SOP Log Sheet

ID # SOP0132

Region: SOR

State: Arkansas **City:** Fayetteville

Location: Field Arkansas

FRD/LRD: Leopoldo Estevez
Submitter

Effective Date: 10/27/16

Description of Material (s): 2016 SOPs

Reviewed By: DD 10/31/16
Sign/Date

Receive Date: 10/28/16 **Date to Archivist:** 10/31/16

File Format: E-mail ☐ **CD** ☐ **Hard Copy** ☑

Electronic copy ok to use: Y or (No)
(Circle one)

If no, indicated below, what needs to be done

Date from Reviewer: 10/31/16

Date Posted: 10/31/16 **Archive Date:** 10/31/16

Archive Location: Active File Rm. Cabinet 6 Drawer 2

Sign: [signature]

Comment:

S: Facility Files- SOP Cover Sheet

9/13/16 JT

UofA
UNIVERSITY OF ARKANSAS
DIVISION OF AGRICULTURE

Department of
Crop, Soil, and Environmental Sciences

UNIVERSITY of ARKANSAS
DALE BUMPERS COLLEGE
of AGRICULTURAL, FOOD AND LIFE SCIENCES

115 Plant Science Building • Fayetteville, Arkansas 72701 • (479) 575-2354 • (479) 575-7465 (FAX)

October 18, 2016

Dr. Michelle Samuel-Foo
Food and Env. Tox. Lab.,
Bldg 833, IFAS, Univ. Florida
P.O. Box 110720, SW 23rd Dr.
Gainesville, FL 312611-0720

Dear Michelle,

Please find enclosed, the proposed SOP for use at the UA IR-4 Field Research Center for 2016. The following SOPs, 4.1, 9.3, will require approval as revisions were needed upon review. All other SOPs have been reviewed and were found to be satisfactory. I can mail to you the originals if so needed.

With approval, via your signature on the front of this revised SOP, we will implement it in the 2016 season. Previous versions of any revised SOPs will be retained, per SOP 1.1.

Please let me know if anything further is required regarding the SOPs for the FRC at the University of Arkansas.

Yours truly,

Leopoldo E. Estorninos Jr.
Field Research Director
University of Arkansas IR-4 Center
Fayetteville, AR 72704

STANDARD OPERATING PROCEDURES

FOR

MAGNITUDE OF THE RESIDUE - FIELD STUDIES

University of Arkansas
Department of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Drive, Fayetteville, AR 72704

Nilda R. Burgos	nrburgos	nrb	10/18/16
Research Center Director	***Signature***	***Initials***	***Date***
Leopoldo E. Estorninos Jr.		LEE	10/18/16
Field Research Director	***Signature***	***Initials***	***Date***
Field Research/Center Director	***Signature***	***Initials***	***Date***
Michelle Samuel-Foo		MSF	10/27/16
Regional Field Coordinator and Approving Official	***Signature***	***Initials***	***Date***

Revision: See specific SOP

Effective Date See specific SOP

Contents – Standard Operating Procedures

Revision: See specific SOP

Effective Date See specific SOP

Revision: See specific SOP

Effective Date See specific SOP

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 1.1 ***Revision Number:*** 3

Submitted by: mbuerger ***Date:*** 2/20/2013

Approved by: [signature] ***Date:*** 3/19/13

Title: General requirements for the development and use of Standard Operating Procedures.

Purpose: To provide guidence to scientist conducting field trial(s) in the development and use of Standard Operating Procedures for field research.

Scope: Locations conducting field trial(s).

Procedures:

1. Each facility where trial(s) are conducted in support of the registration of pesticides will develop SOPs for all phases of the research.

2. Generic SOPs may be provided to each facility and these SOPs will be revised to accurately reflect that facility's policies, procedures and methods. Where generic SOPs are not available, the Field Research Director will see that the required SOPs are developed and approved prior to the initiation of any GLP studies.

3. The SOPs will be approved by the IR-4 Regional Field Coordinator or other appropriate approving official. The title page should show the signature of the approving official, and the date signed by the approving official. Approval may also be in the form of a dated signature on each SOP.

4. Each SOP will be reviewed regularly and revised as needed. The effective date and revision number must be changed to reflect the revision, or if not revised the review documented by the reviewer signing the SOP "Reviewed by" and dating. The revision number should begin with 1 and increase sequentially with each revision. [One copy of each old SOP will be retained by the Field Research Director].

5. SOP will be effective one week from receipt of the approved SOP.

6. Any deviations from the SOPs must be documented in the raw data and authorized by the Study Director.

Reviewed by: mbuerger Date: 2/20/2013

Reviewed by: [signature] Date: 3/6/14

Reviewed by: [signature] Date: 3/19/16

SOP 1.1 General Requirements for the development and use of Standard Operating Procedures

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 1.2 ***Revision Number:*** 1

Submitted by: mburger ***Date:*** 9-28-2009

Approved by: [signature] ***Date:*** 11/3/09

Title: Numbering system for SOPs.

Purpose: To provide a general outline for SOPs via a numbering system.

Scope: All SOPs should follow the numbering system to provide uniformity in the system.

Procedures: The numbering system for SOPs is as follows:

1. General
2. Personnel
3. Facilities
4. Equipment
5. Test System Establishment & Maintenance
6. Test Substance
7. Data Handling
8. Residue Sample Handling
9. Reporting and Retention of Data
10. Disposal of Pesticides
11. Safety and Health Procedures
12. Procedures to Handle an EPA Audit or Inspection

Reviewed by: mburger Date: 01-06-2012

Reviewed by: [signature] Date: 3/6/15

Reviewed by: [signature] Date: 3/19/16

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1366 W. Altheimer Dr., Fayetteville, AR 72704

SOP 1.2 Numbering system for SOPs

Reviewed By: Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 1.3 ***Revision Number:*** 1

Submitted by: mrburgos ***Date:*** 9-28-2009

Approved by: [signature] ***Date:*** 11/3/09

Title: Format for use in developing SOPs.

Purpose: To assure a uniform format in the development of SOPs.

Scope: Applies to all SOPs developed by scientists for use in the conduct of trial(s) under GLP.

Procedures: The following is the format to be used for each Standard Operating Procedure (SOP):

Name of Test Facility (centered)
1 space
Effective Date:
1 space
SOP Number: (SOP section number as a decimal); Revision Number: (sequentially beginning with 1 for first use)
1 space
Submitted by: (Name of person developing the SOP); Date: (date submitted)
1 space
Approved by: (Name of Approving official); Date: (date approved)
1 space
Title: (title)
1 space
Purpose: (Brief description of the purpose of the SOP).
1 space
Scope: (Determines where and when the SOP is applicable)
1 space
Procedures: (Describe the operating procedures in numerical order from beginning to end so that an intelligent person with some knowledge of the process can carry out the procedures without any verbal input from other sources.) Each SOP will be numbered page __ of __.

Reviewed by: mrburgos Date: 01-06-2012

Reviewed by: [signature] Date: 3/6/16

Reviewed by: [signature] Date: 3/19/16

SOP 1.3 Format for use in developing SOPs

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 1.4 ***Revision Number:*** 1

Submitted by: MBurgos ***Date:*** 9-14-2009

Approved by: ***Date:*** 11/3/09

Title: Designation of Field Research Director and responsibilities.

Purpose: To provide information on how a Field Research Director is designated and outline the responsibilities of the Field Research Director.

Scope: All test facilities where GLP trial(s) are conducted.

Procedures:

1. The Field Research Director is designated by the research test site management in conjunction with the Regional Field Coordinator, and oversees the residue trial(s) at the facility for the Study Director. The Field Research Director shall be a scientist with appropriate training and experience to conduct the trial(s).

2. The Field Research Director will ensure that:

   a. The trial is carried out in accordance to an approved protocol and the GLP regulations.

   b. Utilize personnel, resources, facilities, equipment, materials and methods as necessary for the conduct of the trial.

   c. All personnel conducting the study understand the protocol, SOPs for the project, and GLP regulations.

   d. All deviations reported by the Quality Assurance Officer are responded to in writing.

   e. All raw data, summaries and other items connected with the study that need to be retained are transferred to the archives at IR-4 Headquarters.

   f. Maintain a current copy of a master schedule for all GLP projects under his/her direction.

Reviewed by: MBurgos Date: 01-06-2012

Reviewed by: [illegible] Date: 3/6/16

Reviewed by: [illegible] Date: 3/19/16

University of Arkansas, Dep't of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

SOP 1.4 Designation of Field Research Director and responsibilities

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 2.1 ***Revision Number:*** 1

Submitted by: nrburgess ***Date:*** 9-28-2009

Approved by: [signature] ***Date:*** 11/3/09

Title: Personnel.

Purpose: Provide information to field locations about personnel requirements under Good Laboratory Practices.

Scope: All field facilities conducting trial(s) for the registration of pesticides.

Procedures:

1. The field facility will have on file current copies of a professional biography or CV, a position description, and training records for each person engaged in or supervising the trial(s).

2. The field facility will have a sufficient number of persons to carry out the trial(s) to its completion and the Field Research Director or designee will utilize trained personnel to conduct their portion of the trial(s).

3. The field facility will have a supply of safety equipment in working order and sufficiently clean to protect the health and safety of the personnel connected with the project as required by the Health and Safety SOPs, regulations, other institution regulations, pesticide labels or the trial(s) protocol.

4. Where the application of restricted use pesticides is required in the trial(s), the applicator must be certified or under the direct supervision of a certified applicator.

5. Personnel handling pesticides should be trained in accordance with the current policies and guidelines of their institution.

6. Personnel documentation will be reviewed annually and revised as needed, or indicated by a dated signature that the document was reviewed.

7. In the event that a person's employment with the organization ends, their personnel records will be archived.

Reviewed by: nrburgess Date: 01-06-2012

Reviewed by: [signature] Date: 3/6/15

Reviewed by: [signature] Date: 3/19/16

SOP 2.1 Personnel

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date: 3|19|13

SOP#: 2.2 ***Revision Number:*** 2

Submitted by: ***Date:*** 3/15/13

Approved by: ***Date:*** 3|19|13

Title: Organizational Chart.

Purpose: To assist locations in the development of an organizational chart.

Scope: All field facilities conducting trial(s) for the registration of pesticides.

Procedures:

1. An organizational chart should describe the management structure of the institution performing the work. It should also document the reporting lines for personnel engaged in GLP studies both to the institution's management and to IR-4 Testing Facility Management.

2. Each block in the chart should show the title, and a brief description of the duties of each person.

3. The head of the unit (i.e. Department Chair, Director, etc.) should be included in the chart. This person should be the one who appoints the Field Research Director at the institution.

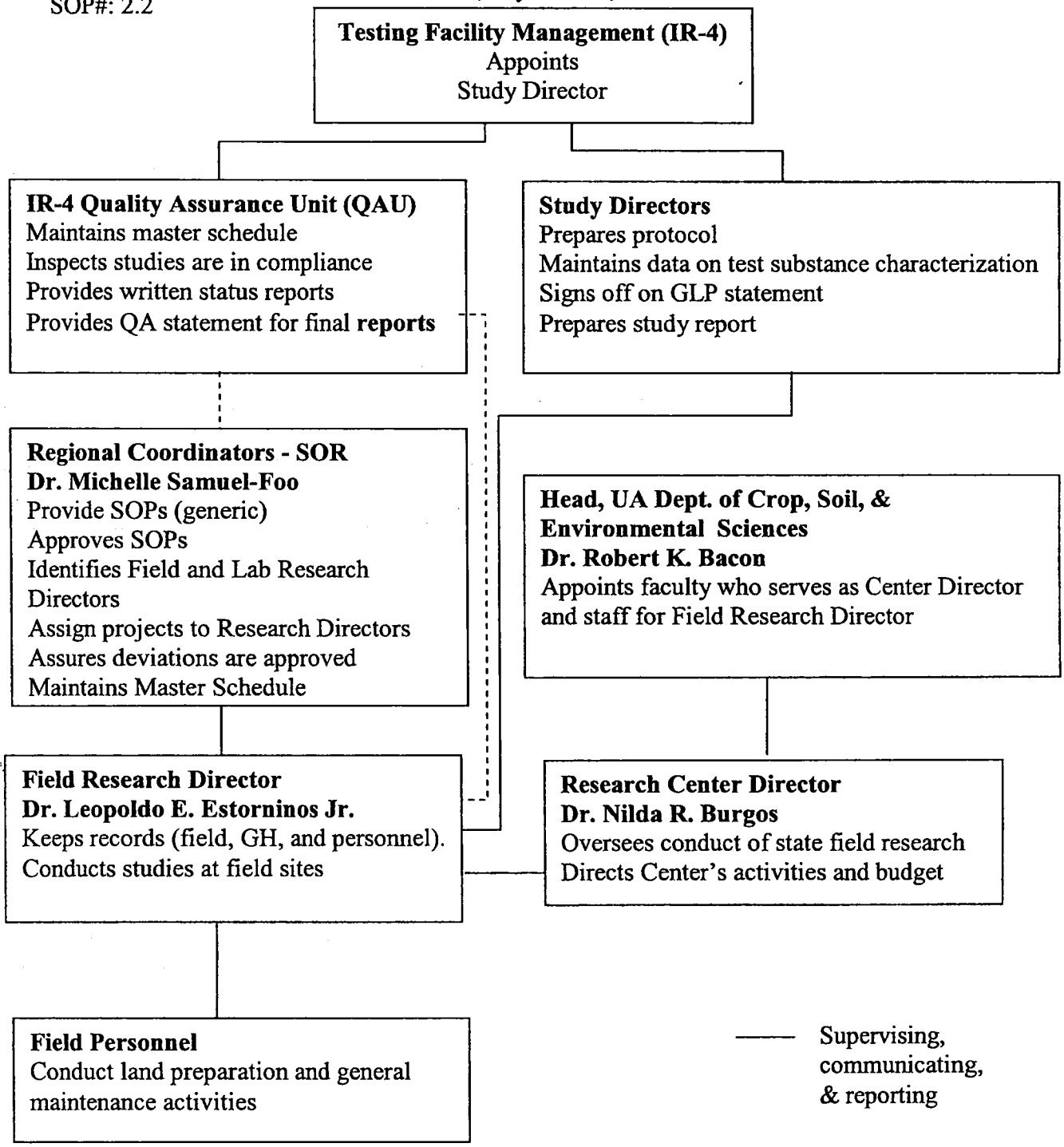
4. The chart should then show how the Field Research Director and the Quality Assurance Unit (QAU) independently report to the IR-4 Testing Facility Management.

5. Personnel engaged in the conduct of the trial(s) should then be shown on the chart with lines of supervision, communication, and cooperation indicated.

Reviewed by: _____ Date: 3/15/13

Reviewed by: _____ Date: 3/6/15

Reviewed by: _____ Date: 4/1/16



Reviewed by: _____ Date: 3/6/15

Reviewed by: _____ Date: 4/1/16 EE BF 10-25-16

Reviewed by: _____ Date: _____

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SOP 2.2 Organizational Chart

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 2.3 ***Revision Number:*** 1

Submitted by: nrburgos ***Date:*** 9-28-2009

Approved by: ***Date:*** 11/3/09

Title: Documentation of Training.

Purpose: To assure that training for personnel involved in the study is properly documented.

Scope: All field facilities conducting trial(s) for the registration of pesticides.

Procedures:

1. All training of personnel engaged in GLP trials should be documented in a training record, to be kept at the field facility.

2. Training received from any source, should be noted as to the name of the event, date(s) of attendance, instructors' name, and subjects covered. A copy of any type of certificates issued should be retained in the personnel files at the location.

3. Training on specific procedures and/or SOPs should also be documented. Record the name of the person giving the instruction, the name of the person receiving the instruction, the date given and a concise statement of the instruction, or SOP (e.g. Dr. X explained to Mr. Y how to label the sample bags as per SOP xx on 6/1/08).

4. Each person engaged in the conduct of the study should have read and understood those sections of the protocol and the standard operating procedures that pertain to their responsibilities. The Field Research Director should record in their respective training records, the name of the personnel and dates that the SOPs were explained to them. This information should be placed in the personnel file.

Reviewed by: nrburgos Date: 01-06-2012

Reviewed by: [signature] Date: 3/6/15

Reviewed by: [signature] Date: 4/1/16

SOP 2.3 Documentation of training

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 3.1 ***Revision Number:*** 3

Submitted by: ***Date:*** 6/23/15

Approved by: ***Date:*** 6/30/15

Title: Guidelines for test substance and adjuvants storage and maintenance.

Purpose: To assure that all test substances and adjuvants are stored in a manner consistent with GLP requirements.

Scope: Locations conducting IR-4 field trials(s) and where institutional guidelines do not exist for pesticide storage.

Procedures: A. Test substance

1. Test substances will be stored in a dry, well-ventilated building which is separate from office, laboratories and sample storage areas. The storage area should be sufficient for the test substances according to their label directions. Test substance will be stored in accordance with current policies and guidelines of the testing facility institution.

2. The test substance should be labeled with: name and concentration of the test substance; batch or lot number (if available); expiration date; date received; and storage conditions.

3. If using a data logger to monitor temperature, this should be set for a maximum time interval of two hours and units should be downloaded once per month, preferably on the first working day of each month or within the first week of each month except on holidays or if field personnel are on leave, in which case the data will be downloaded upon the field personnel's return to the office or shortly thereafter. Two data loggers (data logger #1 and back data logger # 2) will be set to record the prevailing temperature in the cabinet(s). Should the primary unit fail to record information, the backup unit data will be used in place. The back-up unit should be re-set each time the data logger (primary temperature monitoring device) is downloaded and documented in a maintenance log.

Reviewed by: _____ Date: 4/8/16

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

4. A min/max thermometer will also be set up as a tertiary backup. The temperatures reported from the min/max thermometer will be recorded at a maximum interval of two weeks.

5. The original containers for all GLP test substances must be retained until completion of the study and permission is given by the study director to dispose of the container.

6. The storage facility should have limited access by utilization of a lock and key so that only authorized persons may have access to GLP test substances. Place highly visible, waterproof identification signs on doors, gates, buildings, and fences to advice of the hazardous nature of the storage facility's contents

7. Post the telephone numbers and name of personnel responsible for and knowledgeable of the contents of the storage facility.

8. Make accessible, materials such as adsorptive clay, granulated activated charcoal, hydrated lime, and sodium hypochlorite for emergency treatment or detoxification of spills or leaks.

9. Post a current inventory of all test substances in the storage unit in an inside location accessible and visible to study personnel. This inventory will include the information required by local regulations, the GLP regulations, the protocol, and SOPs.

10. The receipt and storage, and mixing areas for the test substance should be separate to prevent contamination or mix up.

B. Adjuvants (spray additives)

1. The adjuvants or spray additives should be labeled with: name and concentration of the adjuvant; date received and placed in storage; storage condition; and expiration date (if not supplied by the manufacturer, assign an expiration date up to 5 years from the date of purchase).

2. The adjuvants should be stored in storage facility where temperature is monitored similar to that of the test substance.

Reviewed by: _____ Date: 4/8/16

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

3. Determine the adjuvant to use based on recommendation in the test protocol. If it is not specified in the protocol, consult the pesticide label.

4. Calculate the amount needed at recommended rate in the protocol based on the total amount of carrier (water). If the rate is not specified, use the commercial rate recommended in the adjuvant label.

5. Adjuvants must be handled in a way to prevent contamination with the test substance and other spray additives. Spray additives should be dispensed from primary or secondary container prior to application. If possible, dispense into a temporary container for measuring and discard any remaining adjuvant. No 'double-dipping' which means not to use the same syringe or pipette when mixing the adjuvants with the test substance.

Reviewed by: _____ Date: 4/8/16

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

SOP 3.1 Guidelines for test substance and adjuvants storage and maintenance.

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 3.2 ***Revision Number:*** 2

Submitted by: MBurger ***Date:*** 01-06-2012

Approved by: ***Date:*** 1/30/12

Title: Site selection for field trial(s)

Purpose: To assure plots are large enough to obtain the required data or samples with sufficient uniformity and can be re-located after the trial(s) is terminated.

Scope: Locations conducting field trial(s).

Procedures:

1. Site selection will be made in accordance with the horticultural practices acceptable for the commodity and the requirements established by the protocol.

2. Site will be large enough to accommodate the required number of replicates, buffer zones and treatments in accordance with an approved study protocol and for the commodity to be grown under simulated commercial conditions yielding samples of sufficient size to comply with protocol sample size requirements.

3. Locate site with sufficient isolation to prevent contamination of the test plots by spray drift sources such as commercial operations or other research trial(s).

4. Where samples for residue trial(s) are required, locate untreated plots within the same area (preferably upwind and upslope of the treated plot(s)) but with enough isolation to produce untreated, uncontaminated samples.

5. If the commodity is not required to be newly established, select a site that has commercial standards for production.

6. Prepare a plot map showing the location, dimensions of each plot, and the slope of the field on the site. The plot map should contain distances to permanent reference points from at least two plot corners for the trial site so that each plot can be re-located after the trial is terminated.

7. Label each plot with the field ID number and treatment as a minimum. If statistical analysis is to be performed on the data, assign the replicates and treatments to the plot map using a commonly accepted statistical design with sufficient information

Reviewed by: _____ Date: 3/6/15

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Reviewed by: _____ Date: _____

to identify the replicate and treatment assigned to each plot.

8. Lay out each plot on the site using a suitable measuring device to accurately locate the plots on the site.

9. Identify both ends of each plot with a marker of sufficient visibility to be seen easily throughout the duration of the trial(s).

10. The plot map (item 6) should be included in the raw data notebook.

Reviewed by: _____ Date: 4/8/16

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

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SOP 3.2 Site selection for field trial(s).

Reviewed By: Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 3.3 ***Revision Number:*** 2

Submitted by: ***Date:*** 01-06-2012

Approved by: ***Date:*** 1/30/12

Title: Greenhouse facilities.

Purpose: To assure that greenhouse facilities are properly maintained and in sufficient working order throughout the trial(s) to obtain data useful in the registration of pesticides in the GLP program.

Scope: All locations where greenhouse trial(s) are performed.

Procedures:

1. Each greenhouse must be sufficiently large enough to contain the entire trial(s) or a complete replicate of the trial(s) with sufficient space between plots to prevent contamination. Identify plots as described in SOP 3.2.

2. Where more than one trial(s) is conducted in a greenhouse, there must be sufficient isolation between the trial(s) to prevent contamination or interference between trial(s).

3. Lighting, temperature, humidity, and shade should be sufficiently uniform at the trial(s) sites in the greenhouse to provide nearly uniform plant growth throughout the trial(s) sites.

4. The walls, floors, and ceilings of the greenhouse should be maintained in good condition. Floors, benches and aisles should be free of debris, weeds, and superfluous equipment and well-drained to prevent the buildup of excess moisture.

5. Greenhouse tests will be conducted at appropriate periods of the year because greenhouse facility is limited.

6. Sufficient monitoring devices should be installed, in good working order, and calibrated to assure that the proper lighting, temperature and humidity conditions are maintained throughout the trial(s).

Reviewed by: _____ Date: 3/6/15

Reviewed by: _____ Date: 4/8/16

Reviewed by: _____ Date: _____

7. Document cultural practices used in the greenhouse and treatment locations in the raw data notebook.

Reviewed by: _____ Date: 4/8/16

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

SOP 3.3 Greenhouse facilities

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 4.1 ***Revision Number:*** 2

Submitted by: ***Date:*** 5/18/16

Approved by: ***Date:*** 10/27/16

Title: Calibrations and use of balances.

Purpose: To assure an accurate weighing of dry test substances.

Scope: All field facilities where a dry material is weighed for use in a field, greenhouse or hothouse trial(s).

Procedures: The methods, materials, and schedules for routine inspection and cleaning and calibration will be:

1. Prior to and after each use, the user will visually inspect the balance for cleanliness. Any dirt or chemicals within the chamber or on the pan must be cleaned immediately.

2. Follow manufacturers recommendations for frequency of balance calibrations and for proper calibration methodology, and routine maintenance. Calibrations will be recorded in a balance log.

3. Standard weights will be calibrated/standardized annually by checking against recently inspected/certified balances. Balances will be inspected/certified balances. Balances will be inspected annually by a trained technician to assure proper balance operation. Standard weights will be checked against the balance soon after inspection/certification. If inconsistencies arise, then standard weights will be returned to manufacturer for calibration.

4. Balance accuracy checks should be performed, before weighing chemicals for residue tests, using two standard weights that bracket (in the weight range of the chemical samples being weighed) the amount to be weighed. Record declared weights and actual weights of standards as raw data.

Reviewed by: _____ Date: _____

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a. If the measured weights of both standard weights are within ± 2% of the standard weights, proceed with weighing.

b. If the measured weight of either standard weight differs by more than ± 2% from the standard weight, recalibrate the balance.

c. If, after recalibration, the measured weights of both standard weights are within ± 2% of the standard weights, proceed with weighing and record the measured weights.

d. If, after recalibration, the measured weight of either standard weight still differs by more than ± 2%, replace the defective weight. If it is determined that the problem is the balance, then it should be serviced before further use.

5. Select an appropriate container to hold the desired amount of test substance and tare it on the scale following the manufacturer's directions in the appropriate technical manual.

6. If taring the container is not practical, then record the weight of the container, add the weight of the desired amount of test substance to it and weigh out this amount.

7. Select and wear or use appropriate safety equipment while handling the test substance.

8. Label the container to identify it as to the trial ID#, rate, test material, and appropriate treatment.

9. Remedial actions to be taken in case of failure or malfunction include:

   a. Any problem should be immediately reported to the facility director, documented, and placed in the balance records for non-routine procedures.

   b. If the problem cannot be corrected by instructions from the manufacturer's manual, the service representative should be notified. All corrective actions taken shall be documented.

10. Personnel currently operating the equipment are responsible for the maintenance and remedial action taken in case of malfunction.

SOP 4.1 Calibrations and use of balances.

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 4.2 ***Revision Number:*** 1

Submitted by: mrburger ***Date:*** 9-28-2009

Approved by: ***Date:*** 11/3/09

Title: Measuring liquid formulations.

Purpose: To assure an accurate measurement of liquid test substances.

Scope: All field facilities conducting field trial(s) for IR-4.

Procedures:

1. Clean syringes will be used to measure small quantities (generally less than 60 ml) of liquid formulations.

   a. Liquid formulation will be measured using the smallest available syringe that will measure that quantity. (Example: quantities less than 10 ml will be measured with a 3, 5, or 10 ml syringes, quantities between 10 and 20 ml will be measured in a 20 ml syringe, etc.

   b. After air has been removed from the syringe and the appropriate quantity of liquid formulation has been measured, the liquid formulation will be dispensed in the appropriate spray container.

   c. Since syringes expel all of the contents, the rinsate will not be added to the spray mixture. The syringe will be rinsed and disposed of properly.

2. For measuring larger quantities of liquid formulations (generally greater than 60 ml), obtain a clean cylinder or measuring device large enough to hold the volume of liquid needed, graduated in increments small enough to read to an accuracy of 1 ml.

3. If the opening of the cylinder/device is too restricted to allow filling without danger of spillage, then do one of the following:

   a. Use a clean container with a pour lip as an intermediate and fill the cylinder/device from it
   or

Reviewed by: mrburger Date: 01-06-2012

Reviewed by: [signature] Date: 3/6/15

Reviewed by: [signature] Date: 4/8/16

b. Use a clean funnel that is large enough to allow filling the cylinder with a minimum of spillage.

4. Select and wear or use appropriate safety equipment while measuring liquids.

5. Measure the liquid in the cylinder/device. Place the cylinder/device on a level surface and take the reading of the liquid in the cylinder/device at the bottom of the meniscus with the eye being level with the bottom of the meniscus. Document the amount of test substance measured in the raw data book.

6. Pour the liquid into an appropriate container, fit with a leak proof lid and label as to contents and amount. Cylinders/devices used to measure or transfer the test substance concentrate should be triple rinsed into the mixing container and then thoroughly washed with soap and water after use to ensure that they are clean and cross-contamination of pesticides will not occur in future use.

Reviewed by: jrburger Date: 01-06-2012

Reviewed by: [illegible] Date: 3/6/15

Reviewed by: [illegible] Date: 4/8/16

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1366 W. Altheimer Dr., Fayetteville, AR 72704

SOP 4.2 Measuring liquid formulations

Reviewed By: Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 4.3 ***Revision Number:*** 2

Submitted by: mrburgos ***Date:*** 01-06-2012

Approved by: ***Date:*** 1/30/12

Title: Calibration of a Liquid Sprayer.

Purpose: To determine the delivery rate of a liquid sprayer and make adjustments as necessary to ensure an accurate application of the test substance or a maintenance substance.

Scope: All facilities where a liquid sprayer is used in the application of materials.

Procedures: The methods, materials, and schedules for routine inspection and cleaning and calibration should include:

1. Always calibrate before each test substance application or other use of a liquid sprayer. For multiple applications, recheck the calibration to confirm accurate delivery (e.g., ± 5% of initial calibration or as specified by the protocol).

2. Prior to use visually inspect pumps, hoses, pipes, fittings, regulators, gauges, and tanks for obvious wear or potential leaks and repair or replace as necessary as part of routine maintenance. Record any maintenance performed in the appropriate log(s).

3. Refer to the protocol for any specified application requirements. Select the appropriate type of nozzle, which is based on the pesticide formulation, the application method, the operating speed, the pressure setting and the dilution rate (e.g., gal/acre).

4. Use a calibration method suitable to the application and the equipment used.

5. Establish volume per acre. Standard operating procedures and/or protocols dictate pre-determined volume per acre in most cases. Record all details not described in an SOP in the field data book, and all calibration data calculations should be recorded in the raw data.

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Reviewed by: _____ Date: 4/8/16

Reviewed by: _____ Date: _____

Delivery Rate(GPA) =

$$\frac{5940 \times \text{discharge per nozzle (gal/min)}}{\text{speed (MPH)} \times \text{nozzle spacings (inches)}}$$

6. Place the sprayer on level ground. Adjust the boom height and nozzle spacing for the correct application pattern. Determine whether all nozzles are discharging uniformly by spraying clean water only through them at a uniform pressure. Catch and measure the discharge from each nozzle separately over a timed interval beginning after the nozzles are discharging. If the discharge varies widely, replace all nozzle tips that give a much larger or much smaller discharge. Repeat the above procedure until all nozzles are discharging uniformly (± 5% of mean of the nozzle discharge).

   If the measured gal/acre is within 5% of the desired gal/acre, as specified in the protocol and/or SOP, then the sprayer is calibrated. Minor flow-rate changes can be made with a slight pressure change. Major flow-rate changes require selection of new nozzle sizes or changes in ground speed.

7. Applicators must carefully operate under the same conditions as during calibration. Besides checking the nozzles for their proper flow rate, the spray pattern should also be examined for its complete and symmetrical arrangement. Ensure solution is thoroughly mixed before application and continue to agitate during application if possible. The test substance must be applied uniformly to the entire test area. Measure the swath width using the same conditions under which the application will be made and record this width in the raw data.

8. Thorough cleaning of the equipment is required after each period of use and when changing test substances.

9. Remedial action to be taken in case of failure or malfunction should include:

   a. Immediately report to the field research director.

   b. If problems occur during application, refer to SOP 6.4.

   c. Any repairs or repairs or replacements will be documented as non-routine maintenance in the appropriate maintenance log(s).

10. Personnel currently operating the equipment are responsible for the maintenance and remedial action taken in case of malfunction.

Reviewed by: _____ Date: 4/8/16

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

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1366 W. Altheimer Dr., Fayetteville, AR 72704

SOP 4.3 Calibration of liquid sprayer

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 4.4a ***Revision Number:*** 3

Submitted by: [signature] ***Date:*** 2/20/2013

Approved by: [signature] ***Date:*** 3/19/13

Title: Use of borrowed equipment.

Purpose: To assure the cleanliness and working order before and after the use of a borrowed equipment.

Scope: All field facilities or test sites where equipment has to be borrowed instead of procured.

Procedures: The methods, materials, and schedules for inspection and cleaning and calibration will be:

1. Prior to and after use, the user will visually inspect the borrowed equipment for functionality and cleanliness.

2. The proprieter or his/her authorized staff should operate the equipment, whenever possible. If any could not be present at the time of application, the borrower must carefully operate the equipment.

3. In the event of a malfunction, the user should immediately inform the proprieter of the borrowed equipment who in turn will remedy the malfunction. The user should pay for the repair and replacement of parts of the borrowed equipment. The user may not change any part of the borrowed equipment

4. A written record should be kept of the dates when the borrowed equipment was used and returned. Generate a maintenance log for every borrowed equipment. Any activity will be documented on the maintenance log.

5. If a manual is not available to describe how the borrowed equipment should be tested, then the operator should record the testing methods used in the equipment log.

Reviewed by: [signature] Date: 2/20/2017

Reviewed by: [signature] Date: 3/6/17

Reviewed by: [signature] Date: 4/20/16

SOP 4.4a Use of borrowed equipment

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 4.4b ***Revision Number:*** 3 EE RF 10-25-16

Submitted by: mrburger ***Date:*** 01-06-2012

Approved by: ***Date:*** 1/30/12

Title: Calibration, use, and cleaning of air blast sprayer.

Purpose: To determine the delivery rate of air blast sprayer and make adjustments as necessary to ensure an accurate application of the pesticide.

Scope: For use when calibrating an air blast sprayer for applying test substances to tree/bush crops.

Procedures:

1. Sprayer hoses, pipes, connections, gauges, pressure regulator and tank will be examined for leaks. The sprayer will be examined for worn belts and pulleys.

2. The sprayer will be calibrated to deliver a volume per area within the guidelines specified by the protocol. Always calibrate before initial test substance application and after any application parameter changes, if applicable. For multiple applications, recheck the calibration to confirm accurate delivery (e.g., ± 5% of initial calibration or as specified by the protocol).

3. To calculate speed of sprayer, in miles per hour (MPH), the following formula will be used:

   MPH = (D/Sec)/1.47

   Where D is distance of tract used measured in feet and Sec (seconds) is the time to cover the measured distance.

4. An output consisting of an average of three runs must be used when calculating the sprayer output and amount of test substance to use. Each run should be ± 5% of the average output for the 3 runs. If the output result is not within ± 5% of the original average output, then two more runs are needed to produce a new, full calibration. To measure discharge and determine gallons per minute (GPM) add a known volume of clean water to spray tank, discharge the liquid for 15 seconds and measure the remaining liquid in the spray tank using a graduated cylinder. To

Reviewed by: _____ Date: 4/20/16

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calculate gallons per minute (GPM), the following formula will be used:

$$GPM = \frac{Average\,Discharge\,(Gallons) * 4}{Number Nozzles}$$

5. Once application speed (mph), nozzle spacing (in), and sprayer output (GPM) are known, gallons per acre (GPA) can be calculated with the following formula:

$$GPA = \frac{GPM * 5940}{MPH * NS}$$

6. When the application is made, the nozzle arrangement will be to direct 2/3 of the spray pattern to the top one-half of the trees and 1/3 of the pattern to the lower one-half of the trees/bushes.

7. Operator must carefully operate the equipment, during application, under the same conditions as during calibration. Ensure that the solution is thoroughly mixed before application and continue to agitate during application.

8. The sprayer will be cleaned immediately after use by triple rinsing the tank with clean water. The sprayer will then be partially filled with ammonia plus water and operated to clean the spray lines and nozzles. Finally, the tank will be documented in the maintenance for the sprayer.

Reviewed by: _____ Date: 4/20/16

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

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SOP 4.4b Calibration, use and cleaning of air blast sprayer

Reviewed By: Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 4.4c ***Revision Number:*** 23 EFF 10-25-16

Submitted by: Mrburger ***Date:*** 01-06-2012

Approved by: ***Date:*** 1/30/12

Title: Calibration verification of water pump flow meter (in conjunction with usage of air blast sprayer).

Purpose: To accurately determine the water pump delivery rate and the amount of carrier to refill the air blast sprayer.

Scope: For use in determining the amount of water needed to refill the air blast sprayer.

Procedures: Determination of the amount of water using the flow meter every time the air blast sprayer is used.

1. Determine the amount of water needed to refill the air blast sprayer.
2. Record the flow meter readings before and after filling up the air blast sprayer or refilling with the predetermined amount of water.
3. Open the drain valve at the bottom of the air blast chamber and collect the water that drained out of the chamber.
4. Measure the amount of water collected and compare with the amount recorded in the flow meter after filling up the air blast sprayer. The difference should be within the acceptable limits of 5%.
5. Keep a written record of the dates, in a log, when the flow meter was used. Document every air blast sprayer usage activity in this log.

Reviewed by: _____ Date: 4/20/16

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

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SOP 4.4c Calibration verification of water pump flow meter

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 4.5 ***Revision Number:*** 2

Submitted by: nrburgos ***Date:*** 9-28-2009

Approved by: [signature] ***Date:*** 11/3/09

Title: Calibration and use of Granular Applicators.

Purpose: To determine the delivery rate of the granular applicator and make adjustments as necessary to ensure an accurate application of pesticide.

Scope: All facilities where a granular applicator is used in the application of test substances.

Procedures: The methods, materials, and schedules for routine inspection and cleaning and calibration should include:

1. Determine that the applicator is in good working order and mechanical condition. Make sure that the openings to release the granular material are not clogged and free of debris.

2. Ground Driven Applicators:

   Refer to the operator's manual for the calibration method. All calibration data and calculations should be recorded in the raw data.

3. Wear protective clothing as necessary and fill the spreader with enough material to ensure proper operation. Attach a calibration pan under the spreader to catch the material as it is released.

4. Operate the applicator over the desired course and weigh the material caught in the calibration pan. Adjust the applicator as needed until it is applying the correct amount per acre (within ± 5%, or as specified in the protocol). Document each setting and weight.

Reviewed by: nrburgos Date: 01-06-2012

Reviewed by: [signature] Date: 4/21/16

Reviewed by: _____ Date: _____

5. Non-Ground Driven Applicators.

   Following protocol requirements, perform calculation to determine actual pounds (or appropriate measures) of material per acre (or appropriate measure).

6. Place the applicator on level ground. Determine whether all openings are discharging uniformly by turning on the applicator and observing output. Catch and weigh the discharge from each opening separately or from all at once for broadcast applicators in a calibration pan or other appropriate container over a timed interval (e.g., 15 seconds) beginning after the openings are discharging if practical.

   If the measures lb/acre is within 5% of the desired lb/acre, as specified in the protocol and/or SOP, then the applicator is calibrated and the same settings should be used in actual application. When the measured lb/acre must be changed, alter one or all of the following; discharge opening size, applicator drive speed (if possible) or ground speed.

7. Applicators must carefully operate under the same conditions as during calibration. All discharge openings should be unobstructed and flow from each should be identical. The test substance must be applied uniformly to the entire test area.

8. Thorough cleaning of the applicator is required after each period of use and when changing chemicals.

9. Remedial action to be taken in case of failure or malfunction should include:

   a. Immediately report to the field research director.

   b. If problems occur during application, refer to SOP 6.5.

   c. Any repairs or replacements will be documented as non-routine maintenance in appropriate log(s).

10. Personnel currently operating the equipment are responsible for the maintenance and remedial action taken in case of malfunction.

Reviewed by: mrburger Date: 01-06-2012

Reviewed by: [signature] Date: 4/21/16

Reviewed by: _____ Date: _____

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1366 W. Altheimer Dr., Fayetteville, AR 72704

SOP 4.5 Calibration and use of granular applicators

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 4.6 ***Revision Number:*** 2

Submitted by: mrburger ***Date:*** 9-28-2009

Approved by: [signature] ***Date:*** 11/3/09

Title: Operation and maintenance of farm equipment.

Purpose: To assure that the crop or commodity under study is grown under simulated commercial conditions, in a quantity sufficient for the trial(s) and in a state of health.

Scope: All locations where the farming operations are performed for GLP studies.

Procedures:

1. Just prior to the initiation of the use of the equipment (tractor, plow, disk, harrow, planters, harvester etc.) the Field Research Director or a designated representative will visually inspect the equipment to see that it is in good working order, properly lubricated, and in good mechanical condition.

2. Any necessary repairs or adjustments should be made prior to the use of the equipment in the trial(s).

3. The operator of the equipment should be familiar with its operation and safety precautions.

4. Manuals on the operation and maintenance of the equipment should be kept in a place accessible to the operator and the Field Research Director.

5. Personnel currently operating the equipment are responsible for the maintenance and remedial action taken in case of malfunction.

Reviewed by: mrburger Date: 01-06-2012

Reviewed by: [signature] Date: 3/6/15

Reviewed by: [signature] Date: 4/20/16

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SOP 4.6 Operation and maintenance of farm equipment

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 4.7 ***Revision Number:*** 2

Submitted by: mrburgor ***Date:*** 9-28-2009

Approved by: [signature] ***Date:*** 11/3/09

Title: Calibration of field instruments.

Purpose: To assure that all instruments and gauges used in a GLP trial(s) are accurate and in good working order.

Scope: All facilities where trial(s) are conducted.

Procedures:

1. A written record should be kept of the dates of calibration, results of the tests, and of the acceptable variance for each instrument.
2. Gauges or instruments that give inconsistent results or are not accurate to within desired tolerances should be repaired or replaced.
3. If a manual is not available to describe how these should be tested, then record the methods used in the instrument log or describe the methods in an SOP.
4. Personnel currently operating the equipment are responsible for the maintenance and remedial action taken in case of malfunction.

Reviewed by: mrburgor Date: 01-06-2012

Reviewed by: [signature] Date: 3/6/15

Reviewed by: [signature] Date: 4/20/16

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SOP 4.7 Calibration of field instruments

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 4.8a ***Revision Number:*** 2

Submitted by: ***Date:*** 01-06-2012

Approved by: ***Date:*** 1/30/12

Title: Use of freezers for storing samples.

Purpose: To assure that the freezers are accurate and in good working condition.

Scope: All facilities where the freezers for sample storage are kept.

Procedures:

1. Plug in the freezers and inspect for leaking gaskets and compressor functions (stabilizing at the set temperatures).
2. Freezers for both untreated and treated samples will be set at temperatures compliant to the GLP protocols. The tolerance limit for freezer temperature is ± 2 degrees.
3. Freezers will be inspected for gasket wear and compressor functions at the beginning of every growing season.
4. Freezers will be emptied and cleaned with an appropriate cleaning detergent at every end of the growing season.
5. Freezers will be kept locked at all times and only IR-4 personnel or the Station Research Director under the direction of the IR-4 personnel shall have access to the keys.
6. A written record should be kept of the dates when the freezers are checked and when the samples are entered and taken out. Any activity should be documented on the maintenance log.
7. Any freezer that registers inconsistent temperature or not accurate to within the desired tolerances will be repaired or replaced.
8. If a manual is not available to describe how these freezers should be tested, then the IR-4 personnel should record the testing method used in the freezer log.

Reviewed by: _____ Date: 3/6/15

Reviewed by: _____ Date: 4/20/16

Reviewed by: _____ Date: _____

9. The Station Director or his Deputy is responsible for checking the freezers daily.

10. Personnel operating the devices are responsible for the maintenance and remedial actions taken in case of malfunction.

Reviewed by: _____ Date: 4/21/16

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

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SOP 4.8a Use of freezer for storing samples

Reviewed By: Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 4.8b ***Revision Number:*** 2

Submitted by: ***Date:*** 6/23/15

Approved by: ***Date:*** 6/30/15

Title: Calibration and use of temperature monitoring devices in freezers.

Purpose: To assure that the temperature monitoring devices are accurate and in good working condition.

Scope: All field facilities where temperature monitoring devices are kept.

Procedures:

1. The samples in freezers for both untreated and treated will be kept in temperature conditions compliant to the GLP protocols.

2. If using a data logger to monitor temperature, this should be set for a maximum time interval of two hours and units should be downloaded once per month, preferably on the first working day of each month or within the first week of each month except on holidays or if field personnel are on leave, in which case the data will be downloaded upon the field personnel's return to the office or shortly thereafter. Two data loggers (data logger #1 and back data logger # 2) will be set to record the prevailing temperature in the cabinet(s). Should the primary unit fail to record information, the backup unit data will be used in place. The back-up unit should be re-set each time the data logger (primary temperature monitoring device) is downloaded and documented in a maintenance log.

3. A min/max thermometer will also be set up as a tertiary backup. The temperatures reported from the min/max thermometer will be recorded at a maximum interval of two weeks. Temperature information is only required to be collected when samples are in the freezers.

4. A written record should be kept of the dates when the monitoring devices were checked, and the battery checked and changed. Any activity should be documented in the maintenance log.

5. Devices that give inconsistent readings or are not accurate to within desired tolerances should be repaired or replaced.

Reviewed by: _____ Date: 4/20/16

Reviewed by: _____ Date: _____

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6. If a manual is not available to describe how these devices should be tested, then methods of testing should be recorded in the log or described in an additional SOP.

7. Personnel operating the devices are responsible for the maintenance and repair in case of malfunction.

Reviewed by: _____ Date: 4/20/16

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

SOP 4.8b Calibration and use of temperature monitoring devices.

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 4.8c ***Revision Number:*** X2 EERF 10-25-16

Submitted by: prburger ***Date:*** 9-28-2009

Approved by: [signature] ***Date:*** 11/3/09

Title: Loss of electricity.

Purpose: To have back up capabilities under emergency situations (e.g. electrical outage) so that sample integrity is not compromised.

Scope: All field facilities where freezers are kept.

Procedures:

1. The facility must have a backup generator to provide power in case of electrical outage.
2. The backup generator will be tested at least once every two weeks to maintain its functionality.
3. If the backup generator does not work or is not available, place an inverted 'ice bubble' container in each freezer as indicator that samples were not thawed.
4. A written record should be kept of the dates when the backup generator is checked and when it is used. Any activity should be documented on the maintenance log.
5. The Station Director or his deputy is responsible for the maintenance and remedial actions needed in case of malfunction.

Reviewed by: prburger Date: 01-06-2012

Reviewed by: [signature] Date: 4/20/16

Reviewed by: _____ Date: _____

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SOP 4.8c Loss of electricity

Reviewed By: Date:

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1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 5.1 ***Revision Number:*** 3

Submitted by: mrburger ***Date:*** 2/20/2013

Approved by: ***Date:*** 3/19/13

Title: Commodity Production and Maintenance.

Purpose: Assure that commodities are grown under best management practices.

Scope: All locations developing data on vegetable, fruit, grain, oilseed or floral and nursery crops.

Procedures:

1. Refer to U of AR Extension recommendations or other appropriate publications on the production of the commodity. If no such publication exists, consult with agricultural specialist(s) familiar with the production practices for the commodity and document the practices used to produce the commodity under simulated commercial conditions in the raw data notebook.

2. Determine pH, soil fertility, and soil characteristics requirements of the commodity. Obtain random samples of soil for testing from the trial(s) site. Have the soil tested to determine how well it will meet the requirements of the commodity (specify whether or not the testing was done under GLP in the raw data book).

3. Lime, fertilize and/or condition the soil at the site as necessary to bring the soil within the requirements of the commodity.

4. Apply appropriate maintenance pesticides (preplant herbicide, soil insecticide, fungicide drench, soil-incorporated nematicide etc.) as required. Document maintenance chemicals in the field raw data notebook.

5. If pesticides are applied to the commodity to prevent losses due to pests not under trial(s), they should be applied according to the label directions. If this is a residue trial(s), no pesticide should be applied that would interfere with the chemical analysis of the pesticide under trial(s). If in doubt, consult the Study Director and the Regional Field Coordinator identified in the

Reviewed by: mrburger Date: 2/20/2013

Reviewed by: [illegible] Date: 3/6/15

Reviewed by: [illegible] Date: 4/20/16

protocol to determine if a maintenance chemical may be used.

6. Perform other agricultural cultural practices as necessary to establish and maintain the planted commodity.

Reviewed by: nrburger Date: 12/20/2013

Reviewed by: [illegible] Date: 3/6/15

Reviewed by: [illegible] Date: 4/21/16

SOP 5.1 Commodity Production and Maintenance

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 5.2 ***Revision Number:*** 2

Submitted by: mrburger ***Date:*** 2/20/2013

Approved by: ***Date:*** 3/19/13

Title: Method for seeding or transplanting.

Purpose: Assure that commodities are grown under good agricultural practices and provide an acceptable crop for trial(s).

Scope: All locations developing data on vegetable, fruit, grain, oilseed or floral and nursery crops.

Procedures:

1. Determine the correct species and variety to use as specified by the study protocol. If the variety is not specified, determine the variety most commonly used in the area by commercial producers and use it for the trial(s). If a commercial producer is providing the plants, try to select plants as uniform in growth and color as possible.

2. Determine within and between row spacing and seed depth as specified in the Cooperative Extension Services recommendations or to reflect local commercial practices research personnel

3. The station research personnel with the direction of the IR-4 personnel are responsible in planting or transplanting the test crops.

Reviewed by: mrburger Date: 2/20/2013

Reviewed by: [signature] Date: 3/6/15

Reviewed by: [signature] Date: 4/20/16

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1366 W. Altheimer Dr., Fayetteville, AR 72704

SOP 5.2 Method for seeding or transplanting

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 5.3 ***Revision Number:*** 1

Submitted by: mrburger ***Date:*** 9-28-2009

Approved by: [signature] ***Date:*** 11/3/09

Title: Determining yield or quality.

Purpose: To assure that a measurement of yield or quality of the various treatments is taken if required to evaluate the effects of the treatments.

Scope: All locations conducting trial(s) where the protocol requires yield data. (Sample handling for residues is covered under another SOP).

Procedures:

1. Where possible, obtain an up-to-date copy of the United States standards for grades of the commodity under trial(s) from the Agricultural Marketing Service or other sources. If U.S. grade standards do not exist, then consult other sources and document the plant stage, fruit ripeness, or other characteristics needed to determine quality in the raw data notebook.

2. Check the protocol for information on time of harvest. If none, then follow commercial practices in the area for the time of harvest of the commodity. These practices should be documented in the raw data notebook.

3. Where grading standards exist, the commodity should be graded accordingly at harvest to measure quality.

4. Each portion of the commodity, divided as to its quality standard, should be weighed or measured to determine yield. Written records should be kept of each measurement for each plot.

5. Various methods are utilized by various researchers to harvest a commodity. The method used if not specified in the protocol, should be recorded in the raw data notebook.

Reviewed by: mrburger Date: 01-06-2012

Reviewed by: [signature] Date: 3/6/15

Reviewed by: [signature] Date: 4/21/16

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1366 W. Altheimer Dr., Fayetteville, AR 72704

SOP 5.3 Determining yield or quality

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 5.4 ***Revision Number:*** 1

Submitted by: ***Date:*** 9-28-2009

Approved by: ***Date:*** 11/3/09

Title: Method for collecting soil samples for analysis.

Purpose: To assure commodities are grown under good agricultural practices and provide a uniform crop for study.

Scope: All locations conducting trial(s).

Procedures:

1. Soil samples are to be collected early in the season before the trial begins if possible.
2. A hand probe and plastic bucket should be used to collect soil samples from a depth of 0-6 inches or 1-12 inches, depending on the type of analysis desired.
3. Approximately 15 cores are to be collected per test area in an X pattern taken across the area, starting at one corner to opposite bottom corner. Cores should be mixed to obtain one composite sample per test.
4. The composite sample should be air dried and placed into a container for mailing or transporting that is of sufficient size for sample.
5. Samples should be appropriately labeled with location, date, and depth of soil sample. Containers are to be sealed and transported to the University of Arkansas Soil Testing Laboratory for analysis not under GLP guidelines.

Reviewed by: _____ Date: 01-06-2012

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Reviewed by: _____ Date: 4/20/16

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SOP 5.4 Collecting soil samples for analysis

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 6.1 ***Revision Number:*** 1

Submitted by: prburgor ***Date:*** 9-28-2009

Approved by: [signature] ***Date:*** 11/3/09

Title: Adding a test substance concentrate to a carrier in the spray tank of a sprayer.

Purpose: To obtain the proper dilution and mixing of the concentrate in the spray tank.

Scope: All locations conducting field trial(s).

Procedures:

1. After the sprayer has been inspected and calibrated, empty the water from the tank.
2. Measure the amount of water needed to dilute the measured amount of concentrate into a separate container. Make sure the spray mix will be enough to cover at least one treatment plot (preferably all plots in one treatment). Make sure the spray tank will hold this amount and the concentrate. Add ½ the water to the spray tank.
3. If needed (i.e. wettable powder formulation) make a slurry mix first by adding the concentrate to a small volume of water in a separate, clean container. Add the pesticide concentrate or slurry to the water in the spray tank. Triple rinse the container holding the pesticide concentrate (and slurry) using the other ½ of the water not in the spray tank and add the rinse water to the spray tank.
4. Add the remaining water to the spray tank. Close and tighten the lid. Rinse the outside surface of the spray tank with clean water.
5. Agitate the spray mix before and during application to insure an even mix of the pesticide and water.

Reviewed by: prburgor Date: 01-06-2012

Reviewed by: [signature] Date: 3/6/15

Reviewed by: [signature] Date: 4/20/16

University of Arkansas, Dep't of Crop, Soil, and Environmental Sciences
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SOP 6.1 Adding a test substance concentrate to a carrier in the spray tank of a sprayer

Reviewed By:	Date:

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Effective Date:

SOP#: 6.2 ***Revision Number:*** 2

Submitted by: mwburger ***Date:*** 2/20/2013

Approved by: [signature] ***Date:*** 3/19/13

Title: Procedures for the application of the trial(s) pesticide(s) in the field and greenhouse.

Purpose: To assure that the trial(s) pesticide(s) are applied uniformly to the plots.

Scope: All locations conducting field trial(s).

Procedures:

1. Ensure all settings of pressure, speed, granular flow etc. are set according to specification from the calibration as previously performed.

2. Just before entering each plot make sure you are traveling at the correct speed and turn on the sprayer or release the granules. Maintain the correct speed through the plot.

3. Apply the material according to the directions in the protocol or as specified on the label. If fumigants or mist blowers are used, follow manufacturer instructions for equipment operation and pesticide application. If a fumigant is used, two people are required, one doing the actual application and one who can observe from a safe place to provide assistance if necessary.

4. Calculations should be made to minimize the amount of spray material left in the spray equipment. This residue should be sprayed to a similar crop, fallow land or disposed of according to current policies and guidelines of the research testing facility.

Reviewed by: mwburger Date: 2/20/2013

Reviewed by: [signature] Date: 3/6/15

Reviewed by: [signature] Date: 4/20/16

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SOP 6.2 Procedures for the application of the trial(s) pesticide(s) in the field and greenhouse

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
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Effective Date:

SOP#: 6.3 ***Revision Number:*** 2

Submitted by: mrburger ***Date:*** 2/20/2013

Approved by: [signature] ***Date:*** 3/19/13

Title: Cleanup of application equipment.

Purpose: To assure that pesticide application equipment is decontaminated without adversely affecting personnel or the environment.

Scope: All locations where pesticides are used.

Procedures:

1. Granules – Remove any excess granules and return them to the original container if this procedure does not affect the integrity of the contents; otherwise, dispose of the excess by using appropriate methods for handling hazardous wastes. Note in the pesticide log for the chemical, the amount of granular material used in the trial(s).

2. a. Unused spray material should be applied to an overplanting of the crop or fallow land at a distance adequate to prevent contamination of the test plot by drift or downslope movement of surface runoff. If a crop overplanting or fallow farm is not available, then follow the disposal procedures for pesticide rinsate in accordance with current policies and guidelines of the institution.

   b. Replace spray bottle with 2-liter bottle containing soapy water, agitate, and spray out into the overplanting crop or fallow land.

   c. Replace the soapy water bottle with clean water bottle and spray out into the overplanting crop or fallow land.

3. In a suitable area away from aquatic areas or danger of aquatic contamination, hose down the granular applicator to remove pesticide dust from the inside and outside.

4. Triple rinse liquid spray equipment and apply each wash to the overplanting of the crop, fallow land, or dispose of properly (see 2a above).

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Reviewed by: [signature] Date: 3/6/15

Reviewed by: [signature] Date: 4/20/16

a. Conventional Spray Equipment using 3-gallon spray tanks or 2-liter spray bottles.

1. Prior to initial application of test substance, the tanks or 2-liter bottles are rinsed with ammonia, followed by clean water. The spray containers are then labeled and used only to apply that test substance for the duration of the trial. The spray containers are triple-rinsed after each application and stored until next application.

2. Cleaning the spray boom. A sufficient quantity of clean water will be sprayed through the boom to thoroughly rinse all lines and nozzles.

b. Single Tank Sprayer (Air Blast Sprayer)

Rinse the tank with clean water and drain. Then triple-rinse the tank with clean water, spraying the rinsate through the nozzles.

5. Properly dispose of expendable protective clothing. Clean non-disposable items following the manufacturer's instructions or with soap and water as appropriate.

6. After the application equipment is dry, lubricate those parts requiring lubrication and return the equipment to storage.

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SOP 6.3 Cleanup of application equipment

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
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Effective Date:

SOP#: 6.4 ***Revision Number:*** 1

Submitted by: [signature] ***Date:*** 9-28-2009

Approved by: [signature] ***Date:*** 11/3/09

Title: Emergency corrective actions for unexpected problems during treatment application.

Purpose: To lay out the procedures required when something goes wrong during the application of the test substance.

Scope: All locations where pesticides are used. For the purposes of this SOP, test substance also applies to control and reference substances.

Procedures:

1. During application, the operator should observe the process to make sure that the test substance is evenly distributed to the target.

2. If something goes wrong, for example, a nozzle is plugged or a hose breaks, then the operator should take immediate action to correct the situation.

3. The affected portion of the plot should be carefully marked off and staked to indicate the area affected. This portion should not be used for obtaining samples of the commodity for residue analysis. If the unaffected area is too small to obtain the samples required for analysis, then the trial(s) should be discontinued.

4. Appropriate individuals (e.g., the regional field coordinator, and the study director) should be notified of the incident, details recorded in the raw data notebook, and maintenance records retained in the assigned log.

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Reviewed by: [signature] Date: 3/6/15

Reviewed by: [signature] Date: 4/20/16

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1366 W. Altheimer Dr., Fayetteville, AR 72704

SOP 6.4 Procedures to follow when a problem occurs in the application of the test substance

Reviewed By: Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 7.1 ***Revision Number:*** 1

Submitted by: mrburgos ***Date:*** 9-28-2009

Approved by: ***Date:*** 4/3/09

Title: Collection of the raw data electronically.

Purpose: To assure that raw data collected electronically are verifiable if audited.

Scope: All locations conducting field or greenhouse trial(s).

Procedures:

1. Check the power supply on portable units to see that it will be adequate during the data collection and data transfer period.
2. Make sure the correct program for data collection is ready and available for use.
3. At the beginning of data collection, provide verification that the system is working by collecting data from the first plot electronically and also have someone record the data by hand. At the end of the data collection period, the printout of the electronic data and the hand-collected data should be signed by the person collecting the data. If both sets of data are in agreement a signed and dated statement to that effect should be written in the maintenance log.
4. Prompts should be used as much as possible to avoid any confusion in collecting the data. Where feasible, the prompts should state the plot # from which the data is being collected, the current date, and the type of data being collected.
5. Data should be taken in an orderly fashion so as to avoid any confusion.
6. At the end of the data collection period, the data should be transferred to a storage system and immediately printed out with appropriate identification. This hard copy must be dated and signed then stored in the trial(s) file folder.
7. All remote sensing and other automatic data collecting and/or recording devices should be inspected and calibrated.

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Reviewed by: [illegible] Date: 3/6/15

Reviewed by: [illegible] Date: 4/30/16

8. Prints or plots of data from these devices must be legible to persons with normal vision and dated and signed when printed or plotted.

9. Hard copies of computerized data and/or other written or plotted data sheets must be dated and signed, and retained in the file folder of the project. Hard copies serve as original data.

10. Each data sheet from a monitoring device should be marked in ink with the name of the study ID number, dates (day, month, year) of occurrence of the event measured, units of measurement and signed and dated by the person preparing the data sheet.

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Reviewed by: [signature] Date: 3/6/15

Reviewed by: [signature] Date: 4/20/16

SOP 7.1 Collection of raw data electronically

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 7.2 ***Revision Number:*** 2

Submitted by: mrburger ***Date:*** 2/20/2013

Approved by: [signature] ***Date:*** 3/19/13

Title: Recording of raw data.

Purpose: To assure that raw data collected and recorded are accurate and available for audit.

Scope: All locations conducting trial(s).

Procedures:

1. All raw data will be recorded in indelible ink.

2. Changes to the raw data can only be made by drawing a single line through the original entry so as not to obscure it. The date, signature (or initials) and reasons for change (brief description or error code) must accompany any change. Acceptable error codes include:

AW	=	Accidental Writeover	CD	=	Calculation Error
EE	=	Entry Error	IE	=	Illegible Entry
IC	=	Incorrect Comment	IW	=	Inappropriate Word
LE	=	Late Entry	ME	=	Measurement Error
NA	=	Not Applicable	NI	=	New Information
NR	=	Not Recorded	PE	=	Pagination Error
SP	=	Spelling Error	TE	=	Transcription Error
UE	=	Unnecessary Entry	WE	=	Wrong Entry

Other error codes can be used; however, the codes must be noted in the IR-4 Field Data Book.

4. Pages containing raw data shall not be discarded.

5. Cross-reference instrument or statistical printouts when such data are retained in a separate location.

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Reviewed by: [signature] Date: 3/6/15

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6. All data entries shall be dated on the day of entry and signed or initialed by the person entering the data.

7. Make sure that all data required by the study protocol or by the forms provided in the field data book are collected and recorded.

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Reviewed by: [signature] Date: 3/6/15

Reviewed by: [signature] Date: 4/20/16

SOP 7.2 Recording of raw data

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 7.3 ***Revision Number:*** 1

Submitted by: prburgar ***Date:*** 9-28-2009

Approved by: [signature] ***Date:*** 11/3/09

Title: Calculations for Data Presentation.

Purpose: To establish guidelines for computation and presentation of data.

Scope: Field sites conducting trials under the minor use pesticide program.

Procedures:

1. Results must be reported to correct number of significant figures reflecting an appropriate level of certainty.
2. In carrying measured quantities through calculations, the following rules are used:
   a. Multiplication and division: the result must be rounded off as having no more significant figures than the measurement with the fewest significant figures.
   b. Addition and subtraction: the result is rounded off to the same number of decimal places as that of the term with the least number of decimal places.
3. Round-off rules:
   a. If the first digit to be dropped is less than 5, round down.
   b. If the first digit to be dropped is greater than 5, round up.
   c. If the first digit to be dropped is a 5, and the digit to the left is even, round down.
   d. If the first digit to be dropped is a 5, and the digit to the left is odd, round up.
4. When a manual calculation involves two or more steps, retain at least one additional digit (insignificant figure) for intermediate answers. Round off at the end.

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5. In using computer and/or calculator, calculation round off is usually done at the display and serial calculations are done with unrounded numbers. Round off the final results.

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SOP 7.3 Calculations for data presentation

Reviewed By: Date:

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SOP#: 7.4 ***Revision Number:*** 2

Submitted by: ***Date:*** 5-/24/15

Approved by: ***Date:*** 6/30/15

Title: Method for collecting field trial(s) data.

Purpose: To describe the procedure used for taking biological field data.

Scope: All locations conducting field trial(s).

Procedures: A. Phytotoxicity data:

1. Consult the protocol to determine the method and timing of the phytotoxicity data. If no method is cited then an established method available from published literature or other credible source will be followed, or the following procedure will be utilized:

2. Survey the whole plot, take phytotoxicity data within 7 days after the treatment. If symptoms occur during this period that warrant a reading, then additional phytotoxicity data should be taken as necessary.

3. Survey each plot and record a phytotoxicity rating of 0 to 100 for each plant. Zero = plant healthy. 100 = plant dead. One thru 99 = the percentage necrosis and/or yellowing of the plant.

B. Pest data:

1. Consult the protocol to determine the method and timing of the pest data. If no method is cited then reference your method(s) for each pest or proceed as follows:

2. Where possible, take pest data within 24 hrs before the initial pesticide treatment and within 48 hrs after the treatment and at various intervals thereafter depending on the pest lifecycle and at the termination of the trial(s).

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Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

3. Disease data – Record the name of the disease(s) being observed. Record the symptom(s) for each disease. Randomly select 5 plants in the middle row of each plot and record the severity of each disease in a rating system of 0 to 10 for each plant. Zero = plant healthy. Ten = plant dead. One thru nine = the percentage disease appearing on the plant. If there are less than five plants/row, record data from 5 plants/plot or all the plants in a plot.

4. Insect data – Record the name of the insect(s) being observed. Record the damage symptom(s) for each insect. For damage symptoms – randomly select 5 plants in the middle row of each plot and record the severity of damage for each insect in a rating system of 0 to 10 for each plant. Zero = plant healthy. Ten = plant dead. One thru nine = the percentage damage appearing on the plant. If there are less than five plants/row, record data from 5 plants/plot or all the plants in a plot.

   For insect pest population counts – take a random sample of the pest population (i.e. 5 leaves/plant of 5 plants/plot, 4 3-in. diam. Soil cores/plot, 100 apples/tree etc.) to insure an accurate reflection of the pest density/unit area.

5. Nematode data – Record the name of the nematode(s) being observed. Record the damage symptom(s) for each nematode. For damage symptoms – randomly select 10 plants in the middle row of each plot and record the severity of damage for each nematode on each plant using one of the rating systems described by the following:

   Barker, K.R., J.L. Townshend, G.W. Bird, I.J. Thomason and D.W. Dickson. 1986. Determining nematode population responses to control agents. In Kickey, K.D. (ed.). Methods for evaluating pesticides for control of Plant Pathogens. Pages 283-296.

   If there are less than 10 plants/row, record data from all the plants in a row.

   For nematode population counts – take a random sample of the pest population (i.e. root system of 2 plants/plot, 4 3-in. diam. Soil cores/plot, etc.) to insure an accurate reflection of the pest density/unit area as described by Barker et al., cited above. Use a method suitable to extract the nematodes from the soil or plant sample and cite the method here.

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Count and record the number of nematodes by the various life stages/unit of soil or root.

6. Weed data – Visually observe each plot and record the percentage (%) of the area (to the nearest 5%) covered by weeds. Record the names of the 5 most prominent weed species and the area they cover (to the nearest 5%) in each plot. Randomly place a quadrat covering an area of 0.5 x 0.5 m at two sites in the plot. Divide each quadrat by 0.1 x 0.1 m grids. Where possible, count the number of weeds in the quadrat. If weeds are too numerous, then count the number of weeds in the lower left grid then multiply by the number of grids in the quadrat and record this value as the number of weeds in the quadrat.

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SOP 7.4 Method for collecting field trial(s) data.

Reviewed By:	Date:

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1366 W. Altheimer Dr., Fayetteville, AR 72704

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SOP#: 7.5 ***Revision Number:*** 1

Submitted by: prburger ***Date:*** 9-28-2009

Approved by: [signature] ***Date:*** 11/8/09

Title: Experimental design and data analysis.

Purpose: To assure that all efficacy, yield, and phytotoxicity data developed are statistically sound.

Scope: All locations conducting trial(s).

Procedures:

1. The experimental design as specified by the protocol should be used. If none is designated, then the researcher should use a commonly accepted experimental design such as a complete randomized block design. The experimental design used should be documented in the raw data notebook.

2. A minimum of 3 replicates should be used (4 is preferred). No replicates or statistical analysis are required where the trial(s) is for magnitude of the residue only.

3. Draw a plot map showing the location of each plot in the site selected for testing as described under SOP 3.2.

4. Randomly assign the treatments to the plots using a random number table or random number generator. Note the location of the treatments on the plot map.

5. Retain the plot map in the trial(s) folder.

6. Determine the level of significance for the trial(s).

7. Select an appropriate statistical package for data analysis and record sufficient information to identify the statistical package (i.e. Date, Revision no., Title, Authors, Source etc.).

8. When the raw data are available for analysis, utilize the statistical package and follow instructions contained therein to conduct an analysis of variance and mean

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separation of the data.

9. Record the data as required on the appropriate forms and identify statistically significant differences in the data in the raw data notebook.

10. Retain all data, analyses, notes etc. in the trial(s) folder with sufficient information to recalculate the data summaries and statistical analyses by another person without verbal input.

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SOP 7.5 Experimental design and data analysis

Reviewed By:	Date:

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SOP#: 7.6 ***Revision Number:*** 1

Submitted by: mrburger ***Date:*** 9-28-2009

Approved by: [signature] ***Date:*** 11/6/09

Title: Data storage during the active life of the project.

Purpose: To assure that all data resulting from the trial(s) is retained and usable.

Scope: All locations conducting trial(s).

Procedures:

1. It is the responsibility of the Field Research Director to see that all raw data, summaries and other items connected with the trial(s) are properly retained prior to sending the data to the Study Director for archiving.

2. The Field Research Director will see that a separate file containing all raw data, summaries, data logs, etc. connected with the trial(s) is maintained during the active life of each project for which he/she is responsible.

3. Dated and signed hard copies of electronic data, computerized summaries etc. should be placed in the file as soon as possible after the information is generated.

4. All notebooks, data sheets, summaries etc. should be clearly marked with the name of the project, project identification number, dates generated, name of investigator and other information that may be needed to understand the data and its source.

5. Computer software or on line programs such as SAS used in the trial(s) should be noted in the raw data notebook and information on the title, source, revision or other identifying information should be recorded and the data maintained and updated as needed and filed in the trial(s) folder.

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SOP 7.6 Data storage during the life of the project

Reviewed By:	Date:

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Submitted by: mrburger ***Date:*** 2/20/2013

Approved by: [signature] ***Date:*** 3/19/13

Title: Sample Collection, identification, and records

Purpose: To assure proper collection and identification of residue samples

Scope: At locations where trial(s) are conducted to obtain residue samples.

Procedures:

1. Consult the study protocol to establish specific dates and method for the collection of samples. If these dates are based on uncontrolled events (fruit size, spray applications etc.) then tentative dates should be established and refined as necessary. The study Director and Quality Assurance Officer should be kept informed when the dates are changed.

2. Representative samples of the crop in each plot must be taken by a recognized procedure. Follow the protocol or record in the data book the procedure used to ensure a representative sample.

3. Consult the study protocol to determine sample size and special instructions for the commodity.

4. Sample each replicate individually beginning with the untreated plots and working up to the highest dosage. Treatments from each replicate should be individually packaged and labeled.

5. Take special care to do the following in the sample collection process:

   a. Avoid contamination of the field samples with the test substance during the sampling, labeling, storage and shipping processes.

   b. Avoid taking diseased or undersized crop parts.

   c. Take care not to remove surface residues during handling, packing or preparation.

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d. Be certain tools are clean.

e. Do not remove any soil or plant parts or trim the commodity unless it is so specified in the study protocol (leave stem in cherry, outer leaves of lettuce on etc. unless specified otherwise in the protocol).

6. Plastic-lined cloth sampling bags with an identification tag sewn into the bottom stitching are usually provided to GLP operators for sample collection. If these bags have not been provided, a sampling bag suitable to protect the integrity of the sample should be used.

7. Prior to sample collection, obtain a sufficient number of sample bags to collect all the samples with the treatments stored individually by individual replicates and a separate untreated check sample as large as a single treatment combined over the replicates.

8. Before entering the field, fill in the label attached to the bottom of the bag and indicate the study ID number and bag number on the tag if more than one is used for the plot sample. If no tag has been provided, then label each sample bag with waterproof ink with the following:

   a. Field ID Number
   b. Crop Fraction
   c. Test Substance
   d. Sample ID
   e. Treatment Number
   f. Harvest Date
   g. Sample Date
   h. Name of Field Research Director
   i. Research Location (Address/Phone #)
   j. Container Number (if more than 1 container for a plot)

9. On a 3 x 5 card or similar material, type or print the following for each sample bag:

   a. Field ID Number
   b. Crop Fraction
   c. Test Substance
   d. Sample ID
   e. Treatment Number
   f. Harvest Date
   g. Sample Date

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h. Name of Field Research Director
i. Research Location (Address/Phone #)
j. Container Number (if more than 1 container for a plot)

10. Place each card in a moisture proof container (i.e. sandwich zip lock bag) and place it inside the sample bag. This is an important step since the label on the outside of the bag may get lost during handling and transit.

11. Sample bags should be burst proof. Cloth laminated plastic bags are preferred.

12. Upon completion of the sampling, GLP shipping form(s) should be completed. The form should be signed and dated by the Field Research Director or person entering the data. Retain the original of the residue sample shipping form in the project file folder until the samples are shipped to the residue laboratory.

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SOP 8.1 Sample collection, identification, and records

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

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SOP#: 8.2 ***Revision Number:*** 2

Submitted by: mrburger ***Date:*** 2/20/2013

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Title: Packing and storage procedures.

Purpose: To assure the integrity of the samples after collection.

Scope: All locations where residue samples are collected.

Procedures:

1. If transport of samples from the field to the freezer requires more than 30 minutes and samples require refrigeration or freezing prior to shipping to the residue laboratory, then containers with ice, dry ice, or blue ice in sufficient quantity to preserve the samples prior to storage should be taken to the site. Otherwise cartons of sufficient size and burst proof strength to hold the samples should be used.

2. Carefully place the sample as it is collected in the sample bag marked for that sample. Make sure that the labeling in the bag is enclosed with the sample.

3. Close the sample bag so as to prevent loss of the sample under reasonable storage, handling, and transportation conditions. Excess air should be expelled from the bag.

4. Place the sample bag in the appropriate container as determined in #1 above. Physically separate treated and nontreated samples.

5. When sample collection is completed, the samples should be transported from the field and placed in storage freezer as soon as possible.

6. Consult the study protocol for the method, temperature, and maximum length of time for storage. If specifications are not given in the protocol use as a rule of thumb for maximum temperature and storage times: -18°C for frozen commodities, 4°C and 14 days for refrigerated commodities and 25°C and 2 days for commodities held at room temperature.

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Reviewed by: [illegible] Date: 4/24/16

Reviewed by: [illegible] Date: 4/24/16

7. Samples identified for post-harvest processing should be processed or shipped to the processor as soon as possible after collection.

8. The storage temperature of the samples should be recorded frequently enough to ensure that the temperature is maintained within the limits as prescribed by the study protocol or within limits to preserve the commodity and the pesticide residues as close to the condition at harvest as is feasible. A continuous temperature recorder will be used to monitor the temperature of the stored samples. Temperatures will be recorded at least once a day. Instrument calibration is described in Appendix B.

9. The refrigerator, freezer, or room where the samples are stored should be under lock and key with limited access and, where possible only be used to store GLP samples.

10. The facility should maintain a log of the items inside indicating the Field ID No., Date samples collected, and Number of sample bags for each project. Removal of the samples prior to shipment should be recorded on the log sheet as to the name of the person removing them, what sampling bags or parts thereof where removed, date removed and date returned.

11. Freezer temperature does not have to be recorded during time when no residue samples are being stored.

12. Station Research Director or his deputy should be responsible in checking the freezers daily.

13. In case of freezer malfunction, samples will be transferred to other available freezer(s). Field Research Director and/or personnel familiar with field studies will be responsible in case of freezer breakdown.

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Reviewed by: JSV Date: 4/29/16

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SOP 8.2 Packing and storage procedures

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1366 W. Altheimer Dr., Fayetteville, AR 72704

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SOP#: 8.3 ***Revision Number:*** 2

Submitted by: mrburger ***Date:*** 2/20/2013

Approved by: ***Date:*** 3/19/13

Title: Sample shipping procedures.

Purpose: To assure that residue samples are removed from storage and shipped to the residue laboratory with a minimum loss of integrity.

Scope: All locations where residue samples are stored.

Procedures:

1. Follow protocol directions. If not specified, as soon as possible after samples are shipped telephone or fax the chemist at the residue laboratory and notify him/her of the Pr. No., shipment dates and method of shipment including the carrier and carrier schedule (if known). International Air freight shipments should be made on Monday or Tuesday, or Wednesday to avoid potential weekend layovers. Shipments during holidays should be avoided.

2. Make arrangements with the carrier for shipment of the samples and determine any special packing instructions etc. that is required to preserve the sample integrity. Note any limits on quantity of dry ice etc. that may be set by the carrier.

3. Use insulated containers of sufficient size and quantity to hold both the residue samples and dry ice if required. If dry ice is required use sufficient quantities to ensure sample integrity. Pack the samples and dry ice just prior to shipment.

4. Place the copy of the residue sample shipping from in a waterproof container and place it in one of the sample shipping containers.

5. Tie or tape lids of each container firmly in place.

6. Provide carrier with the phone number of the residue laboratory receiving the samples and request the carrier to notify the laboratory when the samples

Reviewed by: mrburger Date: 2/20/2013

Reviewed by: [signature] Date: 4/28/15

Reviewed by: [signature] Date: 4/29/16

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SOP 8.3 Sample shipping procedures

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 9.1 ***Revision Number:*** 2

Submitted by: mrburgos ***Date:*** 2/20/2013

Approved by: ***Date:*** 3/19/13

Title: Raw data report forms.

Purpose: To review the forms used to report raw data.

Scope: All locations conducting trial(s)

Procedures:

1. IR-4 Headquarters provides a field data book to each of the cooperators for each trial undertaken. Detailed instructions are provided in the book.
2. All forms should be filled out legibly and mistakes should be crossed with a single line, initialed, dated, and the reason for change given.
3. Blank forms may be photocopied as needed.
4. The reporting forms as provided in the field data book should be filled out as completely as possible at the time the data is collected.
5. Each location should use the forms provided or develop new forms where needed. The new forms should be placed in the field data book.
6. If a particular form or section of the form does not require a response, make a slashed line (diagonal line from the top of the page or field to the bottom). Initial and date on the slashed line and sign and date at the bottom of the page.
7. Number each from (i.e. 1 of X, 2 of X etc.) within each part of the raw data book.
8. If data are recorded elsewhere, other than the raw-data book, date and sign data entries, and include in the data book.

Reviewed by: mrburgos Date: 2/20/2013

Reviewed by: FSV Date: 4/24/15

Reviewed by: [signature] Date: 4/24/16

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SOP 9.1 Raw data report forms

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 9.2 ***Revision Number:*** 1

Submitted by: nrburgos ***Date:*** 9-28-2009

Approved by: [signature] ***Date:*** 11/3/09

Title: Handling completed report forms that transcend two or more trial(s).

Purpose: To explain how report forms can be completed for one trial(s) and serve as raw data for other trial(s).

Scope: All locations conducting trial(s).

Background: Where a Field Research Director is conducting multiple trial(s) during the year, there may be an opportunity to utilize one form for data that pertains to more than one trial(s). Examples may be logs of various types, weather data, and sprayer calibration/pesticide application where the same test substance is used at the same time at the same rates on two or more crops (i.e. preplant herbicide, foliar insecticide). There are provisions within the GLPs for substitution of verified copies for original records. However, the retention of all original raw data is also a requirement. The following procedures are designed to meet the GLP and FIFRA requirements where copies of data are used.

Procedures:

1. Each form that is to be used for data common to more than one trial(s) should contain a notation at the bottom of the form as to the trial(s) that has been designated as the one containing the raw data. This should read: "The original is in IR-4 field data book No. _____."

2. When the form is completed, it should be photocopied. Each copy should contain a notation that this is a true copy. The copy should be signed, dated and placed in the field data books for the other trial(s) that utilize the same data.

Reviewed by: nrburgos Date: 01-06-2012

Reviewed by: [signature] Date: 4/28/15

Reviewed by: [signature] Date: 4/29/16

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SOP 9.2 Handling complete report forms that transcend two or more trial(s)

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 9.3 ***Revision Number:*** 2

Submitted by: ***Date:*** 10/18/16

Approved by: ***Date:*** 10/27/16

Title: Disposition of raw data from the trial(s).

Purpose: To assure the raw data are sent to the archives.

Scope: All locations conducting trial(s) where the original raw data is not archived at IR-4 Headquarters.

Procedures:

1. The Field Research Director should make an exact copy of the original raw data including completed field data books, correspondence, protocol deviation forms, logs, and any accompanying documentation such as weather charts etc. The original raw data and true copies of site specific documents from the trial(s) should be forwarded by the Field Research Director to the Regional Field Coordinator. These data should then be submitted to the Study Director prior to close of the study.

2. The Regional Field Coordinator will review the documents received in #1 for completeness and accuracy of reporting. The Field Coordinator will follow up to obtain any missing data or correct deficiencies. The raw-data will be forwarded to the Quality Assurance Unit. After Quality Assurance review, the raw-data book will be sent to the Study Director.

3. The Field Research Director will place the true copy of the raw data from #1 in the trial(s) folder. The completed trial(s) folder will be retained at the field facility.

4. Field Data Books of terminated or cancelled trial(s) will also be photocopied prior to forwarding to the Field Coordinator. The photocopied documents will be retained at the field facility.

SOP 9.3 Disposition of raw data from the trial(s).

Reviewed By:	Date:

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Effective Date:

SOP#: 9.4 ***Revision Number:*** 1

Submitted by: nrburgos ***Date:*** 9-28-2009

Approved by: ***Date:*** 11/3/09

Title: Retention of Data.

Purpose: To assure that each location conducting trial(s) retains all data and documents connected with the trial(s) until the study is completed and the Study Director indicates that all data has been archived

Scope: All locations conducting trial(s).

Procedures:

1. The Field Research Director will see that the trial(s) file containing the raw data, originals or true copies of reports, logs, etc. are submitted to the Study Director for archiving and a true copy and original site specific documents retained at the field facility to assure that raw data is not lost.

2. The Field Research Director should maintain a file and items placed in the files should be identified as to the trial(s) they pertain to or the dates when the items were in use. The following is a list of information that should be retained:

   a. True copies of raw data including pest counts, yield, phytotoxicity, weather records, logs of instrument calibration and test substance receipt, distribution, etc.

   b. Copies of summaries including calculations and copies of information used from referenced sources.

   c. Copies of reports and correspondence related to the conduct of the trial(s).

   d. Copies of completed forms used during the trial(s) and for summaries of the trial(s) data.

Reviewed by: nrburgos Date: 01-06-2012

Reviewed by: [illegible] Date: 4/28/15

Reviewed by: [illegible] Date: 4/29/16

e. Historical Standard Operating Procedures.

f. Master schedule of all FLP trial(s) conducted at the facility.

g. Organizational charts, training records, job descriptions and CVs (current, out of date, or former employees).

h. Copies of computer software and/or information sufficient to identify outdated computer software or programs that were used in trial(s) so that the data developed from these programs can be repeated if necessary in the re-construction of the trial(s).

i. Any samples as required by the study protocol or the Study Director.

Reviewed by: nrburger Date: 01-06-2012

Reviewed by: [signature] Date: 1/29/16

Reviewed by: _____ Date: _____

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SOP 9.4 Retention of data

Reviewed By:	Date:

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1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 10.1 ***Revision Number:*** 2

Submitted by: mrburger ***Date:*** 2/20/2013

Approved by: ***Date:*** 3/19/13

Title: Disposal of pesticides.

Purpose: To assure that pesticide concentrate, spray solutions, rinse water, and containers are disposed of with minimal environmental contamination and in accordance with federal, state and local regulation.

Scope: All locations conducting field trial(s).

Procedures:

1. Where institutional policies and guidelines do not exist, the following procedures should be followed.

2. Disposal of pesticide concentrate and/or containers.

   a. Follow procedures in the protocol. Generally, containers cannot be disposed of under GLP until the study is completed. If it is necessary to dispose of the container prior to the end of the trial(s), the Study Director should be consulted.

   b. If requested, the pesticide concentrate and containers should be returned to the registrant or manufacturer. Transportation must be according to all Federal, State, and local laws and regulations.

   c. Once notified by Study Director follow label directions for use or disposal of the pesticide if option 2.b is not available.

   d. If no label directions exist for disposal, arrangements should be made with a licensed waste disposal firm for pickup disposal of the pesticide and/or the empty containers.

3. Disposal of pesticide rinse water, unused spray solutions and other dilute pesticide waste.

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Reviewed by: [illegible] Date: 4/28/15

Reviewed by: [illegible] Date: 4/29/16

a. Check State and local laws and regulations to determine any procedure that may exist for proper disposal of pesticide solutions.

b. Dispose of the dilute pesticide waste in the field by adding to the spray tank and spraying on an overplanting of the crop or fallow land where this procedure does not violate any laws or regulations. All pesticide solutions should be mixed with the intent of limiting the problem of excess solutions.

Reviewed by: mrburger Date: 2/20/2013

Reviewed by: [illegible] Date: 4/29/16

Reviewed by: _____ Date: _____

SOP 10.1 Disposal of pesticides

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 11.1 ***Revision Number:*** 2

Submitted by: mrburger ***Date:*** 2/20/2013

Approved by: [signature] ***Date:*** 3/19/13

Title: Safety and health procedures in handling pesticides.

Purpose: To assure that personnel handling pesticides are doing so in a safe manner and if an accident occurs, danger is minimized.

Scope: All locations conducting field trial(s) (including greenhouse).

Procedures:

1. Where institutional policies and guidelines do not exist, the following procedures should be followed.

2. A supply of soap/detergent and water should be readily accessible for cleanup in the case of an emergency.

3. All personal protective equipment and clothing as required by the label or written SOPs should be worn in the handling of pesticides for storage, mixing and application. Emergency personal protective equipment (e.g. coveralls, respirators) must be available when handling hazardous pesticides such as restricted use pesticides.

4. Appropriate weather conditions for the application of the pesticide should prevail otherwise the pesticide applications should be delayed.

5. All precautions should be taken to avoid applying pesticides to or near sensitive areas or where drift to these areas may occur.

6. Prior to application, the equipment should be checked to make sure there are no leaks in the pump or tanks, hose connections, or worn spots in the hoses. All spray tanks should have lids. Filling the spray tank should be done carefully so it does not run over. All machinery should be shut down if necessary to adjust or repair any moving parts. Never blow out nozzles, hoses, or clogged lines by mouth. Inspect all pesticide containers for leaks, tears, or holes before handling. Do not mishandle or abuse containers and

Reviewed by: mrburger Date: 2/20/2013

Reviewed by: [signature] Date: 4/24/15

Reviewed by: [signature] Date: 4/24/16

thereby create hazard and/or emergencies by carelessness.

7. All pesticides should be mixed in quantities which are adequate for the job to avoid excess dilute solutions after the job is completed. Cleanup procedures should be established whereby excess sprays can be safely discarded preferably by spraying the material on an overplanting of the commodity or fallow land. The equipment should be washed off both inside and outside and all pesticides and pesticide containers should be returned to a storage area immediately after use.

8. At the end of the working day employees who have applies or mixed pesticides should take a shower and change clothes. Clothing should be washed after the end of the day. In no case should the same clothing, including shoes, be worn on a second day after it has been worn during a pesticide application.

9. A pesticide-treated area, greenhouse, or field should not be entered until the re-entry time on the pesticide label has elapsed or proper protective equipment is worn as specified on the pesticide label.

10. Do not permit unauthorized persons in the pesticides storage area.

11. Do not store pesticides next to food, feed, seed, fertilizer, or other articles intended for consumption or use by humans or animals. Do not store food, beverages, tobacco, clothing, eating utensils, or smoking equipment in any area where pesticides are presents.

12. Do not drink, eat food, smoke, apply cosmetics, or use tobacco in areas where pesticides are present.

13. Do not put fingers in mouth or rub eyes while working with pesticides.

14. Wash hand thoroughly with soap and water immediately after handling pesticides and, especially before eating, smoking, or using the toilet.

15. Pesticide storage areas should be properly ventilated.

Reviewed by: MRBurger Date: 2/20/2013

Reviewed by: [illegible] Date: 4/29/16

Reviewed by: _____ Date: _____

SOP 11.1 Safety and health procedures in handling pesticides

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 12.1 ***Revision Number:*** 1

Submitted by: jrburgos ***Date:*** 9-28-2009

Approved by: ***Date:*** 11/3/09

Title: Procedures to follow prior to an EPA inspection.

Purpose: To provide guidance to study personnel in responding to a request for an EPA audit or review by Office of Compliance Monitoring (OCM).

Scope: All locations conducting field trial(s).

Procedures:

1. Notify the Study Director, Quality Assurance Officer, and other interested personnel of the pending audit or review as soon as possible.

2. Arrange to have available the personnel who may be associated with the trial(s) or facilities audit.

3. Make sure someone who is authorized to accept the Notice of Inspection is going to be present at the start and finish of the inspection.

4. Prepare trial(s) and/or facilities personnel for the inspection.

    a. Review position descriptions with technical personnel so they understand and can explain their role in the trial(s).

    b. Discuss possible questions that may likely come up about the trial(s) or facility and make sure everyone understands what to expect.

    c. Request personnel to answer the questions only to the extent needed and not to provide extraneous information. Do not volunteer information; keep answers direct and to the point.

    d. Make certain that technical personnel know the safety precautions needed for the work area.

Reviewed by: jrburgos Date: 01-06-2012

Reviewed by: [illegible] Date: 4/28/15

Reviewed by: [illegible] Date: 4/29/16

e. Be certain that all documents pertaining to the trial(s)/facilities inspection are available. This would include:

1) Master schedules for both the field research director, Quality Assurance Research Officer and possibly their counterparts at the region and IR-4 headquarters.

2) Study Protocol and Standard Operating Procedures

3) Raw data, correspondence and logs.

4) Training records, CVs, job descriptions, etc. of personnel assigned to the trial(s).

5) Appropriate chain of custody documents for samples and freezer logs and storage temperature documentation.

6) Documentation of the characterization of the test substance, receipt, and handling, and storage records.

7) Calibration logs on equipment such as balances and application equipment.

8) Archives or storage of records and logs indicating removal and replacement of documents.

5. Have accessible organizational charts, a map of the facility and any information specific to the facility or area that will make the inspection go smoother.

Reviewed by: JRBurger Date: 01-06-2012

Reviewed by: [illegible] Date: 4/29/16

Reviewed by: _____ Date: _____

SOP 12.1 Procedures to follow prior to an EPA inspection

Reviewed By: Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 12.2 ***Revision Number:*** 1

Submitted by: mrburgos ***Date:*** 9-28-2009

Approved by: ***Date:*** 11/3/09

Title: Procedures to follow during an EPA inspection.

Purpose: To provide guidance to study personnel in responding to a request for an EPA audit or review by OCM.

Scope: All locations conducting field trial(s).

Procedures:

1. Greet the inspection team and follow any institutional procedures for signing in. Provide name tags and escort the entire group to a conference or meeting room.
2. At the opening of the conference ask the lead inspector for his credentials and for any opening statements.
3. Introduce the facility personnel present and state their function in the facility or trial(s). Identify the person responsible who will accept the Notice of Inspection.
4. Distribute organization charts, map of the facility and any other information previously prepared to make the inspection go smoother.
5. Ask the lead inspector for his/her agenda for the inspection as well as a list, if possible, of personnel for interview during the inspection.
6. Explain any housekeeping rules such as the use of safety equipment in work areas etc. to avoid any possible misunderstandings.
7. Proceed with the inspection.
   a. Provide documents requested and provide explanations needed.
   b. Keep notes of observations and of all interviews.
   c. Keep management informed of the progress of the inspection and the findings.

Reviewed by: mrburgos Date: 01-06-2012

Reviewed by: [illegible] Date: 4/28/15

Reviewed by: [illegible] Date: 4/29/16

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SOP 12.2 Procedures to follow during an EPA inspection

Reviewed By:	Date:

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1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: 12.3 ***Revision Number:*** 1

Submitted by: mrburgos ***Date:*** 9-28-2009

Approved by: ***Date:*** 11/3/09

Title: Procedures to follow after the EPA inspection.

Purpose: To provide guidance to study personnel in responding to a request for an EPA audit or review by OCM.

Scope: All locations conducting field trial(s).

Procedures:

1. Make sure that all personnel involved in the inspection are present for the closeout conference.
2. Clarify any discrepancies brought up during the exit interview and offer supporting documentation for clarification.
3. If you have corrected any problems during the inspection, make sure the corrections are so noted in the inspector's logbook.
4. Have someone present during the close-out take accurate notes.
5. Be sure you obtain a copy of the list of documents or other materials that may be taken as exhibits by the inspectors.
6. Debrief management, staff, and the Study Director with an explanation of any problems found.
7. Assign responsibility for preparation of possible solutions to problems and obtain time estimates for implementation.
8. Prepare any replies to the regulatory agency as necessary within a timely basis and keep interested parties such as management and the Study Director informed.

Reviewed by: mrburgos Date: 01-06-2012

Reviewed by: [illegible] Date: 4/28/14

Reviewed by: [illegible] Date: 5/2/16

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SOP 12.3 Procedures to follow after the EPA inspection

Reviewed By:	Date:

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Effective Date:

SOP#: 13.1 ***Revision Number:*** 1

Submitted by: prburgos ***Date:*** 9-28-2009

Approved by: [signature] ***Date:*** 11/3/09

Title: Removal and Retrieval of SOPs.

Purpose: To document the date when the old SOPs are removed from the system and replaced by the new or revised SOP for historical reference.

Scope: For use in retrieving archived old SOP copies and inserting new ones in the SOP book.

Procedures:

1. Assign personnel to do the documentation.
2. Document the removal of old (revised) SOPs from the system. Retain a copy of the old SOP for historical reference.
3. Document when the new or revised SOPs were inserted in the SOP books.
4. Send a copy of the new and old SOP to HQ. The old SOP would be "archived" at HQ with a copy kept on site for reference.
5. Generate a sign-off log. Any activity will be documented on the sign off log.

Reviewed by: prburgos Date: 01-06-2012

Reviewed by: [illegible] Date: 4/26/12

Reviewed by: [illegible] Date: 5/2/12

SOP 13.1 Removal and retrieval of SOPs

Reviewed By:	Date:

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Appendix A

EFRF 10-25-16

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Drive, Fayetteville, AR 72704

Effective Date:

SOP#: A.1 ***Revision Number:*** 2

Submitted by: Mrburger ***Date:*** 9-28-2009

Approved by: ***Date:*** 11/3/09

Title: Handling of Test Substance.

Purpose: To outline the procedures required in the receipt, removal, use, return, and transfer of the test control and reference substances.

Scope: All locations where pesticides are used. For the purposes of this SOP, test substance also applies to control and reference substances.

Procedures:

1. When the test substance is received, record the lot/batch number, source, quantity, date of receipt, condition of the material, and storage location in the raw data notebook. Each entry should be initialed and dated. The protocol number(s) may be recorded on the container.

2. The test substance should be stored in the pesticide storage facility until it is needed for use in the trial(s). When a test substance is removed or transferred to a different location for a period of time, record when it is returned to the facility and the purpose for which it is removed.

3. The storage temperatures of the test substance will be collected by a continuous temperature recorder and should be recorded in the raw data. Hard copy from the recording instrument serves as original data. Calibration of instruments is described in Appendix B.

4. When a test substance is used, the date, amount used, purpose of use, and initial/signature of the user should be recorded in the raw data notebook.

5. All test substance containers must be stored until notification by the study director that the containers may be discarded, unless returned to the registrant or sponsor.

Reviewed by: Mrburger Date: 01-06-2012

Reviewed by: ~~JSV~~ Date: 4/28/15

Reviewed by: ~~JSV~~ Date: 5/2/16

SOP A.1 Handling of test substance.

Reviewed By:

Reviewed By:

 EE RF 10-25-16

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Appendix B

 EE RF 10-25-16

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP#: B.1 ***Revision Number:*** 2

Submitted by: ***Date:*** 5/29/15

Approved by: ***Date:*** 6/30/15

Title: Calibration and standardization of temperature recorders.

Purpose: This document is for use by IR-4 personnel to define techniques used for calibrating continuous temperature recorders

Scope: The SOP describes the proper procedures used by IR-4 personnel to ensure that accurate calibration of continuous temperature recorders.

Procedures:

1. Units will be appropriately maintained. If the unit fails, it will be serviced by a technician. The only exception is the changing of batteries and programming.

2. All problems encountered, calibration, and maintenance will be documented in the appropriate log. In addition, hard copies will be treated as original, raw data.

3. All units will be calibrated/ standardized prior to use each year. According to the following procedure:

    a. Two continuous temperature recording instruments and a calibrated thermometer will be set side by side in the environment the recorders will be used.

        1. Recorders used in freezers will be calibrated at temperatures of approximately -20°C.

        2. Recorders used in chemical storage will be calibrated at temperatures bracketing the desired temperature of the chemical storage facility.

    b. Observe and record the temperature values of the calibrated thermometer at times when the continuous recording instruments will be logging data and compare the three readings.

Reviewed by: _____ Date: 5/2/16

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

c. The difference in temperature observed by these recording devices must not be greater than 2°C.

d. If the temperature difference is greater than 2°C between any two instruments, then determine which is incorrect and take appropriate action. If one of the continuous recording instruments is involved, then replace or have serviced by a technician. Replace the calibrated thermometer as needed or at least once every 3 years.

e. Since two continuous recording instruments are being used, there will always be a backup unit in case of failure.

f. Calibrations and/or true copies of originals will be inserted in the appropriate sections of the Field Study Notebooks.

Reviewed by: _____ Date: 5/2/16

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

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SOP B.1 Calibration and standardization of temperature recorders.

Reviewed By: Date:

 EE RS 10-25-16

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Appendix C

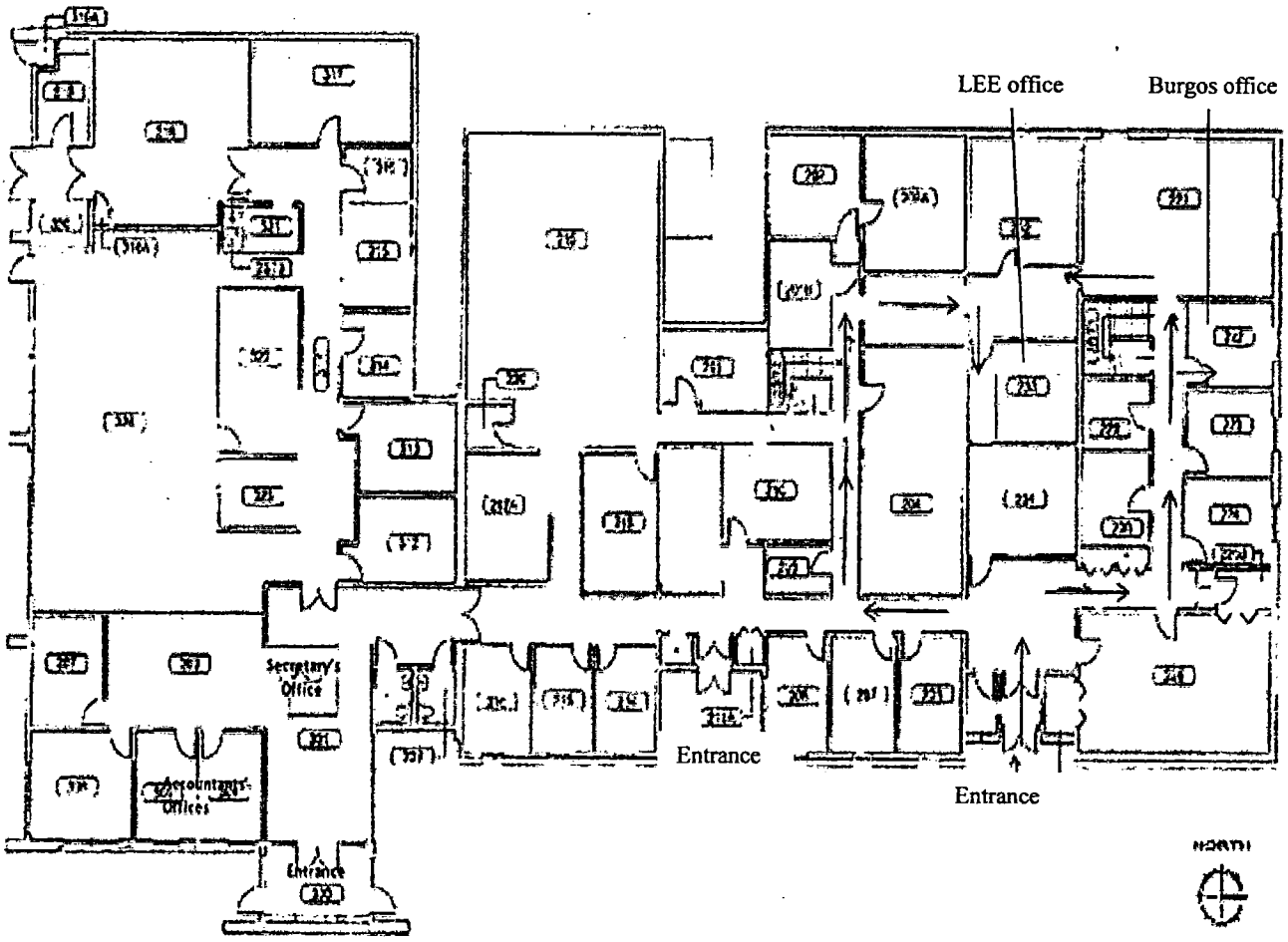
University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP C.1 Building 1: Altheimer Laboratory ***Revision Number:*** 3

Submitted by: ***Date:*** 5/29/15

Approved by: ***Date:*** 6/30/15



Altheimer Lab

Reviewed by: _____ Date: 5/2/16

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

SOP C.1 Altheimer Laboratory.

Reviewed By:	Date:

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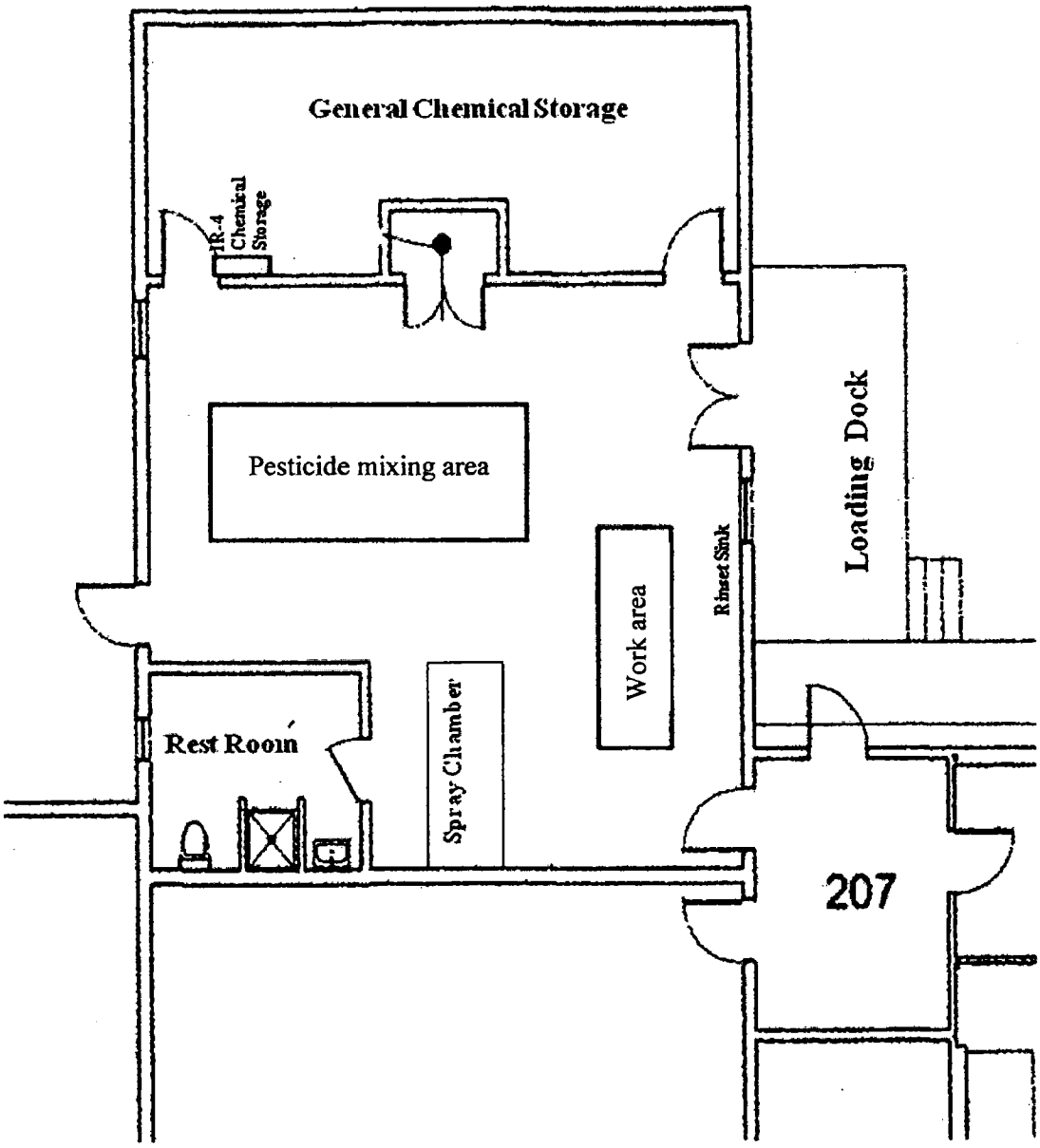
1366 W. Altheimer Dr., Fayetteville, AR 72704

Effective Date:

SOP C.2 Building 2: Chemical Storage – Level 2 ***Revision Number:*** 2

Submitted by: ***Date:***

Approved by: ***Date:***



Reviewed by: _____ Date: 4/26/15

Reviewed by: _____ Date: 5/2/16

Reviewed by: _____ Date: _____

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SOP C1. Building 2: Chemical Storage – Level 2.

Reviewed By:	Date:

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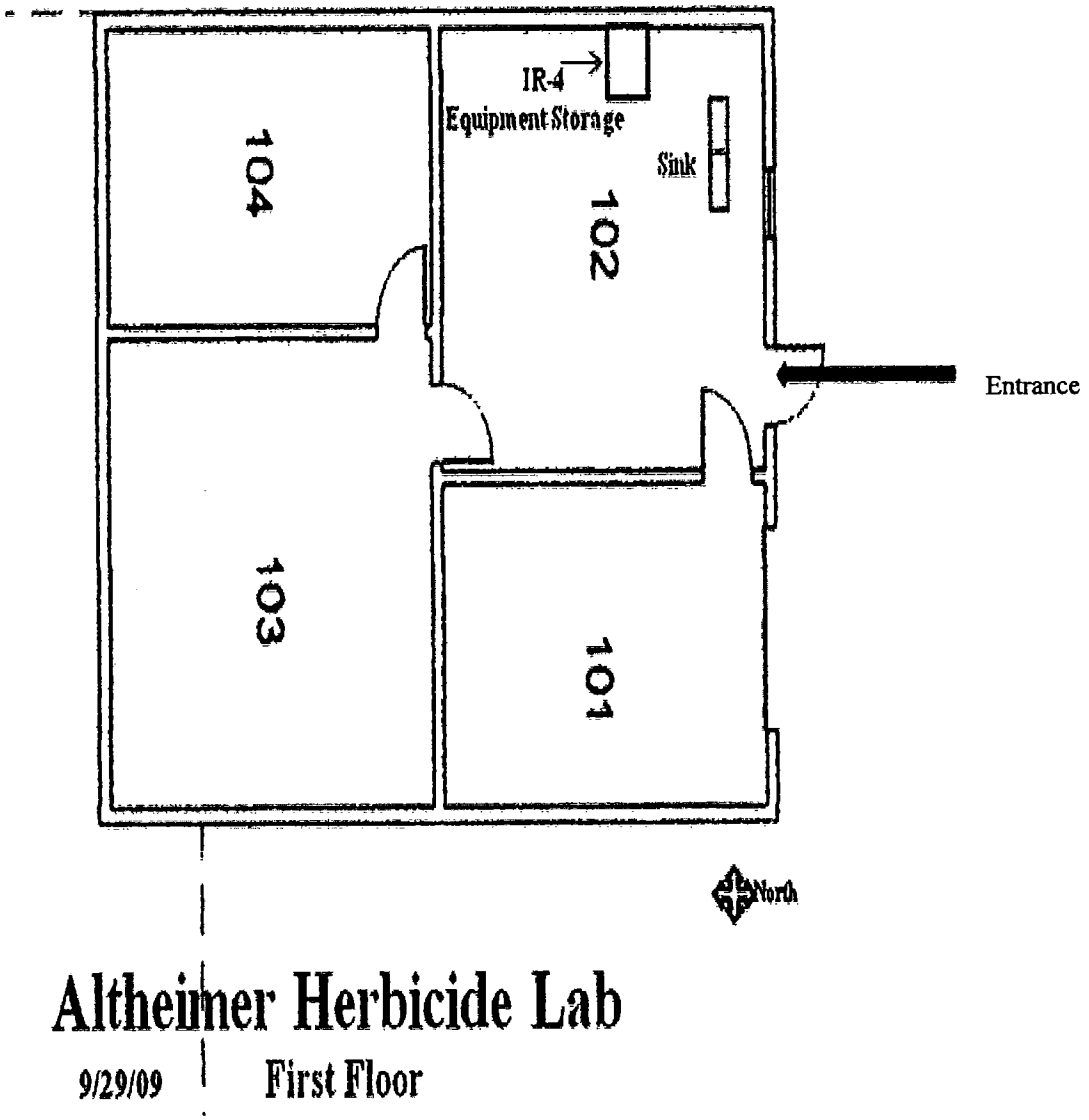
Effective Date:

SOP C.3 Building 2: Chemical Storage – Level 1 ***Revision Number:*** *2*

Submitted by: ***Date:***

Approved by: ***Date:***



Reviewed by: _____ Date: 4/28/15

Reviewed by: _____ Date: 5/2/16

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SOP C.3 Building 2: Chemical Storage – Level 1.

Reviewed By:	Date:

University of Arkansas, Dept. of Crop, Soil, and Environmental Sciences
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Effective Date:

SOP C.4 Building 3: Vegetable Research Station ***Revision Number:*** 3

Submitted by: ***Date:*** 5-/29/15

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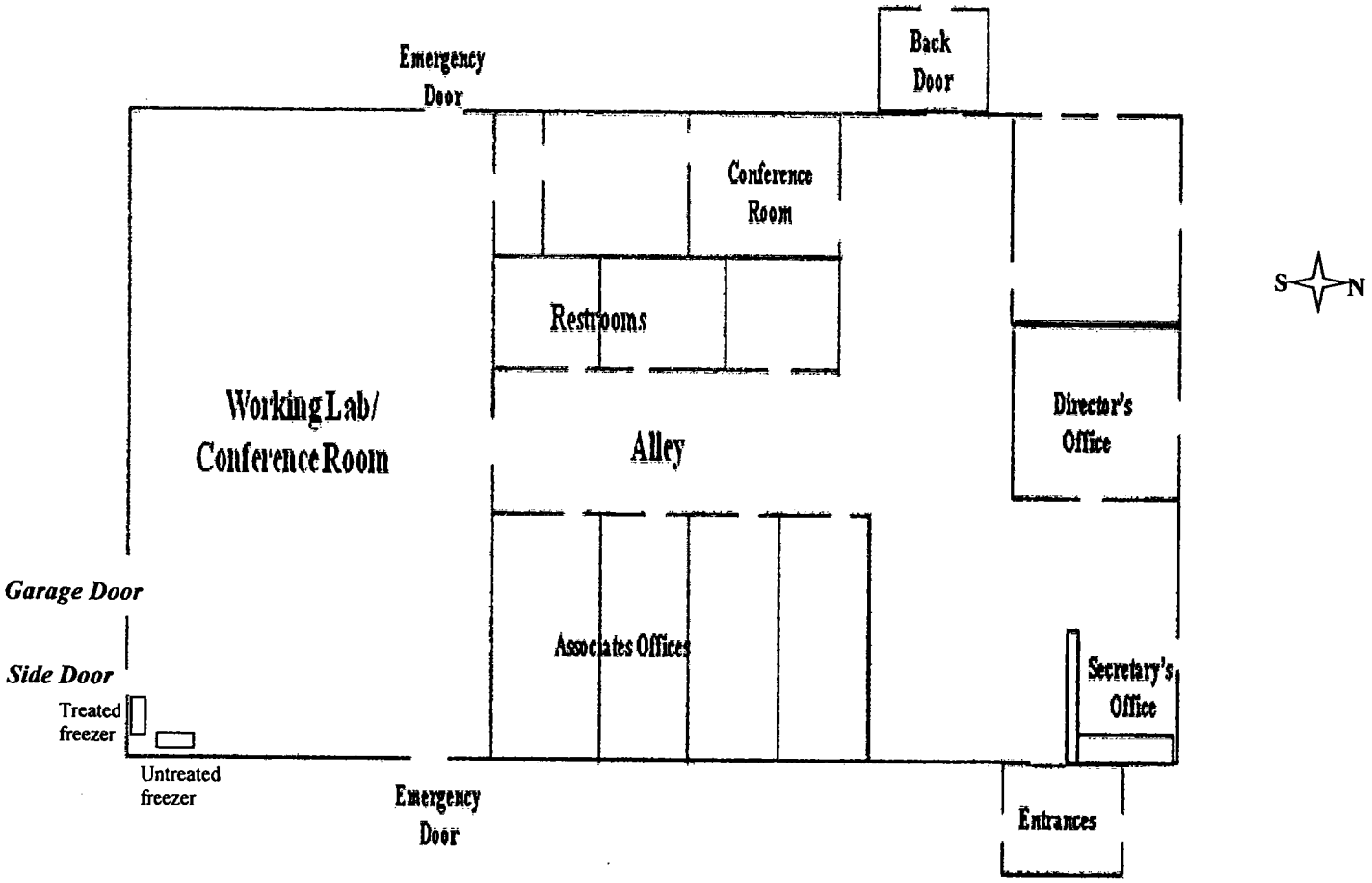

University of Arkansas Vegetable Research Station

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Kibler, Arkansas **3/02/15**

Reviewed by: _____ Date: 5/2/16

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