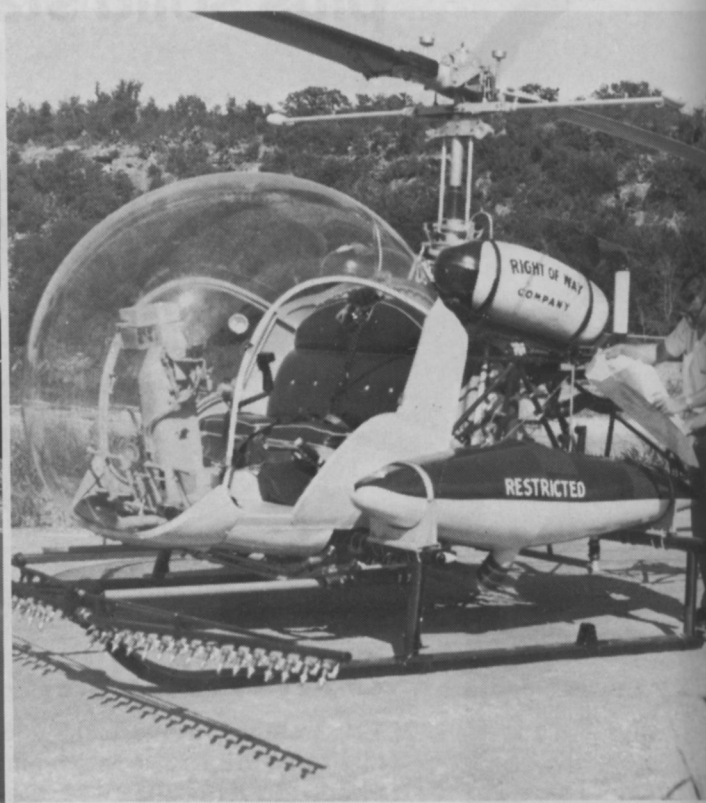
Right-of-Way Spray Control

Invert Emulsions Help Target Herbicides

INVERT emulsions are being used more and more to place herbicides on target. The problems of drift are being solved as new equipment, thickeners, and invert formulations become more readily available in the market.

A veteran rights-of-way helicopter sprayman, Frank Cady, San Antonio, Tex., has been in this business since 1954. As the former manager of air operations for Stull Chemical Company, he was instrumental in the helicopter adaptation of the Stull bifluid system. Cady, now president and owner of ROWCO, Inc., (Right-of-Way Company), was among the first in the nation to use the helicopter for power line brush control spraying. Even today, this type operation accounts for 99 percent of his contracts for herbicide application.

Chief advantage of the invert emulsion for Cady is help in targeting herbicides from the helicopter 75 feet above ground to a right-of-way below, and at the same time controlling drift. The invert emulsion is based on water-in-oil. In short, the oil (a ratio of one part of oil to up to 14 parts of water) surrounds the water droplet. This helps eliminate evaporation and aids the droplet in holding its shape and size during the flight from spray boom to weed surface. Also, the controlled



Frank Cady, left, and Richard E. Fields, manager of field development and research for Velsicol Chemical Corporation, Chicago, discuss the use of Banvel on Bundick Lake. In the picture at right Cady discusses the spray plan with pilot Jim Shaw.

droplet size serves to overcome drift caused by wind.

First use of the present-day Stull bifluid system was made by helicopter in 1959. Shortly thereafter, the same system was applied to ground equipment and with certain refinements has become common for both types of pesticide application.

Neutral spray adjuvants (Stull Bivert Formulations) are used to produce the "invert" emulsions in combination with a variety of water soluble, oil soluble, or conventional emulsifiable herbicides which are on the market. With the spray adjuvants, it is possible to apply more than one herbicide at the same time or in the same formulation.

New Invert Installation

ROWCO, Inc., uses a relatively new invert installation. This consists of a mixing device in the suction side of the sprayer pump. Discharge of the pump proceeds through existing equipment. An additional storage tank to hold the oil phase of the emulsion is only about one-tenth the size of the regular spray tank. Only this small size oil holding reservoir is needed since mixing ratios average one part oil to nine parts water by volume.

Chief purpose for development of the system was to control pesticide drift. But in actual use, another big plus has been reduction in evaporation losses during spraying. Droplets tend to hold form during spraying, which results in an even spray pattern and droplet distribution.

Cady operates in 11 states, primarily spraying herbicides for utilities. His major contracts last year were with Louisiana Power and Light, Kentucky Power Company, Central Louisiana Electric Company, and a number of REA co-ops in Illinois and West Virginia.

The ROWCO helicopter crew normally consists of a pilot and two ground crewmen. Some crews may contain more than one pilot. Cady operates on the theory that careful pesticide application requires intense concentration. Normally, a pilot is spelled after 1½ to two hours of flying time. Cady points out that helicopter spraying is a broader business than just flying. A spray pilot, he states, must know both brush and chemical. Further, he believes

Bundick Lake, about 2000 acres, is being sprayed for aquatic weeds. In this type of project, Cady blocks off the lake and assigns a block to each pilot.

Invert emulsion enables ROWCO pilots to target herbicides on water or right-of-way from up to 75 feet in the air and still control pesticide drift.

that three to four years of experience is needed under careful direction before a pilot can be expected to effectively manage both ship and spray program.

Pilot Training

In his own case, one of the three pilots who work for him was commercially trained. Cady, himself, trained two of the men. All are FFA certified and have passed the necessary examinations for pesticide application in the states which have such requirements. For example, Mississippi, Arkansas, Louisiana, and Texas, where ROWCO has contracts, require pilots to pass a written examination. Further, the aircraft must pass a regular inspection.

Cady uses Bell 47-G helicopters and changes engines every 600 hours. With the exception of changing engines, all maintenance is handled by Cady and his crew. His is an FAA approved repair station and the pilots rework helicopters during the winter months.

During this period, Cady spends his own time largely in lining up the coming work season. He likes to allot three months of the year in selling contracts and scheduling.

When contacted, Cady was spraying Bundick Lake for aquatic weed control. This was a project of the Louisiana Wild Life and Fisheries Commission supervised by Biologist Louie V. Richardson, Tioga, La. Richardson reported that hyacinths were first noted on the lake in 1964. A year later, more than 25 percent of the lake was covered. Normal application by mobile spray crews using boats failed to control the infestation.

Air Application Needed

Since only a portion of the hyacinth reproduction could be controlled, Richardson decided the so-

THE STULL BIFLUID SYSTEM

Background. The Stull Bifluid System is a scientifically and commercially accepted method for the preparation and application of water-in-oil (w/o) and oil-in-water-in-oil (o/w/o) emulsions. Following is a graphical representation of the basic emulsion types utilized in most pesticide applications today:

BASIC EMULSION TYPES

"INVERT" WATER-IN-OIL

OIL SURROUNDS WATER

KEY:

WATER

OIL

"COMMON" OIL-IN-WATER

WATER SURROUNDS OIL

"MULTIPHASE INVERT" OIL-IN-WATER-IN-OIL

OIL SURROUNDS, WATER SURROUNDING OIL

Advantages of W/O and O/W/O Emulsions. Water-in-oil and oil-in-water-in-oil emulsions possess certain distinct advantages over oil-in-water emulsions for pesticide applications:

1. Less Evaporation Loss
2. Less Spray Drift
3. Less Run-off Waste
4. More Rain Resistance
5. More Surface Coverage
6. More Surface Absorption
7. Pesticide Chemicals Can Be Placed In Any or All Phases.

lution was a massive application by air using a drift limited carrier such as the invert emulsion. This led to the contract with ROWCO, Inc., and Cady. When the spraying began, Richardson estimated that the infestation had grown to a range of 50 to 800 million hyacinth seeds per square acre of lake.

In one area of 70 açres, Banvel-D was used with disel and inverter. (Results of this trial will be published in WTT when they become known).

Richardson carries a regular program of aquatic weed control on Louisiana lakes. He has 22 two-man boat crews at his disposal. They are dispersed over the state to save travel and at the same time keep inland waters open.

Each crew is equipped with a lightweight pumping unit consisting of a rotary hydro-tractor pump and an air-cooled gasoline engine mounted on a wood frame. The unit produces a nozzle pressure of about 100 p.s.i. and does not normally cause fogging of the spray mixture.