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**DECLASS REVIEW by NIMA/DOD**

*Reduction* ENCLOSURE 1

2X<sub>1</sub> Printer and 2-Stage Rectifier

HISTORY

1. The original contract called for 6 each 2X<sub>1</sub> printers and 6 each 2-Stage rectifiers and a total amount of [redacted] 25X1A

*Reduction - 2:1*

a. [redacted] recognized on 9 February 1959 that an overrun would be forthcoming; at this time 23% of the contract funds had been expended.

b. On 6 May 1959 [redacted] wrote to TSS that an increase of total costs to [redacted] was necessary and gave the reasons (see Page 3, Appendix A).

c. On 16 June <sup>1959</sup> ~~1960~~ [redacted] received a letter from [redacted] acknowledging the May 6th increase and telling them to wait until they had spent 85% of the money.

d. On 1 September 1959 [redacted] stated to the customer that additional overrun had been experienced now estimated to be [redacted]

e. On 31 December 1959 (see Appendix B) [redacted] stated to [redacted], attention [redacted] that total cost for 6 systems now estimated at [redacted]

f. On 11 January 1960 (see Appendix C) [redacted] a letter giving cost breakdown and reasons for overrun.

g. On 20 January 1960 (see Appendix D) [redacted] stated in a letter to [redacted] that [redacted] was necessary for 6 each systems and that this is the total cost including fixed fee or that 2 each systems could be furnished at original contract price.

*total*

It is interesting to note that these original prices are based on 1957 base manufacturing overhead of 193% and engineering overhead

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of 91%. Today these overheads are: manufacturing 202.95% and engineering 100%. I was assured that these overheads are used for all contracts, civilian or government.

25X1A

h. On 2 March 1960 (see Appendix E) a letter was sent to the government stating that [REDACTED] would furnish one complete additional system at a fixed price of [REDACTED]. This offer holds for 60 days and is for one additional system only; any other additional systems would have to be arbitrated for.

25X1A

2. Appendix F is a complete set of progress reports from [REDACTED] on this system.

25X1A

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TESTS

1. 2X Reduction Printer--

a. Appendix g shows the result of tests using the 2X reduction printer made on various films. 113 l/mm is the best resolution obtained on axis.

25X1A [REDACTED] stated that the focal length was designed to keep the field angle small and that any other lens of this focal length and f stop would perform within 10% of this lens. The present lens is diffraction limited to 200 l/mm on axis. The lens is performing at less than this in order to give a flattening of the curve, thus raising the resolution on the edges over what it would be if 200 was achieved at the center.

b. Since this was an R & D cost, plus fixed fee contract, the manufacturer tried two light sources before determining that present, third source, which is a germicidal, fluorescent light which emits light of the proper spectral characteristics. A diffraction filter had to be used even with this light source in order to make the lens perform. This filter had to be cemented between lens elements B & C since the filter deteriorates rapidly when exposed to air. In addition both D surfaces were given an aspheric coating. Some one of the project monitors approved this action. In addition, some one approved of the focal length and f stop of the present lens.

c. The 2X reduction printer could be made to perform better by opening the f stop. This would mean a new lens and more time and more money. An f/4 system should deliver about 200 lines over the entire field and an f/2 lens would deliver about 400 lines.

25X1A d. Appendix H is the results of tests ran at [REDACTED] on SO 278 on 2 and 3 March 1960. This film peaks at a lower portion of the spectrum than the lens peaks at. Further tests will be run using different spacings of the lens.

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2. Two-stage Rectifier--

a. The lenses of the 2-stage rectifier are presently giving 30 l/mm on axis and 8 l/mm at the corners; however, this system is not ready for testing due to vibration experienced from the traveling light source. The traveling light source also is giving banding on the finished print. This is expected to be smoothed out by causing the IBM card system to give a smooth transition from area to area rather than the stop and start movement presently achieved.

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READINGS MADE AT [REDACTED]

25X1A

		LCL	UCL	LL	UL	O°	UR	LR	UCR	LCR
	S	64	50	80	100	113	88	80	64	64
.6	T	56	32	72	100	113	88	72	64	44

LCU

UCR

LU

UR

O°

LL

LR

LCL

LCR

TARGETS READ AS FOLLOWS

	-2	-1	0	+ 1	+ 2	+ 3
	8	16	32	64	128	256
	9	18	36	72	144	288
	10	20	40	80	160	320
	11	22	44	88	176	352
	12	25	50	100	200	400
	14	28	56	112	224	448

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DIFFICULTIES

1. Additional difficulties experienced with the system are that the vacuum easels still do not hold properly.

FIRM COSTS AND DELIVERY DATES

1. 2 each 2X Reduction Printers

6. 15 April 1960

2. 1 each, 2-stage rectifier June 1960

3. 1 each (2nd 2-stage rectifier) April 1961  
the above to cost [REDACTED] 25X1A  
included with the above are the lens  
elements for four more printers  
and four more 2-stage rectifiers.

4. If ordered by 2 May 1960 another system  
consisting of one 2X reduction printer  
and one 2-stage rectifier will be delivered  
by April 1961 at a cost of [REDACTED] fixed price. 25X1A

5. The cost of any additional systems will have  
to be talked over with [REDACTED] 25X1A

6. The above prices are fob [REDACTED] and do  
not include packing, delivery, or installation  
charges. 25X1A

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RECOMMENDATIONS

*vacuum problem can be solved by simple rolling back placed behind the honeycomb base.*

1. a. That film and/or paper stock to be used on the 2-stage rectifier be purchased in roll form in 22 and 32 inch widths. (Easel sizes are 22" x 43" and 32" x 64"). The entire easel could then be covered with the stock, thus solving the masking and part of the vacuum problem.

*See below*

b. That each easel be provided with a rail on the bottom front on which the film or paper will rest, thus supporting the weight of the film and thus removing one of the force vectors that now pull the stock from the vacuum. ✓

c. That each easel be provided with a simple clamp on the top front which will hold the film flat stopping the tendency to curl. ✓

d. That each easel be provided with a simple cassette mounted near the pivot to hold the raw stock and that each cassette contain a plate at the bottom with smooth bearings to allow easy feed out of raw stock.

*Is it more practical to use cut film?*

DISCUSSION:

The above recommendations are easily accomplished with no waste of time and no modifications other than the aforementioned additions.

This will reduce to one man the operation of placing the raw stock in position.

Completely covering the easel saves time in masking and determining position of masks.

Savings in time and savings in carrying many sizes of stock should outweigh the cost of raw stock. ?

2. It is recommended that it be determined how many additional systems are needed and that they be ordered at a fixed price as soon as possible.

5 25X1C

*↑  
Waiting for confirmation of intent. will determine same on trip 25X1A*

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3. It is recommended that the new Reprogen lenses be supplied to [redacted] if possible for mounting into the 2-stage rectifiers, thus saving the cost of mounting and also saving the cost of mounting the [redacted] lenses.

*We'll have to use [redacted] lenses until better lenses are available.*

4. That a contract be let for an improved resolution either f/4 or f/2 lens to be mounted in the 2X reduction printer, if this printer is to be used with high-quality material.

*We are currently investigating proposals.*

5. It is recommended that steps be taken to provide the proper power for these instruments. The 2-stage rectifier requires 40 amps /220 volts, and the reduction printer requires 1 amp/110 volts.

*Dutch note.*

6. That representative samples of original negatives of various tilt angles be provided to [redacted] as soon as possible in order that they may determine the IBM card deck that controls the light on the 2-stage rectifier.

*↑  
Jim should will have to do this at PIC or AF after delivery.*

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