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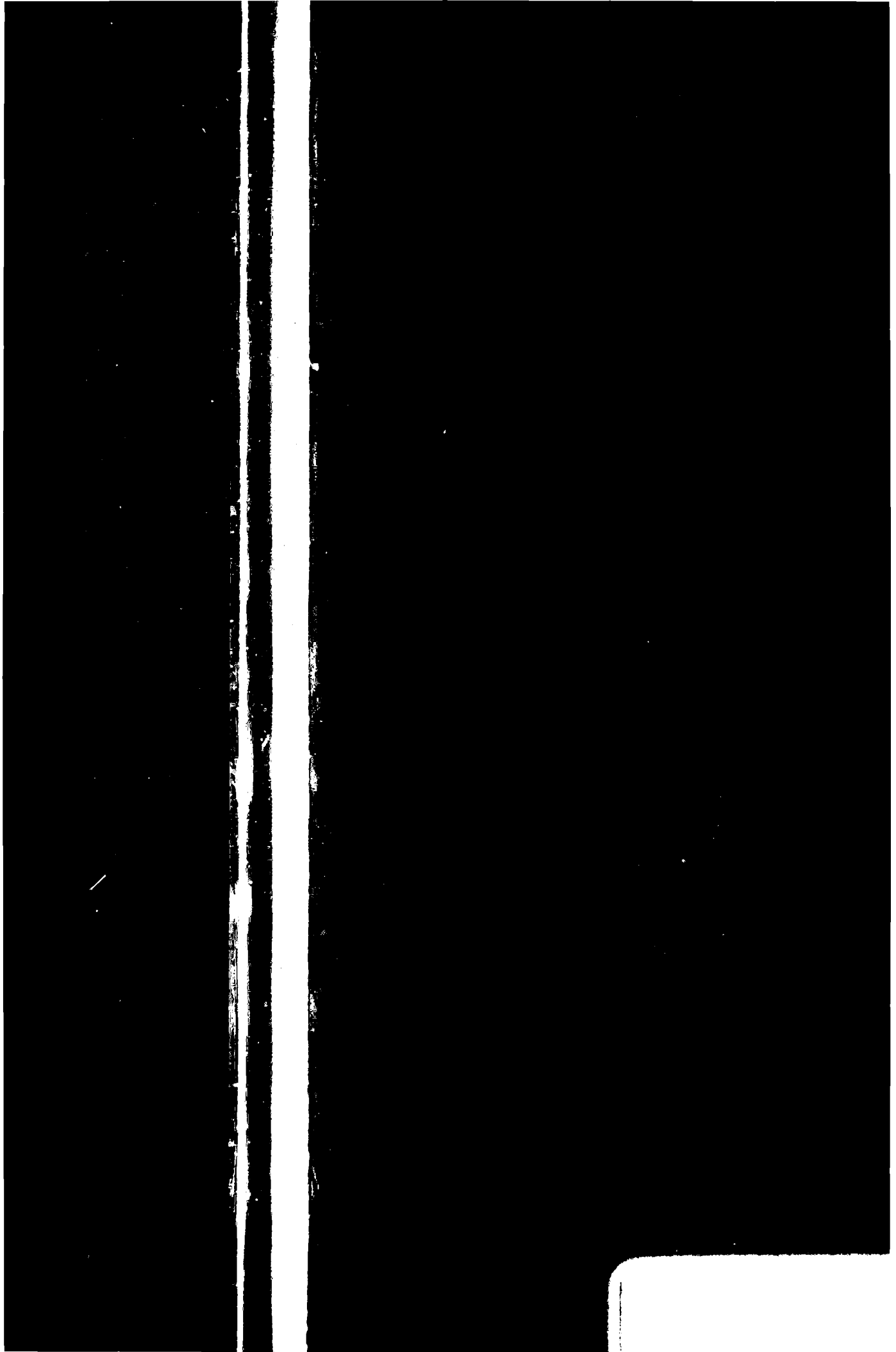

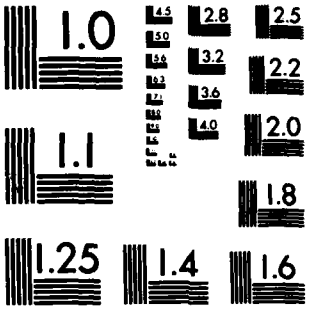

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FUEL FIRE TESTS OF THE HELICOPTER CREWMAN JACKET

George H. Kydd and Gregory K. Askew
Aircraft and Crew Systems Technology Directorate
NAVAL AIR DEVELOPMENT CENTER
Warminster, Pennsylvania 18974

FEBRUARY 1983

FINAL REPORT

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The Helicopter Crewman Jacket is not only resistant to flames itself, but it adds to whatever other protection the crewman might have creating a generally safer micro-environment.

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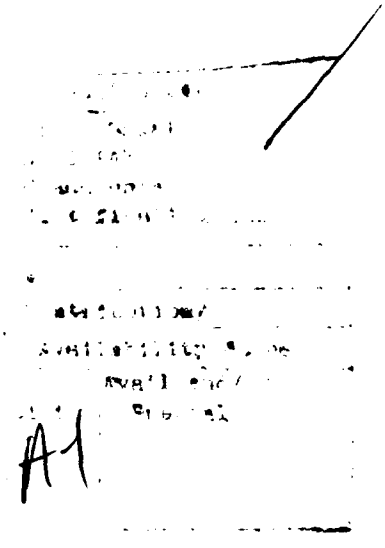
TABLE OF CONTENTS

LIST OF FIGURES



INTRODUCTION

FIRE PIT TESTS OF THE HELICOPTER CREWMAN JACKET

The Helicopter Crewman's Jacket grew out of common requirements experienced by the Coast Guard and the Navy. The requirement was to supply anti-exposure protection and flotation to crewmen who may be swept overboard while at the same time providing a garment that did not seriously encumber the crewman in carrying out his duties. The garment tested here is the product of the pursuit of those requirements. This jacket and its development have been described by Lewyckyj (1). The outer shell is described as 2/2 Nomex/expanded PTFE (Polytetrafluorothylene).

METHOD

The testing method is that used at NAVAIRDEVCEN with some exceptions. The manikin was mounted with twenty leather patches 3" x 3", each of which was mounted with six paper temperature indicators. There were ten sensors on the torso, front and back, one on each arm and eight on the legs. Each sensor was marked with a temperature at which it would change color from gray to black and the sensor used in these tests were 120, 130, 140, 160, 210 and 220°F. The manikin wore summer underwear and a Nomex flight suit under his jacket. Only the sensors on the torso are of interest in these tests.

The dressed manikins were carried through the flames by a rotary crane at the NADC Fire Pit. The fuel was JP-4, floated on water and the exposure was three seconds. The exposure was photographed by two movie cameras, one with a wide angle lens (10mm) running at 100 frames/sec., and one with a longer focal length lens (50mm) at 24 frames/sec. Both were placed to photograph the manikin as it emerged from the flames so that any after-burning could be observed. Still photographs were made of the front, back and a side, before and after the exposure.

RESULTS AND DISCUSSION

None of the torso sensors turned black which means that the minimum temperature was not reached under the jacket. The movie photography indicated that there was no flaming as the manikin emerged from the flames. Results of the still photography are shown in Figures 1 through 6, showing a front, back and a side view of the jacket before and after the test. The jacket itself showed some shrinkage after the test, as shown by comparing the before and after photographs, otherwise it was unchanged by the fire.

TABLE OF FIGURES

	Before Figure No.	After Figure No.
Front	1	2
Back	3	4
Side	5	6

The tests show that while the jacket protects in a cold environment, it is also a significant addition to the protection of the crewman from flames.

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1. Lewyckyj, J. Z. Development of the Helicopter Crewman Jacket. Naval Air Development Center, Report No. NADC-82122-60, Jan 1982.

2. Stoll, A. M. et al. A Facility and Method for Evaluation of Thermal Protection. Naval Air Development Center, Report No. NADC-75286-40, Dec 1975.

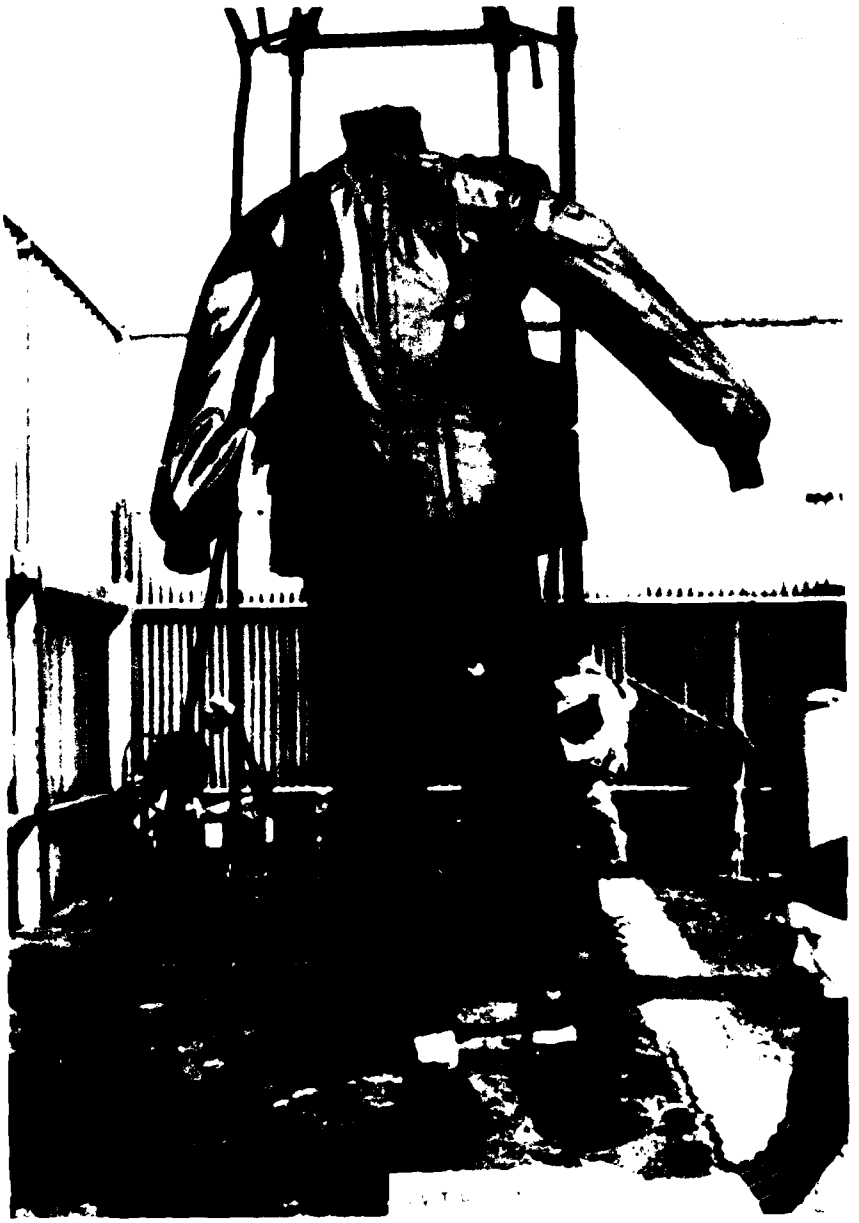

Figure 1. Helo Crewmen's Jacket, front, before

Figure 2. Helo Crewmen's Jacket, front, after

Figure 3. Helo Crewmen's Jacket, back, before

Figure 4. Helo Crewmen's Jacket, back, after

Figure 5. Helo Crewmen's Jacket, side, before

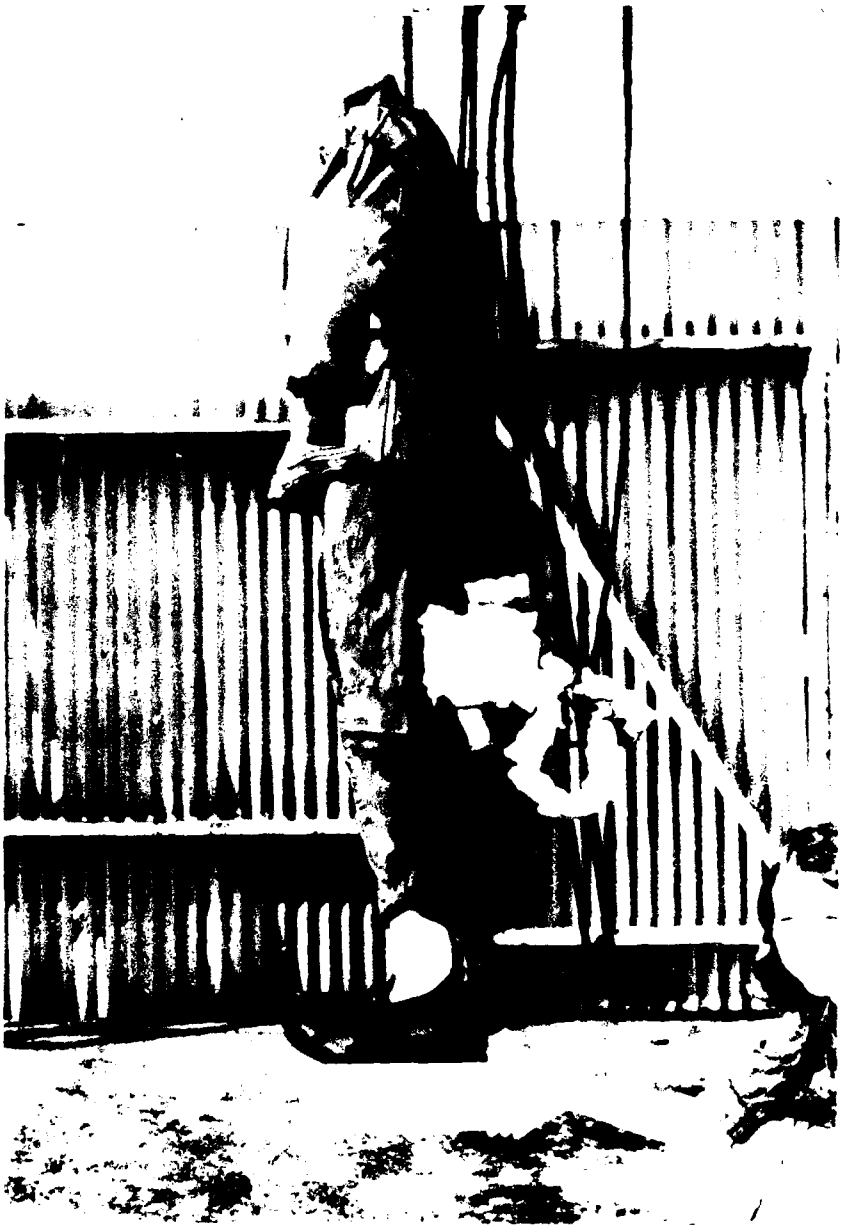

Figure 6. Helo Crewmen's Jacket, side, after

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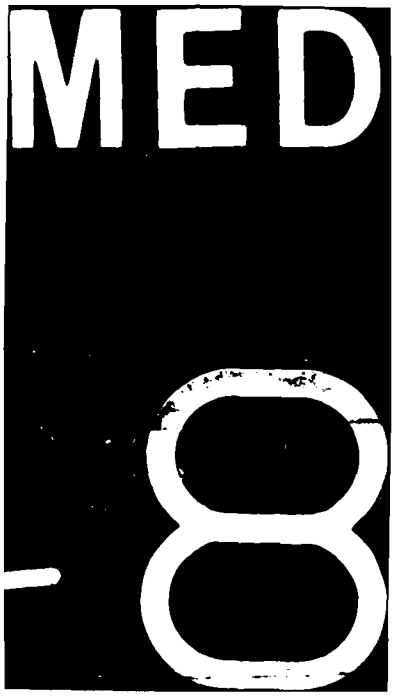
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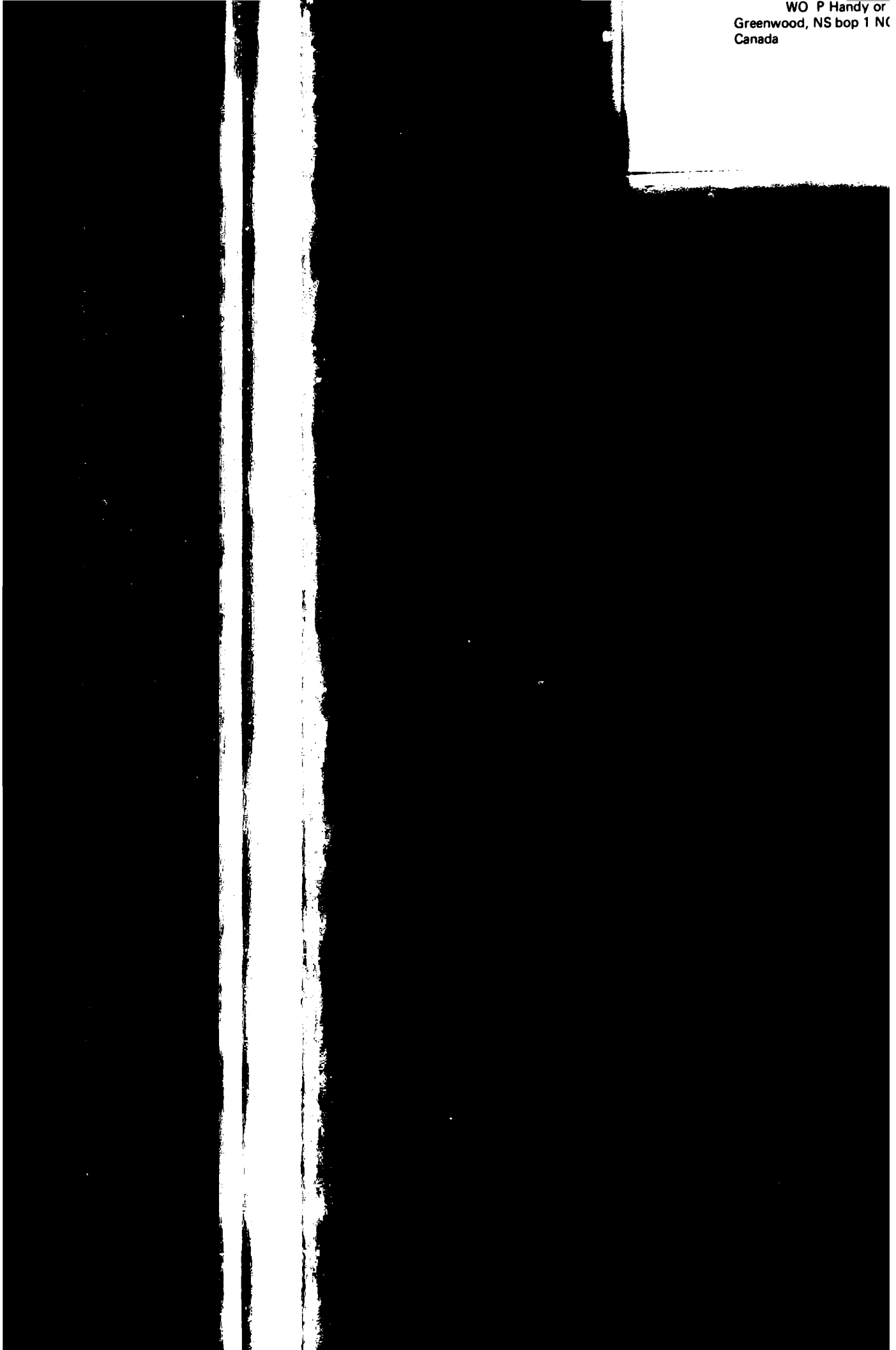
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