Progress Report for March 1959

VORTEX
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A. General

The design criteria discussed in the previous report (February, 1959) is still in preparation. The delay in its completion and release is not the primary cause for delay in the project design since the Architect-Engineer (Holmes & Narver), has not as yet received authority for design of anything but the sphere.

The preliminary proposal for the project is currently in preparation and is scheduled for release to ABC on or about April 15, 1959. With the assumption of normal review periods it is anticipated that construction funds will be available as of May 15 - June 1, 1959.

B. Test Work

1. Basic Design Data

1520A (1#) and 1520B (1½#) H.E. charges were fired in butter salt (particle size .012" - density 1.3 g/cc). The stresses on the sphere were decreased to .8 of that firing in air. However, the salt was compacted into a solid state and had to be chipped away from the sides of the sphere and manually crushed in order to remove it.

1521 (1#) H.E. charge was fired in rock salt (particle size .075" - density 1.16 g/cc). The stresses on the sphere were decreased to .33 that of firing in air or about the same as snow. The salt was still in particle size condition after firing. Some of it was crushed into smaller particles. It was easily removed by a vacuum cleaner.

As a result of this, testing will be conducted in the month of April to evaluate in detail the shock attenuation effects of salt relative to air and snow and to determine an optimum particle size.

2. Shrapnel Damage

1514 (3#) H.E. equivalent Wren hydro device to be delivered in late April. 1515 (3#) H.E. equivalent Robin X-1 hydro device to be delivered in late April.

3. Sphere Support Study

The initial support study is completed and proves the feasibility of mounting the sphere through rubber shock absorbers attached at the equator and to vertical columns. No stress concentrations were noted around the mounts.
4. Scale Verification

In addition to the scaled air and snow shots to be conducted in the 2' and 3' spheres, scale verification shots will also be conducted using rock salt as the shock attenuation medium. The two 2' spheres were hydrostatically tested and accepted at the fabricator. They were shipped March 31, 1959.

The two 3' spheres are now expected to be completed by May 15, 1959.

5. Cable Entry

The four different schemes for sealing diagnostics cables entering the sphere were leak tested with gas statically. One method was highly successful, being leak tight at 625 psig. This method consists of breaking the cable and connecting each inner wire to one end of a central conductor which is impedance matched to the cable and potted in the cover plate. The braids are attached to the cover plate for continuity. Dynamic testing will be conducted in the 3' sphere.

6. Chemical Engineering Sphere

The 19" ID sphere was dynamically tested with five 100 gm shots and then the welds were re-radiographed. No change was noted in these welds and the sphere has been released to Chemistry.

7. Snow Particle Size

Three shots were fired in snow of various particle sizes in late March. No conclusive results are yet available. The actual particle size of the four grinds available will be measured in April.