UNITED STATES MARINE CORPS
Marine Corps Base
Camp Lejeune, North Carolina 28542-5001

BO 4570.1D
MAIN/rsm
10 Oct 1985

BASE ORDER 4570.1D

From: Commanding General
To: Distribution List

Subj: Disposal of Excess/Waste Wood Products

Ref: (a) DOD Disposal Manual 4160.21

1. Purpose. To establish policies and procedures for the disposal of excess/waste wood products and to inform military and civilian personnel of the procedures for obtaining unsaleable waste wood products.

2. Cancellation. BO 4570.1C.

3. Background. The reference requires that excess lumber, boxes or wood products to include pallets not required for the foreseeable needs of the generating activity or unit, or in such condition as to be unacceptable for further use will be disposed of by retail or other sales method. When because of insufficient size, shape or condition, residual lumber is determined to be unsuitable for salvage or sale and is not desired by eligible donees, this residue may be donated to charitable organizations or abandoned for release to charitable organizations and individuals in accordance with established abandonment procedures. Priority will be given to charitable organizations and to those individuals certified to be needy by local welfare organizations. Any remaining materials will be released on a first-come, first-served basis to military personnel and Government employees.

4. Action

a. Activities/units generating excess/waste wood products will:

(1) Deliver all resaleable or reusable lumber, six foot in length or longer without nails, staples, etc, reusable wooden pallets and boxes to the Receiving Section, Defense Reutilization and Marketing Office, Building 906, during the hours of 0800 - 1145 and 1230 - 1530 on Mondays and Wednesdays and 0800 - 1145 on Fridays.

(2) Deliver all lumber, boxes and pallets determined to be Not suitable for resale or reutilization to the Base Sanitary Landfill where the wood material will be segregated from other solid waste. The hours of operation at the Sanitary Landfill are from 0830 to 1530 on Mondays through Fridays for deliveries. NOTE: FMF units disposing of mount out boxes will have them evaluated at the 2d FSSG, Preservation, Packaging and Packing located at Building 915 for refurbishing and reuse prior to disposing of the boxes for resale or as waste wood.

b. Pick up of unsaleable scrap lumber, boxes or pallets by organizations or individuals as defined in paragraph 3 of this Order will be permitted subject to the following procedures:

(1) Unsaleable waste wood products may be picked up from 0830 - 1530 Mondays through Fridays.

(2) The loading and hauling of this material is the responsibility of the organization or individual.

(3) Posted rules and regulations will be observed to insure non-interruption of normal landfill operations.

(4) Scavenging of other solid waste being buried in the Sanitary Landfill is strictly prohibited.

c. Permits to obtain unsaleable and abandoned waste wood products are required for charitable organizations and individuals certified to be needy. Permits may be obtained from Base Maintenance Office, Building 1202.

5. Concurrence. This Order has been coordinated and concurred in by the Commanding Generals, II Marine Amphibious Force, 2d Marine Division, FMF, 2d Force Support Group (Rein), FMF, 6th Marine Amphibious Brigade, FMF, the Commanding Officers, Marine Corps Air Station, New River, Naval Hospital, Naval Dental Clinic and Director, Defense Reutilization and Marketing Office.

R. L. FORMANEK
Chief of Staff

Distribution: A plus MAIN (20)
MCAS (117)
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SOIL TESTING

A soil test is a chemical method for estimating the relative nutrient supplying power of a soil. Several chemical extractants have been developed, based on the chemical and physical properties of soils within various regions of the country, to evaluate the fertility status of soils. The extractant used in Georgia is the Mehlich-1 (0.05 N HCl-0.025 N H_2SO_4) and was designed for use on low cation exchange capacity soils of the southeast.

Most Georgia soils are low in pH and/or one of the essential plant food nutrients. Soils in the state are quite variable and their response to lime and fertilizer additions vary considerably. For example at a high test level the soil will not require the application of as much phosphorus or potassium as it will at a low test level. A soil test is the best means available to assess how soils respond to these additions and to determine the amount of lime and fertilizer needed for crop production. Although this is the primary objective of soil testing, information gained from soil testing can also be used to: (1) monitor the fertility status of a given field - this is accomplished by maintaining fertility records on fields over a period of time, and (2) to evaluate the fertility status of soils on a county, soil area, or state-wide basis by the use of soil test summaries.

One important aspect to remember is that a soil test only measures a portion of the total nutrient supply in the soil. The values obtained when a soil sample is analyzed are of little use in themselves. In order to make use of the values in predicting nutrient needs of crops the test must be calibrated against nutrient rate experiments in the field.

SOIL SAMPLING

Soil testing can be divided into four steps (1) sampling, (2) analysis, (3) interpretation, and (4) recommendations. One of the most important aspects of soil testing is that of obtaining a representative sample of the area in question. Unfortunately, however, this is the weakest step in most soil testing programs. Due to the heterogenous nature of soils, there is tremendous variability in soils across fields, even in those that appear to be uniform. In most fields in Georgia this is confounded due to the presence of two or more soil types.

Variability in the nutrient levels of soils can occur within a relatively small area. It has been shown that there is just as much variance between cores taken at 10-foot spacings as ones which are spaced 100 feet apart, provided there is no substantial change in the soil type or soil characteristics. Intensive soil sampling is one of the most efficient ways to evaluate variability within a field. Depending upon the conditions this could mean that several composite samples consisting of 10 to 20 individual cores be taken from a field.

Usually a composite soil sample weighs about 2 pounds. If the sample is taken from a 10-acre field to a depth of 6-7 inches, this would represent about 20,000,000 pounds of surface soil. Yet from the 2 pounds of soil that is sent to the laboratory for analysis only 25 grams (less than 1 ounce) of soil is used for analysis. Therefore, it is very important that the sampling instructions be followed carefully because the analytical results and recommendations can be no better than the sample submitted to the laboratory.

Sampling Tools

There are a number of devices that can be used to collect the soil sample. The soil sampling tube is one of the more common tools and should be available in every county agent's office. When sampling small areas or when only a few samples need to be taken, a spade or trowel is a sufficient device for collecting individual soil cores. When sampling to depths of 8 to 20 inches, it is necessary to use a soil auger. However, all of these sampling tools must be properly used, if the collected samples are to be representative of the area under test.

Size of Area to Sample

The size of the area from which a sample is taken may vary from less than one acre (e.g., lawns, gardens, etc.) to 15 acres. For most field conditions the size may range from 5 to not more than 15 acres. Variations in soil types, slope, drainage, or past management may require that smaller areas be sampled, resulting in three or more composite samples per field.

Areas Not To Sample

Due to past management and cultural practices certain areas are brought into fields and should not be sampled. These are:

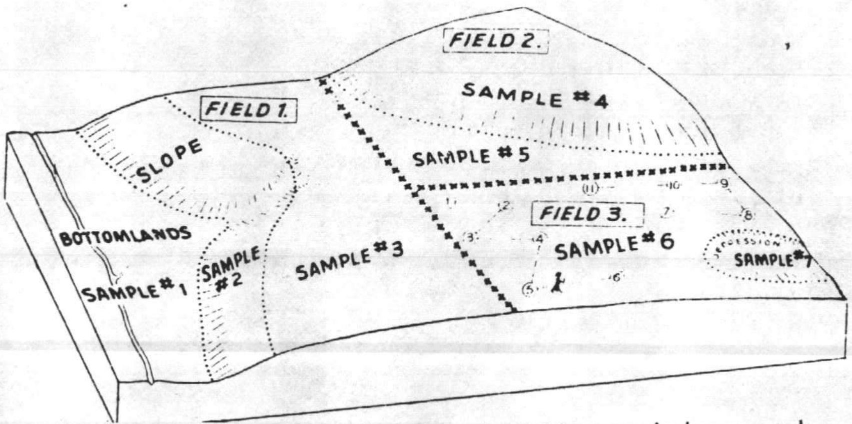
- Old fertilizer bands
- Field borders, especially close to a gravel road
- Dead furrow or back furrows
- Terraces, old fence rows, or roads
- Animal excretion spots
- Where there have been straw stacks, manure piles, brushpiles, or lime piles
- Trouble spots, such as eroded areas. In some cases these areas may be sampled separately.
- Near trees
- Old building sites

Number of Cores

A composite soil sample is made up of a number of individual cores taken at random over a given area. The purpose of this is to minimize the variability that exists which may have been caused by previous lime and fertilizer applications or slight soil variations.

If an insufficient number of cores are pulled for a composite sample, the sample results can be biased either too high or too low. It is recommended that a minimum of 10 to 20 cores be taken for a composite sample. Previous sampling studies have shown that the number of cores required per composite sample varies with the size of the area being sampled. For example, 20 cores were required for a 20-acre field, 15 cores for a 10-acre field, and 10 cores for a 5-acre field. As previously mentioned, the cores should be taken at random over a section of the field or plot, and should be representative of the entire area. When all of the cores have been collected they should be thoroughly mixed together. After mixing, a sufficient amount of sample is placed in the soil sample bag to fill the bag up to the "fill line."

In some cases where a field contains more than one soil type, collect a composite sample from each area. Various soil types may require different lime and fertilizer treatments. Also, problem areas within a field should be sampled separately.



Areas cropped or fertilized differently should be sampled separately.

When To Sample

Soil test levels will change during the year, depending on the temperature and moisture of the soil. It's important, therefore, that samples be taken at the same time each year so results from year to year can be compared. Generally, pH and nutrient levels will be lower during summer and fall as compared to winter and spring. The ideal time to sample would be during the growing season or in the early fall for the pH and level of nutrients to approximate that which is found in the soil during the growing season. However, since sampling during the growing season presents several problems, the best time to sample is immediately after the crop is removed or during early fall. In most cases this allows enough time for the grower to get the results back and to apply needed lime and fertilizer before planting.

For most situations soils should be tested every 2 to 3 years. However, test the soil when there is a suspected nutrient deficiency, once per crop rotation, or once every other year if the soil is fertilized and cropped intensively. Annual sampling is recommended (1) on areas where high-value cash crops such as tobacco and vegetables are grown, (2) on areas testing high in P and K where no phosphate or potash is recommended and none is applied, (3) on areas where the annual nitrogen application rate exceeds 150 pounds of N per acre. Soil samples should also be pulled following crops where large amounts of nutrients are removed in the harvested portion of the plant, particularily silage crops, hybrid bermuda hay, and when peanut vines are used for hay.

Keep previous soil test results from individual field (or advise growers to keep records) and refer to them when adjusting lime and fertilizer recommendations. Significant changes in pH or nutrient levels should be considered when making adjustments in lime and fertilizer recommendations. Abrupt changes in soil test results may signal that a sampling or analytical error has been made and if not taken into account could lead to an improper recommendation.

Contamination

In order to prevent contamination of the sample, clean tools and bucket should be used. However, galvanized or brass buckets and tools should not be used. Such devices will contaminate the samples with copper and zinc. It is best to use plastic buckets and steel sampling devices.

Specific Sampling Procedures

Plowed Field Soils

Sample to the plow depth. The lime recommendations found in Tables A, B, C, and D are based on an 8-inch depth. Make adjustments in the lime recommendations to compensate for plow depth if other than 8 inches. The table "Lime Requirement Adjustments for Plow Depth" lists the adjustments for several plow depths.

Similarily when plowing to greater depths, fertilizer rates may need to be increased to compensate for the greater volume of soil to which the fertilizer is being applied. This does not ordinarily pose a serious problem because sampling to depths of 8 to 12 inches usually results in lower soil test readings and high fertilizer recommendations. In situations where the growers primary motive is to build soil test levels to a given category, failure to compensate for plow depth may result in a slower rate of buildup. Fertilizer recommendations are based on a 6-inch depth, consequently if the effective plow depth or zone of mixing is 8 inches the fertilizer rate should be increased 30%. If the plow depth is 10 inches the fertilizer rate should be increased 60%. Therefore, if the fertilizer recommendation is 60 pounds per acre, the recommendations for 8 and 10 inch plow depths would be 80 and 100 pounds per acre, respectively.

Pasture and No-Till Fields

Pastures and no-till fields should be sampled to a depth of 4 inches. This represents the depth of active absorption, and the zone where residual fertilizer nutrients accumulate.

Orchards

Numerous sampling studies have shown that with most orchard crops the greatest root activity occurs at a depth of 8 to 12 inches. When sampling orchards this depth should be included in the sample. For peach and apple orchards a depth of 12 to 14 inches is recommended. For pecans a depth of 6 to 8 inches is recommended.

Gardens

The recommended sampling depth for gardens is 6 inches. This represents the normal spading depth of most garden soils.

Lawns and Turf

Take soil samples to a depth of 4 inches. This is the actual soil depth and should not include roots or other accumulated organic material on the surface. When collecting soil plugs, remove the organic residue that may be present on the surface; this eliminates the contamination of the soil sample with dried plant material which can influence the analysis. In order to take an inconspicuous sample, use small-diameter soil sampling tools. A sampling device for golf greens and tees can be made from an old golf club shaft.

Subsoil Sampling

Take a subsoil sample every four to five years. This is especially important in problem areas. A subsoil sample should be to a depth six inches below plow depth or normal surface sampling depth.

SOIL ANALYSIS

Once a soil sample is collected the nutrient status of the sample must be determined. Several different chemical methods are used at the Soil Testing and Plant Analysis Laboratory to assess the nutrient status of soils. In order to provide a large selection of chemical determinations along with rapid and accurate results, the laboratory is equipped with the most modern instrumentation available for soil analysis. Analysis time in the laboratory for a "Routine Test" averages just a little over two days depending on the time of year and current work load.

The following tests are provided for soils:

1. Soil water pH (water pH in a 1:1 soil water ratio)+
2. Lime Requirement Test (Adams Buffer Method)+
3. Extractable Phosphorus, Potassium Calcium, and Magnesium (Mehlich-1 extractable)+
4. Extractable Manganese and Zinc (Mehlich-1 extractable)*
5. Extractable Boron (Modified Hot-Water Extractable)*
6. Organic Matter Content (Wet Oxidation)*
7. Soluble Salt Content (electrical conductance, 1:2 soil water ratio)*
8. Ammonium and nitrate-nitrogen content (2 N KCl extractable)*
9. Commercial Greenhouse or Nursery Soil Test (water extraction)*

*Obtained only upon request
+Routine Test

Procedures Used at University of Georgia Soil Testing Laboratory

Sample Preparation:

At the laboratory, each sample is assigned a laboratory number and transferred to a tray of 40 samples. The 40th sample is a check sample of known chemical properties.

The soils are dried in a large walk-in oven with a heating element and exhaust fan to remove moisture-laden air. The temperature of the oven does not exceed 100° F in order to approximate air-drying conditions.

Samples are crushed with a Nasco mechanical mortar and auger grinder and passed through a 10-mesh sieve. In order to avoid contamination, samples submitted for micronutrient tests are crushed in a grinder, equipped with stainless steel contact points, and screened to pass a 10-mesh sieve.

Soil Water pH and Lime Requirement:

The pH is determined with a glass electrode pH meter on a 1:1 soil to water suspension (20 milliliters soil:20 milliliters water). Samples with pH readings of less than 6.0 are saved for the lime requirement test. Twenty milliliters of Adams-Evans buffer solution are added to the soil-water suspension shaken for 5 minutes and the pH of the suspension determined with a glass electrode pH meter.

Extractable Phosphorus, Potassium, Calcium, Magnesium, Managanese and Zinc

Extractable P, K, Ca, Mg, Mn, and Zn is determined by extracting a soil sample with 0.05 N HCl in 0.025 N H_2SO_4, referred to as (Mehlich-1 Extractant). A 4cc volume of soil and 20 milliliters of extractant are shaken together for 5 minutes at 200 oscillations per minute. After filtering, the amount of P, K, Ca, Mg, Mn, and Zn in the filtrate is determined simultaneously on an Inductively Coupled Plasma Spectrograph. The amount of element determined is expressed as pounds per acre of element on the basis of 2 million pounds of soil.

Extractable Boron:

A 5-gram soil sample is extracted with 25 milliliters of hot water by shaking in a hot water bath (80°C) for 30 minutes. After filtering, the boron content in the extract is determined using an Inductively Coupled Plasma Spectrograph. The amount of the element extracted is expressed as pounds per acre.

Organic Matter Content:

The organic matter content is determined by the wet oxidation method, using potassium dichromate and titrating with a standard solution of ferrous ammonium sulfate. Organic matter is expressed as percent by weight.

Soluble Salt Test for Mineral Soils:

An extract is prepared by adding 100 milliliters of water to 50 grams of soil, shaking for 1 minute and allowing to stand for 30 minutes. After filtering, the electrical conductance of the filtrate is determined with a Solu-Bridge and reported as mhos x 10^{-5} per centimeter at 20°C.

Ammonium and Nitrate-Nitrogen Content:

A 10-gram soil sample is extracted with 100 ml 1 N KCl. After shaking for 1 hour and filtering, the NH_4-N content is determined by distillation. After the NH_4-N has been determined the NO_3-N in the filtrate is determined by steam distillation after the addition of Devarda's Alloy.

SOIL TEST INTERPRETATION & RECOMMENDATIONS

Introduction

The lime and fertilizer recommendation should be closely followed and only altered based on extenuating circumstances such as previous soil tests, a plant analysis result or visual observations. Soils should be tested periodically, sampling about the same time of the year. Maintain records on soil test results and compare previous results with present. Changes in pH and nutrient test levels should be countered with corresponding lime and fertilizer treatments to maintain the soil fertility level within the sufficiency range. For most soils and cropping situations, the soil pH should be between 5.5 and 6.5, the P and K levels within the high category and the Ca and Mg levels adequate and medium, respectively.

Soil Acidity

Practically all of the soils in Georgia are slightly to strongly acid and need to be limed in order to attain good crop growth. Soils in Georgia are acidic in nature because of the parent materials from which they were developed and the high annual rainfall which leaches base forming cations such as calcium and magnesium from the soil. This condition is accentuated by the use of acid forming fertilizers, crop removal of calcium and magnesium and other factors. Approximately 40 percent of the samples received at the Soil Testing and Plant Analysis laboratory need lime.

Although soil pH is a critical factor in determining response of crops to fertilizers, pH *per se* is not the factor that adversely affects plant growth. As the soil pH decreases, the amount of aluminum and manganese in the soil solution increases. Many plants are particularly sensitive to these two elements. Also, the amount of calcium and magnesium in the soil solution decreases as the soil pH decreases. At low pH's, particularly when the pH is less than 5.5, there may not be sufficient calcium or magnesium in the soil solution to meet the crop requirement. Therefore, a deficiency of either or both elements can occur. Normally, magnesium deficiency is more likely to occur at low soil pH's than calcium. When lime is applied, the amount of aluminum and manganese in the soil solution decreases and the amount of calcium and magnesium increases, thereby reducing the likelihood of a toxicity or deficiency, respectively.

The soil pH can change quickly depending on the soil type, buffer capacity, and losses of calcium and magnesium by leaching, erosion and crop removal. When a' soil is intensively cropped, liming may be necessary every year. Soils which have low buffer capacities (that is, they contain only small quantities of clay and organic matter), the soil pH will change during the year. Normally, the soil pH is at its lowest in the summer and fall, and highest in the late winter and spring. This seasonal fluctuation may be as much as 1.0 pH unit. If soil tests are to be compared from year to year, it is best to sample at about the same time of the year. In general, soil samples collected in the fall reflects to a great extent the pH plant roots reside in during the growing season.

The pH of a very sandy soil is not too meaningful as the pH is a reflection of whatever may be present in soil solution at the time the sample was taken. Therefore, in such instances, the need to lime may have to be based primarily on the amount of calcium and magnesium present. If these elements are low, some lime may be needed to provide an ample supply of calcium and magnesium to meet the crop requirement.

The subsoil for most Georgia soils is acidic and is difficult to correct. Lime does not readily move down through a soil. Experiments have shown that downward movement of lime occurs only when the surface soil is near neutral (pH 7.0) or greater. Developing subsoil acidity can be detrimental to future crops and can significantly affect crop growth by limiting root development into the subsoil. In order to minimize this soil acidity problem, the surface soil should be kept at the proper pH level by the addition of lime based on a soil test recommendation. If the surface soil is adequately supplied with calcium and magnesium, the crop removal of these elements from the subsoil will be substantially reduced. Therefore, the pH and supply of calcium and magnesium will remain fairly constant. When a soil fertility problem exists, a subsoil analysis can be helpful in diagnosing the problem.

<u>Lime Requirement (L.R.)</u>:

The lime requirement is determined by chemical test based on a comparison of the soil water pH with the soil buffer pH. On soils where limestone is recommended the soil buffer pH is quantitatively reported on the computer printouts as "Lime Index." A large shift in the water pH is required to significantly alter the lime requirement. Conversely, a small change in the buffer pH will result in a significant change in the lime requirement. This can be seen by closely studying the lime tables presented later in this section. The soil water pH is a measure of the hydrogen ion concentration in the soil solution (active acidity), while the buffer pH is a measure of the total hydrogen ion concentration on the exchange sites (potential or reserve acidity). The objective of liming a soil is to neutralize the exchangeable hydrogen ions by replacing them with calcium and magnesium ions. Therefore, as the hydrogen ions on the exchange sites are neutralized and replaced by calcium and magnesium, the soil pH will increase. Since the concentration of hydrogen ions in the soil solution is in equilibrium with the hydrogen ions on the exchange sites, a change in the latter will affect the water pH of a soil.

Two soils may have the same lime requirement but different water pH's. Similarly, two soils may have the same water pH but different lime requirements. These differences are primarily related to the amount of clay (texture of the soil) and organic matter present. Soils that are high in organic matter and clay content require more lime to raise the pH to a specific level than do sandy soils that are low in organic matter. For example, a sandy soil at pH 5.0 may require only 1 ton of limestone to raise the pH to 6.0, while a clay soil at the same pH may require 2 or more tons of limestone.

Crops have different requirements for soil pH, therefore lime recommendations vary with the crop to be grown. Lime should be applied and mixed with the soil as soon after sampling as possible. It will begin to react with the soil immediately after application, but the full effect may not be evident for several months. The pH requirements on which lime recommendations for different crops are based are presented in the following table.

Lime Requirement and Optimum Soil pH

Crops	Lime if pH below	Lime to pH
Azaleas, rhododendron, centipede, irish potato, christmas trees	5.0	5.5
Annual and perennial flowers, summer bulbs, spring flowering bulbs, sweet potatoes, grapes (muscadines), tobacco, lawn grasses (bluegrass, fescue evergreen mixtures, bermuda)	5.5	6.0
Agronomic crops (except alfalfa)	6.0	6.0
Alfalfa	6.5	7.0
All except those listed above	6.0	6.5