

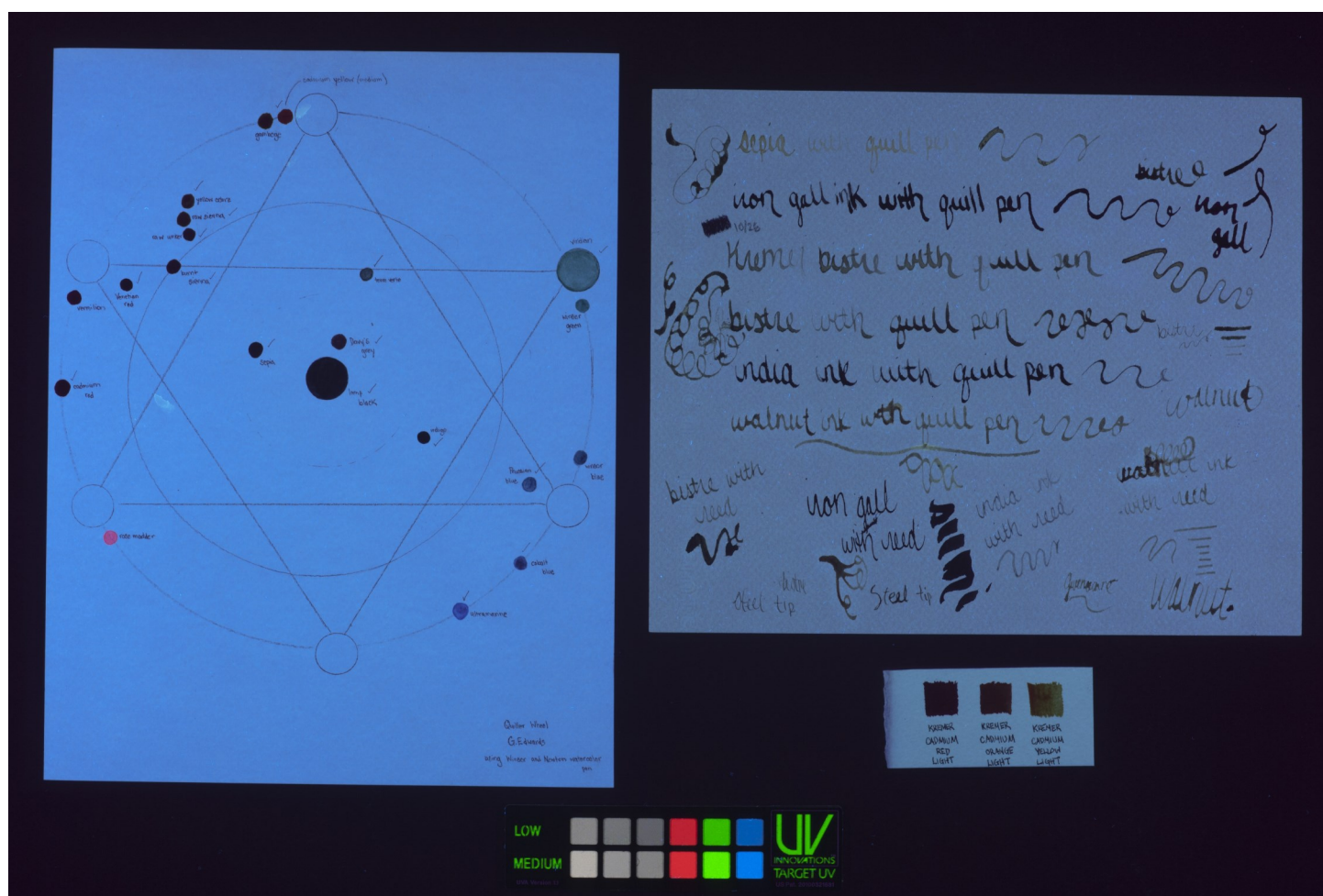
Section 17—UV-Visible Fluorescence (Modified Camera)

Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

ULTRAVIOLET (UVA)-INDUCED VISIBLE FLUORESCENCE (MODIFIED CAMERA)

This mode is used to differentiate and characterize materials. The technique involves excitation of materials with ultraviolet radiation in order to induce fluorescence in visible wavelengths.



Ultraviolet-induced visible fluorescence photograph

Section 17—UV-Visible Fluorescence (Modified Camera)



Figure 17.01



Figure 17.02

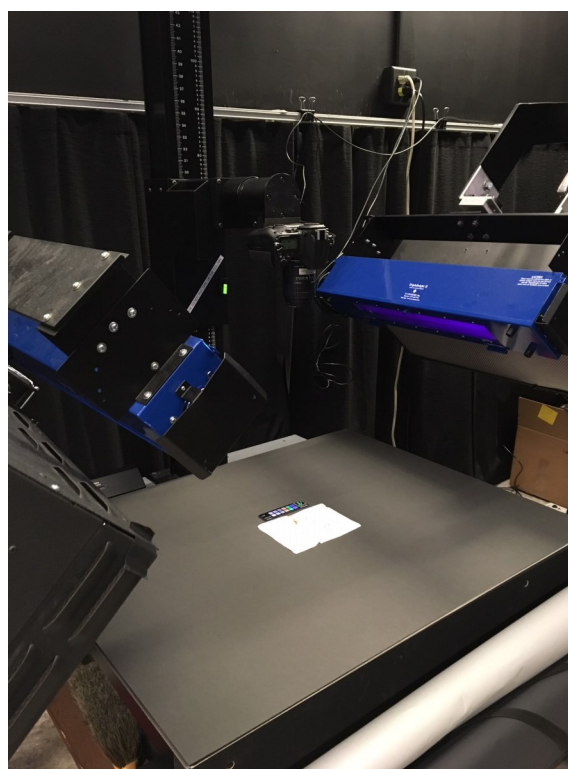


Figure 17.03

Section 17—UV-Visible Fluorescence (Modified Camera)

Capture

Preliminary

If not done already, capture a visible illumination image with the modified camera following instructions in Section 14. **Wear UV goggles when the UV lights are on.**

Set Up

1. Use the Nikon D700 modified camera and the CoastalOpt lens.
2. The CoastalOpt lens **MUST** be set at the minimum aperture setting of f/45 to utilize the electronic aperture function (otherwise the camera will display ∞).
3. The **PECA 916** and **PECA 918** filters are used for UV-induced visible fluorescence photography with the modified camera (fig 17.01). The filters are stored in the studio cabinet. Very carefully, screw on both filters to the end of the camera lens. The order the filters are screwed on does not matter.
4. Plug in the UV lamps. **It is important to plug in both cords (two for each lamp) for at least 20 seconds before switching on lamps.** Neglecting to do this will seriously shorten the life of the tubes. Turn on the lamps using the white toggle switch (fig 17.02) located at the short end of each unit closest to the copystand wall. Let the lamps warm up for at least 5 minutes before capture.
5. Adjust the height of the lamp stands so the bottom of the collar is at 25". Position the lamps equidistant and as close to the copystand as possible (fig. 17.03). Try to achieve even illumination across the area to be photographed. Do not change the angle of the lamps.

Section 17—UV-Visible Fluorescence (Modified Camera)

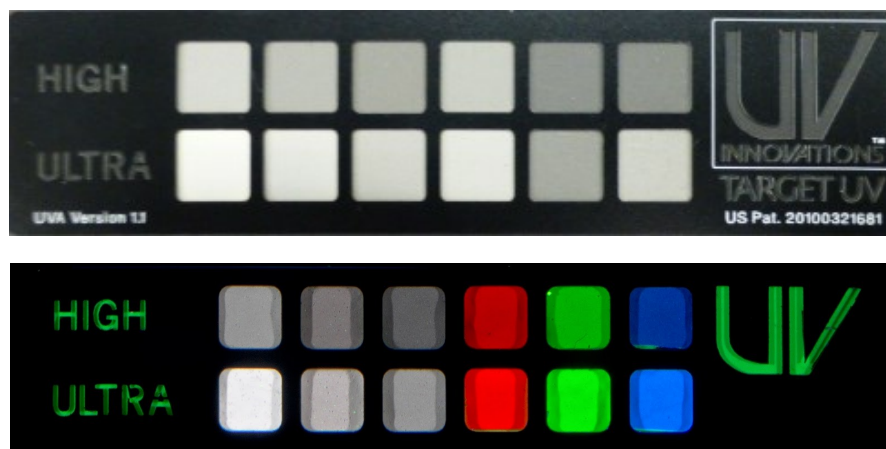


Figure 17.04

2.18.4106.001 Before treatment
11/20/17 UVA-induced visible fluorescence

Figure 17.05

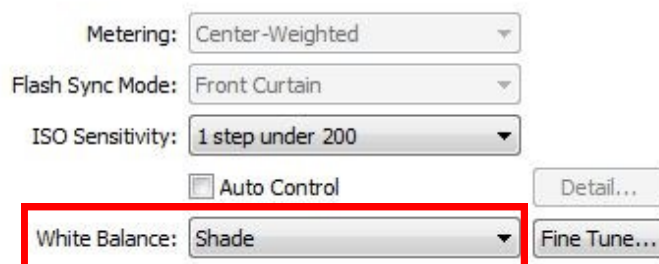


Figure 17.06

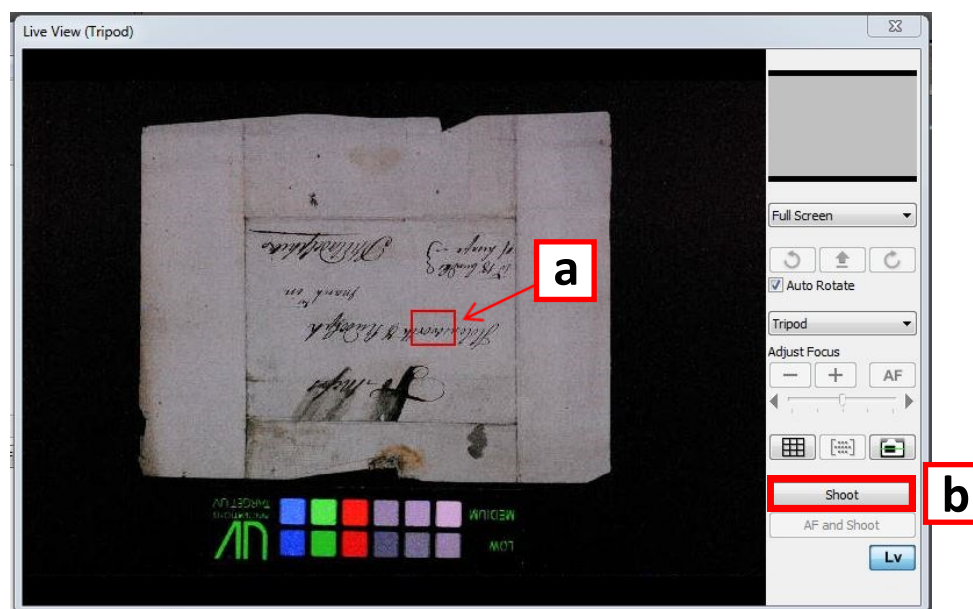


Figure 17.07

Section 17—UV-Visible Fluorescence (Modified Camera)

Set Up, continued

7. With the UV lamps warmed up and the overhead light off, position the UV target (fig 17.04) adjacent to your object. Compare the intensity levels on the target (Low, Medium, High, or Ultra) with the overall fluorescence of the object and select an intensity with a similar brightness level. If you are still unsure, consult the detailed guide to matching fluorescent targets with fluorescent materials which is kept in the studio cabinet.
8. Include a paper identification label using white letters on a black background in order to reduce flair from paper fluorescence (fig. 17.05).

Image Capture

1. In **Camera Control Pro** under the *Exposure 1* tab, select the following:
Exposure Mode: Aperture Priority
Aperture: f/8 (flat objects) or f/11 (3D objects) - select same as used in visible
Exposure Comp.: 0
2. Under the *Exposure 2* tab, set the white balance to **Shade** (fig. 17.06).
3. Settings under the *Storage* and *Image Processing* tabs are the same as with visible illumination with the modified camera (Section 14).
4. Open *Live View*. Position your object and label in the image frame. Place the UV target adjacent to the object so that the gray patches of the intensity level chosen are closest to the object.
5. Use the same focus as set manually for visible illumination with the modified camera (Section 14). The focus frame will remain red due to manual focusing (fig. 17.07a).
6. With the overhead light off, place the cursor on the *Shoot* button and cover the monitor with black fabric from the studio cabinet. Be careful not to move the mouse and left click *Shoot* (fig. 17.07b).

Section 17—UV-Visible Fluorescence (Modified Camera)

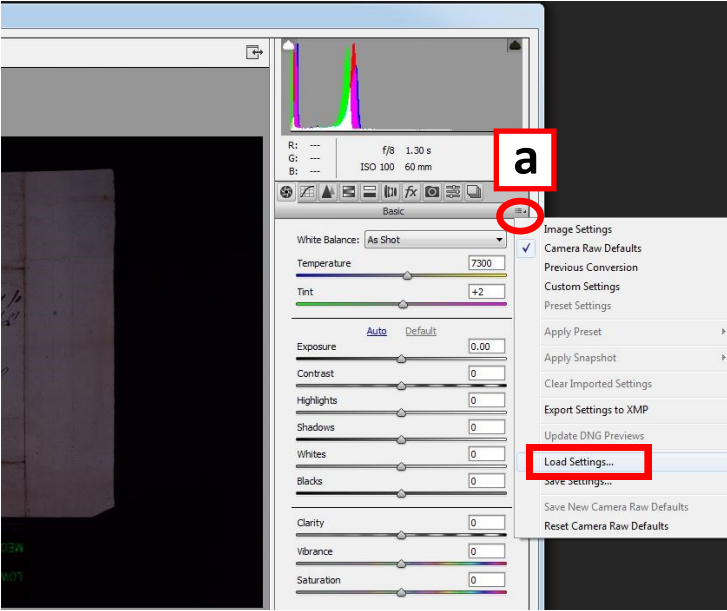


Figure 17.08

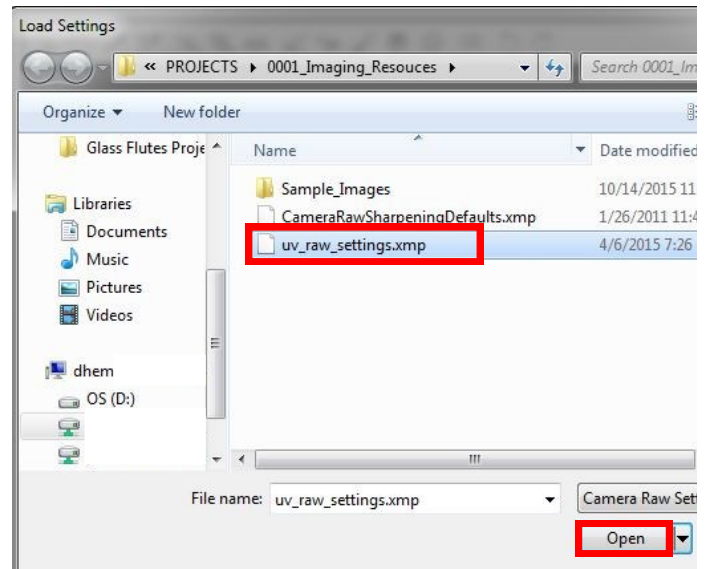


Figure 17.09

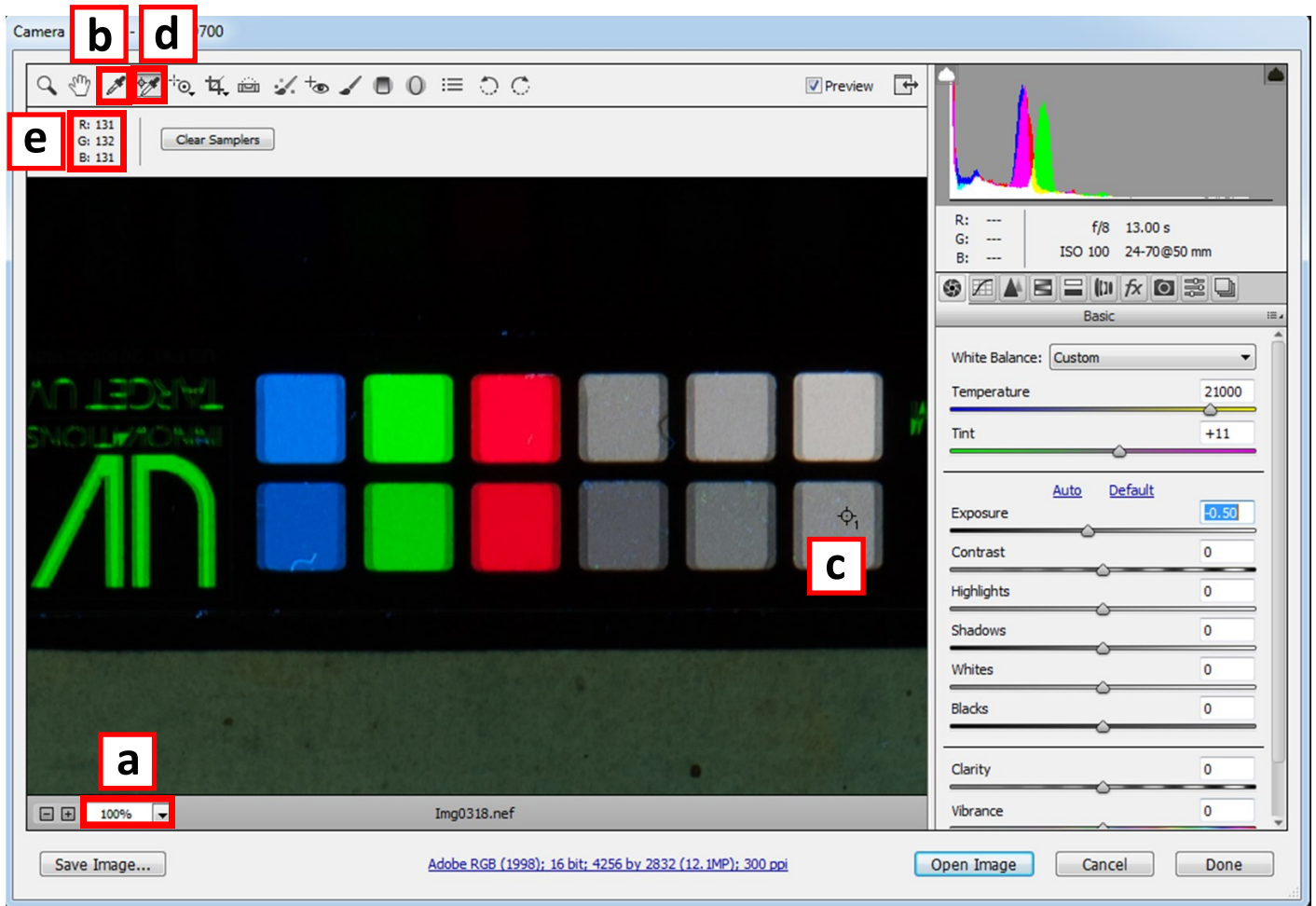


Figure 17.10

Section 17—UV-Visible Fluorescence (Modified Camera)

Preview Images

1. In **Bridge**, open the image in **Camera Raw**.
2. Left click on the *Camera Raw Settings Menu* in the upper right corner of the *Camera Raw* window (fig. 17.08a). Select *Load Settings*.
3. Navigate to *N: > Projects > 0001_Imaging_Resources* and select *uv_raw_settings.xmp* (fig. 17.09). Click *Open* to apply UV settings.
4. To white balance, zoom to 100% (fig. 17.10a). Select the *White Balance Tool* (fig. 17.10b) and click on the lightest gray patch for the intensity level chosen (fig. 17.10c). Be careful to click on the gray particles and not the green particles in the gray patch.
5. To check exposure, select the *Color Sampler Tool* (fig. 17.10d). Click on the lightest gray patch for the intensity level you have chosen (fig. 17.10c). Be careful to click on the gray particles and not the green particles in the gray patch. The RGB values should be 130 +/-3 (fig. 17.10e).
6. If RGB values are outside of 130 +/-3, adjust *Exposure Comp.* in the *Exposure 1* tab of **Camera Control Pro** and reshoot. Reapply UV settings, white balance, and check exposure again in **Camera Raw**.
7. Click *Done* in **Camera Raw** to accept changes.

NOTE: It is not uncommon for paper objects to display a weak fluorescence. If the area of interest on your object appears too dark on the monitor when the lightest gray patch is at 130, move the *Color Sampler Tool* to the second or middle gray patch and target 130 again. Note which patch was used to replicate for during and after treatment capture.

NOTE: The object as displayed on the monitor may appear slightly blue/green overall as compared to what you observe directly on the copystand. This variation derives from the difference between subjective human perception and the objective responsivity of the camera sensor.

Section 17—UV-Visible Fluorescence (Modified Camera)

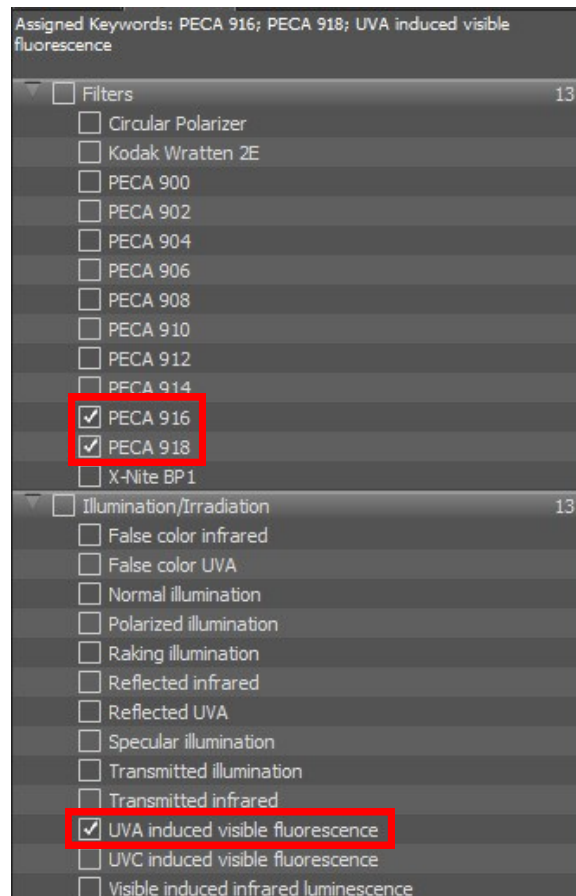


Figure 17.11

Section 17—UV-Visible Fluorescence (Modified Camera)

Finish

If continuing to another section, remove the PECA 916 and 918 filters before proceeding.

When finished with the session, return the camera, USB cord, filters, goggles, and target to the studio cabinet; turn off and unplug the UV lamps, wrapping cords around fixture at the end of the lamp; reposition the light at the 66" mark on the floor, with the top of collar at 52".

Metadata

Add metadata as you would for normal illumination except when applying *Keywords* (Section 3). Choose *PECA 916* and *PECA 918* under *Filters* and *UVA induced visible fluorescence* under *Illumination/Irradiation* (fig.17.11).

Image Processing

Adjust Image Files

1. In **Bridge**, open the image in **Camera Raw**.
2. Adjust *Exposure* to obtain RGB values of 130 in the gray patch targeted (fig. 17.10c-e).
3. Sharpening, straightening, cropping, and confirming workflow options are the same as with normal illumination images (Section 4).
4. Click *Done* to save your adjustments.

Rename and Save

Follow the instructions in Section 4 for renaming and to create .dng archive files and .tiff derivative files.