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ALMD59043900972

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~~Enclosed is a copy of the Minutes of the Twenty-Sixth Meeting of  
the Protective Information Coordinating Committee held at Mound  
Laboratory on March 28, 1979.~~

~~Subject~~

~~John H. Bradley~~

~~To:~~

~~Participants:~~

- 1 - E. E. Brown, MLL, Waco.
- 2 - E. L. Bradley, MLL, Waco.
- 3 - E. J. Brown, MLL, Waco.
- 4 - E. V. Brown, MLL, Waco.
- 5 - E. L. Brown, MLL, Waco.
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- 9 - E. E. Brown, MLL, Waco.
- 10 - E. E. Brown, MLL, Waco.
- 11 - J. H. Bradley, Mound Laboratory, Waco.
- 12 - E. A. Williams, Mound Laboratory, Waco.
- 13 - Control File

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This Document Consists of 8 Pages  
This is Copy 1 of 11

April 1, 1959

MINUTES OF THE TWENTY-FOURTH MEETING  
OF THE  
DETONATOR PRODUCTION COORDINATING COMMITTEE

The twenty-fourth meeting of the Detonator Production Coordinating Committee was held at Mound Laboratory March 18, 1959. The following attended:

AEC

E. A. Walker  
E. M. Otto  
J. Pattillo  
R. C. Washburn  
J. V. Durant

Pepper

K. L. Fichter  
N. Weissman  
H. Carlson

LASL

A. D. Van Vessel  
W. H. Meyers  
J. L. Tucker  
W. E. Crowe

Mound Laboratory

D. L. Scott  
J. E. Bradley  
E. A. Waldfogle  
J. R. Brinkman  
L. B. Gnagey

IRL

J. Stroud

Various Mound personnel sat in on portions of the meeting.

1. Review of the Minutes

Weissman pointed out that W. L. Stilwell was erroneously listed as having attended the Twenty-Third Meeting. With this correction, the minutes were accepted.

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MOUND DECLASSIFICATION REVIEW	
1ST REVIEW DATE: <u>4/24/68</u>	DETERMINATION (CIRCLE NUMBER(S))
AUTHORITY: <u>DAOC DAOC DADD</u>	1. CLASSIFICATION RETAINED
NAME: <u>L. BRIDGEMAN</u>	2. CLASSIFICATION CHANGED TO: _____
2ND REVIEW DATE: <u>5/18/97</u>	3. CONTAINS NO DOE CLASSIFIED INFO
AUTHORITY: <u>ADD</u>	4. COORDINATE WITH: _____
NAME: <u>W. B. Atay</u>	5. CLASSIFICATION CANCELLED
	6. CLASSIFIED INFO BRACKETED
	7. OTHER SPECIFIC: _____

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2. Production Reports

<u>Manufacturer</u>	<u>Type</u>	<u>Cumulative Percentage</u>
Pepper	1E23	90
Pepper	1E26	90
Mound	1E26	102

Durant stated that, as of March 16, Pepper was put on schedule by cancellation of their shortage.

3. Rejection Rates

A. Pepper Table 1 summarizes the rejections at Pepper for February 1959.

Pepper's high rate of rejection on pre-loading assemblies is attributed to the difficulty they are having in beginning to use tetryl pellets made on a Stokes press. This likewise accounts for the high rejection rate of the pellets themselves.

Radiographic rejection rates have dropped a little, others are about the same.

Table 1. Pepper Rejection Summary

<u>Class of Defect</u>	<u>Per Cent Rejection</u>		
	<u>Month of February 1959</u>		
1. Large Pellet - Total	13.6		
1.1 Dimensional	0.4		
1.2 Visual	13.2		
2. Small Pellet - Total	*55		
2.1 Dimensional	24.5 of those inspected		
2.2 Visual	23.3 " " "		
2.3 Weight	26.8 " " "		
3. Disk - Total	13.4		
3.1 Dimensional	8.9		
3.2 Visual	4.5		
	<u>Pepper</u>	<u>Molded</u>	<u>Waterbury</u>
4. Head - Total	-	-	-
4.1 X-ray	15.0	12.25	5.0
4.2 Dimensional		15.0	4.4
4.3 Visual		2.3	3.6
5. Wire Assembly - Total	3	8	22
6. Other Sub-Assembly - Total		11	
7. Assembly - Total		11	
8. Cumulative Total after Lot Numbering		-	

\*The individual reasons reported are not directly additive to this total.

Pepper has gone back to using the Federal gage for teteryl pellets rather than the Sheffield gage. They believe that the two-jet gage of Federal gives a better reading at either extreme than does the single jet Sheffield.

B. Mound Table 2 summarizes the rejections at Mound.

Bradley explained that any rejection rate of zero for the visual attribute merely means that no screening for that attribute was necessary. The dimensional rejection rate for teteryl pellets is much higher than the weight rejection rate because the pellets are gaged prior to weighing.

Table 2. Mound Rejection Summary

<u>Class of Defect</u>	Month of:	<u>Per Cent Rejection</u>	
		<u>January 1959</u>	<u>February 1959</u>
1. Large Pellet - Total		22.9	8.9
1.1 Dimensional		13.3	8.9
1.2 Visual		9.6	0.0
2. Small Pellet - Total		24.1	23.1
2.1 Dimensional		23.7	22.6
2.2 Visual		0.0	0.0
2.3 Weight		0.4	0.5
3. Disk - Total		7.1	18.2
3.1 Dimensional		7.1	18.2
3.2 Visual		0.0	0.0
4. Head - Total		30.8	33.1
4.1 X-ray		14.2	14.5
4.2 Dimensional		4.9	4.5
4.3 Visual		11.7	14.1
5. Wire Assembly - Total		4.6	4.5
6. Other Sub-Assembly - Total		5.8	6.9
7. Assembly - Total		8.4	9.5
8. Cumulative Total after Lot Numbering		18.8	20.9

4. Production Problems

A. 1E23 Fichter reported that Molded Insulation Products is back in head production since the use of burnt Orlon is being permitted. A shipment of 5000 heads is expected this week. The burnt Orlon is evidently caused by some change that has been made by Durez. Molded has ordered some material from Mesa for evaluation.

With regard to the problem of the quality of the gold plating on 1E23 heads, the latest shipment received was all right.

Pepper expects to produce three lots of 1E23 detonators this month. Durant commented that because of firm retirement plans, there will probably be a reduction of about 400 cases in the number required to be made.

B. 1E26 Van Vessem recalled that, at the last Production Meeting, Mound reported they were experiencing excessive wear on Stokes tooling (die bodies primarily) for the large pellet. He wondered whether Mound was still having this difficulty. Bradley reported in the affirmative, although the situation is much improved since the last meeting. Mound is using some carbide tooling which so far looks good. Fichter stated that they have been using the same tooling for 2 1/2 months.

Meyers mentioned the high sigmas on a couple of Mound lots and asked if Mound had had any more. Bradley answered that recent lots have been quite normal.

Meyers asked if Pepper had experienced any questionable results following a near-miss on a 30-06 lot. Fichter answered in the negative.

Bradley reported that Mound has done some testing of du Pont PETN. This material looks good from the standpoint of  $\Delta t_m$ .

Durant asked if the Mesa molding powder was running about the same quality as it had been. The answer was yes, and the inclusion rate accounts for about two-thirds of the rejects.

Durant asked the approximate percentage of heads used by Pepper from their different vendors. Fichter replied that Pepper was using, roughly, 60 per cent Molded, 30 per cent Waterbury, and 10 per cent Picatinny heads.

Tucker presented some data pertaining to IQA. LASL began monitoring 1E26 production by test firing each lot and eventually dropped to the present level of 1 in 5. They recently had a regression analysis made using firing data obtained by the manufacturers and by themselves. The calculations indicate that the firing relationship between the sites is pretty constant and that, for example, LASL could calculate the  $t_p$  they would get on a lot provided they fired it, based on firing data at either Pepper or Mound. While the work is somewhat preliminary, it indicates that as long as the relation between  $t_p$  and  $t_m$  holds (as long as the plants are in control), LASL may be able to reduce their 1 in 5 firing.

The correlation between  $t_p$  and  $t_m$  is important for zippered weapons, and it is likely that a specification will be set controlling the lots which will be useable on these weapons. Most lots being produced fall within the zipper needs.

5. Production Engineering at Mound

Meyers stated that a letter clarifying the Production Engineering function of Mound will be put out. The letter will cover the following points: LASL will define detonator parameters in a general way, will determine that such detonators can be produced, and will function satisfactorily. At this point, they will send preliminary information and drawings to Mound. LASL will not have finished their work at this time but would be checking such aspects as safety and proper functioning of the item. Work would be concurrent at both places. Mound would begin to look at the item from the standpoint of production. Environmental testing in general will be done at LASL. It is believed that Mound will function thusly:

1. During development
  - a. Determine characteristics of new material
  - b. Study new processes
  - c. Start preliminary design of new, special tools and gages
  - d. Review tolerances, dimensions, specifications
2. During production start-up
  - a. Help plants to get going
  - b. Review the plant set-up, their tooling and gaging.  
Spot potential trouble
  - c. Inspect some of trial lots. Review rejections. Make recommendations based on difficulties encountered.
3. During production
  - a. Help trouble shoot
  - b. Analyze rejection rates and what causes rejects
  - c. Advise LASL on specification changes.

General specifications and drawings will continue to come from LASL. Detailed specifications and procedures may come from Mound at some future date.

Tucker pointed out that any change-over will be handled essentially as was 1E26 start-up. LASL will look critically at the first units and pass the acceptance responsibility to AEC as they gain experience.

6. Status Report of 1E26-A and 1E26-B

A. Production of 1E26-A Gnagey reported that Mound had two molds modified to evaluate the split-ring method for molding 1E26-S heads. The molds have been on a press for only two days and no proper evaluation of

performance has been made. The inspection report of the molds showed that they did not meet the drawing in many dimensions. Mound has also machined and has a vendor machining shoulders on heads. Tool wear is very rapid, and it is not easy to maintain the sharp 0.005 corner. Mound wants to try diamond tooling. The spinover tool is due to be delivered at Mound. Unless something unforeseen occurs, Mound expects to meet delivery of the five cans in April.

Fichter stated that Pepper has sent drawings of the 1E26-S head to their vendors so that they can study the feasibility of mold modification. Pepper is set up to machine shoulders on heads. They are awaiting delivery of a spinover tool.

Mound expects to purchase aluminum cans; Pepper expect to make their own.

Meyers gave a brief summary on Exon-RDX. LASL observes (by rear view shots) that the progression of the shock wave through the PETN-Exon interface has much less delay than through a PETN-tetryl interface. With tetryl the delay is about 0.4 microsecond, with 3 per cent Exon it is about 0.1 microsecond. With 8 per cent Exon, the delay is about 0.25 microsecond. They presently feel that the material to be used will be 6 per cent Exon with 0.8 per cent graphite. GMX-3 has been able to make 6 per cent Exon which meets the granulation requirements of PAPD-711. GMX-7 is now in the process of running 50 pounds on their Stokes. If all goes well, 50 pounds will be shipped to Mound. LASL feels that Exon will be ready for use in the 1E26-A for both disk and small pellet.

B. Production of 1E26-B Gnagey reported that Kel-F cups have been received from two different vendors. Work is progressing on construction of a vacuum system for leak testing of assemblies. The heat sealer is due in within a week. Bendix expects to have some cable made in April. However, Mound will not get any until LASL has received some and has had a chance to inspect it.

C. Test Firing of 1E26-A Brinkman discussed in detail the work done at Mound investigating ways of consistently getting good readable traces from 1E26-A detonators. Different methods included various films and developing techniques; PBX, tetryl, and PETN on double-faced masking and Scotch tape; aluminum fluorosilicate inside and outside the can; PBX glued to the can; PETN and aluminum fluorosilicate held to the can with Scotch tape; and an air gap between the can and Scotch tape.

Mound feels that the best technique at the present time is to:

1. Move board as close as possible to the camera, the detonators being 1/4 inch apart
2. Use Royal-X Pan film "pushed" in developing
3. Use aluminum fluorosilicate
4. Have each board carefully checked before firing

Mound shot six full boards, 12 half boards, and one 30-190 board using these techniques. All were readable traces. Mound believes that such a system is adequate to get started with.

It was observed in examining the films that the most readable traces were on film with a high background density. It was suggested that an improvement in traces could be obtained by building into the camera a means for deliberately fogging the film after exposure. Meyers promised to discuss this possibility with McQueen.

Brinkman reported that the CTS results obtained by Mound looked discouraging but that the work had not been carried very far. Crowe stated that it appears that LASL will permit the pulling of the CTS detonators at random prior to canning.

Crowe stated that LASL was considering, for 1E26-A firing, a black insulator with ears so that the still picture would show whether or not the insulators were in place. LASL agreed that, if the paint and/or the insulator were missing from a detonator (as shown by the still), the lot would not be jeopardized due to a poor trace or no trace from that detonator.

D. Gaging Waldfofle reported that Mound has received two proposals for gaging the 1E26-A: one air system and one optical. The air system does not check the radius of the shoulder, and the optical system does not check the diameter although this could be added. He does not like either proposal as they now stand.

Crowe stated that the gaging for this detonator is somewhat long range and LASL does not expect this sort of gaging on the trial lots. Component gaging will be up to the manufacturer; Mound will be responsible for Final Inspection gaging. Mound has a 1E26-S Final Inspection gage, a 1E26-S well-depth gage, and a 1E26-S large pellet gage on order.

## 7. Quality Survey

Crowe itemized what would be expected of Mound and Pepper at the forthcoming Quality Survey by reviewing the recent survey at Bendix. There is a review of the drawings and specifications with comments by the contractor with reference to the design agency. There is an examination of the manufacturer's inspection methods with the design agency and others criticizing what the manufacturer is doing as opposed to what he should be doing. AEC people examine what is being done by AEC. There is a formal manager's review, a discussion with the Plant Manager of the findings. There is an on-the-spot report written by the design agency, the manufacturer, the local AEC, and ALOO AEC.

## 8. Plastics Formulation

Dr. J. F. Eichelberger, Research Director at Mound, summarized the status of the Plastics Formulation Facility. He described in some detail the process and what the problems were at each step of the process.

The production roll mill is regarded as the chief weakness in the process at the present time. The angular speed of this mill is the same as the laboratory mill whereas the peripheral differential speeds should have been the same. This can be corrected by a different gear set or by a variable speed motor or drive. Such a change will involve considerable time since 50 HP motor drives are not stock items.

Heads made from material which went through the production facility except for milling (which was done on the laboratory mill) compared favorably with heads from Mesa material.

Research does not believe the facility should be turned over to Production until it is ready to go.

## 9. Next Meeting

The next meeting will be at Picatinny Arsenal May 13, 1959.

*L. B. Cnagey*

L. B. Cnagey

LBG:vrg

### Distribution:

- Cy 1 - E. H. Fyster, GMX-7, LAS
- 2 - R. I. Spaulding, GMX-7, LAS
- 3 - Ralph Johnson, USAEC, AIC  
Attn: J. V. Durant
- 4 - H. V. Frazier, IC
- 5 - K. L. Fichte, LA
- 6 - D. C. Smith, Jr., PA
- 7 - R. C. Washburn, USAEC, PA
- 8 - J. P. Stroud, IRI, Livermore
- 9 - W. B. Creamer, USAEC, DAC
- 10 - D. L. Scott, Mound Laboratory
- 11 - J. E. Bradley, Mound Laboratory
- 12 - E. A. Waldfogle, Mound Laboratory
- 13 - Central Files