

STANDARD OPERATING PROCEDURE
Procedure for Sampling Pesticide Application Equipment

KEY WORDS

Bailer, Mityvac[®], application, tank mix, percent active ingredient (AI), tank sampling

APPROVALS

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1.0 INTRODUCTION

Analyses of tank samples determine the percentage of active ingredient (AI) and trace contaminants in the application mix. The amount of AI applied per unit area can be calculated using the percentage of AI in the tank sample and the rate of application per unit area. This application rate can then be compared to the label rate. Analysis of a tank sample is an accurate test of mixer-loader personnel and equipment operation.

Selection of sampling devices, techniques and sample containers will vary depending on chemical and application equipment. All tank sampling should be considered potentially hazardous and be performed with extreme caution according to the pesticide label, the [DPR Field Health and Safety Guide](#), and safety procedures outlined in this [SOP](#). Collect samples at the spray tip nozzle (point of delivery) or directly from the tank when a nozzle sample is not practical.

1.1 Purpose

This SOP provides technical guidance for collecting pesticide application tank samples. Site conditions, equipment, and the limitations imposed by safety procedures will dictate specific methods to be used.

1.2 Definitions

- 1.2.1 **Active Ingredient (AI)**- Chemical in a pesticide formulation that is biologically active and usually the pure or technical form. A given formulation may have one or more active ingredients.
- 1.2.2 **Mixing-Loading Equipment**- Equipment that mixes and loads pesticide into a ground or aerial application system. Some mixer-loaders are closed systems to prevent human exposure.

2.0 MATERIALS

The following are supplies commonly used for tank sampling. Other materials can be used if they conform to the requirements of this SOP.

- 2.1 Personal safety equipment as per label: pesticide resistant coveralls, gloves, boots and eye protection.
- 2.2 Sample containers: glass, polypropylene or polycarbonate bottles with sealable lids and labeled with sample numbers.

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- 2.3 Cleanup supplies: soap and water, garbage bags, alcohol, disposable towels.
- 2.4 Plastic tarp or large plastic bag to place on the ground for spill protection.
- 2.5 Appropriate size disposable plastic bags to cover the bottle while sampling, a latex glove can also be used.
- 2.6 Hand operated vacuum pump (Mityvac[®]) or siphon pump.
- 2.7 Tubing and bottles for vacuum pump sampling.
- 2.8 Bailer (disposable).
- 2.9 Aluminum foil.
- 2.10 Canning jars with bands and seals, stainless steel bucket.
- 2.11 Sealable plastic bags to place each sample bottle in after sampling.
- 2.12 Ice chest or Expanded Polystyrene (EPS) container to store and transport samples.
- 2.13 Wet ice or dry ice.
- 2.14 Chain of Custody (COC).
- 2.15 Pesticide Label.

3.0 PROCEDURES

NOTE: Consult the Health and Safety Officer, Randy Segawa, if the product to be sampled is a category II or higher.

3.1 General Preparation for tank sampling

- 3.1.1 Survey the area and apparatus to be sampled and decide the preferred way to collect the tank sample. Collect a “well mixed” sample with the tank agitators running to minimize separation.
- 3.1.2 Cover each sample container with a plastic bag to prevent contaminating the outside surface of the container. Place the sample container on the plastic tarp or large plastic bag near the tank to be sampled.
- 3.1.3 Sampling should be performed in teams of two people. Designate one person to place the tarp on the ground and prepare the sample container to be filled by the pesticide applicator. Once the

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container is filled this person replaces the cap and removes the plastic cover. The other person then holds open a new sealable plastic bag and the first person places the container in the bag. The second person repeats this step so that the sample container is triple bagged, then placed in the ice chest

- 3.1.4 Generally a 3/4 filled container is a sufficient sample size. Check with the laboratory to verify the volume needed for analysis prior to collecting the sample. This helps to minimize hazardous waste disposal at the laboratory.

3.2 Tank sampling from a wand or spray nozzle

- 3.2.1 Prepare the bottles, and plan the sampling process as described in section [3.1](#).
- 3.2.2 Prior to collecting the sample, instruct the operator to circulate mixture through the hose and spray nozzle while directing the material back into the tank. Circulating the material in this manner for 3 to 5 minutes should assure a well-mixed sample. In addition to this step or if circulating the material is not possible, sample after some of the mix has been applied.
- 3.2.3 When possible, always collect the sample while agitator or recirculating pumps are turned on.
- 3.2.4 Place the covered sample container on the ground. The operator can then reduce the line pressure and direct the flow into the sample container.
- 3.2.5 Follow steps in [3.8](#) for packing and transporting the sample.

3.3 Using a bailer to collect a sample directly from a tank

- 3.3.1 Prepare the bottles, and plan the sampling process as described in section [3.1](#).
- 3.3.2 Operate the agitator or recirculation pump 3 to 5 minutes to assure a well-mixed sample.

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- 3.3.3 Instruct the operator to turn off agitators. Immediately lower the bailer (Figure 3) slowly into the tank.
 - 3.3.4 Allow the bailer to fill and retrieve it from the tank.
 - 3.3.5 Lower the bailer to the bottom of a clean stainless steel bucket or into a jar larger than the bailer itself to release the ball and liquid. Carefully transfer the contents of the bucket or jar into the labeled sample bottles through a stainless steel or disposable plastic funnel.
 - 3.3.6 Follow steps in [3.8](#) for packing and transporting the sample.
- 3.4 Using a hand operated vacuum pump (Mityvac[®]) or siphon pump to collect a sample directly from a tank.**
- 3.4.1 Prepare the bottles, and plan the sampling process as described in section [3.1](#).
 - 3.4.2 The Mityvac[®] (Figure 2) attached to a vented rubber stopper fitted to a sample bottle creates a partial vacuum to draw the mix into the sample bottle. Available hand operated siphon pumps work well in some cases but cannot be cleaned and reused.
 - 3.4.3 Attach a length of Tygon[®] tubing from the hand pump to the sample bottle and a length of Teflon[®] tubing from the sample bottle to the tank.
 - 3.4.4 Pump the handle to create a partial vacuum and draw the tank mix into the sample bottle.
 - 3.4.5 If using a “collection only” bottle, remove the rubber stopper from the collection bottle and transfer the sample to a labeled sample container.
 - 3.4.6 Dispose of the contaminated tubing and/or jar. If the chemical came in contact with the Mityvac[®] it must be washed and rinsed with alcohol.
 - 3.4.7 Follow steps in [3.8](#) for packing and transporting the sample.

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3.5 To sample from an aircraft, boom or truck with multiple spray nozzles

- 3.5.1 Prepare the bottles, and plan the sampling process as described in section [3.1](#).
- 3.5.2 Use one quart canning jars with bands and lids or aluminum foil in place of the seals. Make a small hole in the lid or foil to insert the spray nozzle to minimize splashing.
- 3.5.3 A sample jar should be placed under each nozzle and a 5-gallon bucket is held in place under each sample jar to contain excess mixture. The process requires a sampler staff member at each nozzle position.
- 3.5.4 Hold the bottle under the nozzle and direct the operator to activate the spray pump when all sampler staff are ready. When the bottles are sufficiently filled, instruct the operator to turn off the spray pump.
- 3.5.5 Combine the sub-samples in a stainless steel bucket and pour a well-mixed aliquot into a labeled sample container.
- 3.5.6 Follow steps in [3.8](#) for packing and transporting the sample.

3.6 Granular chemical collection

- 3.6.1 Prepare the bottles, and plan the sampling process as described in section [3.1](#).
- 3.6.2 Use a new unused jar to scoop out the desired amount of sample. Transfer the sample to a labeled sample container.
- 3.6.3 Cap and store on dry ice in an EPS.
- 3.6.4 Follow steps in [3.8](#) for packing and transporting the sample.

3.7 Methods not covered by this SOP

If none of these methods are suitable, great attention to safety and preservation of sample integrity will be necessary for any new method.

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3.8 Packing and transporting sample

- 3.8.1 Cap all containers tightly. Remove the protective plastic bags.
- 3.8.2 Triple-bag the sample in sealable plastic bags. Fill out the appropriate COC according to [QAQC006.01](#).
- 3.8.3 Package the sample in an ice chest with wet ice or an EPS with dry ice as called for in the sections above. Ice chests designated for tank samples should never be used to store or ship other environmental samples.
- 3.8.4 Whenever possible, obtain a copy or keep a clean pesticide label from the application.

4.0 CLEAN UP

It is best to have the applicator dispose of the used sampling supplies such as Tyvec[®] suits, gloves, and plastic bags, generated during the sampling process. If you cannot dispose of used sampling supplies on site, then double bag them so they can be safely transported. It is always best to choose disposable supplies for tank sampling. Never reuse sample containers.

5.0 SAFETY

5.1 Hazards

- 5.1.1 Hazards associated with tank sampling may cause bodily injury, illness or death to the worker. Failure to recognize potential hazards is the cause of most accidents. It is imperative that the safety of the sampler is of utmost concern when tank sampling. All sampling materials should be considered potentially hazardous and the sampler(s) must follow U.S. EPA, OSHA, pesticide label requirements and provisions of the [DPR Field Health and Safety Guide](#).
- 5.1.2 Hazards include ambient air, liquids and solids that can be toxic, flammable, asphyxiating or corrosive to the body as well as to equipment.

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- 5.1.3 Use extreme caution if sampling requires climbing on or around a tank, a narrow space or a ladder while wearing protective clothing and carrying sampling equipment.
- 5.1.4 Keep a copy of the pesticide label or MSDS information and know the intended percent concentration of the chemical.
- 5.1.5 Communication between all of the samplers and the pesticide operators is very important to prevent unnoticed hazards or injury.

6.0 REPORTING REQUIREMENTS

An application record should be filled out on site to note important information about the pesticide application (Attachment 1).

Figure 1. 500 ml polypropylene bottle with a glove as a cover.



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Figure 2. Mityvac[®] with tube attached to a vented rubber stopper fitted to a sample bottle and second tube placed in a pesticide tank (size and type of tank vary).



Figure 3. Bailer diagram and photo.

