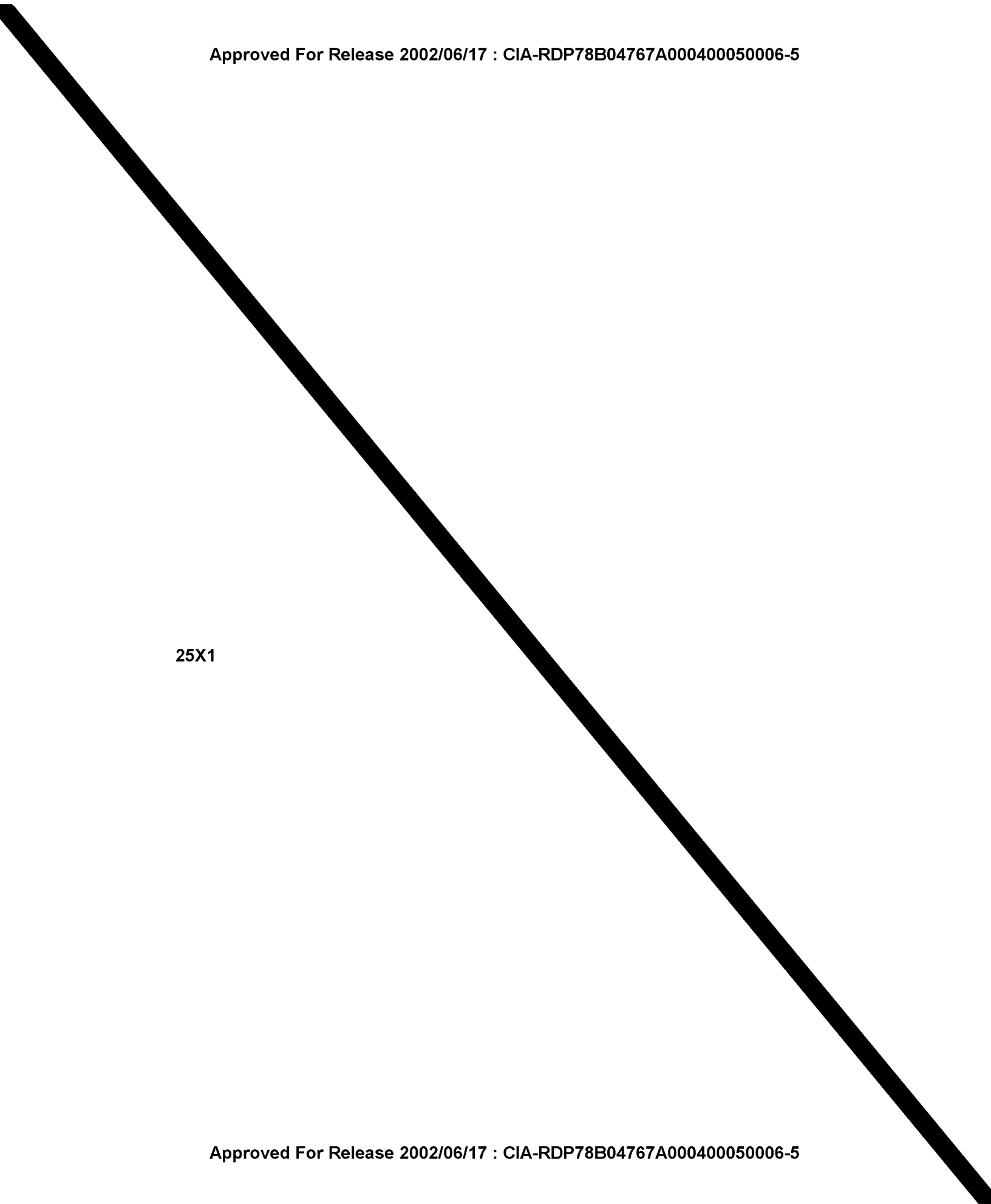

25X1

25X1

TOP SECRET

25X1

25X1

2.3 EVALUATION [redacted] AT LOW SOLAR ALTITUDES

2.3.1 Test Type

25X1

[redacted]

2.3.2 Test Objectives

1. Examine the color reproduction [redacted] at low solar altitudes. 25X1

2. Obtain an estimate of the image quality obtainable with this material.

3. Estimate ~~Consider~~ the ~~impact~~ [redacted] ~~on the~~ performance in the KH-4b System. 25X1

2.3.3 Test Details

The photography from this test was obtained [redacted] 25X1

[redacted] at 65,000 feet. This produced a ~~resulted in~~ scale 25X1

of 1:33,000 at the center of format for the original negatives. [redacted] 25X1

[redacted] 25X1

[redacted] The flight started early in the morning 25X1

in order to acquire photography at very low solar altitudes. The photography continued from 5 degrees solar altitude to midmorning where the solar altitude was 37 degrees. In order to obtain well exposed photography over this wide range of solar altitudes, a neutral density filter was used in one unit to make a full stop difference in exposure between the two cameras. The specific camera parameters

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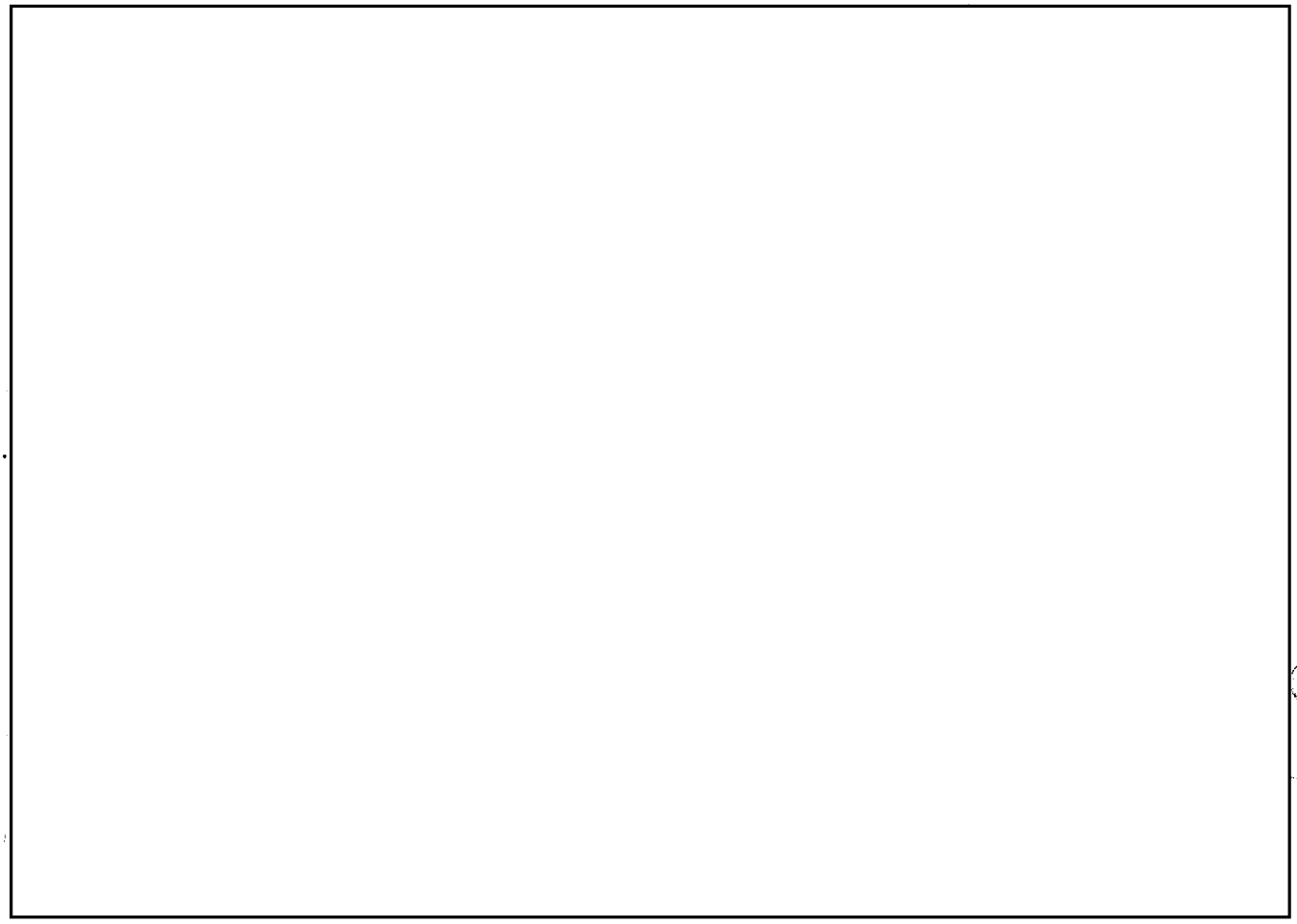
[redacted]

25X1

for the flight are listed in Table 2.3-1.

25X1



2.3.4 Discussion of Examples

Two photographic illustrations have been included to show the resultant photography at the extremes of the solar altitudes covered. (See Fig. 2.3-2). These illustrations have been printed to look as much like the original [redacted] film as possible. It is interesting to note that in making these images many of the test prints had a much better color balance. However, they were not used since they were not a good representation of the original material.

25X1

[redacted] 25X1

At the low solar altitude, sufficient quality is present to clearly locate small aircraft. There is little improvement in the recognition of these aircraft (or support vehicles) at the higher solar elevation. The overall color cast of the material at low solar altitude is bluish. However, there are areas of warm tone where the sunlight strikes the area directly. In the shadow areas, such as near wooded terrain, there is a severe loss due to underexposure.

At the higher solar altitudes the image has a warm tone cast, principally brown. Almost the entire scene is illuminated by direct sunlight. As such, there is detail prevalent in the wooded areas. High reflectance objects are really not that much easier to identify and recognize. This can be noted in the light aircraft, the terminal area, the swimming pool, and the parking lot.

2.3.5 Results/Condlusions

The following results and conclusions were obtained from this evaluation:

25X1 1. [redacted] can generally be used at solar altitudes as low as 10 degrees. Certain types of information can recorded as low as 5 degrees solar altitude.

25X1 2. A full load [redacted] could be properly exposed at a range of solar altitudes as low as 13 degrees in the KH-4B System. Only slight underexposure would occur at 10 degrees.

[redacted] 25X1

[redacted] 25X1

A partial load, however, would be more severely limited since a combination of filter and exposure control would have to be used with the color correction filter inthis case. A neutral density filter would have to be used since the film is approximately 8 x faster [redacted] and slit control alone is not sufficient for proper exposure. 25X1

25X1 3. The [redacted] lens is not optimized for the entire visible spectrum. The 2 : 1 resolution performance to be expected from a split load [redacted] is 40 to 50 lines per 25X1
25X1 millimeter. [redacted] The resolution expected from a full load 25X1
25X1 [redacted] where the lens can be set at peak focus for this material, is ~~from~~ approximately 50 to 60 lines per millimeter. It would be worth considering a lens design corrected for the entire visible wavelength band if color is to be used extensively in the KH-4B System.

4. Color reproduction is poor at the low solar altitudes when using the nominal color compensating filter pack. For a full load where both prime and alternate filter positions can be devoted to the color film a separate filter pack should be used at low solar altitudes. However, this is not practical for a partial load of color film since one filter position would have to be used ~~with~~ for the black and white emulsion.

5. Poor color balance (from either improper filtration, inadequate

25X1

exposure, or low solar elevations) can be partially corrected in the duplication stage.

6. The blue component on the color image is severely affected by atmospheric haze, resulting in very low contrast. A stronger haze cutting filter (such as the Wratten no. 4) would be useful in improving the contrast. There must be, though, an appropriate color correction filter used to off-set the yellow cast that would result in the highlights.

25X1

25X1

Next 3 Page(s) In Document Exempt

25X1

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