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R & D Department
ACHESON COLLOIDS COMPANY
Port Huron, Michigan

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Project CPD-A-66

MONTHLY REPORT #5

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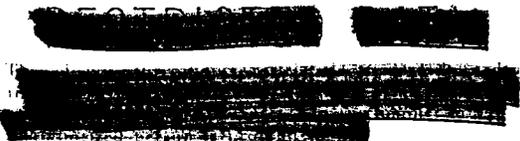
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SANDIA SYSTEMATIC DECLASSIFICATION REVIEW	
FOYUNCLATED FOR DECLASSIFICATION STAMP	
Date: <i>7/22/97</i> By: <i>Emilda Seph</i>	Date: <i>7/22/97</i> By: <i>Carmela Bulley</i>
Date: <i>7/7/97</i> By: <i>W.C. Layne</i>	Date: <i>9/25/2402</i> By: <i>9/25/2402</i>

Arthur J. Stock

March 9, 1960

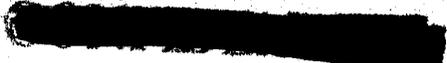


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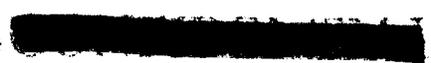
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I. SUMMARY

An attempt was made to produce two master dispersions, one containing lead plus resin system, and one containing UO_2 plus resin system. There was no problem with the lead, but the UO_2 set up without the presence of catalyst. Thus a new trial has to be made by a different method. It is planned to disperse the UO_2 in EPOX resin alone if the resulting viscosity is not too great.



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II. INTRODUCTION

Attempts to produce a superior dispersion of lead and uranium dioxide in epoxy resin are underway at Arbeson Colloids Company. Past efforts indicated that it would be desirable to make up two master mixes and then to allow them to stand for a day or two before final mixing. This would allow the surfacing of entrapped air bubbles prior to molding. Also it would permit larger sized mastication runs with greater efficiencies. Trial runs were planned along these lines.

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III. PROCEDURES AND RESULTS

In order to further study the two master dispersion techniques, a masticator run of UO₂ was made to the following formula:

EC-3003	1256.8 gms.	UO ₂ , S R 1135 batch No. 226
	126 gms.	EPCON 828 - DDSA blend

The load ran one hour after coming together as a paste. It was noted that the UO₂ dusted more than did the lead as additions were made. After thinning the run with the balance of the EPCON 828 - DDSA blend (147.2 gms) the load was removed from the mill. Examination of the product was done under the microscope after thinning a portion with additional DDSA. The following size data was obtained:

Maximum	10.5	microns
Many	3.5 - 7.0	microns
Numerous	1.4 - 2.8	microns
Majority	0.7 - 1.4	microns

It was noted that the product flocculates upon standing, however, the flocs are easily broken up. The mix was put in a quart jar and allowed to stand overnight.

The next day an attempt was made to stir the mix so as to break up the bubbles. We were surprised to find that the product had begun to set up without the addition of DWP-30. This should not have occurred since the EPCON 828-DDSA mix is hardened by heating over 70°C. Therefore, we concluded that radiation-induced polymerization was taking place, since our lead - 828-DDSA dispersion did not set up. This is something of which we were not warned, and we would appreciate receiving some confirmation of our hypothesis.

In order to further analyze this phenomena we had stirred up four mixes:

- (1) UO₂ + 828 - (2) UO₂ + DDSA - (3) Pb + 828 - (4) Pb + DDSA.

When immediately examined under the microscope all these mixes looked good, with no flocculation. The following day microscopic observation showed that (1), (2) and (3) were not flocculated, but (4) was flocculated.

As regards viscosity of the blend, (1), (2) and (3) were still viscous and tacky. (4) showed a false body which is frequently indicative of a flocculated mix.

The next day the viscosity characteristics were the same. Now, however, both (2) and (4) were flocculated under the microscope. It appears that the DDSA is causing the tendency to agglomeration, and the UO₂ radiation is causing the EPCON 828 - DDSA mix to set up.

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IV. DISCUSSION

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After analyzing the result of the preceding experiments it was decided to attack the process in a different method. We are going to make another testicator run of NO_2 in pure EPCN 828. There may be problems in viscosity, but at least the mix should not set up. Then we will make another mix of lead, using a small amount of EPCN 828 to wet the powder, and then finish off with the major portion of the DDOA. This we hope will give us two stable dispersions which can be pre-mixed with the DMP-30 just prior to molding, thus giving a uniform, well dispersed liquid dispersion and cured solid. Comments on the suitability of this procedure for subsequent operations will be appreciated.

V. COSTS PER MONTH

January costs of \$176.80 are being billed to Sandia. It should be noted that our expenditures are progressing at a relatively low rate. If progress has not been fast enough to date, we should like to be so informed. It would be possible for us to further expedite this work if there is a desire to do so.

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