[redacted] This document consists of 2 pages

DNA1.940930.103

DASAST

2 FEB 1962

MEMORANDUM FOR: ASSISTANT TO THE SECRETARY OF DEFENSE (ATOMIC ENERGY)

SUBJECT: Storage Criteria for Plutonium Bearing Weapons

1. An informal meeting was held in Headquarters, DASA on 26 January 1962 to consider possible answers to a letter from Sir Solly Zuckerman, British Ministry of Defence to you dated 16 January 1962, which sets a limit [redacted] on the amount of plutonium that may be stored in one cell of a multicubicle magazine at [redacted]. The meeting included: Capt Bennett, Office ATSD(AE); Dr. Otting, DASA; Col Tyler, DASA; and representatives from the Navy, SACLANT, and ASESB.

2. After consideration of the several possible proposals, the attendees recommended that the DASA earth covered storage structure described in the attached drawings be suggested to the British as an alternate solution. This structure appears to have advantages of compactness approaching that of the multicubicle structure together with an earth cover which, in U. S. practice, provides a scavenging factor of 2 as in the conventional earth covered igloo. The structures would be designed to prevent the propagation of explosion of 2000 lbs of H.E. between adjacent cells. This H.E. loading per cell would correspond to the H.E. amount associated with [redacted] of plutonium stored in an earth covered igloo which is allowed by the U. S. criteria established by the Joint Board for Future Storage. Since the scavenging factor of 2 provided by an earth covered igloo is reasonably well established, and accepted by U. S. standards, the structure should permit storage of [redacted] of plutonium per cell on the basis that the British would allow storage of [redacted] Pu with no scavenging. It is hoped that this limit may later be raised by U.S.-UK negotiations to the U. S. limit of [redacted] per cell.

3. The cost of construction of the earth covered storage structure for the two sites involved should be comparable to the cost for multicubicle construction with the advantage that [redacted] of plutonium, and possibly later [redacted] rather than the maximum [redacted] could be stored in each cell. It is therefore recommended that the DASA storage structure be submitted to the UK as an alternative proposal for the two specific sites under consideration. [redacted]

DASA 82155

[redacted]

ST Comeback Cy

Declassified WITH DELETIONS by
DNA, Chief, ISTS
DATE 9/28/94

HRE-0802

[redacted]

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4. The above recommendation does not imply that DASA supports the British proposed reduced limits on storage of plutonium bearing weapons. This recommendation is intended only to expedite the construction of the specific storage facilities urgently needed by SACLANT in the United Kingdom. An effort to resolve the basic difference of opinion on the limitation of the amount of plutonium permitted to be involved in one accident should be carried on in parallel. Appropriate adjustments in the plutonium limitations for these two sites can be made when the UK and U.S. reach agreement as to the amount that can be permitted to become involved in one accident.

2 Incl
1. Drawing
   Multi Barrel
   Ammo Storage
2. Results of Storage
   Structure Tests

ROBERT H. BOOTH
Major General, USA
Chief

M/R: The first letter written by Dr. Johnson to Sir Solly Zuckerman on 13 October 1961 suggested a multicubicle storage structure [redacted] Sir Solly replied on 16 January 1962 stating that the Medical Research Council would only agree to a storage of [redacted] of plutonium * in a multicubicle type structure. This limitation and the indication from testing that multicubicle structures may not stand 425 lbs H.E. loading lead to the suggestion that DASA type structure which was tested on 15 Jan 62 at Inyokern, Calif may provide a soultion.

Coordination by Navy will be obtained by ATSD(AE) on the final xx letter.

* per cubicle

DepCh,NV DepCh, AF

ST LG AG CS CH

[redacted]

Dr [redacted] mfv 1B662 55265

TECHNICAL RESULTS OF TESTS CONDUCTED ON MULTI BARREL STORAGE STRUCTURES

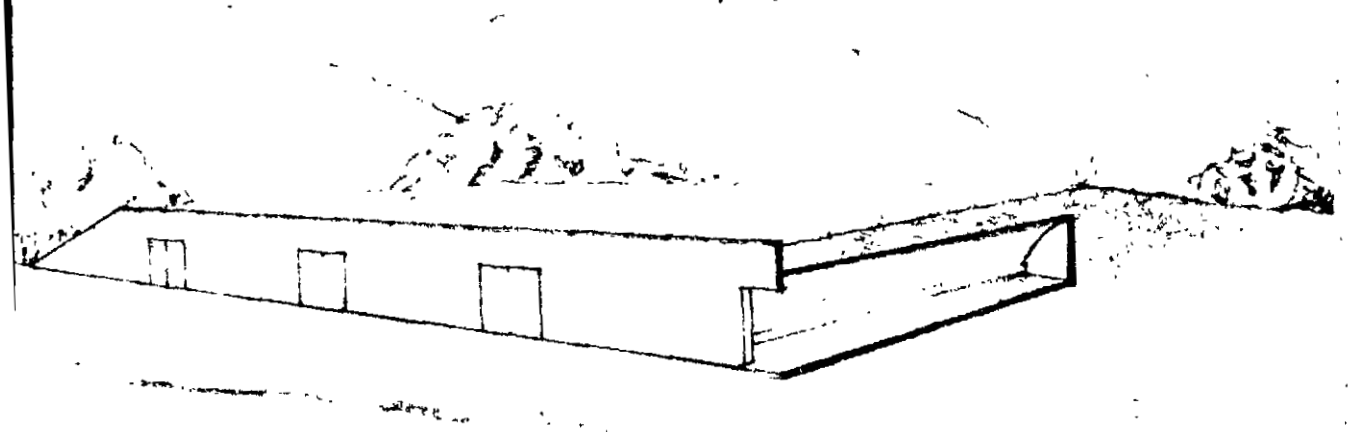
On 19 January 1962 a three barrel structure, designed as indicated in the attached sketch with the exception that the barrel was 6 feet in radius and 25 feet in length, was tested under an explosive loading of 2180 pounds of hi explosives in the form of eight G.P. bombs simultaneously exploded in the center barrel. Separation between the center barrel and the right hand barrel was $\frac{1}{2}W^{1/3}$ = 6'6" (W is weight of H.E. in pounds of RDX equivalent). Separation between the center barrel and the left hand barrel was $W^{1/3}$ = 13'. Both barrels suffered extensive deformation with the lower, right hand, barrel being completely ruptured. No propagation occurred to the acceptor charges (four [redacted] spheres in each barrel). No fragment penetrated any acceptor in the left hand barrel. A fourth barrel located 59' behind the center barrel was undisturbed and weapons therein were still on their stands.

Based on observed results of the above test, and on other available data, Armed Forces Explosive Safety Board has stated that a structure of this design is adequately safe, insofar as propagation of an H.E. detonation in one barrel to other barrels is concerned, if the thickness of earth fill between barrels in feet is $1.5W^{1/3}$ (but not less than 7'). The coefficient of W was raised from 1 to 1.5 to provide an arbitrary additional safety factor. The Defense Atomic Support Agency concurred at conclusion.

Far form the separation between barrels would be as follows for the loadings indicated:

E. Loading	$1.5\ W^{1/3}$
100 lbs	11 feet
1000 lbs	15 feet
2000 lbs	18.9 feet

Incl 2

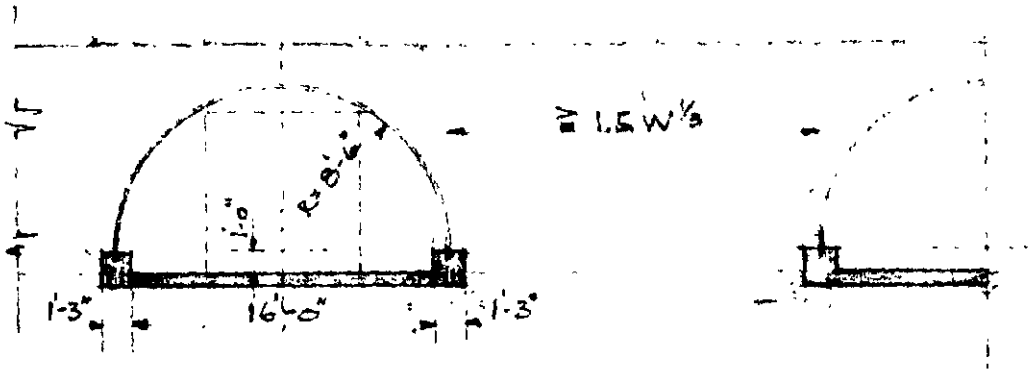


· PERSPECTIVE ·

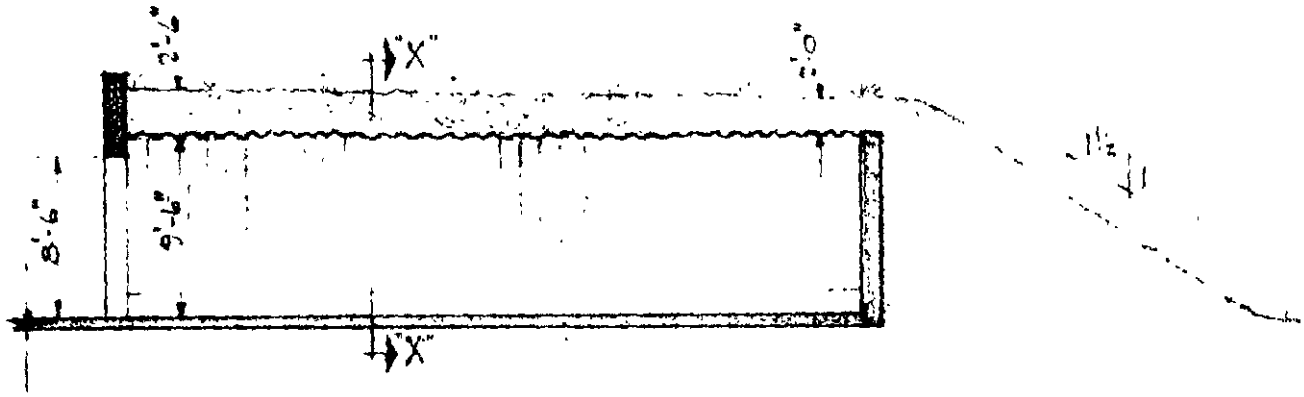
GENERAL NOTES ·

1. HEAD & REAR WALLS - 12" R. CONC. w/ ½" ϕ RODS 12" o.c., b.w., b.f. STAGGERED.
2. ARCH - HEAVY CORRUGATED STEEL PLATE.
3. SPACING OF ROWS - FRONT TO BACK: $4.5W^{1/3}$; BACK TO BACK: $2.35W^{1/3}$
4. DIMENSIONS MAY BE VARIED TO SUIT OPERATIONAL CONDITIONS PROVIDING EARTH COVER. OVER ARCH IS NOT LESS THAN 2 FEET THICK & DISTANCE BETWEEN BARRELS IN FEET IS EQUAL TO, OR GREATER THAN, $1.5W^{1/3}$ AND IS NOT LESS THAN 7 FEET WHERE "W" IS WEIGHT OF EXPLOSIVES IN POUNDS RDX EQUIVALENT.*

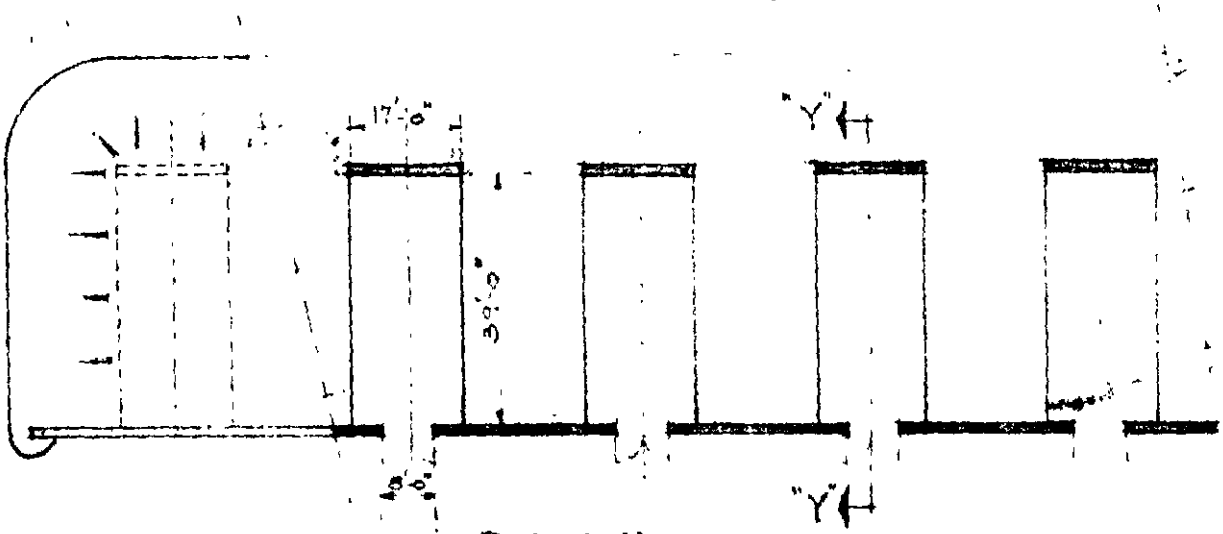
LT. · BARREL · AMMO · STORAGE



· SECTION · X-X ·



· SECTION · Y-Y ·



· PLAN ·

Sheet 1