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Ref: J-16083

4 February 1953

TENTATIVE EXPERIMENTAL OUTLINE
OPERATION CASTLE (U)

William E. Ogle

[redacted]

Sanitized by NN-523 on 2/5/98

This outline is intended only to furnish a first basis for planning by those groups who require an over-all estimate of the job to be done in order to make judgments of their own jobs. Thus, this is a "first draft" of the experimental plan. Rather large changes are to be expected in this plan as further investigations of the problems are made. The Livermore and DOD portions of this program are based on what is, at this stage of the game, little more than rumor.

Operation Castle is presently conceived to consist of six detonations, as follows:

Shot	Model	Site	Tentative Dates	Remarks
1	DELETED	Elugelab*	15 Feb 54	Ground
2		Eninman	22 Feb 54	Ground
3		Bikini Atoll	1 Mar 54	Barge or Ground
4	DELETED	Bikini Atoll	11 Mar 54	Barge
5		Bikini Atoll	21 Mar 54	Barge
6		Eberiru	28 Mar 54	Ground

DOE

*There is still some doubt that Elugelab will be radioactively safe for work on Castle. A survey is presently being made to establish this point. If Elugelab is not usable, it will be necessary to move on down the reef toward Rigili.

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
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AUTHORITY: DADC, EADC, DADD
NAME:
2ND REVIEW-DATE: 10-8-97
AUTHORITY: ADD
NAME:
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1. CLASSIFICATION RETAINED
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6. CLASSIFIED INFO BRACKETED
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Att 16

A. C. Graves

[redacted]

PROGRAM 2 - NUCLEAR RADIATION STUDIES

Would cover the same ground as Programs 4 and 5 on Ivy, with the addition of studies on neutron and gamma-ray shielding. Would presumably stress fall-out studies.

PROGRAM 3 - STRUCTURES AND CRATERS

Would measure crater sizes and shapes, and study reaction of existing structures to blast wave.

PROGRAM 4 - BIOMEDICAL STUDIES

Mainly neutron dosimetry with mice.

PROGRAM 6 - SERVICE EQUIPMENT AND TECHNIQUES

IBDA work, effects of blast and thermal radiation on manned aircraft, electromagnetic effects, and tests of decontamination methods.

PROGRAM 7 - LONG RANGE DETECTION

Essentially a repeat of Ivy measurements.

PROGRAM 8 - THERMAL RADIATION

A study of the obscuration effects of dust, etc., on surface shots.

[redacted]

Requires construction of two towers, one on Bikini and one on Enyu Islands. May in addition use Felt's station on Bogallua.

[redacted]

Project 13.2 - Cloud Photography (H. Grier). All shots. At least two airplanes (C-54 or B-36) required. Will use photo stations of 3.1 in addition.

Project 13.3 - Monochromatic Photography - GR Slits, etc. (H. Grier). [DELETED] [DELETED] Will use same stations as 3.1, above. This project is a collection of the small, multifarious photographic experiments required to increase our knowledge of the phenomena taking place and, therefore, to develop the ability to take the proper kind of pictures. It is expected that the details of this project will not be set for many months yet, but this will cause no trouble since the same stations are used as for 3.1, above.

Project 13.4 - High-speed Photography (G. Felt). [DELETED] Both Bowens and high-speed frame cameras will be used to observe radiation flow and case motion. Experiment will probably require new photo stations on Cochiti or San Ildefonso, and on Aomoen or Romurikku.

Project 13.5 - Time Interval Measurement with Bowens (G. Felt). [DELETED] [DELETED] [DELETED]

PROGRAM 14 - EXTERNAL NEUTRON MEASUREMENTS - C. Cowan

Jughead only. An attempt will be made to improve the Ivy techniques to allow a good measurement of the total neutron flux external to the bomb, and to allow a measurement of the spectrum of those neutrons.

Project 14.1 - Threshold Detectors (W. Biggers). This project will probably require much more massive stations than those used at Ivy.

Project 14.2 - Nuclear Emulsion Plates (D. Phillips). Some three stations to be used.

PROGRAM 15 - ALPHA MEASUREMENT - N. H. Smith

This program concerns itself mainly with means of measuring alpha which allow for remote recording.

Project 15.1 - Teller Alpha (project leader to be designated by N. Smith). [DELETED] If done, this experiment could use the various photo towers as receiving stations. However, the decision to do the experiment must await results of Upshot.

Project 15.2 - Alpha by Electromagnetic Signals (project leader to be designated by N. Smith). [DELETED] Will require recording station on Parry, and close to timing station on Enyu. Again, decision to do experiment must await results of Upshot.

[redacted]

Project 15.3 - Telemetered Alpha (project leader to be designated by N. Smith). DELETED This project will require a buoy or raft ~ 500 yds from the bomb, and some four conductors from there to the timing cable.

PROGRAM 16 - GAMMAS AND RESIDUAL CONTAMINATION (Agency not yet chosen)- B. Watt?

Project 16.1 - Gamma Intensity at Late Times. DELETED This measurement is intended to give the total number of neutrons captured in air (by observation of capture gammas) and the total number of fissions (by observation of fission fragment gammas). Approximately three stations required, possibly on Bogon and Teiteiripucchi.

Project 16.2 - Film Badge Total Dose. It is not yet clear that this is a desirable measurement, and it is included only for the sake of completeness.

PROGRAM 18 - THERMAL RADIATION (Program Director not yet designated)

Project 18.1 - Time Interval between Reactions (H. Stewart). DELETED As on Ivy, the time interval will be measured by observation of the Teller light, using photomultipliers as detectors.

Project 18.2 - Power vs Time (H. Stewart). DELETED DELETED The various photo towers can be used as receiving stations for this project.

Project 18.3 - Spectroscopy (H. Stewart). The extent of this project will not be decided for some time. Will require platform on each photo tower and station on Engebi.

Project 18.4 - Air Transmission and Resolution (H. Stewart). DELETED An attempt will be made to properly specify the transmission conditions necessary for effective photography. These parameters will then be measured at the time of the shot in order to insure good ball-of-fire, etc., pictures.

TASK UNIT 12 (LIVERMORE - Arthur J. Hudgins)

The programs listed under this task unit are quite tentative (as is this whole paper). They were outlined during discussions with A. Hudgins. It is expected that a much fuller outline will be available in a few weeks.

PROGRAM 21 - RADIOCHEMISTRY (Unknown)

Analysis for fission and fusion energy yields. DELETED DELETED Will use samples collected by Project 11.2 on those shots. No field facilities required.

[redacted]

[redacted]

DELETED [redacted] Will try to study details of compression and burn on above two devices. Will require recording stations on Bigiren or Airukiraru and on Aomon or Bijiiri. Vacuum pipe systems are necessary, probably in both places.

PROGRAM 23 - PHOTOGRAPHY

Project 23.1 - Ball of Fire Photography (H. Grier). [redacted] DELETED [redacted] Can use towers on Enyu, Bikini, and Parry, but may require use of coral head at Eniwetok.

~~Project 23.4 - High-speed Photography (Unknown).~~ [redacted] DELETED [redacted] DELETED [redacted] Will probably require recording stations on Enifirikku and Bokonaarappu.

In conclusion, it must again be emphasized that this whole program is very tentative, and can be expected to change seriously in the coming months.

Original Signed by
WILLIAM E. OGLE

William E. Ogle

WEO:djw

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