

## Memo for Record

SUBJECT: Nickel Ion Concentration in Apollo 14 Water

This is to summarize the telecon of June 23, 1971 between Aaron Cohen, North American personnel, and MSC personnel (Ken Hecht, Elliott Harris, Dave Cauley, Jerry Lowe, Jerry Craig, and Don Hughes) to discuss the MR&OD memo to PA which summarized the results of the Apollo 14 water analysis.

Comparisons between Apollo 14 and previous flights were discussed. The following table was used for this purpose.

| Apollo Flight # | Time from last H <sub>2</sub> O Use to Sample Taking (hrs) |               | Postflight Ni Ion Concentration (mg/liter) |
|-----------------|--|---------------|--|
|                 | NR t   | MSC t         |  |
| 7               | 29:00  | 23            | -  |
| 8               | 19:40  | 19            | 2.42                                       |
| 9               | 18:47  | 18            | 2.97                                       |
| 10              | 13:04  | 9             | 0.34                                       |
| 11              | 20:07  | 19            | 1.1  |
| 12              | 19 days 7:22   | 19 days 5 hrs | 910  |
| 13              | -  | -             | -  |
| 14              | 45:41  | 44            | 6.0  |

Other information that was available (not to all conferees) during the discussion included the results of the water system delta qualification test and a ground-based test of the S/C 103 water system.

NR expressed the water system for possible sources of nickel. As suspected the primary source turned out to be the hot water tank brazes. Minute traces can come from the Fuel Cell, but this is not significant.

Concerning the inhibitor (NaNO<sub>2</sub>, average 55 ppm) and its relation to the amount of Chlorine, the statement in the MR&OD memo was in error because we were not aware that the concentration of chlorine had been decreased on Apollo 14 to 2.8 ppm (on previous flights it was 10 ppm). Accordingly it was concurred for the purpose of discussion that the inhibitor was not an issue for Apollo 14.

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The conductivity was questioned for Apollo 12 (in comparing with Apollo 14) by Elliott Harris. Dave Cauley did not have the 12 data available. Elliott will look at this when he returns from St. Louis. He fully expects the value to be lower than that for Apollo 14 (1.71).

A review of the table above and the delta qual. and S/C 103 tests, indicates that the most likely cause of higher concentrations of nickel in the water samples was increased time between last water usage and sample taking. In other words, the Apollo 14 analysis revealed the high nickel concentration because of "excessive" postflight time to sample taking.

To confirm the above conclusion, NR was requested to make some analytical calculations based on the qualification data and the S/C 103 data, as follows:

1. In-flight Nickel concentration (expect .3 to .4 ppm).
2. Nickel concentration someplace between 20 and 40 hours postflight. This could only be used to show trends since the data base will assume conservatively that all nickel rates are associated with the elevated temperatures (approx. 155°F) of the hot water, whereas the heaters are not on in the postflight condition.
3. By calculation determine if the nickel concentration is significantly affected by a reduction in  $\text{NaNO}_3$  to 40 ppm.

The results of the above calculations are to be discussed in another telecon with NR on Monday, June 28 at 2:30 CDT in Aaron Cohen's office.

/s/ Kenneth Hecht

cc:  
DA/Dr. Berry  
DB5/Dr. Harris  
DC7/Mr. Sauer  
DD/Dr. Hawkins

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