

# NEIC

PESTICIDE USE OBSERVATION  
AINSWORTH, NEBRASKA  
August 1981

November 1981



**national enforcement investigations center**

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
OFFICE OF ENFORCEMENT

PESTICIDE USE OBSERVATION  
AINSWORTH, NEBRASKA  
August 1981

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Bruce A. Binkley

NATIONAL ENFORCEMENT INVESTIGATIONS CENTER  
DENVER, COLORADO

## CONTENTS

### EXECUTIVE SUMMARY

INTRODUCTION . . . . .	1
SUMMARY OF INVESTIGATION . . . . .	3
CONCLUSIONS . . . . .	3

### TECHNICAL REPORT

STUDY DESCRIPTION . . . . .	5
IN-SITU FISH EXPOSURES . . . . .	5
FLOW MEASUREMENTS . . . . .	9
DISCUSSION OF FINDINGS . . . . .	10
IN-SITU FISH EXPOSURES . . . . .	11
FLOW MEASUREMENTS . . . . .	15
MAGNACIDE H <sup>TM</sup> INJECTIONS . . . . .	18

### TABLES

1	Station Descriptions . . . . .	7
2	In-Situ Exposure Survival Data . . . . .	12
3	Chemical Analysis . . . . .	16

### FIGURES

1	Ainsworth Irrigation District . . . . .	6
2	Sampling Locations . . . . .	8
3	Magnacide H <sup>TM</sup> Label . . . . .	17
APPENDIX . . . . .		20

## EXECUTIVE SUMMARY



## INTRODUCTION

At the request of EPA Region VII, the National Enforcement Investigations Center (NEIC) conducted a pesticide use observation in Nebraska during August 1981. Specifically, Region VII had requested that NEIC investigate the use of the restricted herbicide Magnacide H<sup>TM</sup>.<sup>\*</sup> Citizens complaints have been made, alleging that this practice has caused fish kills in the canal systems and receiving waters.

The agricultural industry is basic to Nebraska's economy. Because of the erratic rainfall patterns much of the tillable land is irrigated to increase crop production. Water is provided to landowners for a fee from a group of privately maintained irrigation districts. Excessive growth of aquatic weeds in irrigation canals is a chronic problem. If not controlled, such growth severely restricts water flow and the increased volume of the weed mass can cause breaching of the canal banks resulting in serious erosion. Weed control in Nebraska is achieved primarily through the use of the aquatic herbicide acrolein, marketed under the trade name Magnacide H<sup>TM</sup> (EPA Registration Number 10707-9). Attributes that promote the widespread use of Magnacide H<sup>TM</sup> are its high efficacy as an aquatic herbicide and comparative low cost of treatment.

Magnacide H<sup>TM</sup> (acrolein 92% by weight) is a clear colorless liquid with a slightly aldehydic odor and is a powerful lacrimator. Because of its toxicity by inhalation it is classified by EPA as a Restricted Use Pesticide for use only by certified applicators or persons under their direct supervision. The product is supplied by distributors in pressurized steel cylinders. To achieve weed control the herbicide is forced from the cylinder by oxygen-free nitrogen through a metering device into the irrigation water. Normal injections of Magnacide H<sup>TM</sup> into irrigation canals provide final concentrations of the product ranging from 5 to 15

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<sup>\*</sup> TM-Registered Trademark

ppm. This range is well above the level known to be toxic to fish. For instance, rainbow trout have been shown to suffer 70% mortality when exposed to 0.41 ppm acrolein for 48 hours.\*

To allow for the protection of non-target aquatic organisms the registered label for Magnacide H<sup>TM</sup> bears the warning "Do not release treated water for 6 days after application into any fish bearing waters or where it will drain into them." The 6 day holding period is designed to allow for complete detoxification of the treated water, however, the Nebraska Game and Parks Commission has received complaints of fish kills allegedly occurring in receiving waters as a direct result of Magnacide H<sup>TM</sup> injections into irrigation canals.

From June 1 through June 5, 1981, NEIC and Region VII personnel did a reconnaissance inspection of three irrigation districts in Nebraska; the Farmers Irrigation District at Scottsbluff, the Ainsworth Irrigation District at Ainsworth, and the North Loup Irrigation District at Ord, Nebraska. Based on the reconnaissance a decision was made to conduct use observation studies on the Ainsworth and North Loup Irrigation Districts. Specific objectives for the study were to:

- Determine if Magnacide H<sup>TM</sup> use is consistent with label instructions and federal (FIFRA) regulations.
- Determine if Magnacide H<sup>TM</sup> injected into the irrigation canals is translocated to fish-bearing receiving waters.
- Determine the effects, if any, of Magnacide H<sup>TM</sup> on fish populations in the receiving waters.

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\* Acrolein Residues in Irrigation Water and Effects on Rainbow Trout.  
T.R. Bartley, et al, Bureau of Reclamation, Denver, Colorado, May 1975.

## SUMMARY OF THE INVESTIGATION

The field work for the study was conducted from 3 August through 17 August 1981. On the 4th and 5th of August, exceptionally heavy rain and hail (4-6 inches) was encountered at Ainsworth and Ord, Nebraska. As a result of the heavy rainfall and its effect on the irrigation system, much of the work intended to meet the study objectives was not completed. The rainfall caused a severe cutback in herbicide applications at Ainsworth, and resulted in complete cancellation of applications at Ord. At no time during the study was Magnacide H<sup>TM</sup> used on any portion of the North Loup Irrigation District canal system. At Ainsworth, NEIC conducted a limited pesticide use investigation which included caged fish exposures, flow measurements, and observation and limited sampling of Magnacide H<sup>TM</sup> injections.

## CONCLUSIONS

As a result of the limited use observation study done in Ainsworth, Nebraska during August 1981, the following conclusions were drawn.

- Injection of Magnacide H<sup>TM</sup> for aquatic weed control is lethal to fish within the confines of the canal system.
- Because of the hydrology of the irrigation system, it is unlikely that treated water can be held for six days for injections made in the Airport and Sand Draw lateral canals.
- Significant mortality occurred among fish exposed in Sand Draw Creek at its confluence with the Airport Lateral irrigation return. However, it could not be confirmed that the mortality was directly related to acrolein toxicity.
- It was not determined that use of acrolein in the irrigation system has had an adverse affect on Long Pine Creek.

In general, Magnacide H<sup>TM</sup> injections were found to conform with existing regulations defining the proper use of this restricted pesticide. An inconsistency with label instructions was noted concerning storage of Magnacide H<sup>TM</sup> tanks. The tanks at the Ainsworth facility were stored uncovered in the open, whereas, the label requires that storage be under cover in a well ventilated area.



## TECHNICAL REPORT

## STUDY DESCRIPTION

Evaluation of the operation of the Ainsworth Irrigation System was done through observations of field inspectors, and review of information provided by the District Supervisor and irrigation district maps. Water is supplied to the district from Merritt Reservoir, an impoundment on the Snake River approximately 53 miles west of Ainsworth. Water is delivered to the Ainsworth area through a single concrete-lined main canal. This canal has an initial capacity of 580 cfs flow and services approximately 34,000 acres of farmland. At Ainsworth water is diverted to cropland through 5 main lateral canals and numerous minor laterals for a total length of 169.7 miles (Figure 1). In order to insure sufficient water delivery to all parts of the district, an excess must be drawn from Merritt Reservoir. When all water demands have been satisfied this excess water is "wasted." Two methods of "wasting" are used; collection in waste impoundments which are small, shallow containment ponds and direct discharge into local creeks. A major concern in the Ainsworth area is Long Pine Creek, an established trout stream and recreational area. A gradual degradation of the quality of the creek and declining trout populations has been alleged by local citizens to be due to the Irrigation District wasting acrolein laden water into the creek system. The following studies were done to determine if Magnacide H<sup>TM</sup>, when properly used by the Irrigation District, is having an adverse effect on the aquatic environment of receiving waters.

### In-Situ Fish Exposures

Live bluegills (Lepomis macrochirus) were exposed in floating cages at 12 locations in the canal system and receiving waters to evaluate the effects of acrolein injections. Stations 2, 3, and 4 were in Long Pine Creek (Table 1, Figure 2). Station 4, located upstream of any possible irrigation discharge served as a control. Stations 6 and 7 were in Bone Creek and Stations 5 and 8 located in Sand Draw Creek. The remaining five stations (1, 11, 15, 25, 29) were located in the canal

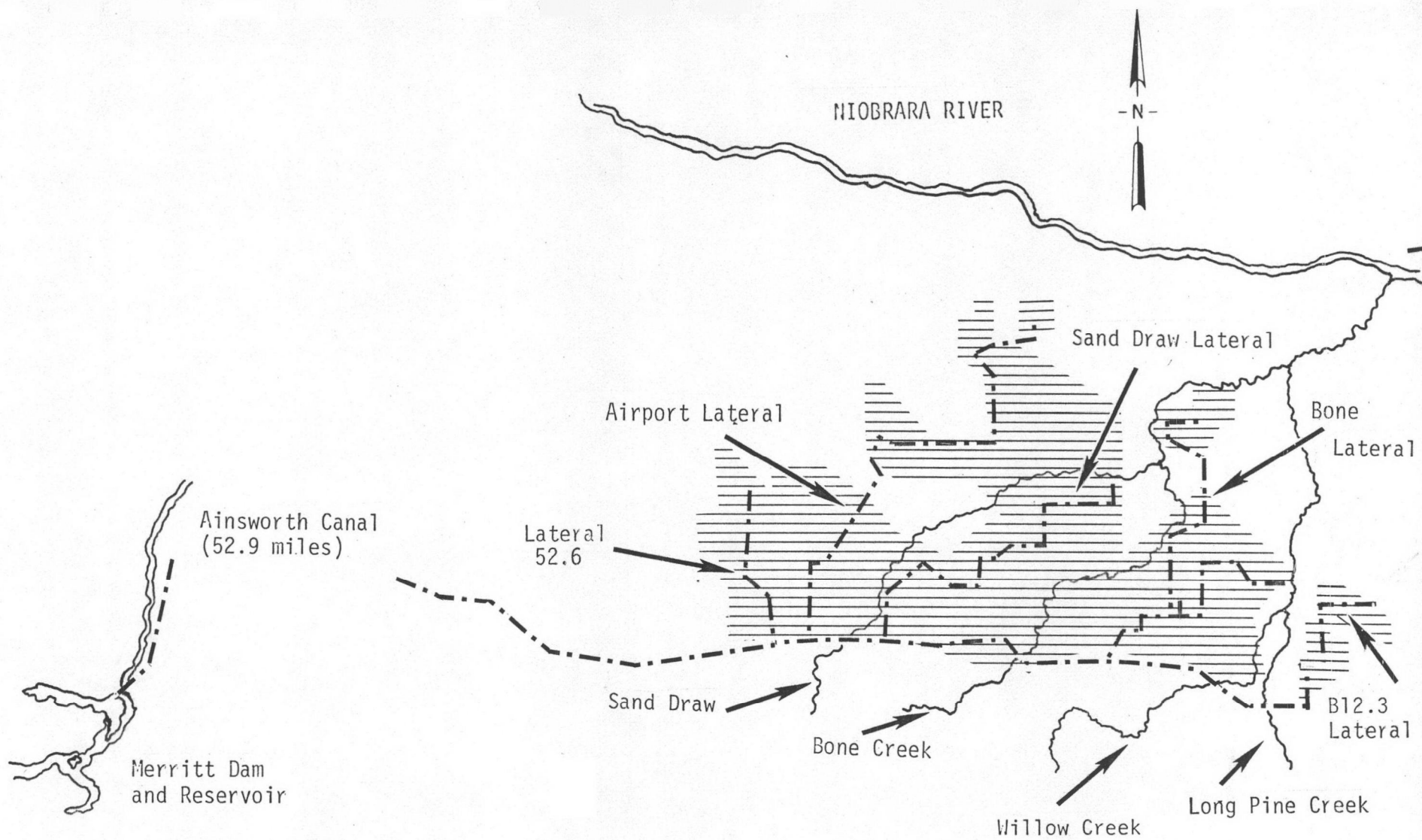


Figure 1  
 AINSWORTH IRRIGATION DISTRICT  
 AINSWORTH, NEBRASKA  
 August 1981

Table 1  
STATION DESCRIPTIONS  
AINSWORTH, NEBRASKA  
AUGUST 1981

<u>STATION NO.</u>	<u>LOCATION</u>
1	100 feet above Ainsworth main syphon at Bone Creek Overflow.
2	Long Pine Creek approximately 1 1/4 miles downstream from confluence of Bone Creek.
3	Long Pine Creek approximately 1/8 mile downstream from confluence of Bone Creek.
4	Long Pine Creek 4 miles south of city of Long Pine Control Station.
5	End of line Airport Lateral (A 12.1) confluence with Sand Draw.
6	Bone Creek 3/4 mile downstream from Bone lateral overflow 17.1.
7	Bone Creek at confluence of Ainsworth syphon overflow.
8	End of line of Sand Draw lateral at confluence with Sand Draw.
11	Sand Draw lateral mile post 1.8.
15	Sand Draw lateral mile post 6.8.
24	Bone lateral B-15.0 - 2.8.
25	Bone lateral B-20.75
29	Bone lateral end of line B-25.2.
30	Bone lateral B-12.3 Headgate.
31	Bone lateral B-12.3 - 5.0.
32	Bone lateral B-12.3 - 7.0.



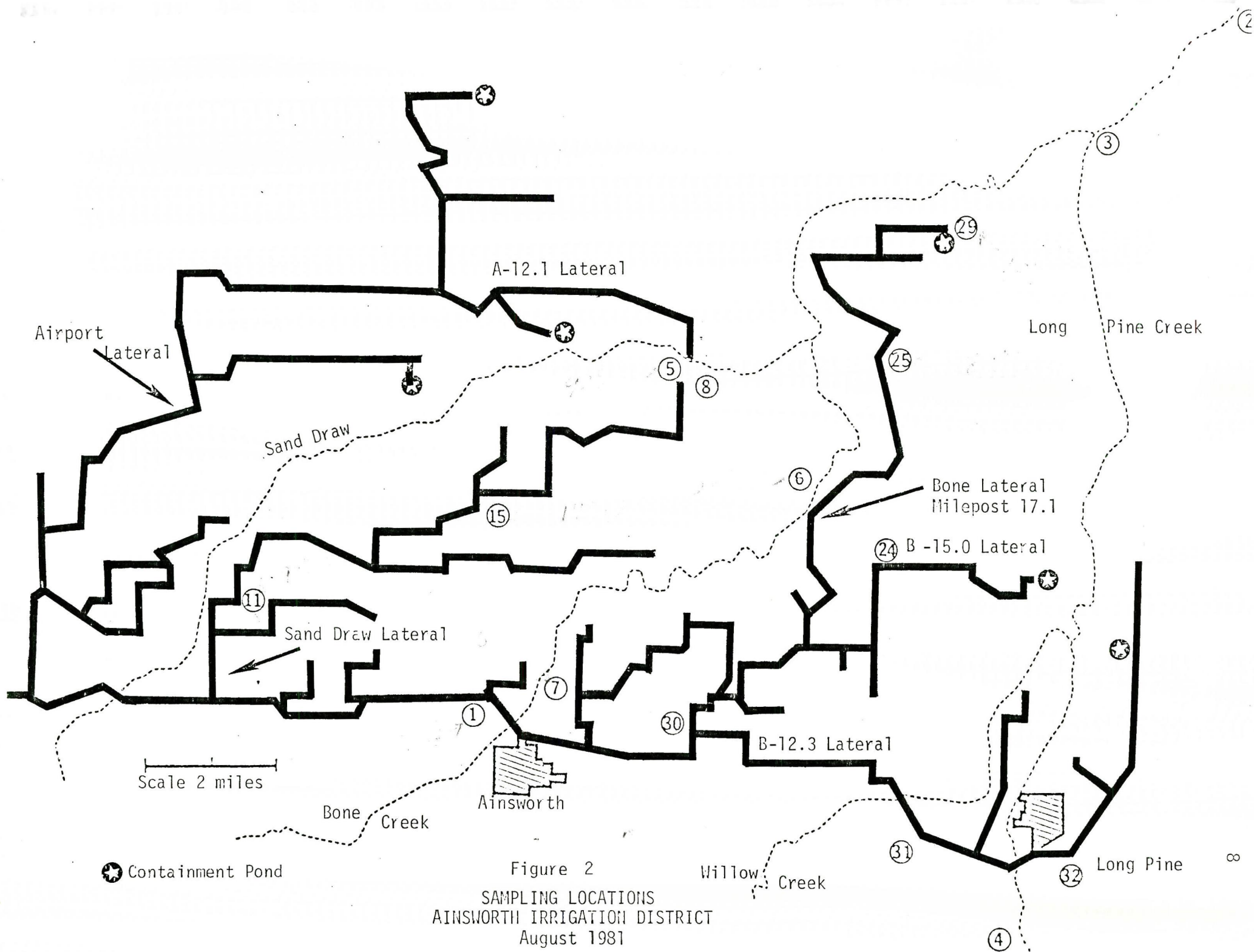


Figure 2  
 SAMPLING LOCATIONS  
 AINSWORTH IRRIGATION DISTRICT  
 August 1981

system. Twelve fish were exposed in each cage for a 96-hour period. Measurements were taken daily at each station of water temperature, pH, and dissolved oxygen concentration.

### Flow Measurements

Flow measurements using fluorescent Rhodamine WT dye were done at three locations in the canal system: lateral 52.6 mile marker 0.9 (Figure 1), Sand Draw lateral at mile markers 0.0 and 1.2 (Figure 2).

### Magnacide H<sup>TM</sup> Injection

Inspections were made of the Ainsworth Irrigation Districts facilities and observations made of five Magnacide H<sup>TM</sup> injections by NEIC and/or Region VII inspectors to verify that users:

- Were properly certified and trained to inject Magnacide H<sup>TM</sup> herbicide.
- Adhere to all registered label instructions and precautions.
- Properly clean and maintain all injection and protective equipment.
- Store and dispose of herbicide containers in the prescribed manner.
- Maintain complete and accurate records of all Magnacide H<sup>TM</sup> injections.

## DISCUSSION OF FINDINGS

There are two possible modes through which the Operations of the Ainsworth Irrigation System might effect an adverse impact on Long Pine Creek: acrolein toxicity and habitat destruction by excessive siltation. If irrigation return flow contains acrolein, the possibility exists that it could be toxic to fish in Long Pine Creek during times of low flow. It was observed that the stretch of Long Pine Creek below the confluence of Bone Creek (Station 3, Figure 2) bears a heavy silt load. Very little habitat is available for either benthic organisms or trout which in turn feed primarily on the benthos. During the study period, the silt contribution coming from Bone Creek was very evident. However it must be realized that due to the extremely heavy rainfall, wasted irrigation water, and natural runoff were abnormally high. It was also observed that some growers appeared to irrigate excessively. Water was allowed to breach the field borders and run down the hillside into Bone Creek, also increasing the silt load.

Prior to the installation of the Ainsworth irrigation system, Sand Draw Creek, a tributary to Bone Creek, was an intermittent stream of low flow. However due to irrigation return and field runoff the Creek now flows continually during the irrigation season and adds to the silt burden.

It appears that under normal flow conditions, there is no need to have excessive wasted irrigation water. Of the six containment ponds inspected, only one located at the end of Bone lateral 15.0 (Figure 2) had any possibility of returning irrigation water to any local creeks. In general the containment ponds were small and shallow allowing wasted water to dissipate through evaporation and percolation. The pond at Bone lateral 15.0 did contain an overflow pipe. If the water level rises to the pipe, irrigation water would flow through Rattlesnake Gulch directly into Long Pine Creek. It seems unlikely however, that such an overflow would normally be toxic. During the study fishermen were observed catching mature bullhead from this pond indicating the pond water was probably not toxic for at least several years.

Four areas were observed where wasted water directly enters local receiving waters:

- 1) The overflow at the main Ainsworth Syphon (Station 1, Figure 2). This overflow was observed to discharge irrigation water directly to Bone Creek following the heavy rainfall.
- 2) The overflow on Bone lateral at mile post B-17.1. This overflow discharges directly into Bone Creek. No active discharge was observed during this study.
- 3) Airport lateral A-12.1 discharges directly into Sand Draw Creek through a syphon at Station 5 (Figure 2). This discharge was active continually during the study period.
- 4) Sand Draw lateral discharges directly into Sand Draw Creek through a syphon at Station 8 (Figure 2). This discharge was active continually during the study period.

#### In-Situ Fish Exposures

Results of the in-situ fish exposures are inconclusive. Eleven exposures consisting of 12 fish per exposure cage were done from August 9 through August 13. Survival of the exposed fish for the 96-hour period ranged from 0-100% (Table 2, Figure 2). Of particular note is the fact that no mortality occurred at any of the stations located in Long Pine Creek (Stations 2, 3, 4). Extensive mortality occurred at Stations 25 and 29 located in the Bone lateral canal. Survival at these stations was only 17% and 0% respectively. Irrigation district records show Magnacide H<sup>TM</sup> was injected into this canal on August 7 and 8 just prior to the fish being placed into the exposure cages. Eight injections were done on August 7, starting at mile post 12.7 and occurring at approximately mile intervals to mile post 20.5. On August 8, injections were done at mile posts 21.5, 22.9 and 24.0. Stations 25 and 29 are located at mile posts 20.75 and 25.2 respectively.



Table 2  
IN SITU EXPOSURE  
SURVIVAL DATA\*  
AINSWORTH, NEBRASKA  
August 1981

<u>Station No.</u>	<u>Date</u>	<u>Hours of Exposure</u>	<u>No. Surviving</u>	<u>% Survival</u>	<u>Temperature</u>	<u>pH</u>	<u>Dissolved Oxygen</u>
1	9 Aug. 81	0	12	12	22.5		
	11 Aug. 81	48	8	66	21.5	8.0	7.5
	12 Aug. 81	72	8	66	22.7	7.9	7.1
	13 Aug. 81	96	8	66	22.0	7.9	
2	9 Aug. 81	0	12	100	22.0		
	10 Aug. 81	24	12	100	21.0	7.9	8.1
	11 Aug. 81	48	12	100	21.5	8.4	7.5
	12 Aug. 81	72	12	100	18.8	7.7	9.0
	13 Aug. 81	96	12	100	17.9	7.8	6.9
3	9 Aug. 81	0	12	100	21.0		
	10 Aug. 81	24	12	100	19.0	7.6	8.8
	11 Aug. 81	48	12	100	21.5	8.4	7.5
	12 Aug. 81	72	12	100	17.8	8.0	9.5
	13 Aug. 81	96	12	100	17.3	8.0	7.6
4 (Control)	9 Aug. 81	0	12	100	21.0		
	10 Aug. 81	24	12	100	19.0	7.6	8.8
	11 Aug. 81	48	12	100	21.5	8.4	7.5
	12 Aug. 81	72	12	100	17.8	8.0	9.5
	13 Aug. 81	96	5**	100	17.3	8.0	7.6

Table 2 (Continued)  
 IN SITU EXPOSURE  
 SURVIVAL DATA  
 Ainsworth, Nebraska  
 August 1981

<u>Station No.</u>	<u>Date</u>	<u>Hours of Exposure</u>	<u>No. Surviving</u>	<u>% Survival</u>	<u>Temperature</u>	<u>pH</u>	<u>Dissolved Oxygen</u>
5	9 Aug. 81	0	12	100	25.0		
	10 Aug. 81	24	8	66	27.0	9.1	7.9
	11 Aug. 81	48	2	17	31.9	9.1	6.0
	12 Aug. 81	72	1	8	28.5	8.2	7.5
	13 Aug. 81	96	1	8	23.9	8.6	7.5
6	9 Aug. 81	0	12	100	23.0		
	10 Aug. 81	24	12	100			
	11 Aug. 81	48	12	100	24.6	8.2	6.6
	12 Aug. 81	72	12	100	18.2	7.9	8.2
	13 Aug. 81	96	9	75	18.7	8.0	6.6
7	9 Aug. 81	0	12	100	18.5		
	10 Aug. 81	24					
	11 Aug. 81	48	8	66	21.4	8.2	7.6
	12 Aug. 81	72	7	58	15.3	6.1	4.6
	13 Aug. 81	96	6	50	18.4	7.1	5.9
11	9 Aug. 81	0	12	100	22.5		
	10 Aug. 81	24					
	11 Aug. 81	48	6	50	20.6	7.9	6.9
	12 Aug. 81	72	1	8	21.6	8.6	7.3
	13 Aug. 81	96	1	8	21.6	8.2	5.8

Table 2 (Continued)  
IN SITU EXPOSURE  
SURVIVAL DATA  
Ainsworth, Nebraska  
August 1981

<u>Station No.</u>	<u>Date</u>	<u>Hours of Exposure</u>	<u>No. Surviving</u>	<u>% Survival</u>	<u>Temperature</u>	<u>pH</u>	<u>Dissolved Oxygen</u>
15	9 Aug. 81	0	12	100	23.0		
	10 Aug. 81	24					
	11 Aug. 81	48	11	92	21.9	8.0	6.4
	12 Aug. 81	72	10	83	22.2	7.8	6.8
	13 Aug. 81	96	10	83	21.5	7.8	4.0
25	9 Aug. 81	0	12	100	24.0		
	10 Aug. 81	24	10	83	24.0	7.8	5.9
	11 Aug. 81	48	4	33	25.7	9.0	11.7
	12 Aug. 81	72	2	17	23.6	8.5	10.4
	13 Aug. 81	96	2	17	22.3	8.4	7.7
29	9 Aug. 81	0	12	100	26.0		
	10 Aug. 81	24	7	58	26.5	8.2	8.7
	11 Aug. 81	48	4	33	30.0	8.8	8.3
	12 Aug. 81	72	0	0	28.5	8.9	10.2
	13 Aug. 81	96	0	0	23.0	8.3	7.6

\* Vandalism not mortality. Security seal was broken indicating cage had been opened.

\*\* No data is recorded for station 8. This site was vandalized within the first 24 hours of exposure and all fish released.

At Station 5 only 8% (one fish) survived the exposure period (Table 2). This station was located directly in the overflow from the Airport lateral end on line discharge at the confluence with Sand Draw Creek. Irrigation District records show injections occurred on the Airport lateral on August 10 at mile posts 1.8, 3.0, 4.5, 6.7, 8.5, 9.7, 12.6, 14.2, and 15.6.

Significant mortality also occurred at Stations 7 and 11 where 50% and 8% was recorded, respectively. No specific injection of Magnacide H<sup>TM</sup> correlated with mortality at these stations.

These data indicate that Magnacide H<sup>TM</sup> injections into the canal system are lethal to fish living within the confines of the canal itself. This is substantiated by visual observations made during the study when dead fish could be observed on almost any occasion in the various laterals. The high mortality of caged fish in receiving water at Sand Draw Creek, (Station 5) indicates that the discharge at this point can be lethal. However, this does not prove that acrolein injections have been lethal to indigenous fish. Given the opportunity, fish will avoid acrolein and it is quite probable this occurs in the receiving waters. Chemical analysis of waters from the canal and receiving waters during the period mortalities occurred did not show acrolein to be present and were inconclusive (Table 3). However since injections move through the canal system in waves, acrolein may have been present at earlier times and missed in the NEIC sampling.

#### Flow Measurements

The results of three sets of flow measurements indicate the grade is quite consistent through the canal system. In all three tests, the calculated flow was approximately 1 ft/sec or approximately 0.7 mile per hour. This indicates that injections in the Sand Draw and Airport laterals flowing toward the syphons emptying into Sand Draw Creek would probably reach the receiving water within 24 hours. The Magnacide H<sup>TM</sup> label (Figure 3) states "Do not release treated water for 6 days after



Table 3  
CHEMICAL ANALYSIS  
AINSWORTH IRRIGATION DISTRICT  
August 1981

<u>Station No.</u>	<u>Location</u>	<u>Date</u>	<u>Acrolein (<math>\mu\text{g/l}</math>)</u>
1	Ainsworth Syphon	8/11/81	ND*
3	Long Pine Creek	8/12/81	ND*
4	Long Pine Creek	8/12/81	ND*
5	Airport Lateral Discharge	8/10/81	ND*
5	Airport Lateral Discharge	8/12/81	ND*
11	Sand Draw Lateral Mile Post 1.8	8/12/81	ND*
29	Bone Lateral Mile Post 25.2	8/10/81	ND*
24	Bone Lateral B-15.0 Mile Post 2.3	8/15/81	6400**
30	Bone Lateral B-12.3 Headgate	8/15/81	15000
31	Bone Lateral B-12.3 Mile Post 5.0	8/15/81	6600**
32	Bone Lateral B-12.3	8/15/81	5100**

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\* ND = None detected. The detection limit was 25  $\mu\text{g/l}$  acrolein.

\*\* The methodology may have yielded low results by a factor of 2 to 3 at this level of acrolein. There was insufficient sample to reanalyze these samples at lower dilutions.

Figure 3

NEBRASKA USE OBSERVATION

August 1981

# MAGNACIDE™ H HERBICIDE (Acrolein, Inhibited)

EPA Reg. No. 10707-9

EPA Est. 10707 CA-5

CONTENTS UNDER PRESSURE

ACTIVE INGREDIENT	BY WEIGHT
Acrolein.....	92%
INERT INGREDIENTS .....	8%
TOTAL	100%

(MAGNACIDE™ H Herbicide contains 6.5 pounds of active ingredient per gallon.)

ANGER

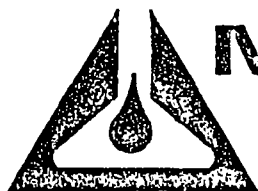


POISON

KEEP OUT OF REACH OF CHILDREN

## RESTRICTED USE PESTICIDE

For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's certification.



MAGNA

### NET WEIGHTS

Cylinder-370 lbs.

Skid Tank-2450 lbs.

## DANGER

EXTREMELY FLAMMABLE AND IRRITATING VAPOR AND LIQUID, POISONOUS BY INHALATION, SKIN CONTACT OR SWALLOWING. DO NOT BREATHE VAPOR DO NOT GET IN EYES, OR SKIN OR ON CLOTHING. KEEP AWAY FROM FIRE, SPARKS AND HEATED SURFACES.

If spilled on clothing, gloves or shoes, remove them immediately and wash thoroughly before re-use.

**CAUTION:** Acrolein, the active ingredient in MAGNACIDE H Herbicide is highly reactive chemically and readily forms polymers. If alkalis (such as ammonia and caustic) or strong acids are brought in contact with the MAGNACIDE H Herbicide in a closed system, the Herbicide can polymerize with sufficient violence to rupture the container. Do not apply with equipment used for acids and alkalis. Contamination of MAGNACIDE H Herbicide with any foreign matter must be avoided.

A supply of sodium carbonate (soda ash) or a 10% sodium sulfite solution should be readily available for de-activating spilled MAGNACIDE H. All spills should be confined and de-activated before disposal. See the MAGNACIDE H Herbicide Application and Safety Manual for additional information.

## STORAGE OF MAGNACIDE H TANKS

Full tanks of acrolein should be stored in a cool, shady, well-ventilated area which is protected from the weather and away from other chemicals. (No alkalis or oxidizing materials should be near.)

The storage area preferably should be remotely located and should be of fireproof construction. An open shed type structure is suitable. All electrical equipment should be explosion-proof and all equipment properly grounded.

## GENERAL DIRECTIONS

MAGNACIDE H Herbicide is a water soluble material for the control of submersed and floating weeds and algae in irrigation canals. This material should only be applied in accordance with directions in the MAGNACIDE H Herbicide Application and Safety Manual by a certified applicator or under a certified applicator's supervision. Do not permit dairy animals to drink treated water. Do not use where waters will either flow into or transfer via underground streams to potential sources of drinking water. Do not release treated water for 6 days after application into any fish bearing waters or where it will drain into them.

## PRECAUTIONS IN USING

Wear face shields or goggles during handling. Use with adequate ventilation. Keep available at all times, a gas mask of a type approved by the U.S. Bureau of Mines for organic vapor protection. Clean application equipment with large amounts of water after using.

This product will kill fish and wildlife. Keep out of lakes, streams or ponds. Fish, shrimp and crab will be killed at application rates recommended. Do not apply where they are important resources. Do not apply to water drainage areas where runoff or flooding will contaminate ponds, lakes, streams, tidal marshes and estuaries. Do not contaminate water by cleaning of equipment or disposal of wastes. Consult your State Fish and Game Agency before applying this product. Use only as specified.

Do not reuse empty container. Return empty containers to Magna Corporation.

## ANTIDOTE AND FIRST AID TREATMENT

CALL A PHYSICIAN IMMEDIATELY IN ALL CASES OF SUSPECTED POISONING

**INTERNAL:** If the material has been swallowed, give two glasses of water and induce vomiting immediately by introducing a finger into the throat. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. Keep patient prone and quiet.

If inhaled, get victim into fresh air immediately and give artificial respiration if breathing has stopped.

**EXTERNAL:** If spilled on the skin, remove all contaminated clothing and wash skin with soap and running water. If the material gets into the eyes, wash immediately with running water for at least 15 minutes. For eyes get medical attention.

## NOTE TO PHYSICIANS

**WARNING SIGNS AND SYMPTOMS:** Liquid MAGNACIDE H Herbicide is absorbed by the skin and is particularly irritating to any lesion and to the eyes. The vapors act principally on the mucous membranes of the eyes and respiratory tract. Because of the extreme lachrymatory warning effect, the concentration tolerable by man is far below the minimum lethal concentration.

**TREATMENT:** Treat exposed area as a chemical burn. Thoroughly flush the eyes with water and treat symptomatically. Persons exposed to MAGNACIDE H Herbicide vapors have a delayed reaction and experience irritation of the respiratory tract. In severe cases, this may progress to pulmonary edema. Therefore, it is advisable to keep persons exposed to MAGNACIDE H Herbicide under observation for 24 hours following exposure.

## NOTICE OF WARRANTY

MAGNA CORPORATION MAKES NO WARRANTY OF MERCHANTABILITY FITNESS FOR ANY PURPOSE, OR OTHERWISE, EXPRESS OR IMPLIED concerning this product or its uses which extend beyond the use of the product under normal conditions in accord with the statements made on this label.

Revised 3-27-80

Supersedes 5-1-78

DISTRIBUTED BY: MAGNA CORPORATION, 11808 South Bloomfield Ave, Santa Fe Springs, California 90670

application into any fish bearing waters or where it will drain into them." It appears that any discharge from this canal system following an injection would occur in less than 6 days. Studies need to be done to determine if sufficient dilution and degrading of acrolein occurs so as to be undetectable in less than the stated six day period.

#### Magnacide H Injections

Personnel performing Magnacide H<sup>TM</sup> injections were found to be properly certified or under direct supervision of a certified applicator as required for use of a restricted pesticide. The Magnacide H<sup>TM</sup> is purchased from a distributor in 2300 pound portable skid mounted tanks. The tanks are mounted at the Irrigation District on a trailer along with the various other equipment required for herbicide injections. It was noted that skid tanks and trailer mounted tanks were stored on the premises in the open. This is inconsistent with label instructions which state "Full tanks of acrolein should be stored in a cool, shady, well-ventilated area which is protected from the weather ...." The Magnacide H<sup>TM</sup> Herbicide Application and Safety Manual further states "At a minimum, Magnacide H containers should be stored in open construction buildings of fire resistant material, which are capable of maintaining container temperatures below 100°F."

Five injections of Magnacide H<sup>TM</sup> were observed on August 15, 1981. The equipment was inspected at this time and appeared to be well-maintained and meet Magnacide Inc. requirements. The applicator was familiar with the equipment and made all injections in an efficient manner. Injection was accomplished by pressurizing the Magnacide H<sup>TM</sup> tank with nitrogen forcing the liquid through a polypropylene hose into the canal. The injections were made at points (headgates) where water turbulence effected rapid mixing. The end of the delivery hose was left submerged so that no objectionable vapor loss was noted in proximity of the application. The injection rate was determined by the flow rate of the canal and regulating the nitrogen pressure and orifice plate. The operator had available and used adequate safety equipment. The

addition of a portable eye wash would however be very desirable. It was noted that when the injection was made at Station 31, the applicator delayed treatment until a second "Ditch-rider" confirmed by radio that a poppet valve in this area was closed. This valve if left open could allow irrigation return to Long Pine Creek. Water samples were taken at four injection sites (stations 24, 30, 31, 32) by NEIC to determine if dose rates were accurate. The results of 3 of the 4 samples were lost due to laboratory error. The analysis of the fourth sample showed acrolein present at 15 ppm (Table 3). The intended dose rate was 10.5 ppm. This is not an inconsistency, since injections up to 15 ppm are recommended; however, it may indicate a need for greater accuracy when injecting this product.

Copies of Magnacide H<sup>TM</sup> injection records for 1981 were provided to EPA by the Ainsworth Irrigation District. In general these records were found to be in order, up-to-date and complete.



## APPENDIX

### SAMPLING AND ANALYTICAL METHODS

#### In-Situ Fish Exposures

In-situ fish exposures were done using indigenous bluegills live trapped by the Nebraska Game and Parks Commission. The exposure cages were of epoxy-coated plywood construction. Wire covered openings on four sides allowed free circulation of water through the cage. The cages were anchored and allowed to float freely at the surface level at each station. Cages were inspected daily for mortalities and measurements taken for pH, water temperature and dissolved oxygen concentration.

#### Environmental Measurements

Measurements for pH, water temperature and dissolved oxygen concentration were taken with a Hariba Model U-7 Water Quality Checker. The pH mode was calibrated using pH 4, 7, and 11 standard buffer solutions. Dissolved oxygen was calibrated by using the saturated water method. The temperature mode was checked against a NBS calibrated thermometer.

#### Water Samples

Water samples for acrolein analyses were collected in glass bottles with Teflon-lined caps. Sample bottles were completely filled to preclude air bubbles, acidified with dilute sulfuric acid to pH 4-5 and stored in ice. Holding tests showed this collection method retains 70-80% of the acrolein for a 5-day period.

#### Analytical Methods

The acrolein is reacted with 2,4-dinitrophenylhydrazine (2,4-DNPH) to form a highly colored hydrazone which is extracted with toluene. The toluene is back washed with NaOH to eliminate the excess 2,4-DNPH.

1. Prepare a 2,4-DNPH solution by addition of 0.792 g of 2,4-DNPH and 167 ml of concentrated HCl to 500 ml of water in a 1000 ml volumetric flask. Stir with a magnetic stirrer until the 2,4-DNPH is completely dissolved. Dilute the solution to the 1000 ml mark. The solution should be stored in darkness and remade weekly.
2. Empty the sample bottle into a 1 liter graduated cylinder and record the sample volume.
3. Transfer the sample to a 2 liter separatory funnel and add 40 ml of 2,4-DNPH solution to the sample. Shake gently and let stand for two hours with occasional, gentle shaking.
4. After two hours, extract with 25 ml of toluene followed by a second extraction with an additional 15 ml of toluene. Combine the two extracts in a 125 ml separatory funnel.
5. Backwash the toluene extract twice with 100 ml portions of saturated NaCl. Discard the NaCl washes. Backwash the extract with 100 ml of 3N NaOH by shaking for approximately 15 seconds. Discard the NaOH wash.
6. Pass the toluene through a small amount of the  $\text{Na}_2\text{SO}_4$  packed in a funnel. Wash the  $\text{Na}_2\text{SO}_4$  with 10 ml of toluene. Combine the wash with the extract for a total volume of 50 ml.

The hydrazone derivative is not stable. Analysis must be completed on the same day as extraction.

#### Quality Control

A field blank was analyzed and no acrolein was detected. Sample #752-030 was analyzed in duplicate and a concentration of 15 mg/L was found both times. Sample #752-030 was spiked with 5.1 mg/L of acrolein and the recovery was 80%.

#### Chain of Custody Procedures

Sample chain of custody and document control methods used during this study are those detailed in the NEIC Policies and Procedures Manual (EPA 330/9/78/001-R).



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII  
324 EAST ELEVENTH STREET  
KANSAS CITY, MISSOURI - 64106

April 2, 1982

Mr. William Blackman, Jr.  
Deputy Director, EPA-NEIC  
Building 53, Box 25227  
Denver Federal Center  
Denver, Colorado 80225

Dear Mr. Blackman:

As previously discussed by telephone, this office is holding a meeting to determine the possibility of resolving a problem with respect to the use of the herbicide acrolein in Nebraska irrigation canals. The problem is relative to the release of treated waters into fish bearing waters prior to the six day waiting period as specified on the label.

The meeting will begin at 8:30 a.m. on Tuesday, May 4, 1982, in room 148, Federal Office Building, 100 Centennial Mall North, Lincoln, Nebraska, and will probably last until late afternoon.

Enclosed is a list of those persons who have been notified and have stated that they or their representatives will attend.

I look forward to you or your designated representative attending this very important meeting and if you have any questions, please do not hesitate to write or call me at (816) 374-6538.

Sincerely yours,

C. E. Poindexter  
Consumer Safety Officer  
Air and Waste Compliance Branch  
Air and Waste Management Division

Enclosure

cc: Bob Schneider ✓

EPA MEETING  
ACROLEIN USE IN NEBRASKA IRRIGATION SYSTEMS  
FEDERAL OFFICE BUILDING  
LINCOLN, NEBRASKA  
MAY 4, 1982

8:30 A.M.	Introductions, Regional Office Position, and Statement of Purpose - EPA	Poindexter
9:00 A.M.	The Registration Process - EPA	Adamczyk
9:15 A.M.	Weed Problems and Control In Irrigation Canals - Irrigation District Managers  Long                      Davis Pritts                    Laverack Welch                    Sell	
10:15 A.M.	The Bureau's Viewpoint - Bureau of Reclamation, USDI	Kutz
10:30 A.M.	BREAK	
10:45 A.M.	Commission Concerns - Nebraska Game and Parks Commission	Thomas
11:00 A.M.	Environmental Concerns - Nebraska Department of Environmental Control	Lund
11:15 A.M.	Other Voluntary Statements State Department of Agriculture Nebraska Department of Water Resources Nebraska Water Resources Association University of Nebraska - Environmental Programs	
11:30 A.M.	The Registrant's Position - Magna Corporation	McDonald Stennett
12:00 A.M.	LUNCH	
1:00 P.M.	Open Discussion by Participants	Poindexter
2:00 P.M.	BREAK	
2:15 P.M.	Formulation of Ideas and Preliminary Decision for Problem Approach EPA, GPC, DEC, Magna	Poindexter



Figure 3

NEBRASKA USE OBSERVATION

August 1981

# MAGNACIDE™ H HERBICIDE (Acrolein, Inhibited)

EPA Reg. No. 10707-9

EPA Est. 10707 CA-5

CONTENTS UNDER PRESSURE

ACTIVE INGREDIENT	BY WEIGHT
Acrolein.....	92%
INERT INGREDIENTS .....	8%
TOTAL	100%

(MAGNACIDE™ H Herbicide contains 6.5 pounds of active ingredient per gallon.)

ANGER

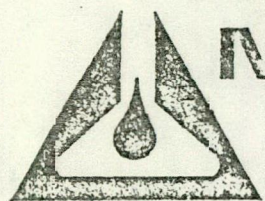


POISON

KEEP OUT OF REACH OF CHILDREN

## RESTRICTED USE PESTICIDE

For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's certification.



MAGNA

### NET WEIGHTS

Cylinder-370 lbs.

Skid Tank-2450 lbs.

## DANGER

EXTREMELY FLAMMABLE AND IRRITATING VAPOR AND LIQUID, POISONOUS BY INHALATION, SKIN CONTACT OR SWALLOWING. DO NOT BREATHE VAPOR DO NOT GET IN EYES. OR SKIN OR ON CLOTHING. KEEP AWAY FROM FIRE, SPARKS AND HEATED SURFACES.

If spilled on clothing, gloves or shoes, remove them immediately and wash thoroughly before re-use.

CAUTION: Acrolein, the active ingredient in MAGNACIDE H Herbicide is highly reactive chemically and readily forms polymers. If alkalies (such as ammonia and caustic) or strong acids are brought in contact with the MAGNACIDE H Herbicide in a closed system, the Herbicide can polymerize with sufficient violence to rupture the container. Do not apply with equipment used for acids and alkalies. Contamination of MAGNACIDE H Herbicide with any foreign matter must be avoided.

A supply of sodium carbonate (soda ash) or a 10% sodium sulfite solution should be readily available for de-activating spilled MAGNACIDE H. All spills should be confined and de-activated before disposal. See the MAGNACIDE H Herbicide Application and Safety Manual for additional information.

### STORAGE OF MAGNACIDE H TANKS

Full tanks of acrolein should be stored in a cool, shady, well-ventilated area which is protected from the weather and away from other chemicals. (No alkalies or oxidizing materials should be near.)

The storage area preferably should be remotely located and should be of fireproof construction. An open shed type structure is suitable. All electrical equipment should be explosion-proof and all equipment properly grounded.

### GENERAL DIRECTIONS

MAGNACIDE H Herbicide is a water soluble material for the control of submersed and floating weeds and algae in irrigation canals. This material should only be applied in accordance with directions in the MAGNACIDE H Herbicide Application and Safety Manual by a certified applicator or under a certified applicator's supervision. Do not permit dairy animals to drink treated water. Do not use where waters will either flow into or transfer via underground streams to potential sources of drinking water. Do not release treated water for 6 days after application into any fish bearing waters or where it will drain into them.

### PRECAUTIONS IN USING

Wear face shields or goggles during handling. Use with adequate ventilation. Keep available at all times, a gas mask of a type approved by the U.S. Bureau of Mines for organic vapor protection. Clean application equipment with large amounts of water after using.

This product will kill fish and wildlife. Keep out of lakes, streams or ponds. Fish, shrimp and crab will be killed at application rates recommended. Do not apply where they are important resources. Do not apply to water drainage areas where runoff or flooding will contaminate ponds, lakes, streams, tidal marshes and estuaries. Do not contaminate water by cleaning of equipment or disposal of wastes. Consult your State Fish and Game Agency before applying this product. Use only as specified.

Do not reuse empty container. Return empty containers to Magna Corporation.

### ANTIDOTE AND FIRST AID TREATMENT

CALL A PHYSICIAN IMMEDIATELY IN ALL CASES OF SUSPECTED POISONING

INTERNAL: If the material has been swallowed, give two glasses of water and induce vomiting immediately by introducing a finger into the throat. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. Keep patient prone and quiet

If inhaled, get victim into fresh air immediately and give artificial respiration if breathing has stopped.

EXTERNAL: If spilled on the skin, remove all contaminated clothing and wash skin with soap and running water. If the material gets into the eyes, wash immediately with running water for at least 15 minutes. For eyes get medical attention.

### NOTE TO PHYSICIANS

WARNING SIGNS AND SYMPTOMS: Liquid MAGNACIDE H Herbicide is absorbed by the skin and is particularly irritating to any lesion and to the eyes. The vapors act principally on the mucous membranes of the eyes and respiratory tract. Because of the extreme lachrymatory warning effect, the concentration tolerable by man is far below the minimum lethal concentration.

TREATMENT: Treat exposed area as a chemical burn. Thoroughly flush the eyes with water and treat symptomatically. Persons exposed to MAGNACIDE H Herbicide vapors have a delayed reaction and experience irritation of the respiratory tract. In severe cases, this may progress to pulmonary edema. Therefore, it is advisable to keep persons exposed to MAGNACIDE H Herbicide under observation for 24 hours following exposure.

### NOTICE OF WARRANTY

MAGNA CORPORATION MAKES NO WARRANTY OF MERCHANTABILITY FITNESS FOR ANY PURPOSE, OR OTHERWISE, EXPRESS OR IMPLIED concerning this product or its uses which extend beyond the use of the product under normal conditions in accord with the statements made on this label.

Revised: 3-27-80

Supercodes: 5-1-78

DISTRIBUTED BY: MAGNA CORPORATION, 11808 South Bloomfield Ave, Santa Fe Springs, California 90670



PERSONS/ORGANIZATIONS EXPECTED TO ATTEND - SPECIAL MEETING ON ACROLEIN  
LINCOLN, NEBRASKA - May 4, 1982

Douglas Campt, Director  
EPA Registration Division (TS-767)  
401 M Street, S.W.  
Washington, D.C. 20460

William Blackman, Jr.  
Deputy Director, EPA-NEIC  
Building 53, Box 25227  
Denver Federal Center  
Denver, Colorado 80225

Allan Abramson, Director  
Water Division - EPA  
324 East 11th Street  
Kansas City, Missouri 64106

Robert Kutz, Project Manager  
NE/KS Projects Office  
Bureau of Reclamation  
U. S. Department of the Interior  
P. O. Box 1607  
Grand Island, Nebraska 68802

George C. "Charley" McDonald  
Regulatory Affairs Manager  
Magna Corporation  
7505 Fannin, P. O. Box 33387  
Houston, Texas 77033

Richard Reiman, Acting Chief  
Bureau of Plant Industries  
Nebraska Department of Agriculture  
P. O. Box 94756, State House Station  
Lincoln, Nebraska 68509

Bill Bailey, Assistant Director  
Nebraska Fish and Game Commission  
P. O. Box 30370  
Lincoln, Nebraska 68503

Bob Wall, Chief  
Water and Waste Management Division  
Nebraska Department of Environmental  
Control  
Box 94877  
Lincoln, Nebraska 68509

Michael Jess, Director  
Nebraska Department of Water Resources  
301 Centennial Mall South  
Lincoln, Nebraska 68509

Jack Odgaard  
Executive Vice President  
Nebraska Water Resources Association  
512 South 13th Street  
Lincoln, Nebraska 68508

Roger Gold, Ph.D.  
Coordinator, Environmental Programs  
Institute of Agriculture and  
Natural Resources  
University of Nebraska, East Campus  
101 Former Vet Science Building  
Lincoln, Nebraska 68583

Paul Fishbach  
Extension Irrigationist  
Cooperative Extension Service  
Agriculture Engineering Annex  
L. W. Chase Hall, 2nd Floor  
University of Nebraska  
Lincoln, Nebraska 68583

Don Long, Secretary/Treasurer  
Nebraska State Irrigation Association  
c/o Central Nebraska Public Power and  
Irrigation District  
P. O. Box 356  
Holdredge, Nebraska 68949

\*Harlan Welch, Manager  
Ainsworth Irrigation District  
Route 2, Box 33  
Ainsworth, Nebraska 69210

Paul E. Pritts, Manager  
Bostwick Irrigation District  
P. O. Box 446  
Red Cloud, Nebraska 68970

Keith Davis, Manager  
Farwell Irrigation District  
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Farwell, Nebraska 68838

Vernon E. Laverack, Superintendent  
Frenchman-Cambridge Irrigation District  
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Cambridge, Nebraska 69022

Wes Sell  
Farmers Irrigation District  
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Scottsbluff, Nebraska 69361