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COMMENTS ON REPORTS ENTITLED

PLUMBBOB SERIES

AND

SHOT SMOKY

A Report Prepared for

JRB ASSOCIATES, INC.

January 1980

HISTORICAL EVALUATION AND RESEARCH ORGANIZATION

A DIVISION OF T. N. DUPUY ASSOCIATES, INC.

2301 Gallows Rd., P.O. Box 157
Dunn Loring, VA 22027

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and SHOT SMOKY

General

HERO has undertaken a critical review of the two reports -- Plumbbob Series and Shot Smoky -- for the purposes of: a) determining their historical value, b) commenting on the historical methodologies used in their compilation, and c) providing guidance to JRB Associates in their work on similar reports.

These general comments apply to some degree to both volumes. However, Shot Smoky is better organized and better written than Plumbbob Series.

1. It is extremely difficult to determine exactly what was intended in these two volumes, despite the statements of purpose in their introductions. And it is even more difficult to ascertain what was accomplished, since there are no conclusions drawn nor any sort of wrap-up in either volume. Hence one wonders if the authors understood their objective and if they were not sure of what they had found, or if, more likely in light of the contents of the volumes, they were so confused that they did not in fact understand what they had done.

2. Both volumes are poorly organized, although Shot Smoky is not so bad as Plumbbob Series. The net effect is a hodgepodge of data put together with no apparent logical relationship and without regard to purpose. It includes, for example, page after page of lists and organizational diagrams, sketches of M-48 tanks that are not M-48 tanks, illegible pictures of unidentifiable equipment, and a series of appendices whose purpose in the volume is not clear.

3. Acronyms are used extensively, but one discovers only after a complete reading that they are explained -- at least some of them are -- in a subsection of the Glossary (Appendix N) buried at the back of the book. (This location is in accordance with Standards for DNA Scientific and Technical Reports, and would be feasible if the reader were informed of it in the text.)

4. Citation is unsatisfactory. Instead of footnotes or endnotes, references to references are found here and there. The references that are buried in the back of the book are in a totally unsatisfactory form that is neither footnotes, endnotes, nor bibliography. A careful check will disclose a number of errors and omissions between Plumbbob Series and Shot Smoky. Without competent citation there is no way to evaluate the thoroughness or comprehensiveness of the work.

5. There is little comprehension of how to design or use tables. The text of Chapter 3, for example, is interrupted in mid-sentence from page 1 to page 17 by lists that should have been labelled as one or more tables or figures, set up as such, i.e., single spaced, with proper headings to avoid repetition of such words as "project," and then possibly reduced in order to present them on a single page.

6. The Executive Summaries do not comply with Standards, Para. 3-4.2. They are much too long and should be cut by two-thirds or more. Then they should be placed as required directly behind DD 1473.

7. The inadequate documentation suggests that research was incomplete. There is no reference to searches, for example, of the National Archives, various service historical offices, the new Department of Energy historical office, the US Army Military History Institute at Carlisle Barracks, or the US Air Force Historical Center at Maxwell Field. Related to this is the form of acknowledgements. These should be formal, standard, and accurate. Such names as "Andy Anderson" are almost impossible to track, and have no validity.

8. The use of language is unduly complicated. The report should be written in simple grammatical sentences, and words should be used with precision, in accordance with generally understood meanings.

9. Plumbbob Series is unwieldy and would be improved by division in two volumes.

Specific Comments on PLUMBBOB SERIES

<u>Page</u>	<u>Remarks</u>
xviii	Columnarization is confusing. The entries on this chart could be simplified by 1) identifying the year at the top of the firing date column and 2) by identifying the third column heading as APPROX. YIELD(KT) and then listing the appropriate yields in sequence on a common left margin.
xxii	If these were all NTO primary groups, what was the overlap between the last two groups on the page, both of which seem to have a disarming requirement? Was this overlap, redundancy of confusion in reporting?
xxiii	<u>Radiological Safety Programs</u> 2d para. needs clarification to say total or cumulative dose.

- xxiii 3d para. is incomprehensible and should be rewritten.
- 1-2 Reference at bottom of page to Appendix A states "reprinted." However, the documents of Appendix A are merely copies without authentication of any kind. There is no indication that any of them were ever signed and dispatched. There is no list of the ~~one~~. On p. A-4, there is no information that the original was classified when transmitted, if, indeed, it was transmitted, or that it has ever been declassified. On p. A-6 is data supposedly from a document called DASA 1251. This document is undated, unmarked and contains no data as to its ultimate purpose.

In sum, Appendix A is not "Historical Information" nor "Historical Records" nor anything but a collection of otherwise unconnected copies of presumably relevant documents, not very well used in the report.

- 1-3 The paragraph at the top of the page is dubious.
Last paragraph, form used to cite a pertinent document is totally unusable. Thereafter, each time there is a citation a different form is used.
- 1-4 Para. 1-3. Objectives listed here do not jibe with those listed in the letter referenced in Appendix A.
- 1-5 On two successive pages, the acronym FCDA is identified, yet other acronyms already used -- such as OEHL -- (in acknowledgements) -- are not explained at all anywhere.
- 1-5 1st full para. Last two sentences. Is this a justified comment?
- 1-5 The definition of "Safed" (footnote) could be more clearly stated.
- 1-6 Except for the questionable copy of the Eisenhower Endorsement in App. A, none of the documents listed as important to the authority of these tests are included as references. Why? are they missing? Unavailable? Withheld? These documents are essential to this whole exercise. They are the basis upon which the tests took place and indicate the level of responsibility at each echelon, should, eventually, blame have to be fixed.

- 1-7 (Fig. 1-1) As referred to on 1-6 -- there is nothing to indicate that DMA or AFSWP were the executive agents of AEC/DoD on the chart, nor does it portray where NTO is. Where is the authority for a joint AEC/DoD organization? According to the chart DMA deals with AL00, yet the AEC General Manager directs AL00. How? Is he really the Director, DMA, or is he in AEC? Should there be another line from AEC to AL00? How could the "Overall direction. . ." be assigned the Test Manager without a concurrent approval line from DoD? The copy supposedly "reproduced in toto" in Appendix C is no such thing. It is in fact section 1.9 of the Test Manager's own report, which, therefore, is not an "in toto" reproduction of the directive. Further at App. C, p. C-1, the reader is referred to a note which reads "*Extracted exactly from the Test Manager's Report (Reference 4)." Reference 4 is listed as "4950th Test Group Operations Plan." This is obviously an error. It appears reference 3 is what should have been used, and this again points up the very serious problem of accurate citation.
- 1-8 Para. 1-5 (Middle). The phrase "non-interference" should be spelled out. Who was not to interfere with whom? The answer is not obvious the way it is written here.
- 1-8 Why is there a citation at the bottom of this page when elsewhere the reader is told to look at reference such-and-such?
- 1-17 Top Line -- The correct designation of this unit is 82d Airborne Division and not as listed. This unit is also misidentified elsewhere in the study. According to OCMH there was no such unit as 506th Pathfinder in existence in 1957.
- 1-18 Third Para. Last sentence. What source?
- 1-18 2d Para. Why can't NTS be identified directly on Figure 1-6 instead of trying to be explained here?
- 2-1 Recommend paragraphs 3 and 4 be reversed.
- 2-19 Fourth para. The impression given on Table I p. xviii was that the TG 57 Project Shot was non-nuclear. On this page, however, indication is given that there was "surface plutonium contamination." To anyone reading the Table, who was not familiar with nuclear effects, an erroneous idea would be conveyed. Even though the Table is

accurate as to the "yield" of the particular event, it should be better explained. The primary reason for this confusion seems to be the inordinately complicated organization of the material being presented.

- 2-19 Sixth para. "Several" cannot modify "personnel." ("Personnel" is not synonymous with "people.") If the exact number is not known it should be so stated, as this is significant in any future determination of the accuracy of reporting.
- 2-19 Eighth Para. and footnote. If these pilots are, in fact, improperly reported here in the original report, why is the error compounded here? At minimum, a comment should have been made to this effect on p. 2-18 where on-site personnel gamma overexposure is mentioned.
- 2-23 Para. 2-3.3.2 mentions App. J, but careful examination shows that the material presented is for a situation that did not exist as this phase of the test never took place. Although this fact is mentioned in the report, one wonders why the Appendix is included at all.
- 2-25 Second para. This seems extremely important but is glossed over. Is the data elsewhere in the report in more detail? If so, where? Should either be cross-referenced or spelled out in more detail.
- 2-29 First full para. First apparent mention of JTF-7. What is it? Where did it come from? Why was it not discussed earlier?
- Chap 3 This is the most unwieldy part of the volume. It could be divided into two chapters by including all the organizational operational data in one and all the operational test material in the other. This, plus rigorous screening of the material for appropriateness, should bring the section under more manageable control.
- 3-1 Last three lines, continuing to 3-2. Is this the purpose of the work, "to present personnel activities that may have led to exposure?" Isn't it supposed to tell what happened in the Series, and therefore necessary to explain what each project was supposed to do and did? Are technical reports the only available sources? Was any effort made to talk with participants?

- 3-2 Few of these acronyms and exercise names are identified in the glossary or elsewhere in the report.
- 3-17 Note at bottom of page indicates that AEC is now Department of Energy. This is basically untrue, as the old AEC is only a part of DOE's new empire.
- 3-77 These and subsequent sketches do not add to the report. The sketch of the M-48 tank does not really represent an M-48 tank. The quality of the sketches is poor.
- 3-98 Here, at least, there is a discussion of human participation.
- 3-110 Last paragraph. First sentence unclear. Does this mean they were located together? Or, does it mean the A4D-1 had its position aloft confirmed by the radar? Or does it mean that the aircraft was equipped with this radar? (The latter seems unlikely, but it is a possible interpretation.)
- 3-118 Para. four. What other kind of a pod than an airborne pod would be fitted to an aircraft?
- 3-118 Last para. through p. 3-120. This is very confusing and virtually meaningless to the reader.
- 3-119 Figure illegible.
- 3-127 It is difficult to see how this diagram is useful to the reader.
- 3-129 If project 8 was non-human, less space could be accorded to its results.
- 3-134 Para. 3-2.3.2 seems out of place. This seems to be concerned mainly with housekeeping details, not with the tests, as in prior and subsequent sections.
- 3-140 Para. 3-2.3.3 is not related to any of the listed DoD projects. Why? Does it belong here?
- 3-141 Figure 3-50 is extremely useful, and this type of matrix should be used extensively throughout the report. Yet a check of only the first seven horizontal columns reveals mistakes. WILSON adds to 36 not 35, and HOOD adds to 124 instead of 24. (It is assumed that Total Number of Aircraft column refers to number employed.) Because

of this same error the vertical column of totals adds to only 686. The vertical Abort & Cancelled column adds to 97 instead of 87. The Total No. Aircraft Planned column adds to 775 instead of 875 as shown. The horizontal column across the bottom of the chart adds to 783. Two of the vertical project columns are also in error. While the chart is an excellent idea, it is as it stands so full of errors as to be worthless.

- 3-144 Para. three. Was there no maintenance performed on the other aircraft involved in the tests? If the data is known it should be included, if not it should be so noted. Should all aircraft experience not be reported here?
- 3-147 Last para. Should Sewart AFB not be Stewart AFB? (Sewart may be correct.) Should the squadron be identified as Air Force (as opposed to Army)?
- 3-148 Item 6. The description of the 4935th differs here considerably from what is said about it on p. 2-7. This same is true about the statements made about the 4926th on p. 3-40 and 2-7.
- 3-152 The table is meaningless without some explanation. There are three pages of data on Program 32, for instance, but not one reference to the Table. If, as stated on p. 3-155, "The extent of DoD participation is unknown," then where did the data in the table come from?
- 3-167 Last para. The AN/PRC-9 is a radio and not a radar set. This leaves the whole discussion useless without further research.
- 3-175 Item 2. Where did the ontos come from? It should be explained, what it is and how it came to be there. It is not in the glossary and, as it is now out of the inventory, many people may not recognize it.
- 3-176 Third Para. This para. is very confusing. The third sentence refers to the first sentence? Or the second?
- 3-185 Para. 3-3.4.2. In the DoD Projects List this is listed as an FMF PAC fly-by. In this para. it is assigned to the Third Marine Aircraft Wing. Identification of the fact that the 3d MAW was a part of FMF PAC seems appropriate. Secondly, it is Third Marine Air Wing.
- Note This would appear to be an ideal place for a compilation of personnel involved.

- 4-2 The descriptive data on the pages following Table 4-1 is not clear. Bioassay data is not discussed in the initial breakdown of the table's contents.
- 4-3 First para. Reenlistment does not change one's serial number.
- 4-7 This whole section appears to have been written by an amateur. There is no reference to pay records, training rosters, and the like as sources of personnel data. Granting that this may be the data furnished by the military, failure to recognize, and use all potential sources raises grave questions as to the competence of the authors.
- Appendices A - as stated before this section has little validity as an historical source; it should either be corrected or dropped.
- B - This is useful, but was not much utilized in the narrative.
- C - Is probably significant, but again is not the document referred to but, rather, is an extract of a document purportedly copying the original.
- D - This list is incomplete, and to an extent misleading.
In the troop tests section (D-2) the Mortar Battery is not designated as belonging to a particular Battle Group. There were five at Ft. Lewis in the 4th Div.
As noted earlier, the Office of the Chief of Military History cannot identify the 506th Pathfinder Team (called unit and detachment elsewhere.)
For the HumRRO Team - Dept. of Army is not a home station.
Project 50.2 - it is difficult to believe that all United States Observers came from CONARC. Were there no DA observers or observers from the other services, NORAD, ADC, JCS, etc.??
- E - Probably serves some purpose but because of the confused layout of the volume it is difficult to determine.
- G - The same is true here.
- H - The same is true here. Why is there a reference here and not in reference section, if that is the accepted scheme?
- I - This section appears in error as the text indicates that aircraft participating in the tests came from other airfields as well.

- J - This is very confusing as it appears, at least in part, to refer to a part of the test that did not take place.
- K - Seems incomplete. There is no evidence relevant to the numbers and types of aircraft described in figure 3-50 on p. 3-141.
- L - Important.
- M - Important.
- N - Certainly an extremely important section, but it should be more easily recognizable and probably should be located in the front of the study because of the very nature of the material contained. If not this, then the acronym section should be moved forward by itself. Another thing that should be done is that each word defined in the glossary should be located in the text. If it is not, then the term should be deleted.

REFERENCES This section is neither Endnotes nor complete Bibliography. The individual reference is often incorrectly stated; the very first entry, for instance, fails to indicate the source date of the document. The use of a standard format for these entries is suggested.

Because of the possible future importance of these documents an additional useful bit of data would be where the particular document is located. This could be done by a keyed code.

CONCLUSIONS This study suffers serious deficiencies, and should be rewritten. It should be broken into two volumes. One of these would address the organization and operations of the tests themselves, and one would deal with the general personnel matters that are at the heart of the study. Footnoting and other justifications for what is said should be standardized throughout.

SHOT SMOKY

This volume is a little more manageable and a little more closely focussed. However, it suffers from the same general deficiencies as noted in PLUMBBOB SERIES. In both there is a great deal of extraneous material -- or seemingly extraneous material -- without any real tie-in to the effort.

<u>Page</u>	<u>Remarks</u>
x	The Executive Summary is far too long.
x	The comment in the footnote that PLUMBBOB was originally called PILGRIM is not mentioned in the PLUMBBOB SERIES volume.
1-2	The document cited in the footnote does not seem to be in the references at the end of the volume; there is no date, and no authentication. Its value is dubious.
1-6	First full para. The phrase "almost annually reopened" is unclear.
1-7	First full para. The statement is made that the yield "actually measured was 43.8 KT." In several other places -- such as Table 1-1 p. 1-19 in PLUMBBOB SERIES -- the yield is reported as 43.8 KT \pm 2. This type of accuracy is important.
2-3	The layout of this page is confusing because of the paragraph numbering system. The reference to Appendix A is in error as stated earlier. This is an extract of a report and <u>not</u> the instructions <u>in toto</u> .
2-4	The chart does not seem fully consistent with the data presented on p. xv.
2-8	The chart is significantly different from the chart on p. 2-7 in PLUMBBOB SERIES. The 4935th Squadron is either subordinate to the 4926th or it isn't. If there is an Operational Control arrangement it should be spelled out somewhere.
2-14	The chart on this page differs from the data listed on p. 4-52. Of more importance, it differs markedly from the data presented in Appendix D of PLUMBBOB SERIES.
4-33	The chart is wholly inaccurate and needs to be redone. Numerous symbols are wrong. The Mechanized Platoon is actually a Reconnaissance Platoon. Officer and EM numbers are omitted. The mortar platoon numbers do not add up correctly.
4-52	Unit designations here and elsewhere are wrong. The word is petroleum not petrol. There is a difference. The 26th Transportation Battalion is a truck unit and should be so identified. The Photosimetry team and the Signal Pictorial teams are not a part of

232d Signal Company -- which should also be designated as to type.

- General There is considerable incorrect use of terms. For instance, in several places the terms "Movement" and "Maneuver" are interchanged although they have different meanings. Troops move -- units maneuver.
- B-1 The identification of the sources of this data differs here from that listed on p. D-1 in PLUMBBOB SERIES.
- F-1 Definition for Airhead does not conform with SR-320-5-1, November 1953, in use at the time of test. And it differs from that shown in PLUMBBOB SERIES.
- F-2 Why is definition of cloud tracking different between the two volumes?
- F-14 ADC does not stand for US Air Force Air Defense Command but for US Army Air Defense Command.
- F-18 AMC is acronym for US Army Material Command.
- REFERENCES Why are several references not in PLUMBBOB SERIES? (For instance, 1, 2, 9.) No. 12 in SHOT SMOKY differs from No. 22 in PLUMBBOB SERIES and No. 10 in SHOT SMOKY differs from No. 25 in PLUMBBOB SERIES.

Recommendations

1. Format. The specifications in Standards for DNA Scientific and Technical Reports in some respects are not well suited to a report that is basically historical. While useful as a guide they should be used with flexibility, and indeed they permit it. It is recommended that a narrative, multi-chaptered format be used, eliminating or at least minimizing the numbering of paragraphs and subsections, and organizing the various elements for the convenience of the reader.
2. Research. An effort should be made to find and use primary source information, including contemporary records of events as much as possible. The fact that this was done should be made clear in the report.
3. Outline. It would be very helpful to develop an outline of the material to be presented in the report, in order to relate the various elements to one another and insure that they are presented in logical sequence. Naturally it would be subject to modification throughout the project.

4. Organization. The basic objective should be to tell what happened. Details of organization, safety procedures, etc., should be related to the description of events, both in organization and in presentation. Description of the various projects should be written as accounts of events that happened and related to the larger program of which they were a part.

5. Style. While this is not intended to be a classic, it should at least be intelligible. It is not being written primarily as a technical report for scientists or others who are conversant with the nuclear jargon. It should be so clearly written that any of the participants, including the troops of Desert Rock, can understand it. An example of a sentence requiring translation for the ordinary reader is: "In SHOT SMOKY, the translation of native (or natural) stones, steel spheres, and military debris was made in open areas at ranges of 2,548 to 5,680 feet, where the measured overpressures varied from about 13 to 5 psi."

6. Language. Every effort should be made to use words correctly and precisely and to avoid unnecessarily complicated sentences. Acronyms must be explained when first introduced.

7. Appendices. If documents are to be included they should be important and clearly referred to in the text. Other material which is not essential to the basic narrative may appropriately be appended if it could contribute to the understanding of what happened. If the main portion of the report is long, the appendices may appropriately be bound separately. If an appendix is intended to be verbatim, it must be truly verbatim. If it is not, this should be noted, with an explanation.

8. Glossary, list of acronyms, bibliography, endnotes (if not included as footnotes) should be complete and readily available.