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COVER SHEET

DOCUMENT TITLE	AUTHOR
Fabrication of Nickel-Gadolinium Oxide Foil Sleeves for SNAPTRAN	M. W. Mahoney

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ATOMICS INTERNATIONAL a division of North American Aviation, Inc **ENGINEERING DOCUMENT**	DOCUMENT NO. TI-700-28-011
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ABSTRACT A requirement exists for sleeves made of nickel foil containing selected concentrations of Gd_2O_3 as a dispersion. The foils will be installed around individual SNAP-10A fuel elements for special physics tests. A brief program was successfully conducted to develop the process for fabrication of the required sleeves.

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Objective: The objective of this program is to develop a resistance spot welding method for use during fabrication of nickel-gadolinium sleeves for SNAPTRAN fuel elements.

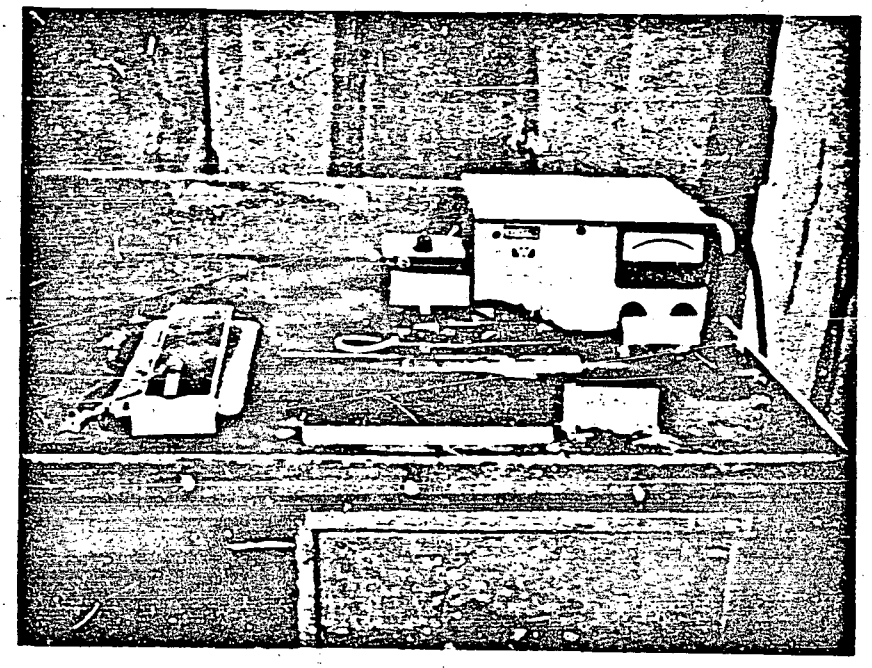
Purpose: The purpose of the program is to fabricate removable nickel sleeves containing various concentrations of gadolinium oxide. The sleeves must be welded such that remote application and removal from fuel elements is possible without damage to the sleeves. The sleeves are to be used in physics tests of a SNAP-10 core.

Technical Approach: To insure easy remote application and removal of the foil sleeves, 9 practice sleeves of 3 different gadolinium oxide concentrations were fabricated. All fabrication problems except one were solved. The one problem that remains is the copper electrodes sticking to the nickel foil and occasionally causing a small hole. Technically this problem has no bearing on the usefulness of the foil sleeves. However, the problem will be solved by use of different materials for electrodes and different configurations for the electrode tips. There are no requirements concerning the welding other than ease of remote application and removal.

The 1.260-inch diameter cylindrical sleeves are fabricated in lengths of $12.40\ ^{+.040}_{-.000}$ inches. The equipment used was a Unitek Weldamatic resistance spot welder with weld parameters of 20 watt-sec and a pressure of 3-4 pounds. The foil is wrapped around a graphite mandrel with a maximum overlap of 1/8 of an inch and secured with rubber bands. The mandrel is held in V-blocks beneath copper electrodes which are applied along the overlap seam using a foot control. A picture of the apparatus is included. With this method of operation the welding can be accomplished by one man. No fabrication problems are foreseen provided material received is in good condition and is cut to proper dimensions.

The following cost estimate assumes fabrication of 150 sleeves with the foil cut to proper dimensions.

	Hours
Engineering, Planning, Reporting, Scheduling and overall surveillance	50
Fabrication	225
Total	275



Fabrication of Nickel Foil Sleeves