001535

UNCLASSIFIED

SC 1004-A (3-55)

[redacted]

ATOMIC WEAPON DATA

SIGMA 3

Ref. Sym: 7223 (433)

[redacted]

[redacted]

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW

Emelda Selph 11-25-96	R.T. Duff
W. Layne 11-26-96	97SN067
PERSON VERIFYING MARKING & DATE	DATED 10/31/96

INVENTORIED

MAR 8 1965

3427-1

SCTM239-57(25)

WEAPON: BIRTH - LIFE - DEATH
SANDIA CORPORATION CONTROLLED ITEMS

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW

1st Review Date: 10-16-96	Determination (Circle Numbers)
Authority: ☐ ADC ☒ ADD	1. Classification Retained
Name: W. Layne	2. Classification Changed to: 4
2nd Review Date: 10/31/96	3. Contains No DOE Classified Information
Authority: ADD	4. Coordinate With:
Name: R.T. Duff	5. Contains UCAI?
	6. Comments:

Inventoried September 1966

MAR 1 1966

G. C. McDonald - 2530

3428-3

ABSTRACT

This memorandum summarizes a typical weapon program and was written to serve as indoctrination or refresher information for technical personnel as indicated by supervision. This document supersedes and replaces Technical Memorandum 249-54-16 and has been brought up to date to reflect the most current processes.

INVENTORIED

AUG 1 1968

3427-1

Work performed under AEC Contract AT-(29-1)-789.

[redacted]

THIS DOCUMENT CONTAINS 12 PAGE(S)
NO. 86 OF 87 COPIES, SERIES A.

UNCLASSIFIED

[redacted]

August 30, 1957

[redacted]

[redacted]

DISTRIBUTION:
1/87A - K. F. Hertford, ALOO
2/87A - P. W. Ager, ALOO
3/87A - R. P. Johnson, ALOO
4/87A - J. L. McCraw, ALOO
5/87A - F. C. DiLuzio, ALOO
6/87A - A. E. Uehlinger, ALOO
7/87A - W. W. Stagg, ALOO
8/87A - E. H. Draper, 1200
9/87A - L. A. Hopkins, 1400
10/87A - J. R. Townsend, 1600
11/87A - C. J. McGarr, 2200
12/87A - K. S. Spoon, 2300
13/87A - R. E. Hopper, 2400
14/87A - F. E. Burley, 2500
15/87A - G. A. Parker, 2700
16/87A - S. C. Hight, 5100
17/87A - R. A. Bice, 5200
18/87A - L. J. Paddison, 5500
19/87A - A. B. Machen, 7100
20/87A - C. W. Campbell, 7200
21/87A - L. E. Lamkin, 7300
22/87A - T. T. Robertson, 7400
23/87A - W. J. Howard, 8100
24/87A - W. C. Scrivner, 1210
25/87A - J. P. Cody, 1220
26/87A - E. H. Draper, 1240
27/87A - L. D. Smith, 1260
28/87A - C. H. DeSelm, 1280
29/87A - W. E. Boyes, 1290
30/87A - T. S. Church, 1410
31/87A - T. F. Marker, 1420
32/87A - E. L. Deeter, 1440
33/87A - J. H. Findlay, 1450
34/87A - W. O. McCord, 1460
35/87A - J. I. Hegge, 1470
36/87A - W. A. Gardner, 1610
37/87A - C. F. Bild, 1620
38/87A - H. C. Biggs, 1650
39/87A - C. J. Baumgartner, 2210
40/87A - W. G. Jenkins, 2220
41/87A - W. R. James, 2310
42/87A - J. E. McGovern, 2320
43/87A - W. R. Rosenburg, 2330
44/87A - E. C. Pace, 2340
45/87A - L. E. Fuller, 2510

[redacted]

[redacted]

[redacted]

DISTRIBUTION: (cont)

46/87A - J. W. Hook, 2520
47/87A - G. C. McDonald, 2530
48/87A - W. C. Kraft, 2540
49/87A - A. K. Leupold, 2550
50/87A - E. P. Hutson, 2740
51/87A - H. W. Maglidt, 4110
52/87A - A. F. Cone, 5510
53/87A - G. H. Roth, 5520
54/87A - W. M. O'Neill, 5530
55/87A - G. C. Hollowwa, 7120
56/87A - R. A. Knapp, 7130
57/87A - H. E. Viney, 7310
58/87A - L. R. Neibel, 7320
59/87A - F. F. Eichert, 7410
60/87A - D. J. Yarbrough, 7420
61/87A - C. R. Barncord, 8110
62/87A - L. E. Hollingsworth, 8120
63/87A - E. W. Baldwin, 8130
64/87A - T. L. Daniel, 2511
65/87A - W. L. Martin, 2513
66/87A - L. E. Snodgrass, 2514
67/87A - E. C. Domme, 2521
68/87A - E. M. Irving, 2522
69/87A - C. A. Ashby, 2524
70/87A - H. H. Brueggemann, 2531
71/87A - L. W. Schulz, 2532
72/87A - D. S. Bliss, 2533
73/87A - C. E. Foster, 2541
74/87A - W. T. Price, 2542
75/87A - B. E. Arthur, Jr., 2543
76/87A - T. W. Holmes, 2544
77/87A - P. W. Callies, 2551
78/87A - G. J. Hildebrandt, 2552
79/87A - J. R. Sublett, 2553
80/87A - J. McMinn, 8141
81/87A - R. K. Smeltzer, 7221-3
82-87/87A - L. F. Parman, 7223 [redacted]

[redacted]

[redacted]

[redacted]

WEAPON: BIRTH - LIFE - DEATH
SANDIA CORPORATION CONTROLLED ITEMS

This memorandum summarizes all phases of a typical weapon program, from weapon conception to stockpile entry and possible retirement. It is written to serve as indoctrination or refresher information for technical personnel.

1. Weapon Conception (a or b):

   a. Studies may be conducted on a continuing basis by AEC agencies such as Sandia Corporation, Los Alamos Scientific Laboratory, and University of California Radiation Laboratory. These studies may be informal and independent from the DOD or they may be conducted jointly with the DOD. An informal study may result in the focusing of sufficient DOD interest in a modification of a present weapon or in the development of a new type weapon to warrant a formal study.

   b. The DOD may conduct continuing studies, independent of the AEC or jointly with the AEC. Sufficient attention may become focused on an item to warrant the initiation of a formal study. The DOD may request AEC to make a program study on a new idea or component or the DOD may initiate its own study.

NOTE

This stage is often called Phase 1. Work in succeeding phases is normally not done until Phase Authorization is issued by ALO/AEC.

2. Feasibility Study:

   a. The AEC performs independent feasibility studies as desired. Based on the DOD's request for a feasibility study, the AEC makes a study to determine a weapon's feasibility, development and production time scale, costs and interprogram effects, etc., and reports the results of the study to the DOD.

   b. Similarly, the DOD may perform independent feasibility studies or may ask assistance, as desired. The DOD also furnishes detailed guidance on weapon characteristics and probable requirements to the AEC and reviews the AEC's feasibility studies. From the feasibility studies the required Military Characteristics are determined by the DOD for the weapon and furnished to the AEC.

[redacted]

c. If a review of the feasibility study indicates that a development program is desirable, the AEC and DOD reach a joint agreement on the division of responsibilities for development and procurement. From time to time agreements may be made covering items in a whole class of weapons.

d. The feasibility study usually leads to a Feasibility Report. It is also possible that limited model shop hardware is built during this stage to provide early design parameters.

NOTE

The feasibility stage is called Phase 2 in ALO programming language.

3. Development Process:

a. The layout of the design on the drawing boards is done as completely as possible in an attempt to minimize cut-and-try development. The parameters derived from the Military Characteristics, from the feasibility study, and those established as standard by Government Standards and Specifications are used and expanded. Early testing and adjusting of design is accomplished to better enable the proposed weapon to meet the Military Characteristics. At this point the Design Group is required to present an Ordnance Characteristics Report to SWDB with prior approval by the TX and LP Committees. Environmental and other type testing is performed during this stage as a further verification of function, materials, and processes. A Development Program Definition letter is prepared by the design organization for all concerned as a summary definition of the development program.

b. Prototypes of the new weapon are procured and built up by the development engineers and are tested as assemblies. The satisfactory performance of these will then allow design release to be made.

4. Design Description and Status Reports at Complete Design Release:

a. The Design Description and Status Report at CDR is issued at this point. The weapon system development groups first submit reports to the TX Committee (joint SC/LASL) and/or the Livermore (SC/UCRL) Projects (LP) Committee who are the parent committees issuing the reports. This is evidence that

the development engineer is satisfied with the design of the new weapon. The report is then submitted to the Special Weapons Development Board (SWDB) for consideration and approval. SWDB is a joint AFSWP-SC-LASL-UCRL technical review board. With SWDB approval the report is then transmitted to DOD through DMA. This report provides something tangible for the DOD to review to determine if the new weapon meets all the requirements established by the Military Characteristics.

NOTE

Phase 3 is the Development Phase and is completed at Design Release.

5. Manufacturing Phase:

a. Manufacturing Engineering receives all drawings and specifications of the new weapon. The Production Release (PR) is made on all items ready to manufacture. While Production Release is the generic term, this and all other engineering releases are made on the same Engineering Release form, namely, the ER form. Previous contacts with manufacturers are made firm with the letting of necessary contracts. It is desirable that the development manufacturer be selected to have the capability of final production. However, it is not always possible to have the development contractor and production contractor one and the same because often the three-bid system is utilized and the lowest bid selected. Past experience has proved the lowest bid is not always the least expensive in the long run as a new entry in the field may not be fully aware of all ramifications of production. This lack of experience of a new entry may result in readjusting the contract, cost-wise, as production progresses and in the end may result in a cost exceeding that of the bid of a more experienced supplier. Therefore, it is possible now, with the current level of experience and the use of precontract supplier surveys, to weed out new entries in the bidding if it is known that experience and production capabilities are not adequate. Single-source procurement is used in justifiable situations. A justification letter of record is normally placed in procurement files when single sources are used.

b. Usually the development contractor is given an opportunity to bid for production quantity manufacture and every consideration is given to his bid. Occasionally the development contractor is held for development purposes only.

c. Another method not often used is that all development may be done by the Sandia Corporation, Los Alamos Scientific Laboratory, and Livermore SC/UCRL utilizing local shops for the fabrication of preproduction models. Then the production contracts are let to selected suppliers.

d. As soon as possible after the Development Program Definition letter, the production Programming Organization at Sandia Corporation originates a Preliminary Product Definition which outlines initial allocation of manufacturing responsibilities as a forerunner to the final definition and Directive Schedule assignments.

6. Preproduction Testing:

a. Hardware is received for evaluation by the design engineers. The prototypes or preproduction models are tested to check design variables, materials, and processes. Accelerated environmental testing is accomplished to help eliminate the long delay that is necessary to make complete evaluation of subsequent tool-made samples. This procedure allows a shorter time for testing the tool-made samples if adequate engineering evaluation has already been made.

b. The design engineer furnishes a preliminary draft of the technical content and procedures for the operating manuals, etc., before CDR. The Military Liaison Services organization collates, edits, publishes, and distributes these manuals.

c. Training is begun, often using prototype material. Ballistic drops and tests are made and necessary bombing tables are prepared during this time if new tables are required. Otherwise enough tests are accomplished to verify that existing bombing tables will be satisfactory or that warhead applications are otherwise adequately checked out.

7. Production Testing:

a. Normal manufacturing inspection is used to check items prior to presentation to the AEC. AEC acceptance is based primarily on adherence to Quality Assurance Inspection Procedures (QAIP). Each production lot is sampled to determine whether the lot quality is adequate. Rejected lots are returned to the manufacturer for reprocessing where applicable. Items are inspected to storage inspection criteria upon receipt at the stockpile sites.

b. Tool-made samples (items manufactured in the initial stages of production by use of tools and processes which will be used to make final production units) are supplied to the development engineers, and necessary tests are performed by them to check the manufacturer's adherence to specifications and to insure that the product will function properly.

c. First Production Units (FPU) are received and within approximately 90 days the Final Evaluation Report is submitted to the TX or LP Committees. If approved it is presented before the SWDB and then the report is transmitted to the Division of Military Application (DMA) and to the DOD.

NOTE

Phase 4 starts with the Design Release and ends with delivery of the First Production Unit (FPU).

8. Changes to Product:

Changes to the product being manufactured or in the stockpile can be classified in several different ways. For example, in-process changes are made as soon as new material is available; retroactive changes are made with the intention of incorporating the change in material already manufactured; delayed changes are scheduled to be accomplished at a specific cut-over point. A change classification system was devised for all AEC weapon production and has been used by Sandia Corporation for years. These classifications provide a means of marking the change in various standardized ways to provide a uniform pattern of action for all concerned. The change classifications are:

Class A - A failure or hazard rectification change which must be accomplished before items can be shipped or retained for readiness in the stockpile. This is a retroactive change to the stockpile and an immediate incorporation change for new production.

Class B1 - A capability change which is not critical enough to be placed in the "A" category but is sufficiently important to warrant a separately scheduled retrofit when new material is available and without regard to the cost of reworking or scrapping material. This change then becomes an urgent, scheduled change in new production and is retrofitted as soon as the changed material (usually in kit form) is available at the sites for incorporation.

[redacted]

[redacted]

Class B2 - A lesser capability change which is only of sufficient importance to include its accomplishment in a subsequently scheduled retrofit change. Thus, when stockpile material is withdrawn to incorporate A, B1, or Mod or Alt changes, the B2 is incorporated essentially as in-process change.

Class C1 - An improvement change which is of sufficient importance for early incorporation in new production as soon as changed material can become available but is not of sufficient importance to be included in a retrofit. Changes from "A" through "C1" are considered to be of sufficient importance to be made without regard to cost of reworking or scrapping material, piece parts, or assemblies.

Class C2 - A minor improvement change which is the only true in-process change since they are intended only to be incorporated as previous issue materials, piece parts, or assemblies are used up in new production. It is never included as a retrofit item, nor is any other "C" change.

Class C3 - A manufacturing facility change, strictly at the manufacter's option, but requiring prior approval by Sandia Corporation.

Class C4 - A clarification of specifications or to correct drawing errors of a minor nature. Change does not affect product.

These changes are specified on Engineering Change Orders (ECO's) and are classified in the space provided in accordance with the above categories, but more specifically in accordance with SCI 5405-2. Whenever retroactive changes are necessary, a Production Change Proposal (PCP) is originated by the manufacturing engineer and forwarded to the Military Liaison organization for military and AEC approval in accordance with tripartite agreements. The PCP approval channel is also used for Mod changes and whenever M-, C-, T-, or H-numbered items bear a letter suffix change. For example, when the T-205 was changed to the T-205A, field operational changes required prior approval by the PCP route.

[redacted]

[redacted]

[redacted]

9. Initial Release to Stockpile:

At the time that the first war reserve quality major assembly is delivered to stockpile from a specific AEC production agency, an Initial Major Assembly Release is prepared by the Major Assembly Release Group. The Initial Release, approved by AEC-ALOO, releases the material for stockpiling. Certain restrictions may be placed on use of the initial production weapons which would not be acceptable to the using agency on a long-term basis. This release is required, in fully approved form, 2 weeks after the FPU/WR (First Production Unit in War Reserve) date.

NOTE

Phase 5 starts with FPU and ends with one of the following releases for use, whichever is originally made. It is theoretically possible to issue a General Release first.

10. General Release:

a. A General Major Assembly Release for the new weapon is normally issued 6 months after Initial Release. The General Release signifies that the development phase is completed and reported through an Engineering Evaluation Report to SWDB and that the stockpiled weapons are ready for general use.

b. At the same time the quality evaluation is being made by QA, the DOD starts the Operational Suitability Tests (OST's). Any recommendations resulting from the OST's are made by the DOD and coordinated by the Military Liaison organization with the design engineers. Any changes or alterations agreed to are made either at the point of manufacture, or by retrofit, or by both.

c. The OST's sometimes precede and sometimes follow the General Release. However, it is normal and preferred that they precede.

11. Interim Release:

An Interim Release is issued to advise of changes in the Limitations on Use specified in the Initial Release. An Interim Release is issued only when any such change occurs during the period between Initial and General Release of the material.

[redacted]

[redacted]

[redacted]

12. Stockpile Life:

a. Field usage may indicate that further development is desirable. This leads to subsequent Mod designations. Also, if several modifications are pending simultaneously, a TX-N-X1 development program designation is assigned and the end product comes out as one Mod change if possible and feasible.

b. The weapon remains in stockpile with normal surveillance performed. Training continues, maneuvers are performed, and additional OST's may be conducted. New capabilities may be added by the designers by substituting new cores, components, etc. Evaluation continues to keep pace with all changes. Advances in the "state of the art" at LASL, UCRL, or Sandia may dictate changes as well as field use.

c. A new weapon may be conceived which allows more economical production, or a greater variety of capabilities, or both. In this event the weapon now in stockpile becomes obsolete, even with all new modifications. Any and all components, etc., that may be used on subsequent weapons, or other existing weapons, are stripped from the obsolete weapons, thus writing the end, and the procedures for new development begin once again.

NOTE

Phase 6 covers the balance of active production after Phase 5 and includes all stockpiling and retrofitting. It terminates with retirement, which has been recently named Phase 7.

13. Retirement:

a. Weapons may be expended in tests or retained for long-term surveillance.

b. Weapons may be completed through the design stage and production cancelled as more effective and better weapons can be produced during same time scales.

c. Weapons may be reworked into new and different types and disposition made of excess parts as classified scrap.

[redacted]

[redacted]

[redacted]

d. Studies are conducted by Sandia Corporation upon formal request of the AEC. These studies may be conducted jointly with AEC since inactive facilities of other AEC contractors may be a determining factor for economical salvage.

The weapon is removed from stockpile and completely abolished. A typical salvage study would consist of determining which material is to be assigned to other uses as well as economical salvage and disposition of nonuse materials. Such a study might indicate:

(1) Explosive and nuclear materials to be returned to AEC Assembly Agencies,

(2) Detonators to be returned to LASL,

(3) Parachutes to be returned to AMC,

(4) Fuzes and X-units, as well as miscellaneous hardware, to be sent to Bendix KC,

(5) Power supplies to be reassigned to other programs,

(6) Secondary units to be returned to Oak Ridge, and

(7) Structural case items to be sent to Oak Ridge, Bendix KC, Sandia, or rendered into unclassified waste in the field and sent to the nearest salvage installation other than the site itself.

After completion of such a study, the economies and other factors evaluated, a schedule for a retirement program is determined by AEC with the concurrence of DOD.

NOTE: This general process is dynamic and varies from weapon to weapon and is subject to modification with the flux of schedules and requirements. This document is reissued and brought up to date periodically to reflect the most current processes.

G. C. McDONALD - 2530

August 30, 1957

[redacted]