Sample Preparation, Storage, and Disposal

1. Scope:

This document provides a standard procedure for the preparation, storage, and disposal of fertilizer samples.

2. Safety:

The grinders are dangerous. Read the manual and follow all safety precautions. Do not use without proper training. Debris can be propelled out of the grinder during grinding. Be sure a shield is in place and always wear proper protective equipment including safety glasses, dust mask, gloves, lab coat, and hearing protection. Long hair should be tied back and no items such as long necklaces or badge lanyards shall be worn when grinding.

3. Equipment (equivalents are acceptable):

3.1. Large capacity hammer mill (Jacobson P-88B)
3.2. Centrifugal mill (Retsch ZM 200)
3.3. Drying oven (VWR 1390 FM)
3.4. Refrigerator
3.5. High-capacity balance capable of weighing up to 150 pounds
3.6. Shop vac type vacuum cleaner
3.7. 16-ounce glass jars
3.8. 500mL HDPE bottle
3.9. Utility pans

4. Sample Preparation:

For all samples, download the corresponding sample sheet submitted by the inspector via ExtraView. See section 6 for gypsum samples, section 7 samples with a request for pesticide analysis, and section 8 for samples with split requests.

4.1. Liquid Samples
Prepare a label containing the lab number, inspector number, and date prepared. For small containers, place label directly on the sample. For large containers, mix the sample thoroughly and pour into a labeled 500mL bottle and place the sample in the storage area. Samples that may spoil or ferment shall be stored in a refrigerator.

4.2. Solid Samples **(EXCEPT GYPSUM)**
4.2.1. Label a 16 oz. glass jar with the lab number, inspector number, and date prepared.

4.2.2. If the sample is moist or contains both solid and liquid portions, it must be dried before it is ground. Follow the instructions in section 5 before proceeding with step 4.2.3.

4.2.3. Place the entire sample in a large plastic bag and mix thoroughly for ~1 minute. If the sample is too large to mix in a plastic bag, mix it in its original container.

4.2.4. Grind the sample (or a representative portion). For dry, hard samples use a 0.5mm screen. For compost and similar materials, use a larger screen such as a 0.75mm or 1.0mm screen. If the screen becomes plugged during grinding, use the next larger screen. If the sample is oily or otherwise not amenable to grinding, homogenize with dry ice in a food processor.

4.2.5. Place the entire ground sample in a plastic bag and mix thoroughly.

4.2.6. Fill the labeled jar with ground material ~1 inch from the top and place in the appropriate storage area. The remaining material may be discarded.

4.2.7. Thoroughly clean the grinder between samples to prevent cross-contamination. Brush and vacuum the grinder and screens to remove any remaining sample. The screen may require washing with soap and water to remove sample. Dry screen thoroughly before use.

5. Pre-Drying Samples:

5.1. Weigh a utility pan and record weight.

5.2. Mix the sample thoroughly then add to the pan and record weight.
- 5.2.1. For homogenous samples, if there is too much sample to fit in the pan, place a representative portion into the pan or use multiple pans.
- 5.2.2. High moisture and non-homogenous samples should be dried in shallow layers in multiple pans and stirred often to allow all the moisture to evaporate.
- 5.2.3. When using multiple pans, uniquely number and weigh each pan.

5.3. Place in a drying oven at ~60°C and allow to dry overnight. If sample is dry enough to grind (not moist when stirred), remove from the oven and cool to room temperature. If it is not, allow to dry in oven until it is.

5.4. Weigh the dried sample and pan.

5.5. Calculate the pre-dry moisture using the formula:

$$\%\text{pre-dry moisture} = \frac{W - D}{W - P} \times 100$$

Where: W = Weight of wet sample + pan
D = Weight of dry sample + pan
P = Weight of empty pan

When using multiple pans for one sample:
W = Σ Weights of all wet samples + pans
D = Σ Weights of all dry samples + pans
P = Σ Weights of all empty pans

5.6. Proceed with steps 4.2.3 – 4.2.7.

6. Gypsum Samples:

6.1. Label two 16 oz. glass jars with the lab number, inspector number, and date prepared. Mix the sample thoroughly and fill one jar to ~1 inch from the top with undried, unground material and label as **UNDRIED, UNGROUND**.

6.2. If the gypsum sample requires drying, air dry the sample at room temperature. **Do not dry gypsum samples in the oven.**

6.3. Weigh the sample before and after drying and calculate %pre-dry moisture (see step 5.5).

6.4. Proceed with steps 4.2.3 – 4.2.7.

7. Samples with Requests for Pesticide Analysis:

7.1. Pesticide analyses are performed by the Pesticide Residue group. Label an additional jar or container.

7.2. For liquid samples, pour roughly 200mL into a labeled container.

7.3. For solid samples, after the entire sample is mixed in a plastic bag, coarsely grind ~400 grams of sample and place in labeled container.

7.4. Complete a pesticide request sheet and deliver sample(s) and sheet(s) to the Pesticide Residue group.

8. Split Sample Requests:

8.1. Split samples are requested by the Fertilizing Materials Inspection Program (FMIP).

8.2. Label a small bottle with the lab number and inspector number and place ~200g of ground sample or 200mL of liquid in the container and seal.

8.3. Fill out an electronic (PDF) chain of custody sheet with sample number, inspector number, date split prepared and initials of preparer and sign electronically.

8.4. Send the samples to FMIP via interoffice mail and email the PDF of the chain of custody sheet. The program with sign the chain of custody sheet and return via email.

9. Sample Disposal:

9.1. Non-violative samples are retained for 3 months from the date the data is reported to FMIP.

9.2. Violative samples are retained for one year from the date the data is reported to FMIP.

9.3. Samples that contain any of the following analytes that exceed the listed concentrations shall be moved to the storage cabinet for such samples and shall not be discarded in the trash.

As	50 ppm
Cd	10 ppm
Co	0.08%
Cu	0.025%
Mo	0.35%
Ni	0.02%
Pb	50 ppm
Zn	0.25%

9.4. A record is kept of sample numbers and discard date.

Approvals:

Revised By:

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Revision Log:

Date	What was Revised? Why?
2/15/21	Removed references to Feed
11/16/21	Clarified sample prep of gypsum and wet/oily samples
7/25/23	Changed from receiving sheets by email to ExtraView. Added procedure for storage of samples with metals over the hazardous waste threshold.