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SANDIA SYSTEMATIC DECLASSIFICATION REVIEW	
1st Review Date: 7/21/98 Authority: ☐ ADC ☒ ADD Name: W Sayre 2nd Review Date: 7/23/98 Authority: ADD Name: R B Craner	Determination (Circle Numbers): 1 Classification Retained 2 Classification Changed to: U 3 Contains No DOE Classified Information 4 Contains UCAI? no 5 Comments: OK for Openness

0377

FEB 3 1953
Ref. Sym: 1611 (175)
Project No. ET-1007
Completed 11/1/52

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MR. C. F. ROBINSON - 1263

Re: Environmental Test of Pneumatic Deicing System

Object of Test

This test was conducted to determine the ability of the BF Goodrich Model 6590 pneumatic deicer to remove ice from the Mk 7 Mod 0 plastic nose at specified temperatures and also to determine the effects on the deicer caused by twenty-five hours of operation.

Function of Object Tested

This deicer was designed to remove the ice from the nose of an externally carried Mk 7 unit.

Authorization for Test

The test was requested by Division 1263 in a Work Order Authorization dated September 19, 1952. Mr. V. M. Field was the consultant.

Summary of Results

The operation of the deicer was found to be satisfactory for ice of 1/4 inch thickness and less at all temperatures to and including -30°F. At -40°F the operation was not satisfactory. The removal of ice of 1/8-inch thickness at all temperatures to -30°F was satisfactory, even with pressures of 50 per cent of the normal 30 psi. There were no visible detrimental effects caused by twenty-five hours of operation under all conditions.

Procedure

A. Test Conditions:

Mk. 7
3-2

The deicer was connected to a cycling device (designed and constructed by 1611) that supplied dry air at a pressure of 30 psi for 3 seconds every minute. Immediately following the 3 seconds of 30 psi pressure, the deicer was vented to the atmosphere for one second and then a vacuum of 6 inches of mercury was applied for the remaining 56 seconds. This was to simulate the deicer system used on the carrying aircraft, as the system will be connected to the unit inflight.

The nose cap with the deicer attached was placed in a low-temperature chamber and a layer of ice 1/8-inch thick was formed on the deicer; then the cycling was started and continued until the ice was removed. This procedure was followed for various thicknesses of ice, and the positive pressure of the air supply was changed until the minimum operating pressure for 1/16 inch of ice was determined. The temperature of the chamber was lowered until the minimum operating temperature was determined.

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW DOWNGRADING OR DECLASSIFICATION STAMP	
CLASSIFICATION CHANGED TO: U Emelda Selph 7/29/98	AUTHORITY: R. B. Craner
PERSON CHANGING MARKING & DATE: [illegible] 7/30/98	RECORD ID: 98SN3084

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The deicer was operated for twenty minutes while its temperature was stabilized at +50, +40, +30, +20, +10, 0, -10, -20, -30, and -40°F to determine the physical effect of the operation on the deicer.

The system was then cycled without any ice until a total of 1500 cycles had been completed, after which the deicer was again inspected for visible deterioration caused by the environmental tests.

B. Equipment Used:

Sharpe air compressor
Cenco vacuum pump
Bowser temperature-altitude chamber (27 cu ft)
Wallace & Tiernan manometer
Cycling device and solenoid valves

Results

The operation of the deicer was satisfactory at all temperatures to and including -30°F. At -40°F the rubber became too hard to allow full expansion when the pressure was applied. The deicer satisfactorily removed ice of thicknesses up to 1/8 inch. The normal operating pressure is 30 psi, but satisfactory ice removal was accomplished with only 10 psi pressure for 1/8 inch of ice.

Figures 1 through 5 are sequence photographs of the deicer during operation. Figure 1 shows the deicer prior to the first cycle, Fig. 2 when inflated during the first cycle, Fig. 3 after inflation during the first cycle, Fig. 4 when inflated during the second cycle, and Fig. 5 after the second cycle. It should be noted that during flight, the air stream would greatly aid in the removal of the loose ice.

There was no visible damage or deterioration of the rubber after 1500 cycles at temperatures from -40 to +165°F.

M O Jones

Test Conducted by M. O. JONES - 1611

Original Signed By
R. L. WAGAR
Approved by R. L. WAGAR - 1611

MOJ:1611:mj

Distribution:
1/GA, C. F. Robinson - 1263
2/GA, J. R. Townsend - 1600
3/GA, F. J. Given - 1500
4/GA, A. F. Cone - 1520
5/GA, T. D. Morse - 1610
6/GA, J. M. Ralls - 1621-6 Attn: 1500 Drawing File

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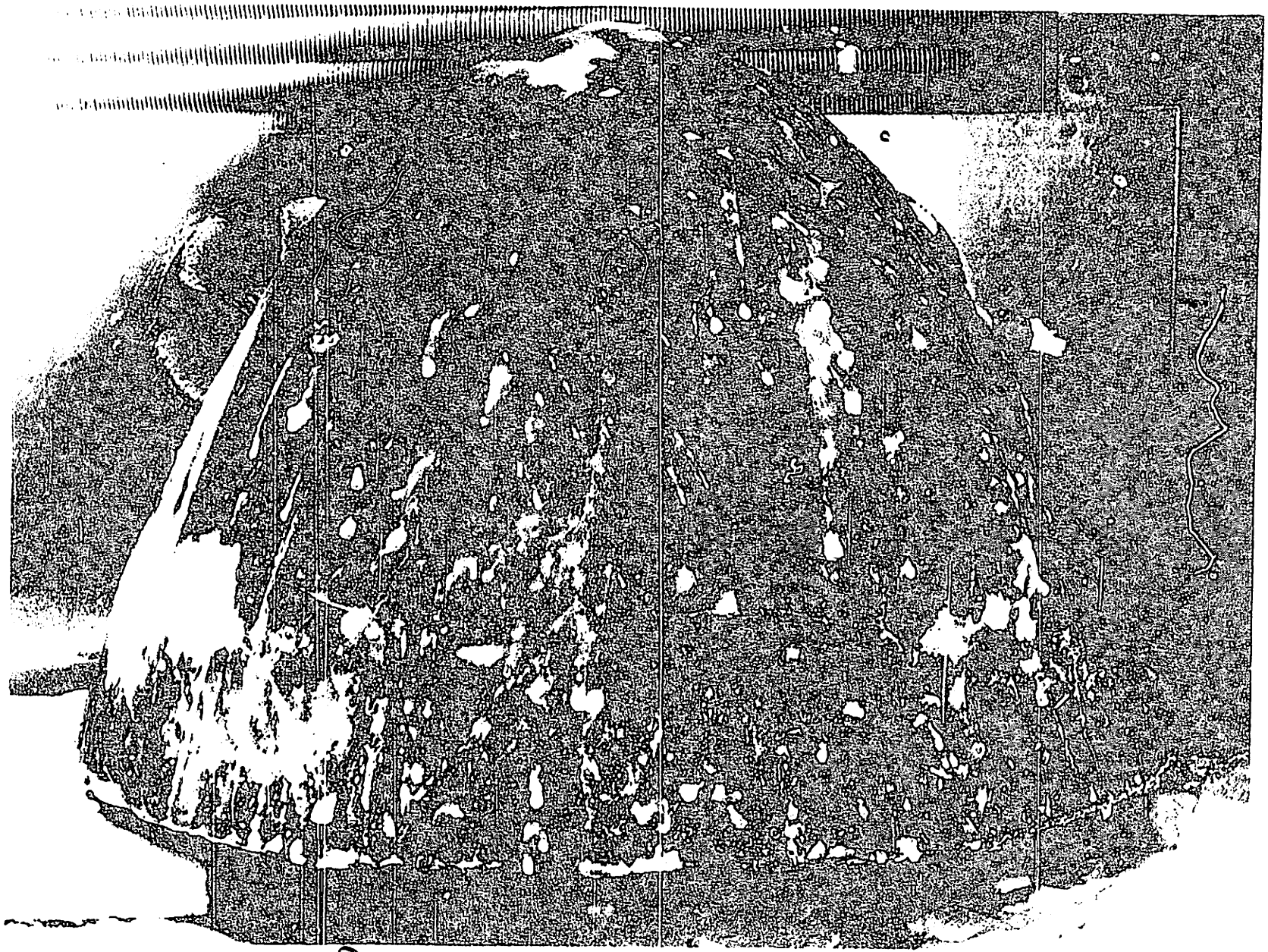

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FIG. 1 - MK-7 NOSE WITH DE-ICER PRIOR TO INFLATION

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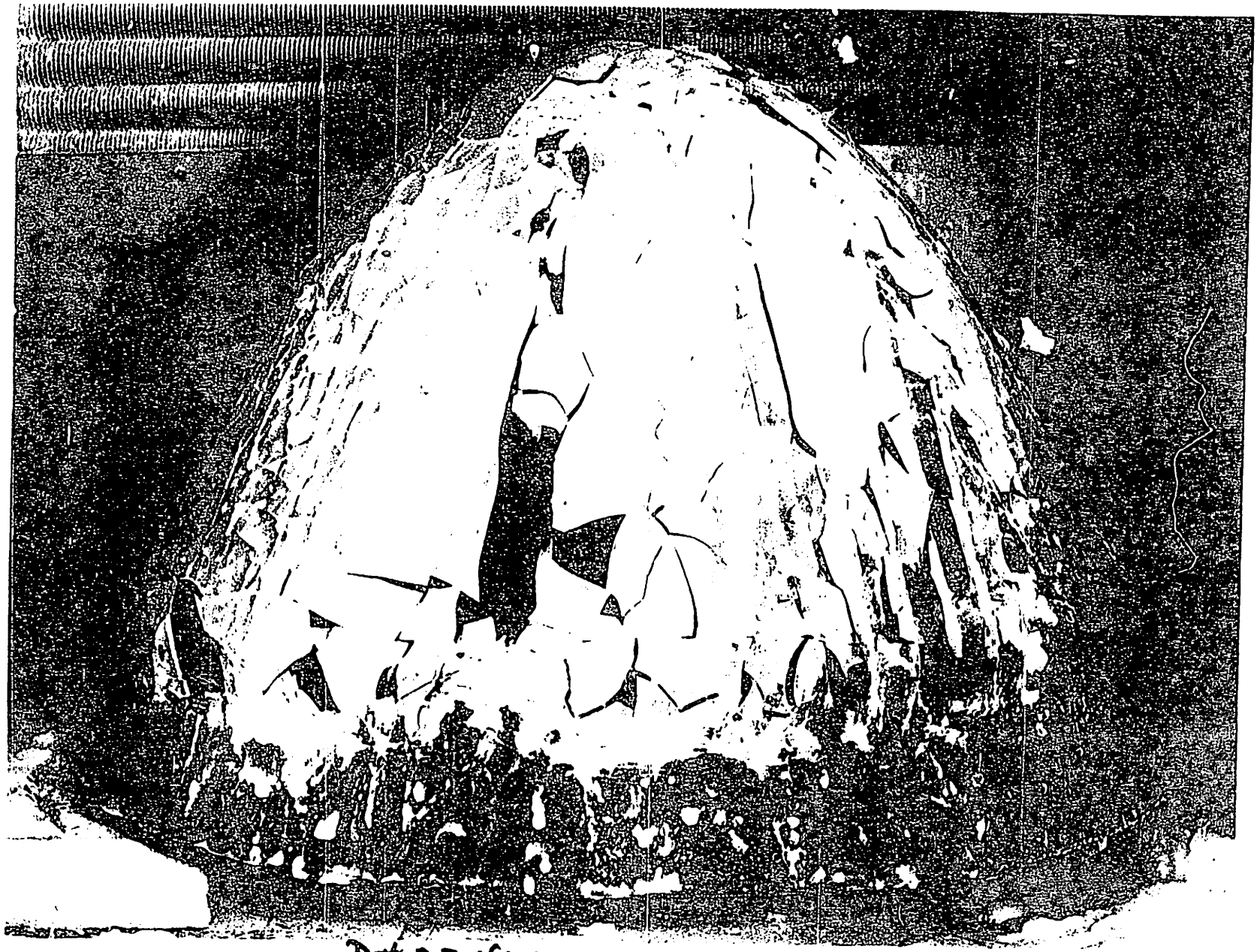

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FIG. 2 – MK-7 NOSE WITH DE-ICER DURING FIRST INFLATION

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FIG. 3 – MK-7 NOSE WITH DE-ICER AFTER FIRST CYCLE

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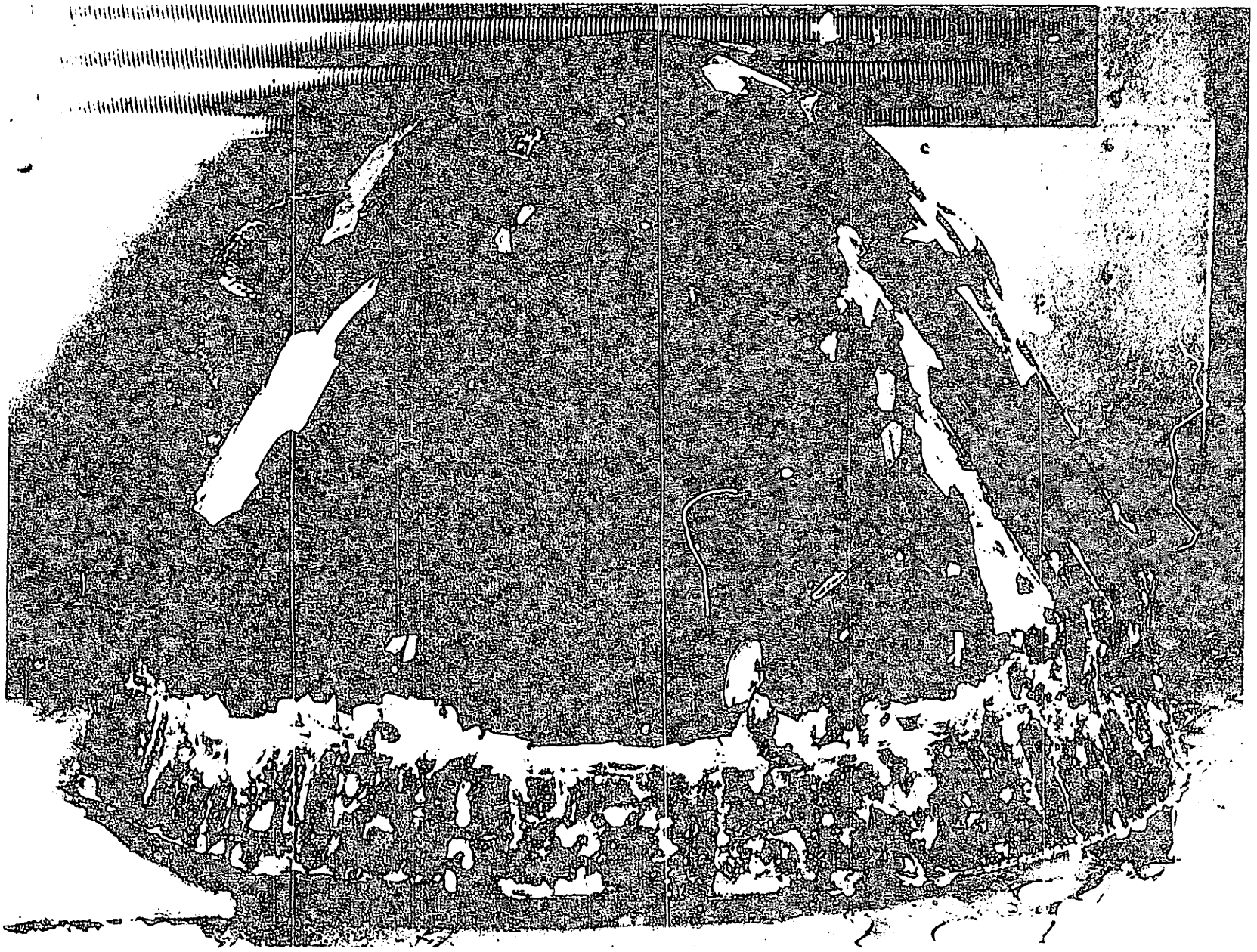

FIG. 4- MK-7 NOSE WITH DE-ICER DURING SECOND INFLATION

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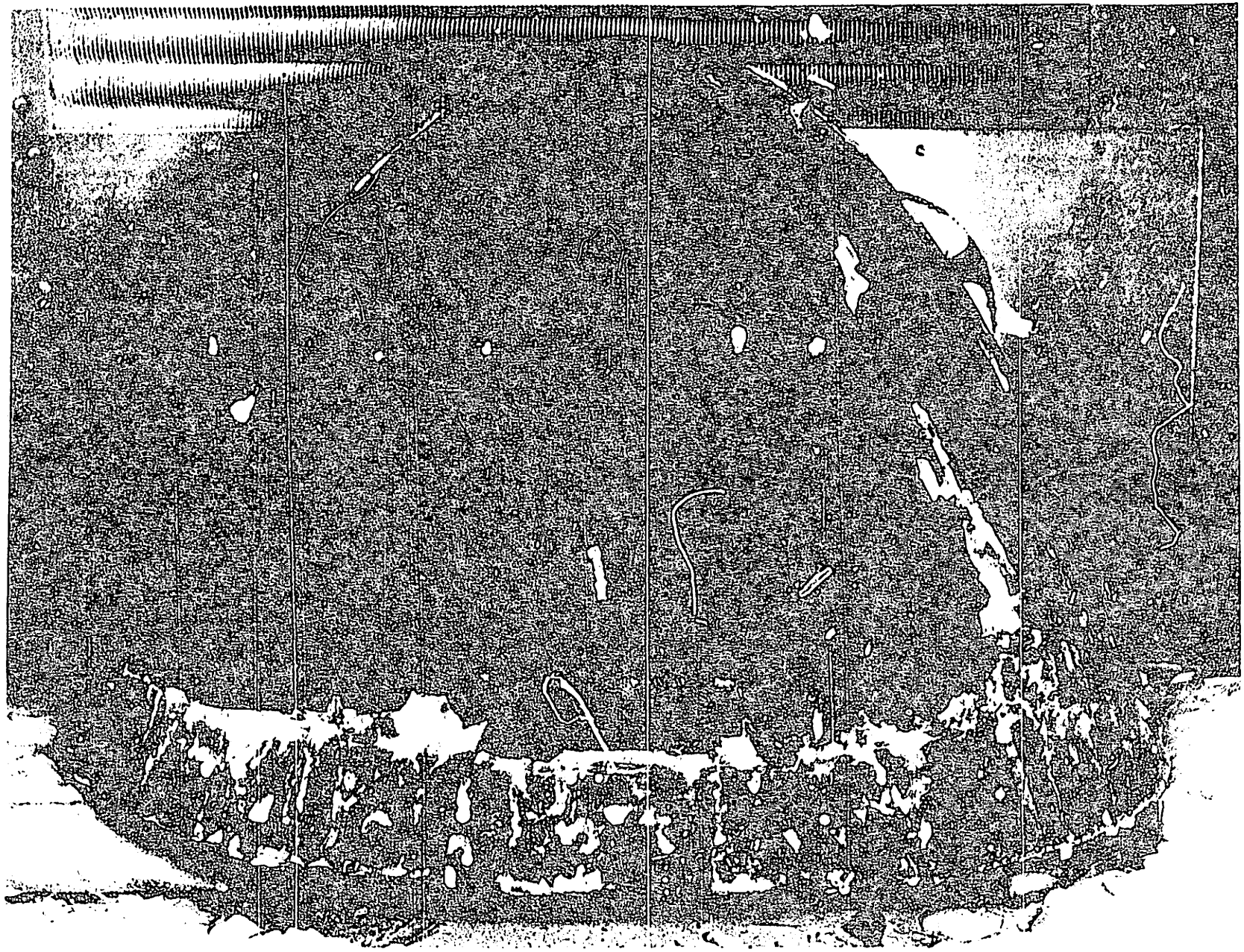

FIG. 5 — MK-7 NOSE WITH DE-ICER AFTER TWO CYCLES

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