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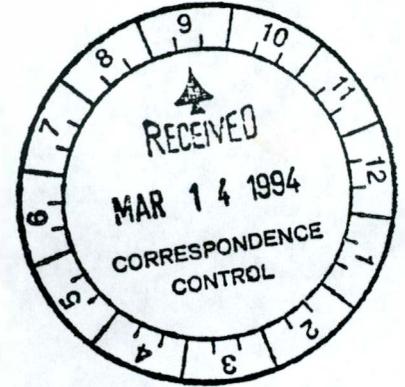


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 HANFORD PROJECT OFFICE
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March 8, 1994



Walter D. Perro
U.S. Department of Energy
P.O. Box 550, A5-19
Richland, Washington 99352

Re: Draft Ordnance and Explosive Waste Records Search Report;
Riverland Study Area Comments

Dear Mr. Perro:

Enclosed are the U.S. Environmental Protection Agency (EPA) and its contractors' comments on the Ordnance and Explosive Waste Report for the 100-IU-1 Operable Unit (Riverland Site).

The EPA is interested in initiating discussions with the U.S. Department of Energy (DOE) and the Washington State Department of Ecology (Ecology) on the relationship between the closeout report being written for the Riverland Site and the Ordnance and Explosive Waste Report. The EPA is interested in how DOE will use these reports in preparing the proposed plan for the 100-IU-1 Operable Unit.

If you have any questions or concerns, please call me at (509) 376-8631.

Sincerely,

Dennis A. Faulk
Operable Unit Manager

Enclosure

cc: Becky Austin, WHC
Glen Goldberg, DOE
Phil Staats, Ecology
Paul Valcich, WHC
Administrative Record (Riverland ERA Site, 100-IU-1 Operable Unit)



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GENERAL COMMENTS

Although the report concludes, in the last bullet on page 22, that "further action should be taken", it does not, but should, identify potential types of action to consider. For example, there are many types of aerial and ground-based searching techniques for detection and identification of unexploded ordnance (UXO). Figure 11 designates areas of greater probability for the presence of UXO. Likely zones of future residential or recreational use within these areas could be targeted for UXO screening. This type of screening could be contingent based on additional information gathered during completion of the inventory project reports.

The report concludes that ordnance and unexploded waste may be present in the Riverland area. The findings include documentation of a minimum of 396 120-mm gun firings on Hanford between 1950 and 1952. Since the command reports from which this information was obtained are typically very detailed, an exceptional event such as a dud-fired projectile is likely to have been recorded. Reexamination of these command reports may provide information on the number of dud-firings that occurred during that period and any efforts that may have been undertaken to investigate such firings. This information could help to better define the likelihood of UXO in the Riverland area.

A glossary defining the numerous acronyms used throughout the report and its appendixes, pagination of the appendixes, and a table of contents for Appendix B would all be helpful to the reader.

SPECIFIC COMMENTS

1. Section 3.0, Page 6, Paragraph 2. One possible source of records was omitted: the U.S. Army Air Defense Center and School, Fort Bliss, Texas, which includes a museum and library, may have some further information on operational records, especially on private caches outside the regular archival system. More importantly, it is the most likely source for technical manuals, ballistic tables or slide rules, and other documents that would corroborate the calculations in Appendix D. This source should be checked for applicable information.
2. Section 4.0, Page 13, Bullet 5. This bullet references Sawicki, 1991, which is not, but should be included in the bibliography.
3. Section 4.0, Page 13, Paragraph 1. When checking the Nike missile sites mentioned here, it should be noted that these were liquid-fueled Nike-Ajax missiles (model MIM-3), not the solid-fueled Nike-Hercules missiles (MIM-14), which were not produced until 1958. Since the Nike-Ajax missile used inhibited red fuming nitric acid and 1,1-dimethylhydrazine, nonstandard analyses will be needed to detect any associated spills.
4. Section 4.2.1, Page 17, Paragraph 3. The text indicates that the horizontal distance traveled by the 120-mm projectile is 60,900 feet. A critical variable in the determination of this distance is the drag constant. Appendix D indicates that the drag constant value was estimated based on the maximum height (47,000 feet) attained by the

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projectile. However, the text also states that a round fired at a 45-degree angle achieves an altitude of 23,000 feet. This inconsistency should be resolved, which may require recalculation of the horizontal distance traveled. Also, more accurate information on the drag constant may be available in documentation on the 120-mm gun and ballistics. A likely source of this information would be the Fort Bliss archives, mentioned in comment 1, above.

5. **Section 4.2.1, Page 17, Paragraph 4.** This paragraph indicates that a description or conversion factor for the unit "mils" could not be found. The artillery unit mil is defined as 1/6,400th of a circle (Webster's 1985). It is a rounded-off milliradian ($2,000 \pi$ or 6,283.185307... per circle). Therefore, if a round was fired at 45 degrees, the firing elevation should have been 800 mils. The command reports should also be checked to determine if the direction of fire, given as "azimuth," was recorded. Azimuth is measured from grid north on the Universal Transverse Mercator grid; grid north can be converted easily to true north. Given the angle and direction of fire, the impact area from any round can be closely approximated. Therefore, the location of any dud-fired projectiles could be established.
6. **Section 4.2.1, Page 17, Paragraph 7.** The statements on trajectories of shrapnel (fragments) and intact projectiles are correct. However, the critical difference between the two is the terminal ballistics -- what happens when the projectile hits the ground. Because of their poor aerodynamics, fragments will have a low terminal velocity and therefore will little, if any, ground penetration. In contrast, an intact projectile will penetrate a considerable depth. Therefore, intact projectiles can be difficult to identify because the presence of fragments on the surface may interfere with detection methods.
7. **Table 2.** The column heading "altitude" should be changed to "maximum altitude."
8. **Appendix B, Page 4, MACTEC Entry.** The report should expand and clarify the phrase "evidence of mortar." There are differences in risk related to mortar at a storage site, a firing site, and an impact area.
9. **Appendix B, Page 7, Paragraph 3.** The text refers to a "shrapnel area" shown on Figure 4, but no such area is shown on the figure. In fact, the North Slope Area cited in the text is shown on Figure 3. The text and figures should be corrected as appropriate and reconciled.
10. **Appendix B, Page 9, Paragraph 6.** The "Sawicki Document" referenced here is a two-volume book (Sawicki 1991), which should be included as a complete reference in the bibliography.
11. **Appendix D.** The source of the exterior ballistics equations given here should be cited. Although the calculations were not verified, the results in the figures and tables are reasonable and are assumed to be correct.

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REFERENCES

Sawicki, James A. 1991. Antiaircraft Artillery Battalions of the U.S. Army. Two Volumes. Wyvern Publications. Dumfries, Virginia.

Webster's Ninth New Collegiate Dictionary. 1985. Springfield, Massachusetts. Merriam-Webster, Inc.

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RIVERLAND STUDY AREA COMMENTS

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