CONTRACTS AND LOGISTICS OF AERIAL FERTILIZER APPLICATION

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ABSTRACT

Contracts for aerial application of fertilizer should be computed to take into consideration the cost of work, equipment, insurance, and procedures for handling catastrophies. Care should be taken that a contract is not written in such detail that the contractor's ability to complete the project in a smooth, workmanlike manner is affected. Logistics of aerial fertilizer application vary with size of project, distance from fertilizer source, means of transportation available, and size and number of aircraft. Generally, the smaller the project the simpler the logistics. The key for the most efficient project is to maximize the hours that the aircraft is actually applying fertilizers.

INTRODUCTION

There are two basic methods of handling contracts for forest fertilization: (1) the complete project contract, which minimizes the time involved; and (2) partial project contracts, which maximize the time involved. Regardless of which method is used, maps and photographs must be prepared and decisions must be made on specifications and time limits for each project.

A *complete project contract* is a single contract covering fertilizer, transportation, and application. This method is generally used for small projects. There are several ways to break a project into separate contracts, called *partial project contracts*. Some are (1) fertilizer, transportation/application; (2) fertilizer, transportation, application; and (3) fertilizer, containerizing, transportation, application. Here *transportation* refers to moving fertilizer from a transfer site to a heliport, as the price of fertilizer usually includes the cost of moving it to a transfer site. Each method has its advantages and disadvantages; thus the method selected depends on the situation and available resources.

Two major points should be considered when determining how a fertilization project is to be handled: (1) With a bulk system it is best to contract transportation and application to the same contractor. (2) Use of containers reduces transportation and application costs.

CONTRACTS

A contract should describe the work, equipment, insurance, and schedule, and should have a procedure for handling catastrophies. A contract should be written in terms as general as possible to allow flexibility necessary to a successful project. Details of what is to be done and who is to do it should be handled during negotiations or in the bid information. A contract handled in this manner allows a smooth-flowing project.

Invitations for bid or negotiation should be completed at least 2 mo prior to startup date. This allows the contractor time to prepare his equipment and make the necessary arrangements; thus a smoother, more efficient project results.

LOGISTICS

Three items control the length of time required to complete a project. They are: (1) time of year (fall, winter, spring), (2) size and location of project, and (3) size of aircraft. Time of year determines the length of daylight available and weather that may occur during the project. Each of the three factors has an impact on the time an aircraft can work, and therefore on production or tons applied.

The size and location of a project determine the efficiency of the aircraft. A large project located in a small geographic area maximizes tonnage per heliport and reduces time and cost of moving, thus allowing the most efficient use of aircraft. Conversely, a project of the same size spread over a wide geographic area minimizes heliport tonnage and increases time and cost of moving, thus giving a less efficient use of aircraft. Aircraft size determines the production that can be expected. Generally, the larger the aircraft the higher the production level and therefore the less time required to complete a project.

When computing time required for application, it is important to know if the production number is for a workday, a calendar day, or the maximum capacity of the aircraft. For example, a Bell 205 helicopter has the following capacities: maximum per day, 250 tons; workday average, 90 tons; calendar day average, 60 tons. These three items furnish the base for

figuring logistics; however, before the complete logistical problem can be solve, additional information is needed as follows: (1) fertilizer delivery time and load size (from material origin to transfer site and from transfer site to heliport); (2) unloading time (at transfer site and heliport); (3) storage or surge capacity; (4) loading time (usually only loading time at transfer site affects logistics). Delivery time and load size, combined with aircraft productivity, give the necessary information to compute the number and timing of fertilizer loads required to keep the operation running.

Loading and unloading times are used to calculate the nonproductive time or time lost. Carriers that deliver to a transfer site allow a given period of time for unloading and if it is not emptied within the allowed time there is an additional charge (commonly referred to as *demurrage*). Trucks used to move material from transfer site to heliport usually are contracted for on a flat rate per hour or per ton.

Storage or surge capacity, when used in the operation, has two functions: (1) Allows the load to be emptied, thus eliminating additional charges at the transfer site, and allows the truck at the heliport to return for another load. (2) Allows material to be stockpiled for use between loads, thus helping the project to flow smoothly.

Areas often given inadequate consideration are time lost by trucks while loading and unloading, particularly if they cannot unload becamse the aircraft cannot fly (weather, maintenance, breakdown); and time lost by aircraft while waiting for fertilizer to arrive at the heliport. Time-lost factors can have significant impact on project costs, which are extremely difficult to estimate and vary with time of year.

SUMMARY

The most important points to be remembered on contracting for an aerial fertilizer application project, therefore, are as follows: (1) Determine how to handle the project; use either a complete project contract or partial project contracts. If the latter are used, determine how many separate contracts are required. (2) Keep contracts general in nature so the project can flow smoothly. (3) For logistics, determine time of year, size and location of project, and size of aircraft. Keep the project in as small a geographic area as possible. Next, determine delivery time and load size, loading and unloading times, and storage or surge capacity. (4) The key to an efficient, smooth-flowing, low-cost operation is to *keep the aircraft flying*.