

This document consists of 3 pages.

No. 3 of ~~Atomic Energy Series~~

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DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW	
1ST REVIEWER-DATE: 6-22-94	DETERMINATION (CIRCLE NUMBER) <input checked="" type="radio"/> 1
AUTHORITY: EAOC 1.2.4.2	<input type="radio"/> 2 CLASSIFICATION CHANGED TO
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July 6, 1953

CRM FILE BC i



DD 64848

TO: A. C. Graves

FROM: Carson Mark

SUBJECT: COMMENT (AS OF JULY 1, 1953) ON EXPECTED BEHAVIOR OF CASTLE DEVICES

SYMBOL: T-505

NMB-U

No specifically relevant yield calculation has been made for any of the Castle devices as of this date, and it will be several months yet before such calculations can be expected. There have been a number of parameter studies of the variation of yield with compression, with mixing, etc., but some of these (notably the ones containing Li) are known to contain errors (which are in process of being corrected) in addition to the great oversimplifications necessarily introduced into such calculations. The problem of designing the particular devices has been approached simply by trying to place ourselves as favorably with respect to the important parameters as conditions of weight, size, materials available, etc., would permit. Any comment at this time concerning the yield to be expected of any of these particular devices is consequently more a quotation of the yields which appear to be applicable to a device of that general sort than an estimate of the expected behavior of the particular object.

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DETERMINATION (CIRCLE NUMBER) 1

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This situation is a little more straightforward than indicated above - where the Mike shot results may also be used to guide an estimate; but less straightforward with respect where neither the progress nor the effect of mixing can be cleanly estimated, but where mixing in some degree and form could interfere decisively with the operation.

DOE
DOE

Before the Castle Operation, it is hoped to improve the nature of the estimates available; but, with the present gaps in our understanding of the processes, even the most careful calculations that can be devised will lead to estimates that are quite uncertain and with which it will be necessary to associate a wide range of possible behavior.

The current estimates of probable yields, and ranges which are believed to cover most of the present uncertainty, are given below. In connection with the ranges quoted it may be worth mentioning that these ranges merely reflect the lack of precision in our present understanding of these objects, and are not to be taken as a probable spread in the yield realized by a particular device from shot to shot. There is no reason to believe that the yield obtained from a particular object of this kind would not be about as reproducible as the yields of fission weapons appear to be.

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- on the basis of comparison with Ivy.

DOE

May be lower: _____ or
higher because of expected better simultaneity than Mike.

DOE

Presumed range: 6 - 10.

_____ probable yield.

DOE

This allows for some, but not decisive, interference from mixing.

DOE

_____ The yield
might turn out higher if mixing is very mild, and 6 is
proposed, - not as an absolute upper limit on what is
possible, - but as an upper limit on what is expected.

Presumed range: 1 - 6.

DOE

The behavior of this device is highly uncertain due to

DOE

the yield could run higher; but 7 seems as
high as could reasonably be considered probable.

Presumed range: 1-1/2 - 7.

DOE

DOE

At the upper end, 8 is proposed, not as an absolute limit, but
as an upper limit on what is expected.

Presumed range: 4 - 8.

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In the considerations outlined here, no weight has been put on the possibility of

[redacted] that the yield realized be in the region of tens or hundreds of kilotons rather than megatons.

DOE

When it may become necessary or possible to revise or improve the estimates given above, a supplement to this comment will be prepared.

Carson Mark
Carson Mark *li*

CM:li

Distribution:

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