Askham's report, the printed narrative indicates that the 250-ml treatments did not affect the behavior of the geese and ducks used in this study.

Askham writes that, in pools given Bird Shield treatments of 63 ml or greater, a "uniform brown precipitate or residue" formed within a day of application, but adds that

"None precipitated to the bottom of the pools nor coalesced on top of the water as noted in the Re-JeX-iT trials."

"Re-JeX-iT" is a trade name for another company's MA products, some of which already are registered. Askham's discussions claim that Bird Shield's "patented" formulation disperses in water better than do the Re-JeX-iT products that have been tested in pools, puddles, and impoundments.

The printed log and the "DAILY INSPECTION/FEEDING RECORD" forms both report that the 500- and 1000-ml treatments imparted a strong odor to the pools.

Accepted at face value, Askham's report only states that captive mallards and barnyard geese do not seem to like water in a child-size wading pool if it has been treated with Bird Shield at a level of 250 ml/190 L (1.32 ml/L). Even this statement is called into question by Askham's notes which indicate that the 500-ml treatments were effective, but the 250-ml treatments were not.

The next 5 documents appended to Askham's report consist of protocols, and animal welfare and other administrative documents. None of these items includes data which could have been used in the statistical analysis to which Askham's report refers.

On 9/7/95, I called Askham and asked him whether he had collected any numerical efficacy data and run any statistical analyses. He said that he was not sure that he had, [REDACTED]

[REDACTED] I also asked him about the discrepancy between the report and the notes regarding the effectiveness of the 250-ml treatments.

A few days later, Askham called me, said that [REDACTED] he thought that he understood what I was looking for, and reported that data

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on pool entries had been collected and had been analyzed statistically. He said that he had an ongoing field trial to attend to immediately but that he would send in the raw data as soon as possible. Because of their relevance to the study discussed above, I have chosen to discuss the data submitted by Askham on 9/22/95 next, ahead of the published Re-JeX-iT report which appears in the end of the volume assigned MRID# 437202-01.

2. Askham, L. (1995b) September 22 letter, with attachments to "Bill Jacobs, Ph.D.", U.S. Environmental Protection Agency. Bird Shield Repellent Corporation, Pullman, WA, 1 p plus 43 pp. of attachments. (This letter is introduced by a 1-p. letter of 9/22/95 from Askham to Dan Peacock, also of EPA, PM Team 14.)

Askham's letter itself is very brief, consisting largely of a retelling of [REDACTED] information on the new field trial, and the data validation circumstances which delayed his response a bit. Forty-one pages of the attachments consist of a collection of "true copies of the field notes", these notes being different from those that were included in the volume assigned MRID# 437202-01. The other two attached pages were a note dated 9/11/95 which introduces the "true copies" and a page entitled "PROBABILITY OF RANDOM SELECTION BY TWO SPECIES OF BIRDS DURING A WATER REPELLENCY TRIAL" on which two sets of Chi-Square contingency tables are presented along with results reported for analyses of the data on the tables.

The raw data sheets indicate that data on pool entry were collected only during two 30-minute observation periods (one in the 8:00-9:30 AM time frame and the other between during the 3:00-4:30 PM time frame) on certain days. One of these days invariably was the day of treatment (or of replacing all treatments with cleaned pools containing fresh water). If there was a second day of pool entry observations, the day chosen usually (3 of 4 cases) was the day following the day of treatment or return to the "buffer" condition. Results for the remaining days under a treatment condition are described in notes, but systematic counts of pool entries are absent. Distinct half-hour intervals were set aside for making pool entry counts for the duck and goose pens.

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Treatment Rate (ml/50 gal)	<u>DUCKS</u>			<u>Total</u>
	<u>Pools</u>			
	<u>Con- trol</u>	<u>Treat- ment 1</u>	<u>Treat- ment 2</u>	
500	318	0	0	318
1000	159	16	11	186
Total Observed	477	16	11	504
Expected	168	168	168	

Chi Square = 284.14 with 2 df.  
P>0.005 [sic]

Treatment Rate (ml/50 gal)	<u>GEESE</u>			<u>Total</u>
	<u>Pools</u>			
	<u>Con- trol</u>	<u>Treat- ment 1</u>	<u>Treat- ment 2</u>	
500	271	10	12	293
1000	116	0	7	123
Total Observed	387	10	19	416
Expected	138.67	138.67	138.67	

Chi Square = 219.172 with 2 df.  
P>0.005 [sic]

The two contingency tables, one for geese and one for ducks, are 3-by-2 tables which present data on pool entries collected during half-hour observation periods conducted on days in which one pool in each pen was untreated and the other two were treated with either 500 ml or 1000 ml of the Bird Shield product. Above, I present the tables much as Askham presents them.

The results for the higher treatment levels can be portrayed as being "highly significant". However, the analyses reported do not consider all data that were collected. There also are inaccuracies on the raw data pages which have led to incorrect numbers being used in Askham's tables and calculations. (The inaccuracies are rather minor and would not have affected the Chi Square values reported very much. I mention them primarily because readers may note discrepancies in some areas between the numbers I present below and those that were entered in Askham's table.) Askham's contingency tables and data analyses do not account for the strong preference that the geese had for the third pool. While the 500 ml concentration appeared to override this preference in the one trial in which that amount of Bird Shield was added to Pool #3, Pool #3 was the untreated pool in the other trial

which included two 500-ml treatments and in the only trial which included 1000-ml treatments (see below).

For the portions of the three buffer periods (no treatments in any pool) during which pool entry data were collected, the results shown below were reported in the duck and goose pens. The total numbers of entries into these pools (pooled across the three "buffer" periods show that geese had a marked and enduring preference for Pool #3 and generally were reluctant to use Pool #1. There was no evidence that ducks clearly preferred or rejected any of the pools if they all were untreated.

DATES OBSERVED (1994)	ENTRIES IN EACH POOL			TOTAL POOL ENTRIES
	Pool #1	Pool #2	Pool #3	

Duck Results

5/19,22	68	58	48	174
6/11	47	32	68	147
6/28	54	71	66	191
TOTALS	169	161	182	512
% FOR POOL	33.0%	31.4%	35.5%	

Goose Results

5/19,22	0	31	70	101
6/11	0	24	67	91
6/28	3	22	127	152
TOTALS	3	77	264	344
% FOR POOL	0.9%	22.4%	76.7%	

If the Chi Square model is to be used to analyze Askham's data on pool entries, it seems to me that one might want to set up a 3-factor table for the results because of the clear bias by geese in favor of Pool #3. A less complicated, and perhaps "legal", alternative would be to use the results on buffer use as the basis for assigning "God-given" probabilities to calculate the expected results for each pool, absent treatment effects. However, geese seldom used Pool #1, especially when there was another pool available that was untreated or that had been treated with less than 500 ml of Bird Shield. Consequently, the "God-given" probability that there would be any geese going into that pool is exceedingly small, leading to distortions in the Chi Square values caused by low expected values in the cell associated with Pool #1.

For ducks, the results in the buffer tests were so close to the expected outcomes of 33.3% of all entries being into each of the pools, that the problem of small expected values does not arise, and that a strong case could be made for ignoring the results of the buffer tests and assigning 33.3% as a "God-given" probability of occurrence to each pool.

Below, I present data, discussions, and Chi Square values for the various periods when repellents were tested, beginning with the highest treatment rate and working downward.

#### 1000 ml

If the results obtained on the two days of observations taken when Pools #1 and #2 were treated are considered, the results for ducks differ markedly from what was seen in the "buffer" trials, while the results with geese appear to be a potentiation of the existing bias in favor of Pool #3, largely at the "expense" of Pool #2. Using the results from the "buffer" trials to generate "God-given" probabilities, I computed a Chi Square value of 263.5 (2 df,  $p < 0.001$ ) for the duck data obtained when 1000 ml of Bird Shield was added to Pools #1 and #2. The table below shows the numbers that were used.

DATES OBSERVED (1994)	ENTRIES IN EACH POOL TREATMENT APPLIED			TOTAL POOL ENTRIES
	Pool #1	Pool #2	Pool #3	
	1000 ml	1000 ml	None	

#### Duck Results

6/3,4	16	11	194	221
% FOR POOL	7.2%	5.0%	87.8%	
Expected	72.9	69.4	78.5	221
% FOR POOL	33.0%	31.4%	35.5%	

#### Goose Results

6/3,4	0	7	114	121
% FOR POOL	0.0%	5.8%	94.2%	
Expected	1.1	27.1	92.8	121
% FOR POOL	0.9%	22.4%	76.7%	

I also performed the same test for the goose data on pool entries that were obtained under the same treatment conditions. Because the actual value for Pool #1 was very close to the expected value, I did not collapse across similarly treated pools (which should be done if the expected value is low and the resulting contribution to the Chi Square value is high). A much smaller Chi Square value (19.7, 2 df,  $p < 0.001$ ) was obtained, although a significant association between entries and treatments still was obtained.

#### 500 ml

When Pools #1 and #2 were treated with 500 ml of Bird Shield, the results obtained were much like those shown above. However, when the treatments were switched so that Pools #2 and #3 were the treated ones, the geese finally entered Pool #1 with some frequency. In fact, 139 of 147 total entries into Pool #1 (in 7 hr of observation while it was in the untreated condition) that were recorded for geese, were observed on two days (6/15-16/94) when the other two pools had been treated with 500 ml of Bird Shield. (Only 22 additional entries into Pool #1 were observed during 8 hr of observation of it while it was in various treated conditions.)

DATES OBSERVED (1994)	ENTRIES IN EACH POOL			TOTAL POOL ENTRIES
	Pool #1	Pool #2	Pool #3	

#### Duck Results

Treatment	None	500 ml	500 ml	
6/15, 16	168	8	0	176
% FOR POOL	95.5%	4.5%	0	
Expected	58.1	55.3	64.5	176
% FOR POOL	33.0%	31.4%	35.5%	
Treatment	500 ml	500 ml	None	
6/25	0	0	155	155
% FOR POOL	0.0%	0.0%	100%	
Expected	51.2	48.7	55.0	155
% FOR POOL	33.0%	31.4%	35.5%	



Goose Results

Treatment	None	500 ml	500 ml	
6/15,16	139	10	12	161
% FOR POOL	86.3%	6.2%	7.5%	
Expected	1.4	36.1	123.0	161
% FOR POOL	0.9%	22.4%	76.7%	
Treatment	500 ml	500 ml	None	
6/25	0	0	143	143
% FOR POOL	0.0%	0.0%	100%	
Expected	1.3	32.0	109.7	143
% FOR POOL	0.9%	22.4%	76.7%	

These results are summarized in the table shown above. Clearly, the Bird Shield was extremely deterrent to both species when applied at or above 500 ml/190 gal of water. The Chi Square values for the results obtained with ducks were 312.9 (2 df) for the 6/15-16 arrangement of treatments and 287.7 (2 df) for the arrangement presented on 6/25. Obviously, these values are significant.

Which pool was left untreated affected the sizes of the Chi Square values calculated for pool entries by geese when the 500-ml treatment was applied to two pools and the third was left untreated. When Pool #3 was treated (6/15,16), the resulting Chi Square value was enormous (13,643.2, 2 df), due mainly to the extremely low expected value and the high number of entries observed for the pool that was not treated. When the favored Pool #3 was the untreated one (6/25), the result obtained again appeared to be mere potentiation of the bias for that pool. The Chi Square value was much smaller (43.4, 2 df) but still significant.

In the only other instance in which an amount of Bird Shield as great as 500 ml was applied to at least one Pool, that treatment level appeared to be more deterrent to both species than was a 250-ml treatment. Again, note that the 500-ml treatment was able to override the preference that geese had for Pool #3. The Chi Square values (2 df) obtained were 189.0 for ducks and 390.5.

DATES OBSERVED (1994)	ENTRIES IN EACH POOL TREATMENT APPLIED			TOTAL POOL ENTRIES
	Pool #1	Pool #2	Pool #3	
	250 ml	None	500 ml	

Duck Results

7/12,13	71	166	3	240
% FOR POOL	29.6%	69.2%	1.8%	
Expected	79.2	75.4	85.2	240
% FOR POOL	33.0%	31.4%	35.5%	

Goose Results

7/12,13	17	86	4	107
% FOR POOL	15.9%	80.4%	3.7%	
Expected	1.0	24.0	82.1	107
% FOR POOL	0.9%	22.4%	76.7%	

For both ducks and geese, the number of entries into the pool (#1) treated with 250 ml of Bird Shield was intermediate to the numbers of entries into the untreated (#2) and 500-ml-treated (#3) pools. However, the number of entries to Pool #1 was fairly large for ducks and unusually large for geese, considering their avoidance of that pool when Pool #3 was untreated. In fact, 17 of the total of 22 observed entries by geese into Pool #1 when it had any Bird Shield in it occurred on 7/12-13 when the 250-ml treatment was one of two alternatives to the 500-ml treatment in Pool #3.

During the succeeding (and final) observation period on 7/17/94, geese returned to their habitual preference for Pool #3 despite the fact that it was the only treated pool. Geese were seen entering Pool #3 67 times (76.1% of total entries), but entered the untreated Pool #1 just 5 times (5.7%) and the untreated Pool #2 16 times (18.2%).

250 ml

When this amount of Bird Shield was applied to Pools #1 and #3, the results shown in the table below were obtained. These data produced non-significant (2 df) Chi Square values of 2.53 for ducks and 3.29 for geese (despite the extremely low expected value for Pool #1).

DATES OBSERVED (1994)	ENTRIES IN EACH POOL TREATMENT APPLIED			TOTAL POOL ENTRIES
	Pool #1	Pool #2	Pool #3	
	250 ml	None	250 ml	

Duck Results

6/30	60	45	68	173
% FOR POOL	34.6%	26.0%	39.3%	
Expected	57.1	54.3	61.4	173
% FOR POOL	33.0%	31.4%	35.5%	

Goose Results

6/30	2	16	54	72
% FOR POOL	2.7%	22.2%	75.0%	
Expected	0.6	16.1	55.2	72
% FOR POOL	0.9%	22.4%	76.7%	

The results obtained during the final period when geese were observed were mentioned above. The data for both species are presented below. From the duck results, I calculated a significant Chi Square value (24.8, 2 df) which seems to have had nothing to do with an aversion for the Bird Shield treatment. For geese, the data seem to fit the prediction from the "buffer" trials very well, except for problems associated with the low expected value for Pool #1. As Pool #2 also was untreated, I lumped the results for the two untreated pools together and came up with a non-significant Chi Square (0.016, 2 df) and an extremely good fit.

DATES OBSERVED (1994)	ENTRIES IN EACH POOL TREATMENT APPLIED			TOTAL POOL ENTRIES
	Pool #1	Pool #2	Pool #3	
	None	None	250 ml	

Duck Results

7/17	29	73	82	184
% FOR POOL	15.8%	39.7%	44.6%	
Expected	60.7	57.8	65.3	184
% FOR POOL	33.0%	31.4%	35.5%	

Goose Results

7/17	5	16	67	88
% FOR POOL	5.7%	18.2%	76.1%	
Expected	0.8	19.7	67.5	88
% FOR POOL	0.9%	22.4%	76.7%	

125 ml, 75 ml, and 40 ml

These concentrations were presented only in combination with at least one other Bird Shield treatment. On 5/24/95, Pool #1 was treated with 75 ml of product, Pool #2 with 125 ml, and Pool #3 was untreated. The results obtained are shown in the table below. Results obtained for ducks fit reasonably well with the results obtained from "buffer" periods (Chi Square = 3.06, 2 df, NS). The same was true for the results with geese (Chi Square = 1.87, 2 df, NS).

DATES OBSERVED (1994)	ENTRIES IN EACH POOL TREATMENT APPLIED			TOTAL POOL ENTRIES
	Pool #1	Pool #2	Pool #3	
	75 ml	125 ml	None	

Duck Results

5/24	47	58	48	153
% FOR POOL	30.7%	37.9%	31.4%	
Expected	50.5	48.0	54.3	153
% FOR POOL	33.0%	31.4%	35.5%	

Goose Results

5/24	0	16	39	55
% FOR POOL	5.7%	18.2%	76.1%	
Expected	0.5	12.3	42.2	55
% FOR POOL	0.9%	22.4%	76.7%	

All three of these treatment levels were used at once in early July of 1994. Askham collected pool entry data on 7/2/94. The results obtained are shown in the table on the next page. For the ducks, the pattern of pool entry was significantly different from that expected from the results of the "buffer" tests (Chi Square = 12.43, 2 df,  $p < 0.01$ ),

but the pool (#1) ostensibly given the lowest amount of Bird Shield was the one most out of line with the expected value. The results with geese fit reasonably well with the results from the "buffer" trials (Chi Square = 4.50, 2 df, NS).

Collectively, these results support that Askham's conclusions that pools treated with Bird Shield at rates equal or higher to 500 ml product/190 gal of water were extremely aversive to mallard and barnyard geese, while lower concentrations were ineffective. These data suggest that the product could be expected to work wonders in some cases and to fail completely in others. The 500 ml/190 gal concentration works out to 0.0695% (v/v).

DATES OBSERVED (1994)	ENTRIES IN EACH POOL TREATMENT APPLIED			TOTAL POOL ENTRIES
	Pool #1	Pool #2	Pool #3	
	40 ml	75 ml	125 ml	

#### Duck Results

7/2	33	65	64	162
% FOR POOL	20.4%	40.1%	39.5%	
Expected	53.4	50.9	57.5	162
% FOR POOL	33.0%	31.4%	35.5%	

#### Goose Results

5/24	3	20	72	95
% FOR POOL	3.2%	21.1%	75.8%	
Expected	0.9	21.3	72.9	95
% FOR POOL	0.9%	22.4%	76.7%	

The published article appended to the version of Askham's report submitted on 7/10/95 is cited and discussed below.

3. Belant, J.L., Gabrey, S.W., Dolbeer, R.A., and Seamans, T.W. (1995) Methyl anthranilate formulations repel gulls and mallards from water. Crop Protection, 14:2, 171-175.

This report discusses studies run in Erie County, OH. As I have already discussed at length an unpublished version of this report (combined efficacy review of 5/24/93 for 58035-A, 58035-T, and 58035-I), will mention only the highlights

of this research here.

Four 8-m-X-4-m pens each containing two 1-m diameter plastic pools were used in the mallard study. A pair of mallards (duck and drake) were placed in each holding pens associated with the corrals.

Initially, one pool was treated with Re-JeX-iT TP-40 ("40% MA, 0.02% v/v" product/water?) in 40 l of water. Mallards then were released into and confined to the corrals for 8 daylight hours per day. Mallard activity was observed at intervals over the first 80 minutes after their release. Instances of occurrence of certain activities during 120 20-second observation periods were recorded. This schedule was maintained for four consecutive days, followed by two days in which the mallards were confined to the holding pens.

The untreated pools were removed, and birds were again released and monitored in the corrals for 8 hr/day for four consecutive days.

Results of this test are summarized in the table immediately below.

MEASUREMENT	TEST PHASE	
	<u>Choice</u>	<u>No-Choice</u>
Mean # Entries in Untreated Pool	52.9	----
Mean # Entries in Treated Pool	0.3	1.1
% of Mallard Use in Untreated Pool	99.4%	----
Mean # Bill Contacts w/Untreated Water	103.8	----
Mean # Bill Contacts w/Treated Pool	6.0	15.6
% of Bill Contacts w/Untreated Water	94.5%	----

During the 4-day choice tests, entries and bill contacts to the water in the treated pools were dramatically (and significantly) lower in treated pools than in untreated pools. The mean numbers of entries and bill contacts in treated water were higher when no untreated pool was available than during the initial choice test, but these numbers remained far below those observed for the untreated pools during the initial test phase.

Under these conditions of testing, the TP-40 had a dramatic negative effect upon pool entry and bill contacts with

treated water by these 8 mallards.

The second phase of this study involved separate trials using two MA formulations. In the first trial of this phase, involving TP-40, eight of 1-m diameter plastic pools were lined up 4 m apart at an Erie County landfill frequented by ring-billed gulls (Larus delawarensis) and herring gulls (L. argentatus). Each pool was filled with 50 l of water. Twenty ml of TP-40 ("0.016% v/v) were added to each of "four randomly chosen pools". Observers noted and recorded gull activity in the pools for 20-sec time periods with two 40-min observation periods/day, beginning at 10:30 AM and 2:30 PM, on 5 of 6 consecutive days in mid-November of 1991. Each pair of pools (paired apparently only on the basis propinquity) was observed for about 40 min/day.

MEASUREMENT	TP-40 CHOICE TEST
Mean # Entries in Untreated Pool	10.8
Mean # Entries in Treated Pool	0.5
% of Gull Entries in Untreated Pool	95.6%
Mean # Bill Contacts w/Untreated Water	107.1
Mean # Bill Contacts w/Treated Pool	6.9
% of Bill Contacts w/Untreated Water	93.9%
Mean # Gulls Using Untreated Pool	7.0
Mean # Gulls Using Treated Pool	2.3
% of Gull Use in Untreated Pool	75.3%

Results (above) of the first landfill trial suggest repellent effects. Total activity at the landfill varied greatly over the period with counts ranging from 0 to 2480 birds. Relatively few birds used pools, whether treated or untreated. This test had a premature ending because the birds left the landfill in favor of another feeding area, the Huron River, where there was an abundance of gizzard shad. The pools had frozen by the time the gulls returned to the landfill.

In the second AP-50 gull trial at the landfill, eight 1.2-m diameter plastic pools were lined up 12 m apart in two parallel lines 10 m apart at the same landfill. Each pool was filled with 100 l of water. Observers noted and recorded gull activity in the pools for 20-sec time periods

during four 20-min observation periods/day. These periods ran from about 1:30 PM to 3:00 PM, during two 5-day and two 7-day periods of study in August and September of 1992. The observation periods were called "weeks".

During the first "week", AP-50 ("0.016% v/v) was added in 75-g aliquots to one member of each (side-by-side) pair of pools. During the second "week", 75 g of AP-50 was added to the previously untreated pool while the previously treated pool was neither cleaned nor retreated. For the third "week", the used pools were removed and replaced with new pools into which 100 l of clean water were placed. During the fourth and last "week" all pools were treated with 75 g of AP-50.

During the first "week", when one member of a pair of pools was treated, the following results were observed:

MEASUREMENT	TREATED POOLS	UNTREATED POOLS	% IN UNTREATED POOLS
Pool Entries	0.4/day	2.4/day	85.7%
Bill Contacts	14.3/day	87.1/day	85.9%
Individual Gulls Using Pools	5.1/day	15.8/day	75.6%

While there was relatively less use of treated pools, pool use was low all around during the first "week". In the second "week", when there was a freshly treated and a previously treated pool in each pair, mean use of both members of pairs was at levels similar to those reported for the treated pools during the first "week". There were no differences between newly and previously treated pools in terms of bird activity, which increased over time in both sets, roughly correlated with increases in numbers of birds observed at the site.

The table below compares the results obtained during the third "week" (no treated pools) and the fourth "week" (no untreated pools). These results suggest that treatment of all pools suppressed pool activity somewhat, but these results (which are not time-controlled) are not nearly as impressive as those obtained when treated and untreated pools were paired side-by-side.



MEASUREMENT	TREATED PERIOD Fourth "Week"	UNTREATED PERIOD Third "Week"	TREATED PERIOD ACTIVITY AS % OF UNTREATED PERIOD ACTIVITY
Pool Entries	0.1/day	0.7/day	14.3%
Bill Contacts	27.1/day	60.1/day	45.1%
Individual Gulls Using Pools	7.0/day	12.8/day	54.7%

Because the data reported by Belant, et al (1995) were generated with different products produced by different companies, questions of applicability to the Bird Shield product (66550-R) and data compensation arise. Considering only the former, I note that these data support the notion that MA can be used to keep captive mallards and free-ranging gulls that are not very interested in the items, out of small circular plastic pools. The producer of the Re-JeX-iT products has submitted data regarding use of MA to repel birds from larger, temporary pools of standing water, such as arise on airport grounds following heavy rains. Askham mentions one such study in his letter of 7/10/95, but does not formally cite the item.

To the materials discussed in the efficacy review of 9/28/95, the letter of 4/4/96 from Askham on Bird Shield Repellent Corporation's stationery adds copies of Askham's letters of 10/1/95 (Dolphin Trust's stationery) and 3/21/96 (on Bird Shield's), and assorted administrative forms. These documents provide no significant new information with respect to this or the previous efficacy review.

The label submitted on 6/18/96 for the purpose of adding claims and directions for use of the product to repel

**"loons (*Gaviidae*), grebes (*Podicipedidae*), albatrosses (*Diomedidae*), swans, geese and ducks (*Anatidae*), and other water using birds from non-fishbearing bodies of water at, on or within airports."**

Except for their being repropounded in bold type and a slightly greater dilution rate, these claims and directions correspond to those which the company was directed by EPA's letter of 3/28/96 to delete from the label that was "ACCEPTED with COMMENTS" on that date.

As the reasons for repelling birds from small, fishless bodies of standing water (e.g., pools and puddles) have significant human health and safety overtones, all such

claims should be supported by efficacy data. The company has provided efficacy data which clearly are product-related for ducks and barnyard geese. I am not prepared to accept claims beyond ducks and geese for this product at this time. (If the site of application were listed on the label and the upper limit of the application rate were not exceeded, it would not be considered to be a misuse if the application were made primarily or entirely to repel birds other than ducks and geese. The problem comes in when companies try to make public health claims which they have not supported.)

Applications to "non-fishbearing bodies of water" are to be made by direct addition of the concentrate to the bodies of water.

In his letter of 6/18/96, Askham expresses a desire

"to delete references to airports because I feel it is too limiting."

In as much as he tested the product in no more than 190 gallons of water and was unable to show consistent repellent effects at when less than 500 ml of product was added per 190 gallons of water, I am not inclined to support this request fully. The airport use could be a very important one if it can aid in reducing the number of and extent of damage resulting from bird strikes by aircraft. We should be careful about removing the term "non-fishbearing" as the most significant defining characteristic of treatable bodies of water. If fish are in the body of water, there could be problems. For example, Clark, et al (1993, Pesticide Science, 39, 313-317) found MA, under laboratory test conditions, to be toxic to fry of Atlantic salmon, rainbow trout, channel catfish, and bluegills (24-hr LC<sub>50</sub>s being 34.28 mg/l, 23.47 mg/l, 20.08, and 19.80 mg/l, respectively). The 48-hr LC<sub>50</sub> for bluegills dropped to 9.12 mg/l. The fish turned blue and moved their opercula rapidly following exposure to MA in water. Affected fish moved to clean water recovered relatively quickly. These authors concluded that MA interferes with respiration in fish. Whether these effects would occur under conditions of use is not clear at a time.

I am not persuaded at this point that MA products are much good in bodies of water with appreciable flow (or appreciable size). "Small, non-fishbearing bodies of standing water" seems to me to be a relatively restrictive descriptor that might be accepted, but some might wonder "How small is small?" There also are some nontarget hazard situations that might arise in certain bodies of water

which might lack fish. Prairie potholes are rich in wildlife, but some which lack fish might be considered to be "small bodies of standing water" despite their being associated with artesian water systems. As potholes are relatively permanent (in existence if not size), I feel that "small, non-fishbearing, temporary bodies of standing water" might be the way to go.

I also feel, however, that the label should mention airports specifically as a use site due to the human safety implications of product failure at such a site. All of the standing-water uses of MA have public-health and/or human safety implications. Nothing that we accept in the way of such claims should make it appear that these are not uses which must be supported by efficacy data.

The proposed dilution rate of

**"1 part of Bird Shield with 450 parts of water (1 gal/60 cubic feet of water)"**

works out to 1598 liters/190 gallons of water (if my calculations are correct) or about 1.6-3.2 times as strong as the dilutions which appeared to work in Askham's trials discussed above. For example, the 1000-ml/190 gal rate works out to 1 part of bird shield/729 parts of water. The proposed concentrations should work for ducks and geese, at least. The nontarget effects of these proposed concentrations might not be trivial -- another reason for keeping the product out of anything but "small temporary bodies of standing water".

What I have decided to do about this product at this time is to permit the same (non-New-York-State) site claim that we already have accepted for a competitor's product (Re-JeX-iT<sup>®</sup> TP-40, 58035-7). That claim is as follows

"non-fishbearing bodies of water (tailing ponds, commercial or industrial water impoundments); and temporary pools of standing water located at or near airports."

#### Proposed Turf Grass Use

The efficacy item submitted in support of this proposed new use is cited and discussed below.

Askham, L.R. (1996) Effect of Bird Shield® Repellent (EPA Registration No. 66550-1) on reducing Canadian geese (*Branta canadensis*) and mallard duck (*Anas platyrhynchos*) use of turf grass. Unpublished Report, Bird Shield Repellent Corporation, 42 pp.

MRID# 440554-01

The "SUMMARY" to this report states that the trials summarized were run

"to control the bird's use of turf grass areas where they had become a physical, aesthetic or health problems to the resource's manager."

Regardless of whether either of the first two of these is perceived to be the most pressing problem, the potential for creating health problems is present whenever avian droppings which accumulate on lawns and turf where birds congregate. If people or pets frequent these same areas, health problems may become acute. Therefore, the proposed turf use seems to me to be a public health use which must be supported by efficacy data.

Askham's (1996) report describes the results of trials run at two sites in the southeastern portion of the State of Washington. The site to be discussed first was a "swimming beach area" in Swallows Park, situated along the Snake River in or near Clarkston, WA. An island which shelters the beach reportedly was home to a number of Canada geese (24 nest sites). According to Askham,

"Feces from these resident birds, and their offspring, have increased until coliform counts in the water, even though it is flushed by the passing river's action several times a day, have risen health concerns by local sanitarian's as well as Crops [sic, probably meaning the Army Corps of Engineers] officials."

The public's proclivity for feeding geese and ducks at this location may have made matters worse.

The study area at Swallows Park was split into "two equal sections", one of which "was left untreated as the control" while the other was "treated with four concentrations of the repellent". The sections were about 100'-X-250' in dimensions and, consequently, just under 0.6 acres in area. The section slated for treatment was subdivided into four 100'-X-62.5' sections (about 0.14 acres each). These 4 areas were treated by backpack sprayer at rates equivalent to 1, 2, 4, and 8 gallons of the Bird Shield product per

acre on 10/4/95. Amounts of product used reportedly were diluted in water to create a volume of applied material equivalent to 60 gallons of tank mix per acre. The areas originally treated at the 1, 2, and 4 gallons-of-product rates were treated again on 10/18/95 with 0.5, 1, and 2 gallons of product per acre, respectively. The plot originally treated with 8 gallons of product was not given a second application. Effects of treatment were assessed by making droppings counts in 18" square sampling plots. Five such sampling plots were located in each treated subsection, while 7 sampling plots were established in the untreated half.

Table 1 summarizes the results of this study. The droppings counts on 10/4/96 and 10/18/96 presumably were made prior to the rounds of treatments which were applied on those dates. The top half of Table 1 indicates the mean numbers of droppings counted for the 2.25-ft<sup>2</sup> sampling plots for each treatment area. As there were supposed to be 5 and 7 of these sampling plots, respectively, in each treated and untreated area and as it seems that the number of droppings counted in any one sampling plot would have to be an integer, it is not clear to me how mean values such as 1.8 were obtained for the control area or 1.5 for treated areas. It is possible that Askham counted fractions of droppings as being in a sampling plot if they straddled the edges of sampling plots.

The bottom half of Table 1 compares each observation day's droppings results to the mean number obtained for the same study area on 10/4/95, which appear to be the only pre-treatment figures available. Reading across by treatment group, the bottom half of Table 1 suggests that all initial Bird Shield treatments may have deterred geese from defecating (and presumably entering or spending time) in the treated areas. The initial effects of treatment appear to have been strongest for the 2 gal/acre and 8 gal/acre rates, while the results for the 4 gal/acre rate were less dramatic and those for the 1 gal/acre rate more erratic. It is not clear that any of the retreatments at half of the original rates potentiated or prolonged what might have remained of the effects of the initial treatment. The effect on the plot originally treated at the 8 gal/acre rate persisted even though no second treatment was made there. The mean number of droppings on the control plot never fell to less than about 62% of the original value.

Assuming that the data reported are valid, one could argue that Bird Shield treatments at rates equal to or greater than 2 gallons of product per acre retained some degree of deterrence for at least 2 weeks, and that the 8 gal/acre

rate was effective for a month. Askham observed that

"Mowing, which removes the repellent from the grass, appears to be more detrimental to the longevity of the repellent than weather conditions during this time of year."

The second site, Chief Timothy State Park, is located 15 miles west of Clarkston and also is on the Snake River. This site also features an island, a swimming beach, and other recreational areas. In this case, however, the beach and recreational areas are located on the island itself. Its Canada goose population is reported to consist of some 3000 resident birds, with up to 5000 being present in winter. Relatively few of these birds (21 pairs producing 85 hatches this past spring) actually nest on the island, but Askham claims that about "300 geese and a dozen ducks" were using the island in May of 1996.

Like the Swallows Park site, the Chief Timothy State Park site initially was divided in two equal sections, each being about 100' by 550' in dimensions and, therefore, about 1-1/4 acres in area. One of these two sections was divided into 4 subsections (about 100' by 136'). These subsections were treated with Bird Shield perhaps at rates of 1.0, 2.0, and 4.0 gallons of product mixed with 59 gallons of water. Effectiveness was assessed in five 1-m circular plots (about 10.8 ft<sup>2</sup> in area) apparently arranged within each treated area and the control section much like the dots on the "five" side of a 6-sided di. Fecal deposits found within these circular plots were counted, dried, and weighed.

Results of this "Phase 1" trial are summarized in Tables 2 and 3. In terms of numbers and masses of droppings, one could make case for treatments effect lasting about 6 days for all application rates. That mean fecal counts and masses were highest (by far) on all areas monitored for the 3/14/96 censuses suggests that the droppings counted and collected then might have accumulated over more than a period of 2 days. It appears that total goose use of this study area declined over the course of this brief trial. Askham observes that

"The number of birds began to decline as the geese began to mating [sic] and disperse from the island to more suitable nesting sites and the trials were terminated twelve days after the trials were begun.

In the late Spring of 1996, Askham began a "Phase 2" trial at the Chief Timothy site. A block of two equally sized plots was set up in a campground area which included turf, 36 RV sites, and a road running among the sites. Half of the block was designated as a treatment section and half as an untreated control section. These sections were about 100' by 1100' in dimensions, or about 1/4 acre in area. Effectiveness initially was to be assessed in six 9-ft<sup>2</sup> plots reportedly

"established at approximately 135 foot intervals throughout the center of the treated area."

However, 3 additional plots were added to the treated section. Seven such circular plots were added to the control side.

A second block of one treated and one untreated section ("of about equal size") was established in a

"day-use area consisting of a swimming beach, children's playground, picnic shelters, broad lawns, restroom and shower facilities, and parking lot."

Six circular plots were established in the treated section and 4 in the untreated section of the day-use-area block.

A third block was added to the study as described by Askham.

"Fourteen days after the trials were initiated and additional control area was established at the parks' boat launch when it became obvious that the original controls were not sufficient to monitor the geese's activities. Five sample plots were randomly located throughout the site where the greatest number of birds were observed feeding and loafing during the day."

Goose droppings found within the circular census plots were counted, dried, and weighed.

Treatments to the first block and second blocks reportedly were made at 7- to 10-day intervals, beginning perhaps on or about 5/20/96. Most treatments may have been at the rate of 1 gallon of product plus 59 gallons of water per acre. For the treatment of 6/13/96, 1/2 gallon of 2,4-D (broadleaf herbicide) was added to the tank mix. On 6/20/96, the treatment rate was increased to 2 gallons of Bird Shield (and no 2,4-D?) per acre. The first data for

the 3 circular plots added to the first block and the first data for the boat launch area are reported for "6/6/96".

As can be seen in Table 4, there were no grams of feces reported for the control section of the first block (campground) after the census of 5/30/96. After the census of 5/27/96, no fecal matter was noted for the control section of the second block (day-use area) for the remainder of the monitoring period, which ended on 6/28/96.

By way of contrast, fecal material was detected in the treated block at the campground for all 15 census periods in the study (between 5/20/96 and 6/28/96). At the day-use area, fecal material was reported for 10 of the 11 census periods between 5/20/96 and 6/19/96, and none thereafter. For the 6 census periods from 6/6/96 through 6/19/96, the 3 circular plots added to the treated portion of the campground site were relatively low in fecal mass when compared to the 6 plots which had been monitored from the start. This situation changed abruptly on 6/21/96 when the 3 newly added plots suddenly had the 3 highest fecal masses, but reverted thereafter to relatively low amounts for all but one of the new plots.

The 5 circular plots censused at the boat launch had from 3.24 to 21.04 g (after drying) of fecal material within them when censused initially on 6/6/96. Askham subsequently fabricated, using undescribed procedures, boat-launch droppings data for the missing census periods.

He then used these results (not shown in my Table 4) to make separate comparisons between fecal masses at the launch site and at the other two sites. These appear to me to be "apples-to-oranges" comparisons.

It also appears to me that Askham added the boat launch plots and 3 more plots in the treated portion of the campground block in an effort to make the product look better and/or in an effort to make the data reflect more accurately what the product was doing. The latter situation might have arisen if the extent of sampling at the campground and the day-use area were so limited as not to reflect what actually was going on. As the density of monitored plots was a bit lower on the control halves of the campground and day-use area sites, the results obtained of the control sections might have been less representative of what was happening on those sections than was the case for the treated sections, but there would have been much less potential for such a bias in this "Phase 2" trial than in the "Phase 1" studies conducted earlier.

At face value, it appears that, shortly after initial treatments, the geese were more likely to defecate (and



presumably to spend time on) the treated portions of the campground and day-use areas than on the untreated portions of these sites. These data could be interpreted as showing that treatment was less repellent to geese than the absence of treatment, but that seems to me to be an unlikely explanation. Askham reports that

"On several occasions campers were observed feeding geese food scraps, loaves of bread and scattering dog food in front of their recreational vehicles which drew the birds from the water onto the treated lawns."

This seems like a better explanation, although I still wonder why none of the birds were lured to the untreated section.

The data from the boat launch site were contrived to show that there was high goose activity on an untreated area somewhat nearby. This information is not enlightening with respect to the effectiveness of the Bird Shield treatments.

My bottom line on the "Phase 2" results is that they should be ignored. It appears that the study was confounded by other factors affecting bird movements and, therefore, that the best that can be said for the product is that it was unable to chase all geese away at the rate at which treatments were made. Maybe, this means that the 1-gal product/acre rate is unreliable or no good. A weak case for some effectiveness of the 2-gal/acre rate could be made based upon changes within treated sections alone. With no activity at all in the adjacent untreated sections during the same time period, however, it is impossible to rule out other causes for the apparent reduction in fecal masses in treated areas.

Because the report was not clear on certain issues and the "Phase 2" results appear to be worthless, I am reluctant to accept the "Grass" use at this time. Among other things, I am not sure when all of the treatments were made at the Chief Timothy State Park site. I also do not know the dimensions of the treated and untreated sections at the day-use area at Chief Timothy. There also is some confusion in the report about the treatment levels in the "Phase 1" trial at Chief Timothy. Were they percents or pounds of product per acre?

I have the impression that the 1-gal-product/acre treatment rate was less effective than the higher rates. The 1-gal/acre rate was more erratic than the higher levels at the Swallows Nest Park site, but seemingly performed about as well in the "Phase 1" trials at Chief Timothy. If the

1-gal\acre rate had appeared to have been effective in the "Phase 2" trials at Chief Timothy, I doubt that the herbicide or the 2-gal\acre treatments would have been attempted.

The "**DIRECTIONS FOR USE**" portion of the revised proposed label submitted on 7/6/96 includes the claims and directions for the standing water use, in addition to those for the ripening fruit uses and the directions for the proposed new "Grass" use claims and didoes not mention the use of the product to treat bodies of water. The B. t. tank-mixing claim is missing.

The proposed directions for the "Grass" use call for applying 1-2 gal of product in a 60-gal water mix per acre. For reasons discussed above, it might be advisable to drop the lower rate.

There are some problems with wording in the "**Use Restrictions**", "**Preparation and Mixing Directions**", and "**Application Directions**" subsections. As these problems call mainly for editorial changes, they are discussed in this review.

This revised proposed label lacks the objectionable claims of safety which were on the labeling discussed in the efficacy review of 5/5/95. However, the following statement does appear:

"This concentrate has been formulated from food grade ingredients that meet or exceed U.S. standards."

Although it is not an efficacy reviewer's "call", if it is true, this statement would appear to be

"A true statement used in such a manner as to give a false or misleading impression to the purchaser." [See 40 CFR, §156.10(a)(5)(vii)]

Specific comments on the label appear under "**CONCLUSIONS.**"

## 202.0 CONCLUSIONS

### Submission of April 9, 1996

We have review the material included in this submission and find that we would not object to your adding to the "**Preparation and Mixing Directions**" subsection of the "**DIRECTIONS FOR USE**" the sentence

"This product may be mixed with *Bacillus thuringensis* formulations."

This new sentence should precede the sentence "Do not mix with other pesticides of fertilizers."

Labels Submitted on May 10, 1996

The labels submitted on 5/10/96 include one, for 66550-1, on which Bird Shield Repellent Corporation is identified as the company and another, for 66550-1-6438, which is attributed to Schall Chemical, Inc., of Monte Vista, CO. While these labels mimic one another in most respects, both differ in many ways from the label that was "ACCEPTED with COMMENTS" on March 28, 1996, and from those labels previously "ACCEPTED with COMMENTS" on October 3, 1995, and on November 15, 1995. Therefore, the "labels as they appear on the finished product" submitted on May 10, 1996 never were accepted. It appears, therefore, that any sale or distribution of this product under either of these labels would be illegal. Probably the worst of several problems with these labels is the altering of the required signal word headings to the precautionary labeling section from

**"WARNING  
KEEP OUT OF REACH OF CHILDREN"**

to

**"WARNING: BIODEGRADABLE MATERIAL  
Use by 6/1/97"**

**KEEP OUT OF REACH OF CHILDREN".**

By virtue of this alteration, what was intended to be a stern introduction to information about the product's potential risks to humans was transformed into language which implies that the main reason for the "WARNING" is the likelihood that the product will only remain good for a year or so. This is an egregious mistake.

Submission of June 18, 1996

We have reviewed your amendment request and have concluded that the following site claims would be acceptable for the use this product in certain types of bodies of water:

"non-fishbearing bodies of water (tailing ponds, commercial or industrial water impoundments) and temporary pools of standing water located at or near airports."

As we have only seen Bird Shield data relevant to such claims for mallards and barnyard geese, we are not permitting species claims beyond "geese and ducks (Family Anatidae)". In light of the limited scope of the study reviewed, accepting a general "geese and ducks" claim for this public-health use pattern is generous.

Submission of July 6, 1996

The data submitted to support the proposed "Grasses" use are of limited value. The "Phase 1" results from Swallows Nest Park suggest that treatments at 2, 4, and 8 gallons of product per acre may have effectively repelled geese for 2 weeks and that no freshening of the 8-gal/acre treatment was needed to extend its effectiveness for another 2 weeks or so.

The "Phase 1" results from the Chief Timothy State Park site suggest that treatments of what were variously reported as 1, 2, and 4 gallons of product/acre and 1%, 2%, and 4%, respectively, were somewhat effective in that birds appeared to leave areas so treated a bit more rapidly than they left the untreated area.

The "Phase 2" results from Chief Timothy are essentially worthless for assessing the product, although it seems unlikely that the treatment rate would have been raised to 2 gal product/acre if the treatments at 1 gal product/acre had appeared to be effective. The information to the effect that geese frequented another part of the park rather than the untreated areas paired with treated areas is not very helpful. It appears that whatever effects the treatments might have had were offset to some degree by the actions of people interested in feeding geese. This observation suggests that the product does not act as a "chemical fence" and, therefore, that any claims for its effectiveness should be presented in relative terms.

The report was not sufficiently precise about all dates of treatment in either of the Chief Timothy trials. In reviewing the report, we assumed that the first date of data entry covered the pretreatment period and that all subsequent dates were after at least one treatment had been made. It appeared in some cases that the pretreatment censuses might have covered longer intervals than were typical of posttreatment census periods.

Based upon the information provided, we can accept, somewhat reluctantly, a claim that applications of the product at rates of 2-8 lbs of product/treated acre may discourage use of turf areas by Canada geese. Such a claim and the directions associated with it would have to be

caveated appropriately concerning the experiences reported in your trials along the Snake River.

The label include with your submission of July 6, 1996, is not acceptable due to problems of organization and content in the "DIRECTIONS FOR USE".

#### New "DIRECTIONS FOR USE"

Considering all of the label changes proposed in your submissions of April 9, June 18, and July 6, 1996, we have concluded that the "DIRECTIONS FOR USE" indicated below would be acceptable.

#### "DIRECTIONS FOR USE"

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

**Use Restrictions:** This product may be used

- 1) to limit feeding by robins (Turdus migratorius), starlings (Sturnus vulgaris), Cedar waxwings (Bombycilla cedrorum), jays, magpies and crows (Corvidae), ravens (Corvus spp.), finches and sparrows (Fringillidae) on ripening cherries, blueberries, and grapes;
- 2) to discourage ducks and geese (Family Anatidae) from using non-fishbearing bodies of water (tailing ponds, commercial or industrial water impoundments) and temporary pools of standing water located at or near airports; and
- 3) to reduce use of turf areas by Canada geese (Branta canadensis).

**Preparation and Mixing Directions:** Warm product, in the sun or a water bath, to 75°F if any part of the formulation has solidified. Mix product with a blade or a paddle until ingredients are evenly distributed before adding the concentrate to water. This product may be mixed with *Bacillus thuringensis* formulations. Do not mix with other pesticides or fertilizers.

#### **Application Directions:**

Blueberries, cherries, and grapes. Mix 1 part Bird Shield Repellent with 99 parts of water.

Agitate mixture well before application.

Apply mixture with a commercial or back-pack sprayer, hand-held hose, or pressurized applicators. Begin making applications when fruit begins to ripen or when birds begin feeding on crop. Thoroughly wet all fruit and foliage until solution runs off treated surfaces. Re-apply every 6 to 8 days or when odor cannot be detected. Repeat treatments as necessary to retain repellency. Harvest 6 to 8 days after the last treatment, or after all odor of the product has dissipated (whichever occurs last).

Do not apply this product to wet surfaces. Repeat treatment if heavy rains occur within 24 hours of application.

Non-fishbearing bodies of water and temporary pools associated with airports. Add 1-2 parts of Bird Shield concentrate per 400 parts of water in the body of water (1-2 gal/53 cubic feet of water). Estimate the volume of standing water by considering the depth, length, width, and shape of pool and using appropriate mathematical formulas. Calculate the amount of Bird Shield concentrate needed to treat the pool within the prescribed rate range. Add undiluted concentrate directly to entire pool surface until the appropriate amount has been applied. Reapply product at 3- to 4-week intervals if necessary to maintain repellency.

Turf. Mix 2-8 gallons of Bird Shield concentrate with sufficient water to make 60 gallons of mix. Apply 60 gallons of mix per acre, making sure that turf is thoroughly saturated. Reapply product at intervals of 7-14 days, or after each mowing, if necessary to maintain repellency. Attempt to prohibit or discourage humans from feeding geese on or near areas from which the birds are to be excluded."

If you elect to adopt these use directions, submit 5 copies of a proposed revised label which bears them worded and organized as indicated above.

William W. Jacobs  
Biologist  
Insecticide-Rodenticide Branch  
October 3, 1996

Table 1. Effects of Fall, 1995, treatments of grass near Swallow Nest Park beach with Bird Shield MA bird repellent (MRID# 440554-01).

Initial Treatment	Before Treatment	Mean		Number of	Droppings	Goose	After	Second Treatment	Treatment				
		After	Treatment										
	10/4/95	10/6/95	10/9/95	10/11/95	10/13/95	10/16/95	10/18/95		11/3/95	11/6/95			
None	2.1	1.9	1.8	1.8	1.3	1.6	1.3	None	2.3	1.8	2.3	3.4	3.6
1 gal/acre	1.7	2.5	0.5	0.2	0.0	1.7	0.8	1/2 gal/acre	0.7	0.7	1.3	2.5	3.3
2 gal/acre	3.2	1.0	0.2	0.3	0.0	0.7	0.0	1 gal/acre	0.7	0.3	0.2	1.3	1.2
4 gal/acre	2.7	1.5	0.7	0.3	0.2	1.5	0.8	2 gal/acre	0.7	0.5	0.2	0.8	0.7
8 gal/acre	5.7	1.5	0.7	0.3	0.2	1.7	1.0	None	0.5	1.3	0.8	1.0	2.0

  

Initial Treatment	Before Treatment	Percent		Change	from	Period							
		After	Treatment										
	10/4/95	10/6/95	10/9/95	10/11/95	10/13/95	10/16/95	10/18/95		11/3/95	11/6/95			
None	100%	-10%	-14%	-14%	-38%	-24%	-38%	None	10%	-14%	10%	62%	71%
1 gal/acre	100%	47%	-71%	-88%	-100%	0%	-53%	1/2 gal/acre	-59%	-59%	-24%	47%	94%
2 gal/acre	100%	-69%	-94%	-91%	-100%	-78%	-100%	1 gal/acre	-78%	-91%	-94%	-59%	-63%
4 gal/acre	100%	-44%	-74%	-89%	-93%	-44%	-70%	2 gal/acre	-74%	-81%	-93%	-70%	-74%
8 gal/acre	100%	74%	88%	95%	96%	70%	82%	None	-91%	-77%	-86%	-82%	-65%

Table 2. Effects of March 1996, Phase 1 treatments of grass near river at Chief Timothy State Park with Bird Shield MA bird repellent (MRID# 440554-01)

Initial Treatment	Plot	Numbers of Droppings						
		Before Treatment	After Treatment					
		3/14/96	3/16/96	3/18/96	3/20/96	3/22/96	3/24/96	3/26/96
None	NE	68.0	42.0	6.0	8.0	3.0	0.0	4.0
	NW	125.0	52.0	12.0	3.0	6.0	0.0	0.0
	Center	26.0	11.0	0.0	3.0	0.0	0.0	0.0
	SE	40.0	16.0	0.0	10.0	0.0	0.0	3.0
	SW	29.0	12.0	7.0	4.0	0.0	0.0	0.0
	Mean	57.6	26.6	5.0	5.6	1.8	0.0	1.4
	SD	41.2	19.0	5.1	3.2	2.7	0.0	1.9
1 gal/acre	NE	2.0	3.0	1.0	0.0	3.0	0.0	4.0
	NW	9.0	6.0	1.0	1.0	0.0	0.0	0.0
	Center	10.0	0.0	0.0	0.0	1.0	0.0	0.0
	SE	18.0	4.0	0.0	1.0	1.0	0.0	2.0
	SW	10.0	2.0	0.0	0.0	0.0	0.0	1.0
	Mean	9.8	3.0	0.4	0.4	1.0	0.0	1.4
	SD	5.7	2.2	0.5	0.5	1.2	0.0	1.7
2 gal/acre	NE	4.0	2.0	0.0	0.0	0.0	0.0	1.0
	NW	3.0	0.0	0.0	0.0	1.0	0.0	0.0
	Center	11.0	5.0	1.0	1.0	3.0	0.0	0.0
	SE	40.0	6.0	0.0	0.0	0.0	0.0	0.0
	SW	7.0	6.0	0.0	0.0	0.0	0.0	0.0
	Mean	13.0	3.8	0.2	0.2	0.8	0.0	0.2
	SD	15.4	2.7	0.4	0.4	1.3	0.0	0.4
4 gal/acre	NE	80.0	14.0	4.0	0.0	2.0	1.0	2.0
	NW	16.0	1.0	0.0	0.0	0.0	1.0	2.0
	Center	7.0	4.0	0.0	0.0	0.0	0.0	1.0
	SE	2.0	0.0	0.0	0.0	0.0	0.0	0.0
	SW	0.0	6.0	2.0	0.0	0.0	0.0	0.0
	Mean	21.0	5.0	1.2	0.0	0.4	0.4	1.0
	SD	33.6	5.6	1.6	0.0	0.8	0.5	0.9



Table 3. Effects on masses of droppings of March, 1996, Phase 1 treatments of grass near river at Chief Timothy State Park with Bird Shield MA bird repellent (MRID# 440554-01).

Initial Treatment	Plot	Masses (g) of Dried Droppings						
		Before Treatment	After Treatment					
		3/14/96	3/16/96	3/18/96	3/20/96	3/22/96	3/24/96	3/26/96
None	NE	20.51	3.52	0.99	2.48	0.92	0.00	0.58
	NW	33.47	10.07	2.48	0.44	0.70	0.00	0.00
	Center	5.72	1.94	0.00	0.37	0.00	0.00	0.00
	SE	11.23	0.74	0.00	2.70	0.00	0.00	0.39
	SW	3.82	2.58	0.36	0.06	0.00	0.00	0.00
	Mean	14.95	3.77	0.77	1.21	0.32	0.00	0.19
	SD	12.21	3.66	1.04	1.27	0.45	0.00	0.27
1 gal/acre	NE	0.64	0.27	0.18	0.00	2.28	0.00	0.89
	NW	2.47	1.32	0.19	1.13	0.00	0.00	0.00
	Center	3.07	0.00	0.00	0.00	1.36	0.00	0.00
	SE	4.98	0.45	0.00	1.17	0.14	0.00	0.31
	SW	4.18	0.08	0.00	0.00	0.00	0.00	0.19
	Mean	3.07	0.42	0.07	0.46	0.76	0.00	0.28
	SD	1.67	0.53	0.10	0.63	1.03	0.00	0.37
2 gal/acre	NE	1.35	0.47	0.00	0.00	0.00	0.00	1.23
	NW	0.41	0.00	0.00	0.00	0.46	0.00	0.00
	Center	3.78	0.84	0.06	0.29	1.34	0.00	0.00
	SE	6.94	0.58	0.00	0.00	0.00	0.00	0.00
	SW	0.68	0.91	0.00	0.00	0.00	0.00	0.00
	Mean	2.63	0.56	0.01	0.06	0.36	0.00	0.25
	SD	2.75	0.36	0.03	0.13	0.58	0.00	0.55
4 gal/acre	NE	17.10	6.72	0.43	0.00	0.44	1.36	0.24
	NW	5.71	0.06	0.00	0.00	0.00	0.85	0.32
	Center	4.87	0.18	0.00	0.00	0.00	0.00	0.20
	SE	0.33	0.00	0.00	0.00	0.00	0.00	0.00
	SW	0.00	0.63	1.60	0.00	0.00	0.00	0.00
	Mean	5.60	1.52	0.41	0.00	0.09	0.44	0.15
	SD	6.93	2.92	0.69	0.00	0.20	0.63	0.15

Table 4. Effects on masses of droppings of May-June, 1996. Phase 2, [redacted] at Chief Timothy State Park with Bird Shield MA bird repellent (MRID# 440554-01).

Site	Treatments	Plot	Before Treatment		After		Dried		Treatment		Droppings								
			Masses (g)		Masses (g)		Masses (g)		Masses (g)		Masses (g)								
Campground	None	CGC1	5/20/96	21.55	4.76	1.40	2.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6/28/96			
			CGC2	10.11	1.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			CGC3	7.94	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			CGC4	6.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			CGC5	6.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			CGC6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			CGC7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
		Mean	7.55	0.95	0.20	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
		SD	7.28	1.74	0.53	0.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Campground	1 g/acre initially	CGT1	5/20/96	12.05	1.90	0.25	13.04	0.59	9.23	3.11	5.66	2.67	0.00	4.37	0.71	0.88	1.37	1.07	
			CGT2	4.54	0.09	0.00	0.69	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.88	0.60	2.55	0.80	
			CGT3	1.76	5.92	4.19	4.14	0.06	4.73	2.50	2.86	5.81	8.74	0.00	0.00	2.21	0.00	1.62	0.00
			CGT4	0.00	1.44	0.00	3.90	1.01	0.60	0.00	3.67	4.44	1.84	0.00	0.80	0.74	1.26	1.09	
			CGT5	1.81	0.00	1.34	0.00	0.00	1.12	5.48	0.92	4.40	1.68	2.34	0.54	0.48	1.53	5.82	
			CGT6	0.72	3.18	0.00	8.01	5.67	4.38	10.55	0.62	2.53	10.06	14.83	0.41	0.00	0.41	1.01	
			CGT7						0.83	0.26	0.00	1.74	0.00	0.00	5.12	0.00	0.00	0.00	
Day-use Area	None	DUC1	5/20/96	3.95	0.00	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			DUC2	4.65	0.00	1.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			DUC3	13.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			DUC4		0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			Mean	7.35	0.16	0.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			SD	4.13	0.32	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			DUT1	2.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Day-use Area	1 g/acre initially	DUT2	5/20/96	4.22	0.90	2.95	3.13	0.00	1.40	0.19	2.70	0.69	1.89	0.00	0.00	0.00	0.00	0.00	
			DUT3	0.73	0.00	1.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			DUT4	1.19	0.00	1.36	0.00	0.00	0.00	1.21	1.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			DUT5	7.55	2.66	0.00	0.00	0.00	1.80	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			DUT6	2.71	0.00	1.65	0.68	0.00	0.00	0.00	0.00	0.00	0.00	2.18	0.00	0.00	0.00	0.00	
			Mean	3.20	0.59	1.16	0.64	0.00	0.69	0.63	0.66	0.15	0.32	0.36	0.00	0.00	0.00	0.00	0.00
			SD	2.47	1.07	1.11	1.25	0.00	0.80	0.99	1.12	0.28	0.77	0.89	0.00	0.00	0.00	0.00	0.00
Boat Landing	None	BLC1	5/20/96	17.11	4.70	1.80	1.80	0.00	1.80	0.00	1.80	0.00	0.35	0.64	5.76	1.46	1.73	17.11	
			BLC2		3.32	4.50	5.34	3.40	3.40	4.92	2.25	0.08	0.86	2.06	0.22	0.00	0.00	0.22	
			BLC3		3.24	0.53	6.08	3.00	3.00	1.24	11.50	3.48	4.02	4.34	0.00	0.00	0.00	12.41	
			BLC4		21.04	2.54	3.70	4.62	5.27	0.00	3.15	0.12	1.46	11.86	0.00	0.00	0.00	11.86	
			BLC5		11.15	8.63	3.00	0.35	2.21	0.00	2.31	0.00	2.12	11.21	0.00	0.00	0.00	11.21	
			Mean	8.69	3.49	3.98	2.27	2.88	2.96	2.34	10.56	0.00	0.00	0.00	0.00	0.00	0.00	10.56	
			SD	7.63	3.25	1.74	2.01	2.20	4.91	1.64	1.15	6.23	0.00	0.00	0.00	0.00	0.00	6.23	



13544

# R142274

**Chemical:** Benzoic acid, 2-amino-, methyl ester

**PC Code:**  
128725

**HED File Code:** 41600 BPPD Other

**Memo Date:** 4/17/1996

**File ID:** DPD227693

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