HA

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# Safety Test Pressure Vessels

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July 11, 1958

Lawrence Livermore National Laboratory

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DECLASSIFICATION STAMP ON REVERSE.

Conference Notes - Claude Benedix

COL 6Ne 2346

Subject: Safety Test Pressure Vessels [redacted]

Date: 11 July 1958

Participants: C. E. Violet, G. Higgins, B. Crowley, C. Benedix

Discussion centered around test results from the 300 site and the type of data to be passed to Holmes & Narver to allow them to complete feasibility studies and designs.

Conclusions were as follows:

1. The design would be for a 300 lb. HE equivalent yield, however Holmes & Narver would be furnished "Equivalent static pressure" (ESP) to design the vessel. The ESP will be based on extrapolation of test results. Data will be passed to H & N in the form of a curve showing the expected ESP - diameter relationships.

2. A 16' ID sphere appears to be a first estimate of an effective system.

3. To prevent an unnecessary number of safety factors from being introduced, and to reduce the thickness of the shell, consideration was given to specifying a working stress of the shell material past the elastic limit and about 10% below the standard listed ultimate strength. This would result in the vessel operating on the flat part of the stress - strain curve, allowing (relatively) large strains with little increase in stress. The value of this is that large strains would sap energy from the system yielding a lower final state of equilibrium. However, this would result in some permanent deformations which may not be tolerable for continued use of the system. It is recommended that for each material taken under consideration, a working stress be selected on the basis of the individual stress - strain curve, rather than specifying an arbitrary working stress 10% below ultimate.

4. H & N will be asked to develop a cost study comparing different materials of different mechanical properties taking into account fabricating difficulties of these various materials.

5. Associated equipment to be designed and considered in the study is as follows:

   a. Recovery system. Perhaps a dual pipe connected to sphere after event; use one pipe to pressurize and other pipe to withdraw material. A bottom drain with attendant connection problems is NOT desirable.

   b. Refrigeration of outer sphere surface to 0°F to assure "snow" ice retaining its density of 0.5 . Snow not to melt as this presents problems with pressure increase due to coupling.

[redacted]

[redacted]

[redacted]

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[redacted]

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c. Post shot ventilation thru Cambridge Type Filter @ 100 cfm (16'D sphere) .

d. Ice preparation equipment:

16' D sphere - 65000lb.

12' D sphere - 27000lb.

6. It was recommended that several H & N Engineers visit the Laboratory at the end of next week to discuss these phases in more detail. L6 has arranged this meeting, tentatively for Thursday, 17 July.

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