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NPIC/P&DS/D/6-772
7 February 1966

MEMORANDUM FOR THE RECORD

SUBJECT: Evaluation of Contract [redacted] "Feasibility of Using a Dipolar Suspension for a Light Amplifying Screen" [redacted]

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REFERENCE: Final Report of Contract [redacted]

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1. The initial interest in pursuing this contract was generated by a product that [redacted] had developed for other purposes. The product, known as "Varad", is a dipolar suspension whose optical transmission can be controlled or modulated by an externally applied electric field. Where the electric field is applied, the dipoles align perpendicular to the surface layer and light can be transmitted through the material in these areas of alignment. The purpose of this contract was to investigate the feasibility of employing photoionic materials to modulate the suspension. An ultraviolet light would be modulated by the original image and projected upon the suspension (in the form of a large screen); those areas, in which the light was transmitted by the film, would appear dark to an observer because ionization of the photoionic material would occur there it was struck by the ultraviolet light and the ions would shield the externally applied electric field, causing the dipoles in those areas to dis-orient and the screen to become opaque.

2. [redacted] begins his report by building a case to show that the duration of the contract was too short; however, it must be remembered that the contractor himself estimated the time period and he was at liberty to select the length of the effort. The six months effort that is referenced as the duration of the contract is misleading for the contract has actually been active for eleven months. From the explanation of how the time was spent, it is evident that the time was not utilized efficiently. From the quantity and quality of the equipment used in the experimentation, it is apparent that a three month effort to complete this phase was not justified. Concurrent efforts should have been initiated during this initial period to obtain the test equipment and material samples, to study the available literature, and to calculate the theoretical results. The final report evidences extremely poor management of the program by the contractor.

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3. The report, as a whole, is inadequate and extremely superficial. Throughout the report, the contractor makes vague references to facts that he assumes to be established. For example; he states in (Section I) on page 6 that "There will be an upper limiting frequency to dipole ion shielding effect because the mobility of the ions is small." The reader is left with this general statement without any quantitative analysis as to specific materials. In (Section II) page 3, the assumption is made "that the dipole suspension contains ultraviolet absorbing molecules which will produce at least 90 to 99% ultraviolet absorption." Nowhere in the report does he substantiate this assumption nor is it related to specific materials. The basis for the assumption is offered in the following: "This [the assumption] is necessary in order to have an efficient utilization of the ultraviolet light intensity". Although the statement is true, it is certainly not a substantiation of the hypothesis. The assumption is further expounded in Section VI, page 1 where the statement is made that "for an efficient photoion layer, the layer thickness and a concentration of photoions is established such that at least 99%, but not more than 99.9%, is absorbed in the layer." Even if this is true (which is doubted for a lack of evidence to the contrary); how would this concentration affect the transmissivity? [redacted] neglects the fact that one can not just add photoions and dipoles and neglect the other factors. There is a possibility that this procedure might decrease the density range of the screen. If this is not a problem, it should be so stated and thoroughly substantiated.

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4. Continuing the analysis of the question and answer section, the contractor again has done a inadequate job. Primarily this is caused by his incomplete investigation -- which is evidenced by the lack of answers to questions 1, 5, 6, 7, 8, 10, 11, 12, 13, 14 and 15 -- but in some instances even this reason is not valid. The answer to the question of "What is the attenuation of the original imagery by the screen?" is completely mis-interpreted when [redacted] answers, "The original imagery which is born by ultraviolet light is substantially totally absorbed by the screen. Very little, if any, ultraviolet light need pass through the screen."

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5. The organization of the report shows that very little effort has been directed toward testing possible photoionic materials. Although vague references are made to the multitude of available materials possessing photoionic characteristics, apparently only three were tested. This fact was in part caused by [redacted] inability to limit the effort to the photoionic investigation. Notwithstanding the fact that early in the program a specific stipulation was made to only investigate photoionic materials, [redacted] apparently continued to explore other possible solutions to the problem. The sections and extensive discussion of photo-dipoles, photoconductive rod matrix layer, and oriented dipole photoconductive layer are completely irrelevant to this program. These subjects comprise over 30% of the final report.

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6. In conclusion, it is recommended that no further endeavors be undertaken with [REDACTED] in the field of optical dipoles. The primary basis for this conclusion is [REDACTED] low productive, inefficient, and unresponsive management. As documented above, the contractual responsibilities were far from satisfied and the yield from this program has been extremely low. Notwithstanding the results of the final report of this contract, it is strongly felt that the basic ideas and concepts should be pursued; however, not with this contractor.

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Development Branch, P&DS

Distribution:

- Orig - Project File [REDACTED]
- 1 - DB Chrono [REDACTED]
- 2 - [REDACTED]

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