

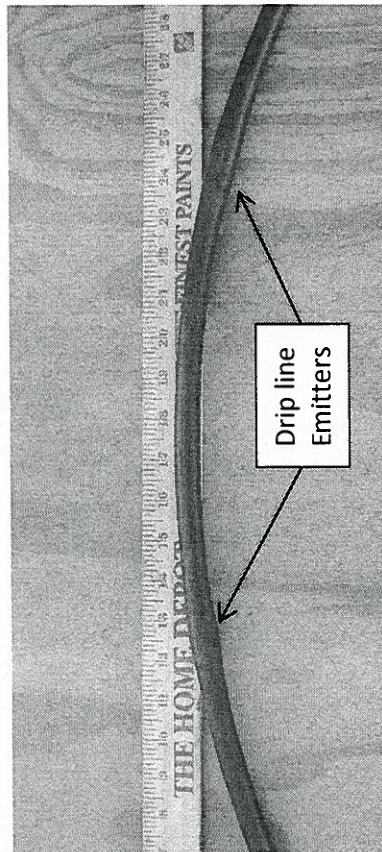
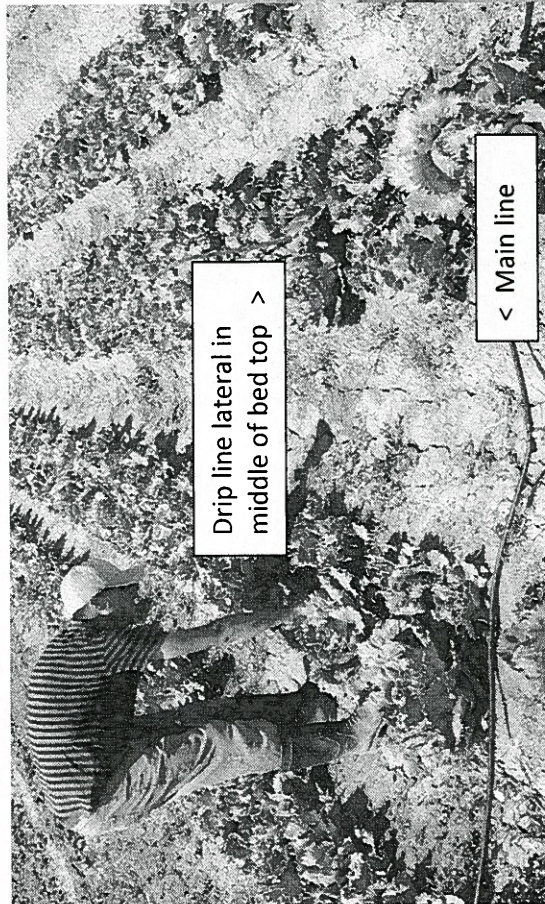
3 pp  
Mar 5-23-12

### PORTABLE DRIP APPLICATOR

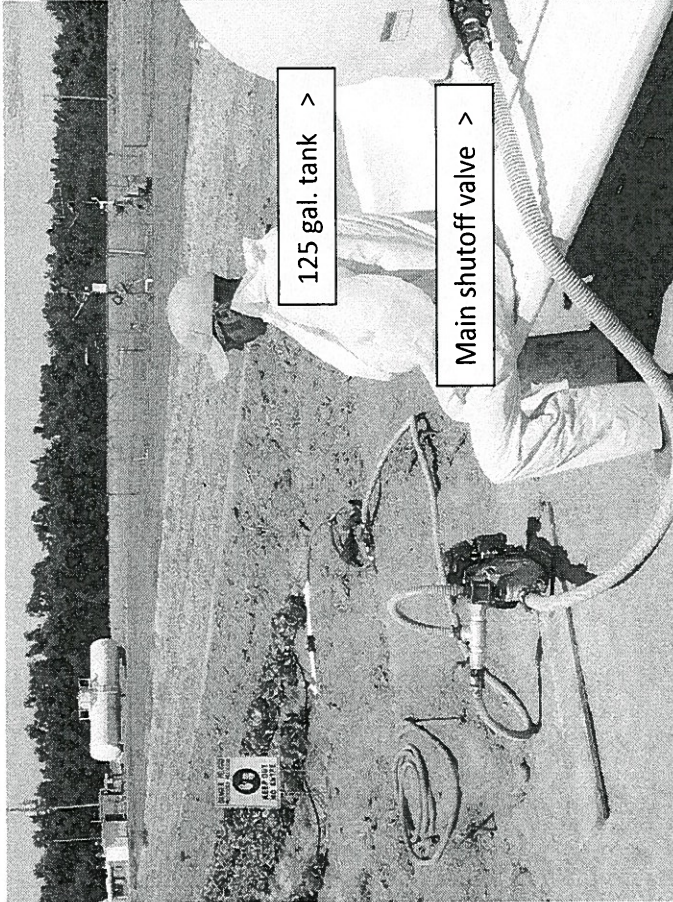
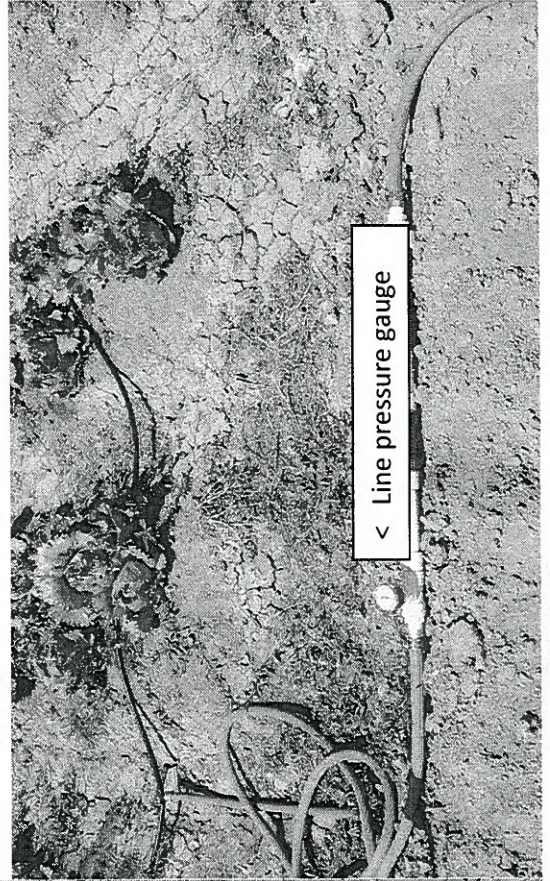
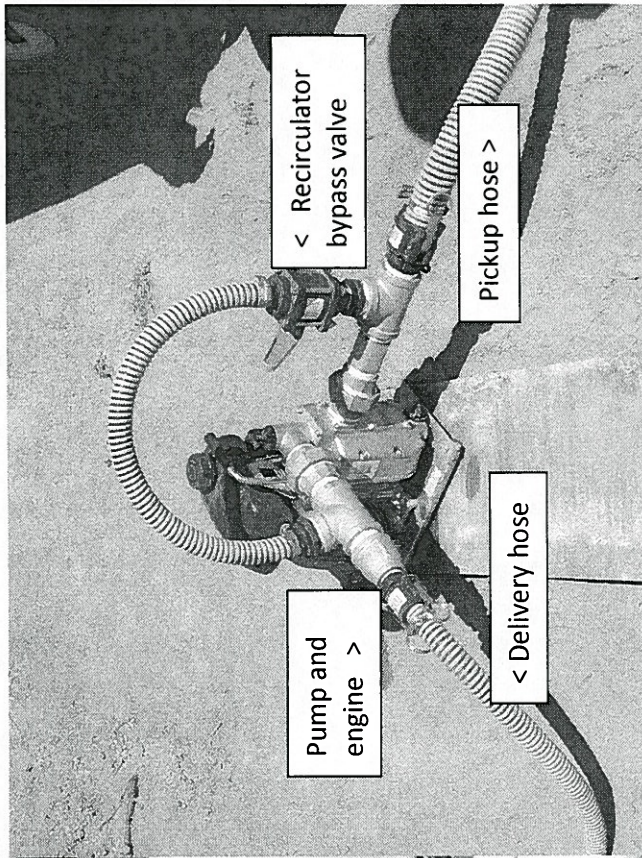
The portable drip applicator consists of a series of drip lines, a tank for containing a measured amount of mix or irrigation water and a pumping system for delivering mix/water to the drip lines. Since the application tank mix and irrigation water are measured, the calculated volume will always be delivered, regardless of emitter discharge rate and time required for application.

Drip line laterals are connected across the plot by a main line. Laterals are 16mm (1/2 in) above-ground drip line with 1 gallon-per-hour (GPH) emitters on 12-in. spacing. Emitters are pressure compensated (PC) so as to deliver the nominal discharge rate at pressures from 10 to 50 PSI. For applications, laterals are laid on top of soil in centers of bed tops, either between multiple plant rows, or close to bases of plants in single-row beds. The distribution system remains in place for discharge verification and all drip applications in a trial.

The pump system is a gasoline engine-powered centrifugal pump with a recirculating bypass for adjusting line pressure, a filtering system and a line pressure gauge. The pump typically will be operated within a range of ~15 to ~45 PSI. As long as PSI remains within the specified bounds of the PC emitters (10 to 50 PSI), line pressure is not a critical factor for uniform discharge.









NOTES TO TRIAL: Drip applications

Worksheets were prepared prior to making drip applications in this trial. These worksheets, along with forms, notes and other documentation in this FDB, detail the procedures that were followed while making the drip applications.

Due to the large volume of carrier and irrigation water used in drip application and incorporation, the gallonage figures recorded in this trial are all approximations, but, unless otherwise indicated, are considered to be within 2.5 gallons of the calculated amounts.

*WLA 5-23-12*

FIELD ID NO: \_\_\_\_\_

IR-4 FIELD DATA BOOK

PART 6. APPLICATION RECORDS

C. DISCHARGE CALIBRATION FOR APPLICATION NUMBER L Trt 04

INSTRUCTIONS: Complete a copy of this form (PHOTOCOPY IF NECESSARY) for additional times when a complete calibration or calibration-recheck of application equipment is required.

EQUIPMENT IDENTIFIER Portable Drip Applicator

DISCHARGE CALIBRATION DATE 5-22-12 PERFORMED BY ML/KCN (INITIALS)

APPROXIMATE TIME OF DAY THAT THE CALIBRATION WAS PERFORMED ~9:00 AM

PRESSURE OR OTHER STANDARD SETTING UTILIZED IN CALIBRATION 24 psi

DISCHARGE UNITS MEASURED (e.g. ml, oz., grams) ml

INSTRUMENT USED TO MEASURE WATER (e.g. 100 ml graduated cylinder) 500 ml grad. cyl., 5 ml incr.

BRIEFLY DESCRIBE PROCEDURE USED TO CHECK DISCHARGE CALIBRATION See following

DISCHARGE CALIBRATION Record time applicator is allowed to discharge. Collect output from each nozzle or hopper. Record this value in "RUN" Row 1 under the appropriate outlet. Calculate the total and average discharge for all the nozzles/hoppers. Entry prompts have been provided for 2 additional discharge calibration runs. Calculate sums and averages of each nozzle/hopper outlet. Show all calculations.

RUN	TIME (sec)	Nozzle/hopper Outlet Number Along Boom (see equipment diagram for nozzle numbers)											Total	Avg.	
		1	2	3	4	5	6	7	8	9	10	11			
1															
2															
3															
Total															
Avg.															

CALCULATIONS:

WAS THIS A RECHECK OF DISCHARGE CALIBRATION? (Check one) YES \_\_\_\_\_ NO NA

IF YES, WERE RESULTS WITHIN 5% OF ORIGINAL CALIBRATION? (Check one) YES \_\_\_\_\_ NO NA

IMPORTANT: An output consisting of an average of three runs must be used when calculating the sprayer output and amount of test substance to use. If this is a recheck (one run) then the results of the original calibration must be used. If the output result of the recheck is more than 5% different than the original calibration result, then two more runs are needed to produce a new, full calibration. The original calibration data, or a true copy, must be in this field data book.

ABOVE DATA ENTERED BY: MLC DATE: 5-22-12

**INSERT PART 6C WORKSHEET: VERIFYING CONSISTENT DISCHARGE FROM DRIP LINES**

**BEFORE THE 1<sup>ST</sup> APPLICATION IN EACH TRIAL**

- ✓ Lay out drip line and main line in center of bed for multiple-row bed tops, or near base of plants for single-row beds. Ensure all active emitters are within plot boundary.
- ✓ Add sufficient water to tank to complete 3 verification runs
- ✓ Assemble pump systems and connect to drip lines
- ✓ Charge applicator with water until all emitters are flowing, check for and repair major leaks, then shut down pump.
- ✓ Place collection equipment (shallow bowl or similar) under one emitter (selected haphazardly) spaced approximately equidistantly along each drip line in the near, middle and far third of the line.
- ✓ Run applicator for a set time period (e.g., 3-8 min.) *5 min*
- ✓ Measure and record discharge from emitters.
- ✓ Repeat for a total of three runs
- ✓ Calculate average discharge/emitter for each run.
- ✓ Compare results: Ideally, all emitters should all be within ~10% of average per run. However, emitters are NOT as consistent as spray nozzles, so there will be variability in discharge rate due to a number of factors inherent in manufacturing and in the layout and use of the drip lines. It is not critical that every emitter discharge be within range, as long as the overall distribution in the plot is relatively consistent.

**NOTES/COMMENTS:**

*None*

*[A long, thin blue diagonal line is drawn across the page, likely a stray mark or a placeholder for a signature.]*

Emitter verification was made as described above:

By *Ma* Date *5-22-12*



**PART 6C: DRIP EMITTER DISCHARGE VERIFICATION**

Prior to first application with drip applicator, record timed discharge from approximately equidistant emitters in near(N), middle(M) and far(F) thirds of each drip line. Rows are numbered from left to right when facing plot from main line.

DISCHARGE IN MILLILITERS (ML)

24 emitters/run

5 min runs, start time: 8:45 AM  
 ME 5-22-12

RUN 1		Run time <u>5 min</u> Pressure: <u>24 psi</u>							
Row	1	2	3	4	5	6	7	8	TOT.
N	<del>330</del> 320	305	310	320	305	330	300	325	2525
M	315	300	330	300	330	320	325	335	2555
F	300	310	320	310	330	315	330	310	2525
TOT.	945	915	960	930	965	965	955	9370	7605
AVG:		<u>316.9</u>		-10%:	<u>285.2</u>		+10%:	<u>348.6</u>	

All emitters are  $\pm 10\%$  average

RUN 2		Run time <u>5 min</u> Pressure: <u>24 psi</u>							
Row	1	2	3	4	5	6	7	8	TOT.
N	330	310	320	325	315	330	310	330	2570
M	315	315	330	300	330	330	325	335	2580
F	320	315	305	305	320	320	335	305	2525
TOT.	965	940	955	930	965	977	970	970	7675
AVG:		<u>319.8</u>		-10%:	<u>287.8</u>		+10%:	<u>351.8</u>	

All emitters  $\pm 10\%$  average

RUN 3		Run time <u>5 min</u> Pressure: <u>24 psi</u>							
Row	1	2	3	4	5	6	7	8	TOT.
N	330	305	310	320	310	330	310	330	2545
M	305	310	330	305	325	320	320	330	2545
F	305	305	310	310	330	315	330	305	2510
TOT.	940	920	950	935	965	965	960	965	7600
AVG:		<u>316.7</u>		-10%:	<u>285.0</u>		+10%:	<u>348.4</u>	

All emitters  $\pm 10\%$  average

Equipment/volume/increments for measuring discharge grad. cyl. 500 ml / 5 ml increments

① WE ME 5-22-12

Performed by Ma MQW

Date 5-22-12

FIELD ID NO: \_\_\_\_\_

### IR-4 FIELD DATA BOOK

#### PART 6. APPLICATION RECORDS

D. SPEED CALIBRATION FOR APPLICATION NUMBER(S) 1 Tritoy

*INSTRUCTIONS: Complete a separate form for additional times when a complete calibration or calibration-recheck of application equipment is required.*

EQUIPMENT IDENTIFIER \_\_\_\_\_

SPEED CALIBRATION DATE \_\_\_\_\_ PERFORMED BY \_\_\_\_\_ (INITIALS)

TERRAIN OF CALIBRATION TRACK (e.g. tilled field) \_\_\_\_\_

BRIEFLY DESCRIBE PROCEDURE USED FOR SPEED CALIBRATION \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*SPEED CALIBRATION: Calculate the speed of the application equipment. If appropriate, note the gear setting and /or RPM setting used in the speed calibration. Indicate the distance (in feet) of the track on which the application equipment was tested to determine speed (e.g. speed of application equipment tested for 100 ft.). The speed is calculated by dividing the length of test track (in feet or meters) by the time needed to cover that length (in seconds). Entry prompts have been provided for 2 additional runs. Show all calculations. For studies beginning in 2011 or later, a speed recheck (one run) is required whenever an output recheck is performed.*

RUN	GEAR	RPM	Length of test track	TIME (sec)	CALCULATED SPEED (include units)	
1						
2						
3						
Total of test run times (sec)			Average time (sec)		Average speed	

CALCULATIONS:

*N/A M22 5-22-17*

WAS THIS A RECHECK OF SPEED CALIBRATION? (Check one) YES \_\_\_\_\_ NO \_\_\_\_\_

IF YES, WERE RESULTS WITHIN 5% OF ORIGINAL CALIBRATION? (Check one) YES \_\_\_\_\_ NO \_\_\_\_\_

*The original calibration data, or a true copy, must be in this field data book.*

**NOTE:** A target speed may be used for application calculations, rather than the mean of three runs, as long as the mean of the three runs in the speed calibration is within 5% of the target speed.

WAS THIS A CHECK OF A TARGET SPEED? (Check one) YES \_\_\_\_\_ NO \_\_\_\_\_

IF YES, WERE RESULTS WITHIN 5% OF TARGET SPEED? (Check one) YES \_\_\_\_\_ NO \_\_\_\_\_

ABOVE DATA ENTERED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

FIELD ID NO: \_\_\_\_\_

# IR-4 FIELD DATA BOOK

## PART 6. APPLICATION RECORDS

E. DELIVERY RATE CALIBRATION FOR APPLICATION NUMBER(S) 1 Trt04

*INSTRUCTIONS: Complete a separate form for each application, unless the same parameters are used-- you are using the same equipment, and have performed a recheck to confirm the result of the full calibration. Determine the rate of delivery from the application equipment. Briefly describe the procedure, including formulas used to determine delivery rate calibration. Show all calculations and units. Equations used in electronic (computer software) calculations in this trial must be transcribed or printed out and attached here. Computer-generated values (as opposed to those entered by the field cooperators) must be reviewed and clearly delineated by circling, initialing, and dating.*

PROCEDURE/FORMULA:

CALCULATIONS:

*NA Max 5-22-12*

ABOVE DATA ENTERED BY: \_\_\_\_\_ DATE: \_\_\_\_\_



FIELD ID NO: \_\_\_\_\_

IR-4 FIELD DATA BOOK

PART 6. APPLICATION RECORDS

F. VOLUME, MIXING AND DILUTION CALCULATIONS FOR APPLICATION NUMBER(S) 1

INSTRUCTIONS: Complete a separate form for each application, unless there are no changes in multiple applications. Show all calculations, formulas, and results below, define units of measure, and cite the initials of the person performing the calculations. Equations used in electronic (computer software) calculations in this trial must be transcribed or printed out and attached here. Computer-generated values (as opposed to those entered by the field cooperators) must be reviewed and clearly delineated by circling, initialing, and dating.

*Concentrate mixed  
10:00AM*

Plot Area = 800 sq. ft.      0.5 acre-inch = 13,577 GPA

$$\text{Total irrigation} = 13,577 \text{ GPA} \times \frac{800 \text{ ft}^2 \text{ area}}{43560 \text{ ft}^2 / \text{A}} \times \frac{1}{1}$$

Calc. irrig size = 249 gal      Will apply Approximately 250 Gal. total irrigation

Protocol Rate = 0.25 lbai/A      Formulation = 4.0 lbai/gal

$$\text{Test Sub. (ml)} = \frac{0.25 \text{ lb ai/A}}{4.0 \text{ lb ai/gal}} \times 800 \text{ ft}^2 \text{ area} \times \frac{3785 \text{ ml/gal}}{43560 \text{ ft}^2 / \text{A}}$$

Calc. Test Sub. = 4.34 ml      Will Mix 3 ml. Test Substance  
*4.4*  
*5-22-12*

Treated percentage of total irrigation ~ 33%

Will Mix/Apply Approximately 80 Gal. Treated Portion

Remaining irrigation = 250 gal. total irrig. - ~ 80 gal. trt. irrig.

Will Apply Approximately 170 Gal Untreated Portion

Measuring device/size/increments for: T.S. syringe / 3ml / 0.1 ml

DESCRIBE HOLDING AND TRANSPORT OF TEST SUBSTANCE FROM STORAGE AREA TO LOCATION OF TANK MIXING (E.g.: "Test substance held securely in an insulated cooler during transport to field site in the bed of a pickup truck" or "Tank mix prepared within walking distance of the chemical storage building")

*cont concentrate mixed within walking distance of chem storage,  
transferred to mix tank in field by pickup truck.*

ABOVE DATA ENTERED BY: MLA      DATE: 5-22-12

COMPLETE IF APPROPRIATE: "THIS IS A TRUE COPY OF THE ORIGINAL"  
THE ORIGINAL IS IN IR-4 FIELD DATA BOOK NO. \_\_\_\_\_ INITIALS \_\_\_\_\_ DATE \_\_\_\_\_

**WORKSHEET: PROCEDURES FOR DRIP APPLICATIONS**

**APPLY T.S. MIX WITH CALCULATED VOLUME OF IRRIGATION WATER:**

- ✓ ● Add water to drip tank, filling to an exact gallonage mark, if applicable, or to the next lowest gallonage mark on tank.
- ✓ ● If needed, add additional water in 5-gal increments to approximate total required.
- ✓ ● In lab, form a concentrated mix by adding calculated amt. of t.s. to ~2 Liters water. Thoroughly agitate mix.
- ✓ ● Add concentrated mix to the drip tank, while stirring the tank mix.
- ✓ ● Rinse concentrate container, add rinsate to tank mix and stir mix.
- ✓ ● Run tank mix through drip lines, stirring tank mix occasionally.

Note: due to the design of drip tank, there will be a small amount of mix (approx. 1 L) remaining in tank. This will be rinsed out of tank in a highly diluted form during the remaining irrigation event.

**APPLY REMAINING IRRIGATION WATER:**

- ✓ ● Disconnect tank from applicator and fill with water as described previously.
- ✓ ● Reconnect tank to drip applicator, start applicator and run irrigation water through drip lines.
- ✓ ● Clean tank with a hose, directing stream to all inside surfaces of the tank. Drip system components will have been flushed clean by the remaining untreated irrigation water.

**NOTES/COMMENTS:**

*used additional tank for part of irrigation  
water application since tank volume is 125gal and  
irrigation volume (2/3 total volume) is 170gal.  
Drip system was primed during discharge verification.*

Application was made as described above:

By *Ma*

Date *5-22-12*



**PART 6: INSERT: DRIP APPLICATION TIME RECORD**

APPLICATION NUMBER: Tit 04 App 1

Time concentrate is added to drip tank application carrier and stirred: 10:10 AM

Mix stirred at ~5 min intervals during application? Y  N

LE KF 1-29-13

Application of t.s.-treated irrigation water to plot:

Approx. start time: 10:10 AM

Approx. end time: 10:28 AM

A: Run time for treatment: 18 minutes

Application of untreated irrigation water to plot:

Approx. start time 10:30 AM switch tanks 10:53 AM

Approx. end time 11:10 AM

B: Run time for added irrigation: 40 minutes

C: Total run time (A + B) = 58 minutes

Percentage of total run time required for t.s. treatment:

(A ÷ C) = 31 %

Comments/ notes: 24 psi. Application mixed in leg tank #1, 100 gal irrig. water applied from leg tank #2, 70 gallons irrig. water applied from leg tank #1. Tank switching time ~20 seconds

Entered by: llc Date: 5-22-12

FIELD ID NO: \_\_\_\_\_

IR-4 FIELD DATA BOOK

PART 6. APPLICATION RECORDS

G. APPLICATION INFORMATION FOR APPLICATION NUMBER T104 Appl APPLICATION DATE 5-22-12

HAS THE APPLICATION EQUIPMENT BEEN USED SINCE THE LAST CALIBRATION/RECHECK WAS PERFORMED? (Check one) YES NA NO NA  
 (If YES, then a recheck is needed.)

**INSTRUCTIONS:** Complete a separate form for each application date. Complete one column for each treated plot (use the Treatment Number as indicated in the protocol). Provide the name of the test substance (common chemical name or chemical code number); the batch or lot number of the test substance; the approximate time the test substance was mixed with the carrier and the approximate time the mixture was applied to the plots, along with the initials of the person(s) mixing and spraying the tank mix; the unique name or code for the application equipment used to apply this treatment; the placement of the test substance (e.g. broadcast, in-furrow, directed, knifed-in, banded); the amount of carrier, formulated product and other additives in the mix; the distance (include units) of the nozzles above the canopy or ground (indicate which); the pressure in pounds per square inch at the boom; if treatment(s) were incorporated, the method and/or equipment used to incorporate the test substance mix (e.g. disked, rotovator, irrigated, etc.), depth to which the test substance was incorporated or the amount of water used to move the test substance into the soil; the time after treatment the incorporation activity was performed; and the carrier (normally water), its source (e.g. farm pond, city water), the pH of the carrier and its temperature, and the equipment used to measure the carrier pH.

	TRT Number <u>04</u>	TRT Number _____
NUMBER OF DAYS SINCE PREVIOUS APPLICATION	<u>NA</u>	
TEST SUBSTANCE	<u>V10208 45C</u>	
BATCH/LOT NUMBER	<u>V12A-55C-2</u>	
TIME MIXED/INITIALS <sup>concentrate</sup> <sub>to tank</sub>	<u>10:00 AM MLL</u> <u>10:10 AM MLL</u>	
TIME APPLIED/INITIALS	<u>10:10-10:28 AM MLL</u>	
EQUIPMENT IDENTIFIER	<u>drip applicator</u>	
PLACEMENT OF TEST SUBSTANCE	<u>drip to bed middle at base of plots</u>	
TANK MIX AMOUNTS		
- CARRIER (starting volume of water)	<u>80 gal</u>	
- Volume of Water Removed from starting volume (if applicable)	<u>NA</u>	
- TEST SUBSTANCE (formulated product)	<u>4.4 ml</u>	
- ADJUVANT OR SURFACTANT	<u>NA</u>	
- TOTAL VOLUME OF TANK MIX	<u>80 gal</u>	
NOZZLE DISTANCE FROM TARGET	<u>NA</u>	
PSI AT BOOM	<u>24 psi</u>	
INCORPORATION		
- Methodology and/or Equipment	<u>irrigation water - 170 gal</u>	
- DEPTH	<u>NA</u>	
- TIME	<u>10:30 - 11:10 AM</u>	
CARRIER SOURCE/TYPE	<u>LPSRC well water</u>	
CARRIER pH/TEMPERATURE	<u>7.9 pH 72 °F</u>	
EQUIPMENT USED TO MEASURE pH	<u>ColorpHast Strips</u>	

MLL  
5-22-12

ABOVE DATA ENTERED BY: MLL DATE: 5-22-12