Discussions were held on August 14, 1972 with several members of the INCO staff at Huntington, West Virginia. Those involved were Dennis Roth (Technical Services), Bob Burford (new assistant to Jim Martin in Sales), and J. C. Hosier, Jerry Harris, and Ralph Scarberry (members of technical staff involved with sulfidation studies). The purposes of the visit were 1) to obtain information on INCO's understanding of sulfidation and what alloys are most resistant and 2) to obtain samples of some potential alloys and information on available sizes of materials desired for loop studies.

INCO's sulfidation work has previously been carried out at Sterling Forest, but is being transferred to Huntington. The personnel at Huntington seem quite knowledgeable about what has been done at Sterling Forest and have started some experiments of their own. They agree with GE and Climax Molybdenum that Cr increases the resistance to sulfidation, but were hesitant to specify an amount that would be required to prevent sulfidation due to the other elements that vary from alloy to alloy. The most beneficial element according to INCO's work is Al. The addition of 2% Al is very beneficial. They are uncertain about the role of Mo.

They have used the above observations to make several alloys with varying degrees of resistance to sulfidation. These include Incoloy 811E (20.5% Cr, 2% Al), Inconel 601 (23% Cr), Inconel 606 (20% Cr; wrought form of INCO 82 filler metal), and Inconel 690 (30% Cr). The only alloy out of this series that we have tested is Inconel 601 and the results were favorable. Monel 400 (65% Ni, 35% Cu) has also looked good in our tests, but INCO has no experience with this alloy in sulfidizing environments.

All of these alloys (that have not already been) should be subjected to Shaffer's tests. The next step is to run some stressed tests where the material is exposed to Te in a salt environment. This is done most easily by tube burst tests and obviously would require tube stock. We should get one thermal convection loop in operation of a material that contains 20% or more Cr to assess the magnitude of the corrosion problem
as a function of temperature. With these factors in mind, the following arrangements were made for material procurement.

Incoloy 801 - 6 ft of 1 in. OD x 0.065 in. wall tubing will be sent gratis.

Inconel 601 - We will initiate an emergency purchase requisition to obtain the materials needed for a thermal convection loop.

Inconel 606 - 12 in. of 3/4 in. diam rod will be sent gratis. No tubing is available in this material.

Inconel 690 - 1 square foot of sheet (0.062 in. or 0.125 in.) will be sent gratis. No tubing is available in this material.

Monel 400 - We will initiate a purchase order for 1 in. OD x 0.083 in. wall tubing.

Enough time was available for a brief plant tour. This plant is unusual in that it has facilities for melting, primary fabrication, and making numerous product shapes including tubing, plate, sheet, bar, strip, welding electrodes, and many others.

H. E. McCoy

HEM:kg

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