

CONSERVATION EXAMINATION REPORT

Accession #: EPTG61.44.30

Object ID (TMS #): 278891

Artist: Attributed to Andrea di Lione (1610-1685), also known as Andrea de Leone; formerly attributed to Nicolas Poussin (1594-1665)

Title: Adoration of the Golden Calf

Medium/Support: Oil on Canvas

Date: 1626-1629

Dimensions: H x W x D: 39 in. x 50½ in. x 1¼ in.

Date of Report: October 2023 - August 2024

Conservator: Josephine Ren (graduate intern)

Marks & Notations:

Signature: "NP 162?" (1626 or 1629) in brown paint, by lower center of right edge (front, right center, in black paint) NP 162[6 or 9?]

Labels: Back of frame on top member in right corner: Sticker label with typewriter text "The Israelites Worshipping the Golden Calf / By Nicolas Poussin, French, 1594-1665 / From: SAMUEL H. KRESS Collection / 31" (last number written in ink). (frame, back, top right corner, black ink on white paper) The Israelites Worshipping the Golden Calf / By Nicolas Poussin, French, 1594-1665 / From: SAMUEL H. KRESS Collection / 31; (frame, back, bottom left, black ink on white paper) 1305

Inscriptions: "1876" in blue marker ink, back of stretcher in right corner of top member. Back of frame - "1876" written in blue marker ink. Back of frame in top right corner: "61.44.30" written in black marker ink. Back of frame in top member left of center: "1876" written in blue marker ink and "CASE #3" written in red marker ink. (stretcher, back, top right corner, in blue ink) 1876; (frame, back, top left corner, in black ink) 61.44.30; (frame, back, top left, in red ink) CASE #3; (frame, back, left, in white chalk) [illegible]; (frame, back, top right, in blue ink) 1876

Treatment History:

Department records state that the painting was relined and varnished by Mario Modestini in 1953-1954; he applied a coat of 27H varnish. In 1959, Mario Modestini “corrected whitish matte strokes along horizontal restored crack” and applied coats of AYAB and Synvar varnishes. In 1970 the painting was inpainted. In 1970 the surface was cleaned with a white wax emulsion to address smoke damage and a Fome-cor backing board was applied. In 2013, scratches in the paint and varnish were retouched with Gamblin colors and resaturated with MS2A varnish while the painting was in the galleries.

Construction & Condition:**Auxiliary Support:**

The painting is supported by a six-member, hardwood stretcher with one vertical cross-member and one horizontal cross-member. All twelve out of twelve keys are present. An inscription is on the back in the top right in what appears to be blue marker ink: “1876”. The stretcher is not original to the painting and is slightly bowing backwards in all directions, likely due to previous treatment and over-tensioning of the painting. Overall the stretcher is in good condition and is structurally stable.

Primary and Secondary Supports:

The painting was lined to a heavyweight, two-to-two plain-weave linen (est.) canvas with a glue-paste adhesive. Black liner’s paper tape is adhered along all margins and obscures the edges of the painting. The painting was executed on a plain-weave canvas. The painting is very taut and over-tensioned on its stretcher. An extensive, horizontal tear in the top third of the painting is present and was previously restored. The painting is well-secured to the stretcher via tacks along the margins. The lining remains well-adhered to the original canvas. Both the lining canvas and original canvas are structurally stable.

Preparatory and Paint Layers:

The painting was prepared on a dark red-brown preparatory layer, which is visible through the overall paint layer in widespread areas due to its abraded surface. The ground appears to be thinly and smoothly applied. No underdrawing was apparent when imaged using infrared reflectography. The ground layer exhibits widespread pinpoint abrasion, as the high points of canvas nubs are visible through the ground and paint in broad areas throughout.

Overall the paint layers are smoothly and thinly applied. The passages are softly blended using wet-on-wet technique, with bolder brushstrokes applied after for detailing, outlines, and shadows. Some texture and slight impasto are present in highlights and details, such as in the clouds and the floral garlands. Hatching marks are scored into the paint in the fleshtones of some figures, creating additional texturing and shadows; this artist’s technique is most apparent in the youth on the right and the female figure and infant on the left. This scoring technique has been observed in other works attributed to Andrea di Lione. Some of the impasto appears to have been slightly flattened, likely due to lining. The canvas texture is visible on the surface.

A few small losses are in the top edge by the left and right corners. An extremely fine craquelure is present throughout the overall paint surface. A long, fine crack is present along the location of the restored horizontal tear in the upper third section of the painting. Several scratches were documented in 2013 while the painting was on display in the Legion of Honor, and appear to partially run through the paint layer. Four vertical scratches are in the lower center around the arm of the kneeling figure in red, right above the kneeling figure in yellow. Three vertical scratches are in the legs and surrounding areas of the standing youth on the right.

The paint surface is highly abraded in the sky, the calf, and a few figures (notably the young boy on the right, the mother and her baby). There are widespread pinhole losses and pinpoint abrasion throughout these abraded areas, revealing the ground underneath and even the canvas in some areas. Abrasion has resulted in loss of some painted details, such as in the flower crown of the leftmost figure. The paint surface throughout the sky exhibits the most abrasion and damage. The paint has also become transparent over time in some areas. The texture of aesthetic restoration along the tear repair is visible when viewed in raking and specular light, and its accompanying crack has some discolored retouching. Large amounts of disfiguring overpaint are present throughout, such as in the sky and in some of the figures and faces. There are numerous areas of discolored retouching throughout the composition; the retouching medium has also developed a white, hazy appearance in many areas.

Surface Coatings:

A light layer of surface dirt is present. An overall natural resin varnish was applied by brush, as indicated by its green fluorescence under UVA irradiation. Historical conservation records state that overall coatings of 27H varnish (poly(isoamyl methacrylate)), Synvar varnish (poly(n-butyl methacrylate)), and PVA AYAB varnish were applied as part of previous restoration campaigns.

The varnish appears thick, glossy, and even in its sheen and application. The coating has heavily discolored and yellowed over time. Accumulations of brown, discolored varnish are in the low points of impasto and brushstroke texture. A varnish solubility test is present at the top edge, top left corner in one of the clouds. The varnish has been disturbed along some areas in the top edge, notably by the left and right corners, giving a matte appearance. The varnish is also abraded along the bottom edge by the left corner. Rabbit rub appears to be present along the left and right edges. There are around 4 vertical scratches in the varnish in the lower center. Some minor splatters or drips are present throughout.

Frame:

The frame is in good condition overall. All members are structurally stable and the gilded carved ornamentation is stable.

Recommended Treatment (TMS entry):

Dust and vacuum all surfaces. Conduct aqueous and solvent solubility tests for cleaning. Surface-clean to remove any dirt/grime. Remove discolored varnish and disfiguring overpaint. Fill losses as needed. Apply layer of isolating varnish. Inpaint losses and abrasion for visual reintegration. Apply final varnish to even out and protect surface.

Technical Analysis Report (TMS entry):

The painting was examined in and out of its frame in the conservation studio. Infrared reflectography, X-radiography, optical microscopy, X-ray fluorescence spectroscopy spot analysis, and fourier-transform infrared spectroscopy were performed.

Shortwave infrared reflectography (IRR): The painting was examined and imaged using a FLIR SC6000 InGaAs camera + 55mm/f8 lens (640 x 480 array; purchased in 2008). Image captures were recorded then processed and stitched together in Adobe Photoshop to create the infrared reflectogram. IRR revealed the presence of various spots of fills and restoration. No underdrawing or evidence of compositional planning are present. No compositional changes are visible in IRR, which supports the theory that the painting is a direct copy of a pre-existing work. IRR also provides a clear visualization of the artist's hatching and scoring technique, notably in the flesh tones of the figures, as well as the application of varied brushstrokes.

Direct exposure digital X-radiography: The painting was penetrated by a beam of X-rays from a tube mounted on a movable track on the ceiling. The tube was positioned at its highest height to a working table, on which the painting was placed face down. The extent of X-ray penetration was recorded on a 14" by 36" Kodak Industrex Flex HR Digital Imaging Plate (2174) using a Carestream Digital X-ray processor (purchased in 2016). No screens or tube filtrations were used. Each radiograph was captured at settings of 35 kV and 5 mA and for an exposure time of 5.5 minutes. Eight total exposures were required to capture the size of the painting. The resulting radiographs were processed and stitched together in Adobe Photoshop. The X-radiograph reveals that the tacking margins have been cut down. The X-ray also visualizes the extent of the repaired horizontal tear in the upper half of the painting, as well as other structural losses and tears. Areas that appear bright white indicate lead white pigment.

Photomicrography: Photomicrographs of areas with overpaint before treatment were captured using a Leica MZ7.5 Stereomicroscope outfitted with a Nikon DSLR camera, iPad, and CamRanger wireless tethering and camera control system.

X-ray fluorescence spectroscopy (XRF): XRF was performed using a handheld Bruker Tracer III-V+ instrument with a rhodium target X-ray tube excitation source and a Peltier cooled Si-PIN detector. Spectral data was acquired and interpreted using S1pXRF and Artax software. A total of 22 spots throughout the painting representing a range of colors were analyzed (see Appendix). Results indicated the possible presence of the following pigments: vermilion, lead white, copper-based blue (likely azurite), copper-based greens, lead-tin yellow, and earth pigments. XRF also confirmed the presence of zinc white overpaint; the presence of zinc white was apparent when the painting was first examined under ultraviolet fluorescence, as zinc white is characterized by its bright yellow-green appearance under UVA-induced visible fluorescence.

Fourier transform infrared spectroscopy (FTIR): FTIR analysis was performed by Dr. Rebecca Ploeger at Buffalo State University for samples of restoration adhesive material that was applied on the paint surface along the tear. Results indicated the presence of poly(vinyl alcohol), poly(vinyl acetate) or poly(ethylene-vinyl acetate), natural resin, and natural wax.



Before treatment, front, normal illumination.



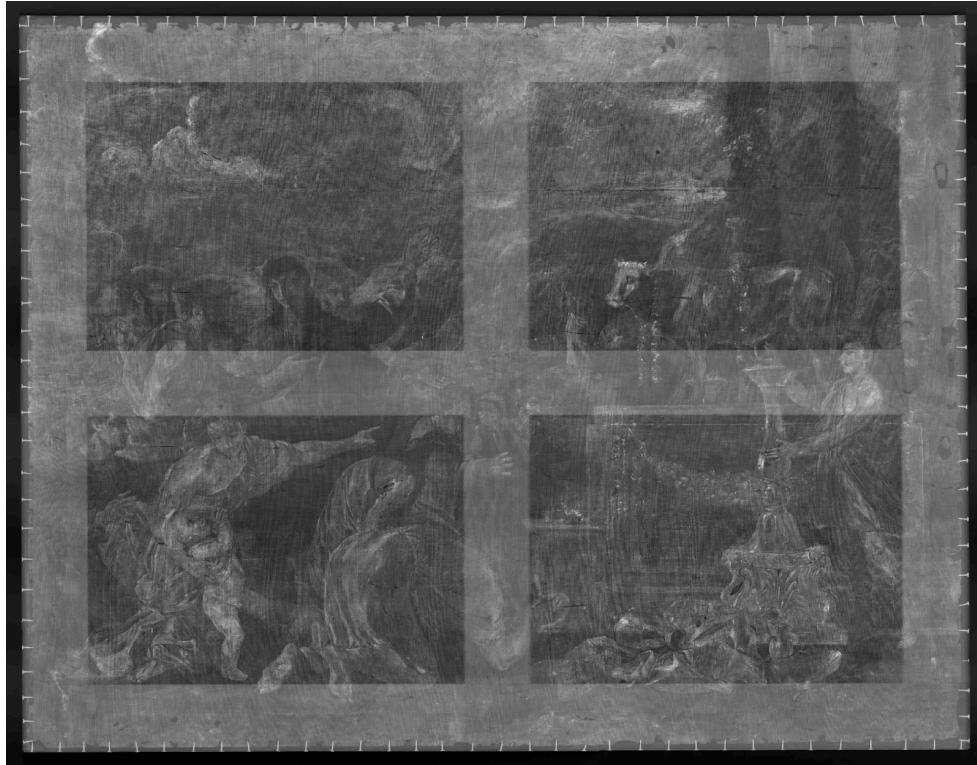
Before treatment, front, raking illumination.



Before treatment, front, UVA-induced visible fluorescence.



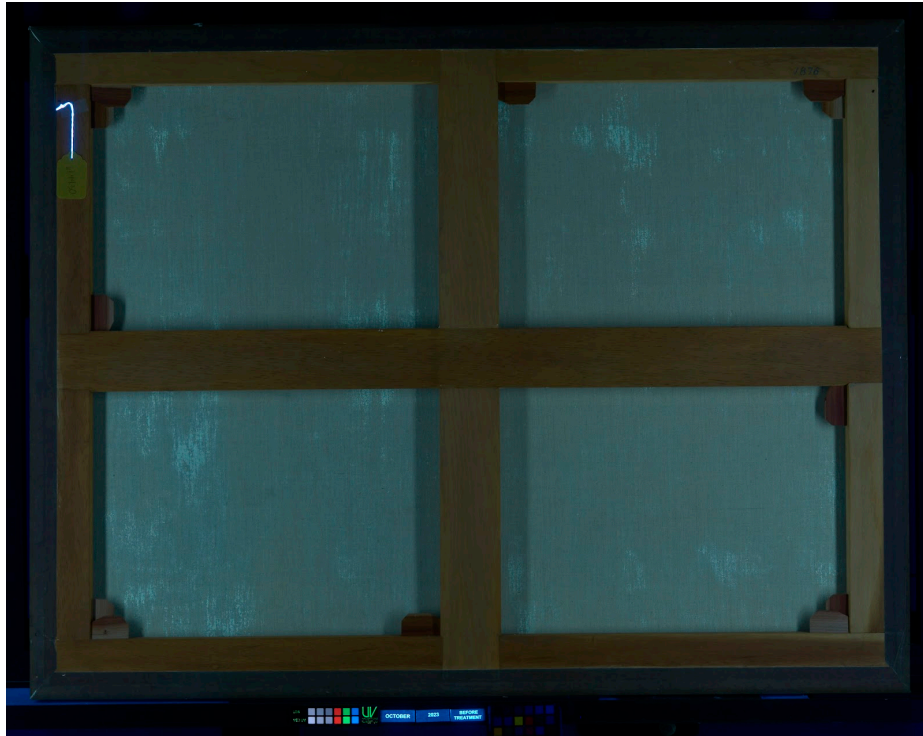
Before treatment, infrared reflectogram.



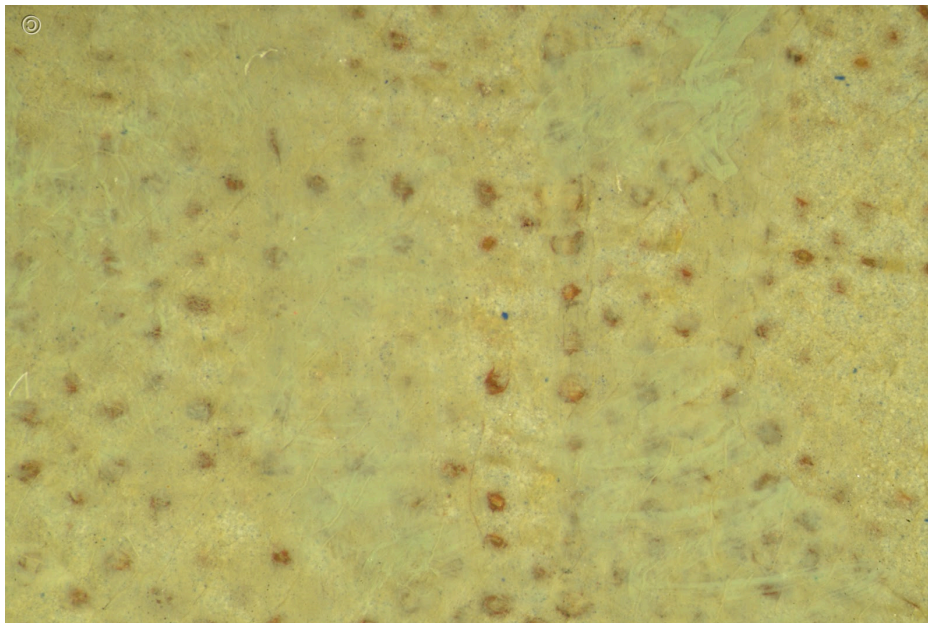
Before treatment, X-radiograph.



Before treatment, back, normal illumination.



Before treatment, back, UVA-induced visible fluorescence.



Micrograph detail before treatment, showing overpaint in blue sky area.



Micrograph detail before treatment, showing overpaint in lower left female figure's face



Micrograph detail before treatment, showing overpaint in flower crown of leftmost male figure.



Micrograph detail before treatment, showing overpaint in nose of rightmost male figure.



Micrograph detail before treatment, showing overpaint in pink robe of left male figure.

blue paint → original?
paint loss? retouch? white
underneath

Disturbance in varnish/possible pressure against paint → frame?

Varnish removal
test

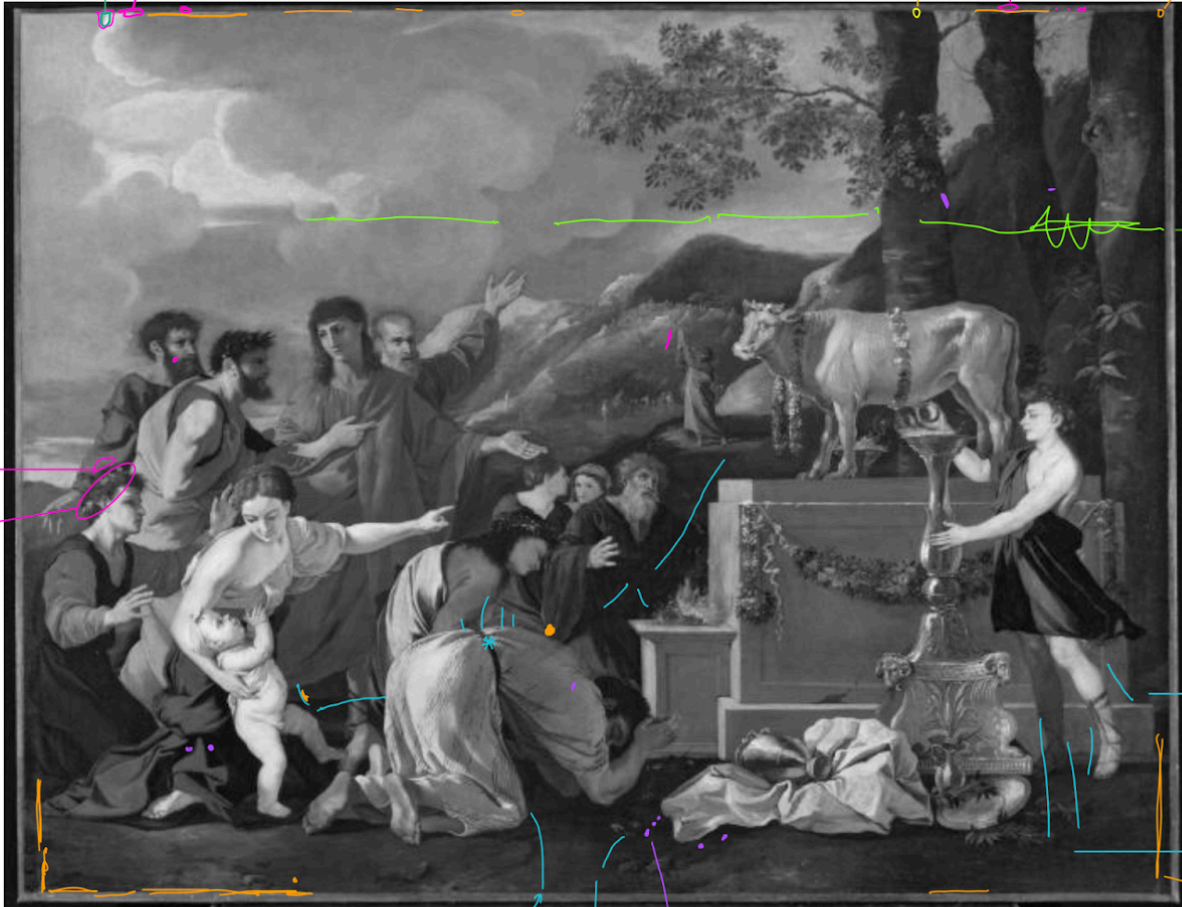
paint loss/loose flake

white underneath → fill?
ground? but overall
ground is red

gold flecks - from frame?

paint loss

inpainting? over loss (no fill?)



Condition diagram.

CONSERVATION TREATMENT REPORT

Accession #: EPTG61.44.30

Object ID (TMS #): 278891

Artist: Attributed to Andrea di Lione (1610-1685), also known as Andrea de Leone; formerly attributed to Nicolas Poussin (1594-1665)

Title: Adoration of the Golden Calf

Medium/Support: Oil on Canvas

Date: 1626-1629

Dimensions: H x W x D: 39 in. x 50½ in. x 1¼ in.

Date of Report: October 2023 - August 2024 (treatment status ongoing)

Conservator: Josephine Ren (graduate intern)

Treatment Proposal:

1. Perform written and photographic documentation before, during, and after treatment.
2. Vacuum and dust all surfaces.
3. Conduct aqueous solubility tests for surface-cleaning.
4. Remove surface dirt and/or grime with aqueous system as needed.
5. Conduct solvent solubility tests for varnish removal.
6. Remove or reduce thick, discolored varnish.
7. Conduct solvent solubility and cleaning tests for overpaint removal as needed.
8. Remove any remaining overpaint.
9. Fill losses as necessary.
10. Apply layer of isolating varnish.
11. Inpaint fills, losses, and abrasion.
12. Apply layer(s) of final varnish.

Treatment Performed:

1. Performed written and photographic documentation before, during, and after treatment.
2. Vacuumed and dusted all surfaces using a HEPA-filtered vacuum.
3. Conducted aqueous solubility tests for surface-cleaning with saliva and deionized water.
4. Removed surface dirt with saliva and cotton swabs.
5. Conducted solvent solubility tests to determine a system for varnish removal.
6. Removed varnish with 2:1 toluene:ethanol and cotton swabs. Typically two passes of this solvent mixture were required to remove the majority of the varnish. Remaining residues of varnish were removed with one broad pass of 2:1 ethanol:iso-octane.
7. Removed thick restoration adhesive material that was present along the length of the horizontal tear on the painting's face. Softened adhesive with deionized water as needed and removed bulk of material with flat-tipped scraper tool and tweezers. Cleaned remaining residues of material and overpaint with acetone and cotton swabs. All work was completed under the stereomicroscope.

8. Performed solubility and cleaning tests to determine a system for removing remaining tenacious overpaint. The following cleaning systems, including recipes from the Modular Cleaning Program, were tested: swabbing with various free solvent mixtures, mechanical removal, ethanol gelled with Klucel G, applications of Evolon CR with free solvent mixtures, Carbopol gel mixtures, Pemulen gel mixtures, aqueous cleaning mixtures with variations in pH/chelators/surfactants, and xanthan gum emulsions. Xanthan gum emulsions with solvent and aqueous cleaning components adjusted to higher pH, combined with mechanical action, were found to be most successful.
9. Reduced overpaint in select areas using a tailored cleaning system. Areas were selected based on whether the original paint was stable and where the overpaint was covering, altering, and/or distorting the original composition. Prepared an emulsion consisting of around 2% xanthan gum thickener, 0.5% EDTA chelating agent, 15% benzyl alcohol, and water adjusted to a pH of 9. Applied emulsion to areas of overpaint and agitated with a brush. Mechanically reduced the softened overpaint using surgical and micro-surgical scalpels with the emulsion present. Removed emulsion and overpaint with a dry brush or swab, cleared area with water adjusted to pH of 8.5, then cleared area with odorless mineral spirits. In some areas, old waxy fill material was also present and had to be removed using the xanthan gum emulsion and mechanical action. Other areas of thinner overpaint, retouching glazes, and remaining coating residues were cleaned using acetone and cotton swabs. All work was completed under the microscope.
10. Filled deeper losses with Flugger and textured pre-existing fills with Flugger diluted in deionized water.
11. Dusted paint surface with a soft hake brush and removed remaining cotton fibers.
12. Varnished painting by brush with ~20% Laropal A81 in 1:1 Shellsol D38:Shellsol A100 plus ~2% Tinuvin 292 to re-saturate and level out paint surface.
13. Inpainted losses and abrasion using Gamblin Conservation Colors and a diluent of isopropanol and 1-methoxy-2-propanol to restore pictorial unity.

Narrative Treatment Report (TMS entry):

The painting was dusted and vacuumed. Surface-cleaning was done with saliva and cotton swabs to remove grime. Solvent solubility tests were conducted to determine a system for varnish removal. The varnish was removed using 2:1 toluene:ethanol and cotton swabs; typically two passes of this solvent mixture were required to remove the thick varnish. Remaining residues of varnish were removed with broad, minimal passes of 2:1 ethanol:iso-octane.

Restoration adhesive material was revealed along the length of the tear on the face of the painting. Samples of the material were collected and sent to the Buffalo State Garman Art Conservation Department, where conservation science professor Dr. Rebecca Ploeger performed FTIR analysis to identify the adhesive material. Dr. Ploeger's analysis revealed that the samples contained poly(vinyl acetate) or poly(ethylene vinyl acetate), poly(vinyl alcohol), natural wax, and natural resin. This composite restoration material was removed by softening the material with deionized water, mechanically removing the bulk of it with a flat-tipped scraper tool and tweezers, and then cleaning remaining amounts of adhesive and overpaint with acetone and cotton swabs. This process was done under the microscope.

Further solubility and cleaning tests were performed to determine a system for removing remaining tenacious overpaint, which was likely oleo-resinous and/or contained lead white. The following cleaning systems, many of which are pulled from the Modular Cleaning Program, were tested: swabbing with free solvent mixtures, mechanical removal, ethanol gelled with Klucel G, applications of Evolon CR with solvent mixtures, Carbopol gel mixtures, Pemulen gel mixtures, aqueous cleaning mixtures with variations in pH/chelators/surfactants, and xanthan gum emulsions. Xanthan gum emulsions with solvent and aqueous cleaning components adjusted to a higher pH, combined with mechanical action, were found to be most successful.

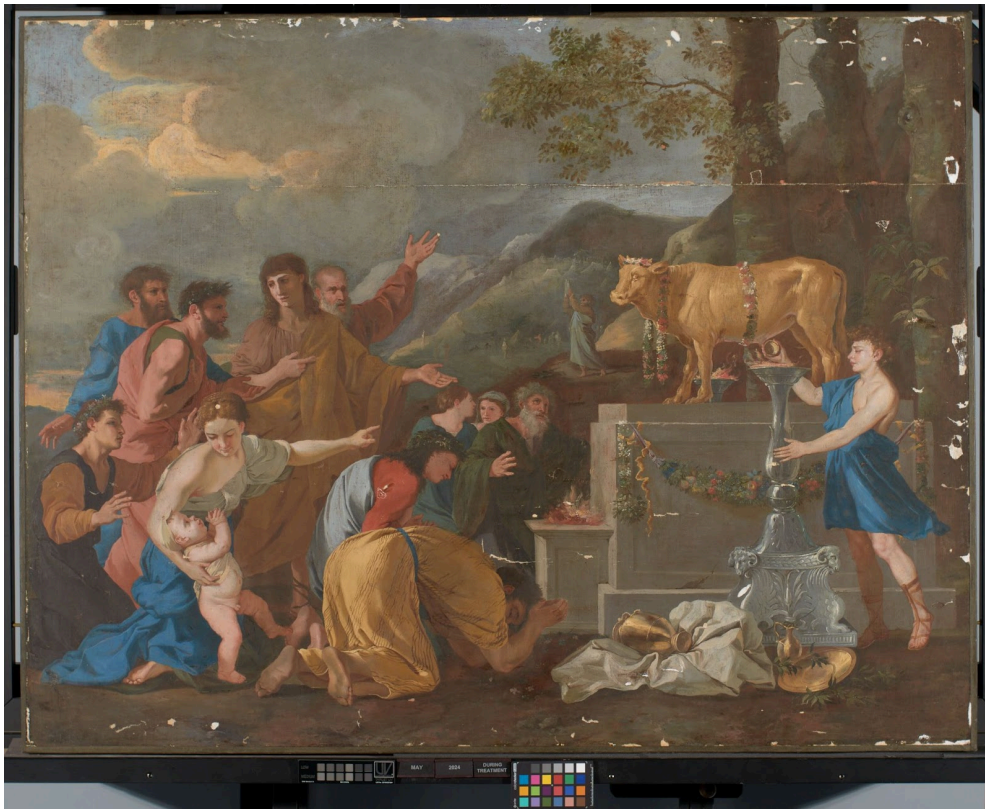
The paint film was abraded and soft in many areas, likely due to previous over-cleaning and other treatments. In some of these areas, the overpaint appeared closely bound to original paint. Thus, a selective cleaning approach was followed for overpaint removal. Areas were selected based on whether the original paint was stable, and where the overpaint was notably covering, altering, and/or distorting the original composition. An emulsion consisting of 0.5% EDTA chelating solution, 15% benzyl alcohol, and water adjusted to a pH of 9 thickened with 2% xanthan gum was used. The xanthan gum emulsion was applied on the overpaint and agitated with a stiff "scrubber" brush. In most areas, brush agitation was not enough to solubilize all of the thick, hard overpaint. Further mechanical action was applied using surgical and micro-surgical scalpels to reduce the overpaint while the emulsion was present. The emulsion and overpaint were then cleared with a brush or dry swab. The area was then cleared with water adjusted to a pH of 8.5 and finally cleared with odorless mineral spirits. In some areas, old waxy fill material was also present and had to be removed using the xanthan gum emulsion and mechanical action. Other thinner areas of overpaint, retouching glazes, and non-original coatings were cleaned using acetone and cotton swabs. These cleaning processes were performed under the microscope.

Losses were filled and pre-existing fills were textured using Flugger. The majority of pre-existing fills were left as is since they were stable, well-executed, and did not cover any original material. The painting was varnished by brush with 20% Laropal A81 in 1:1 Shellsol D38:Shellsol A100 plus 2% Tinuvin 292. Laropal A81 was chosen for its similar appearance to natural resin, its moderate gloss level, even saturation, and ease of application. Losses, abrasion, and discolored overpaint were inpainted using Gamblin Conservation colors and diluents of isopropanol and 1-methoxy-2-propanol. Using a diluent of 1-methoxy-2-propanol was especially useful for inpainting areas with extensive pinhole abrasion.

Varnish recipe: 20 g. Laropal A81, 50 mL Shellsol D38, 50 mL Shellsol A100, 0.4 g. Tinuvin 292 (2% to weight of resin)



Before treatment, front, normal illumination.



During treatment, after cleaning, front, normal illumination.



During treatment, after varnishing and before inpainting, front, normal illumination.



During treatment, during inpainting, front, normal illumination.



Before treatment, front, UVA-induced visible fluorescence.



During treatment, during inpainting, front, UVA-induced visible fluorescence.



During treatment, progression of varnish removal, normal light (left) and UV (right).



During treatment, halfway progression of varnish removal, normal light (left) and UV (right).



During treatment, after varnish removal, normal light (left) and UV (right).



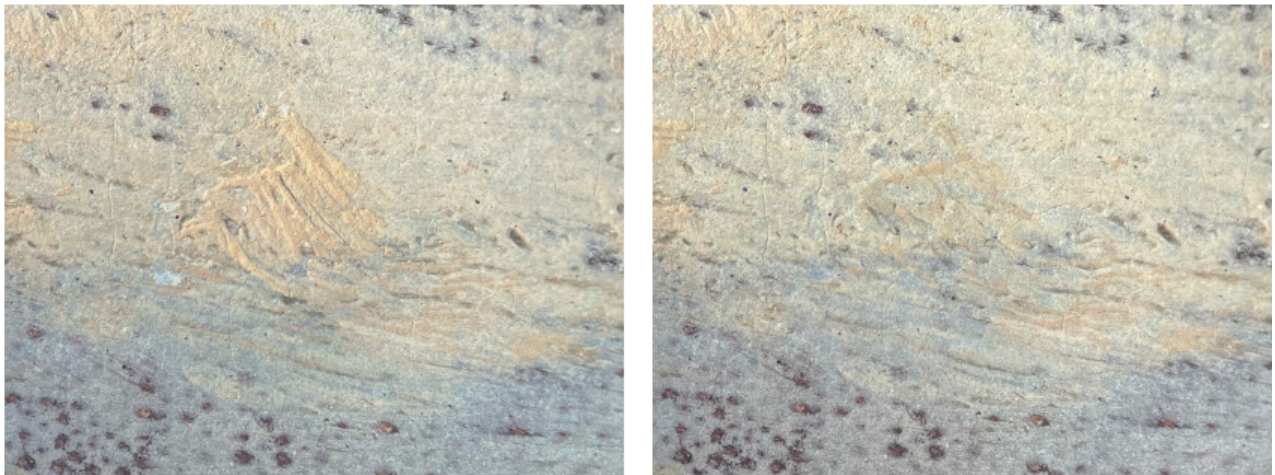
After varnish removal. Annotated area of restoration adhesive material along tear, before its removal.



Details of area with restoration adhesive material. Specular light (top) and raking light (bottom).



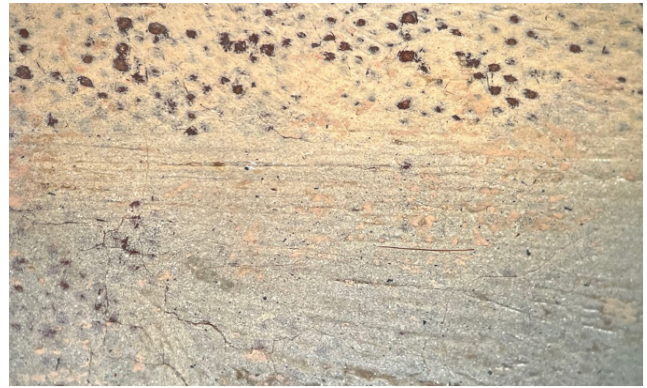
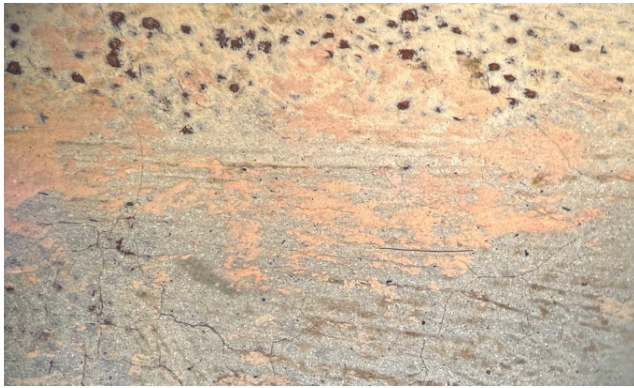
Removal of composite restoration adhesive material that was on paint surface along the horizontal tear.
Left to right: micrograph of restoration material, mechanical removal of material, detail during removal.



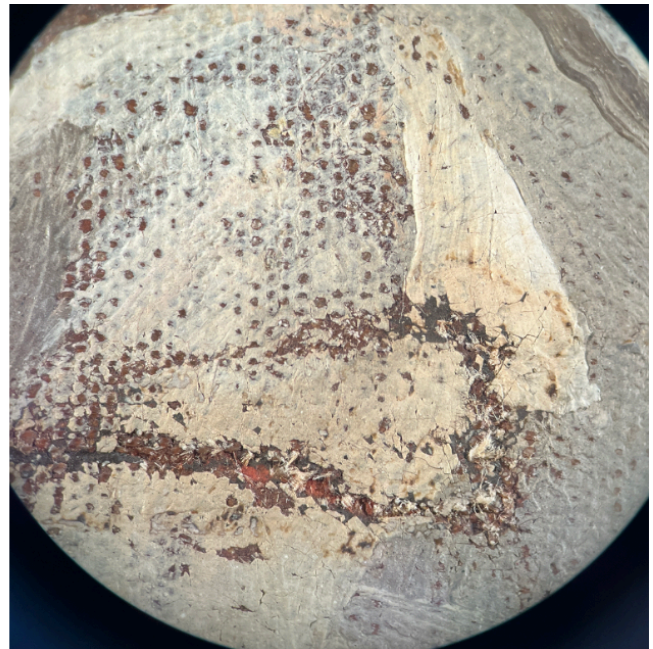
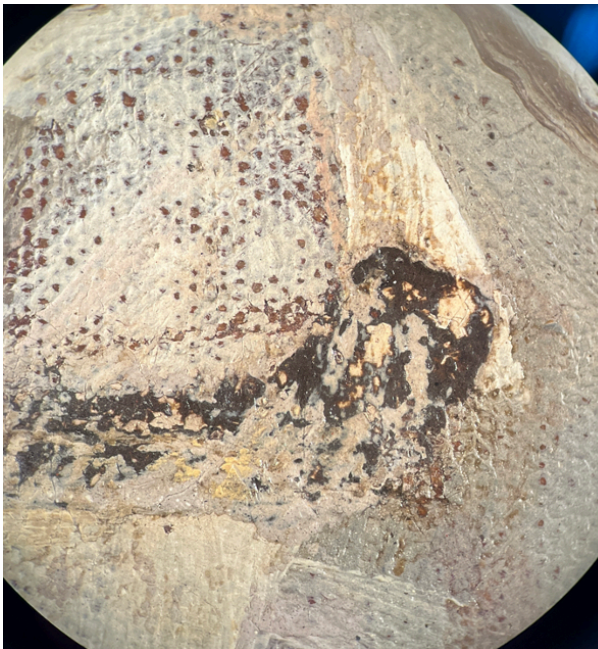
Detail of thick beige overpaint in cloud before (left) and after removal (right).



Removal of thick, tenacious overpaint in a cloud in the background.
Left to right: Agitating xanthan gum emulsion with brush, mechanically removing bulk of overpaint with scalpel, mechanically removing rest of overpaint more precisely with micro-surgical scalpel.



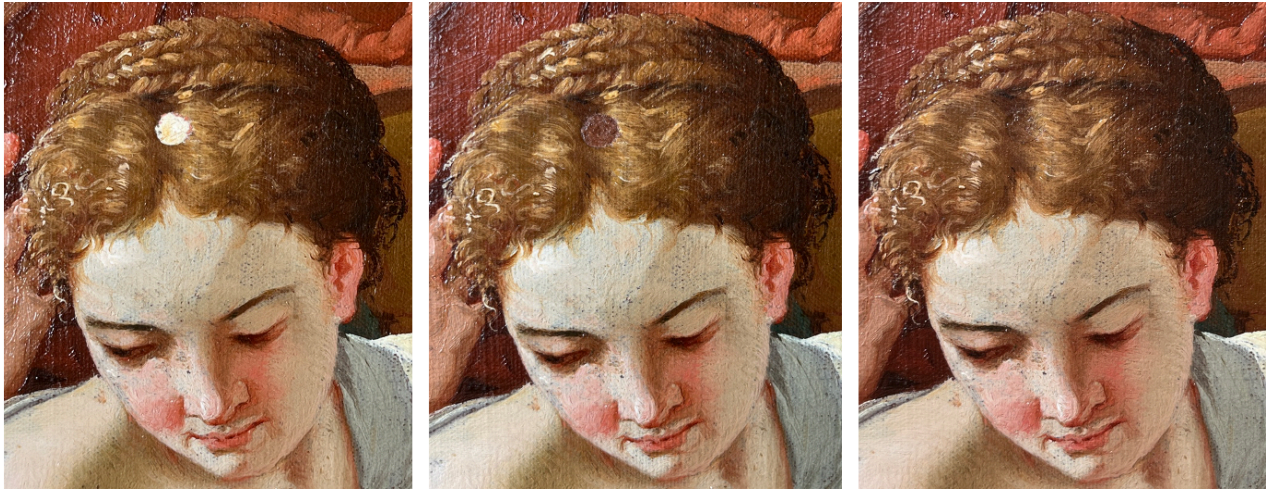
Detail of pink overpaint in cloud before (left) and after removal (right), using cleaning system with xanthan gum emulsion and mechanical action as illustrated above.



Micrographs of area before (left) and after removal (right) of overpaint and old fill, revealing original paint.



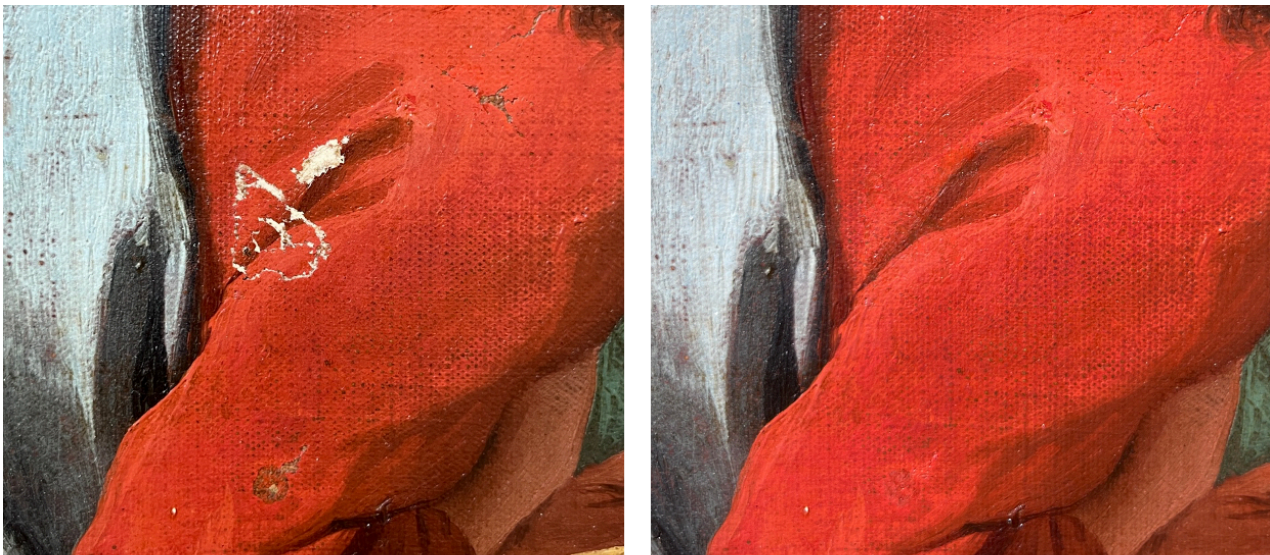
Texturing smooth pre-existing fills with Flagger to mimic canvas texture.



Left to right: details of filled area in figure's hair before, during, and after inpainting.



Details of area in background during successive stages of inpainting.



Details of clothing in figure before (left) and after inpainting (right).

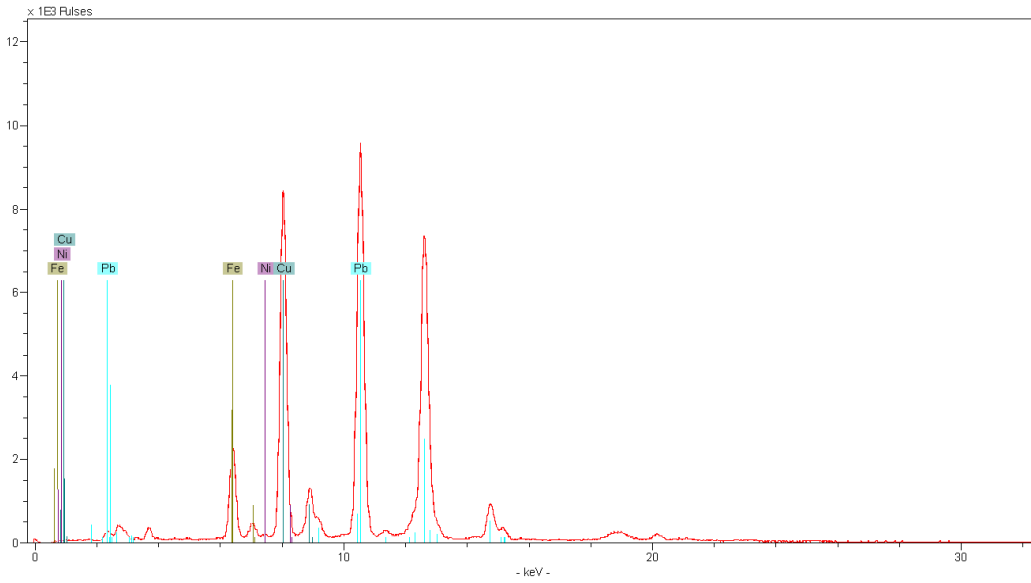
APPENDIX: X-RAY FLUORESCENCE SPECTROSCOPY RESULTS



Diagram of spot areas analyzed using X-ray fluorescence spectroscopy.

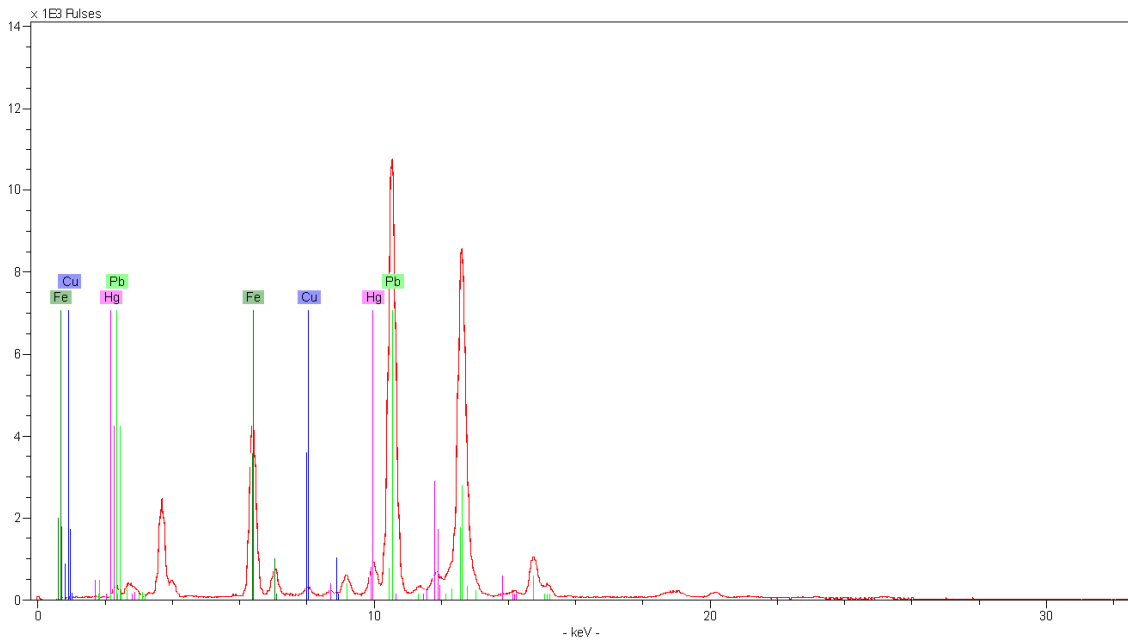
Tables of XRF spectra results and notable peaks:

Spot 01, black



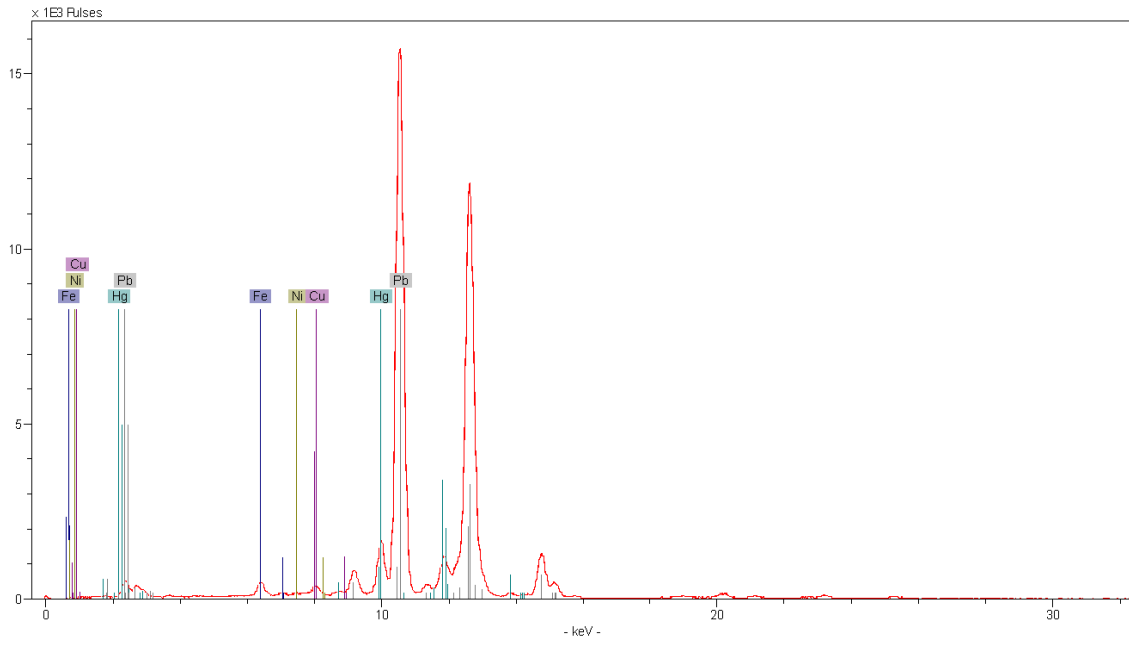
Notable peaks: Fe, Ni, Cu, Pb

Spot 02, yellow-brown



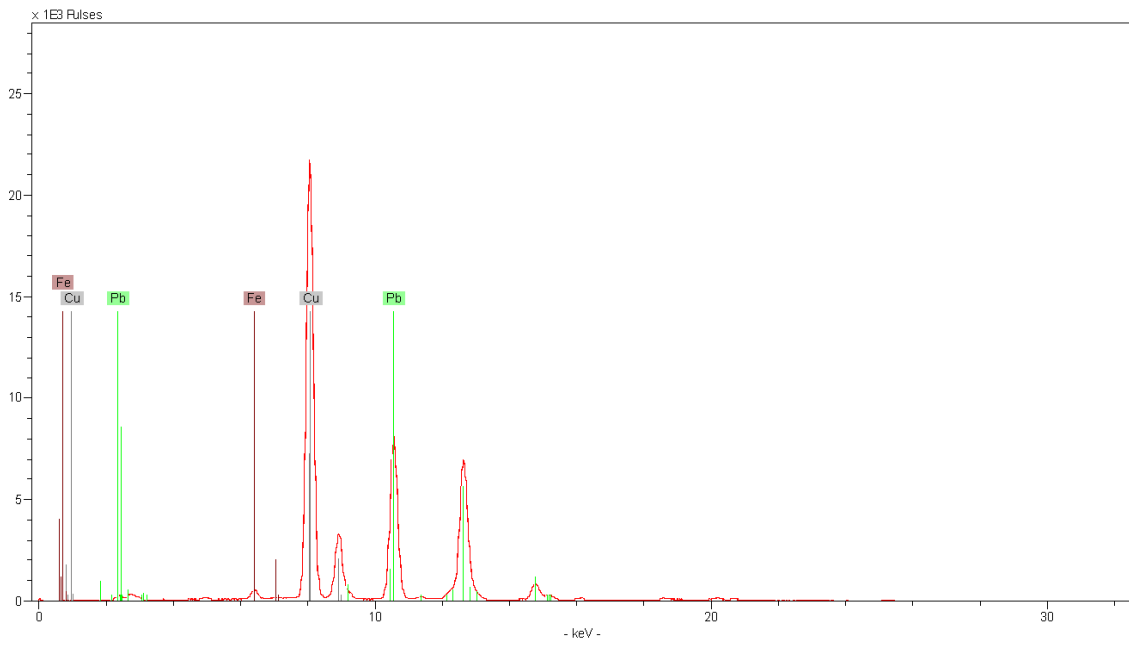
Notable peaks: Fe, Cu, Pb, Hg

Spot 03, pink



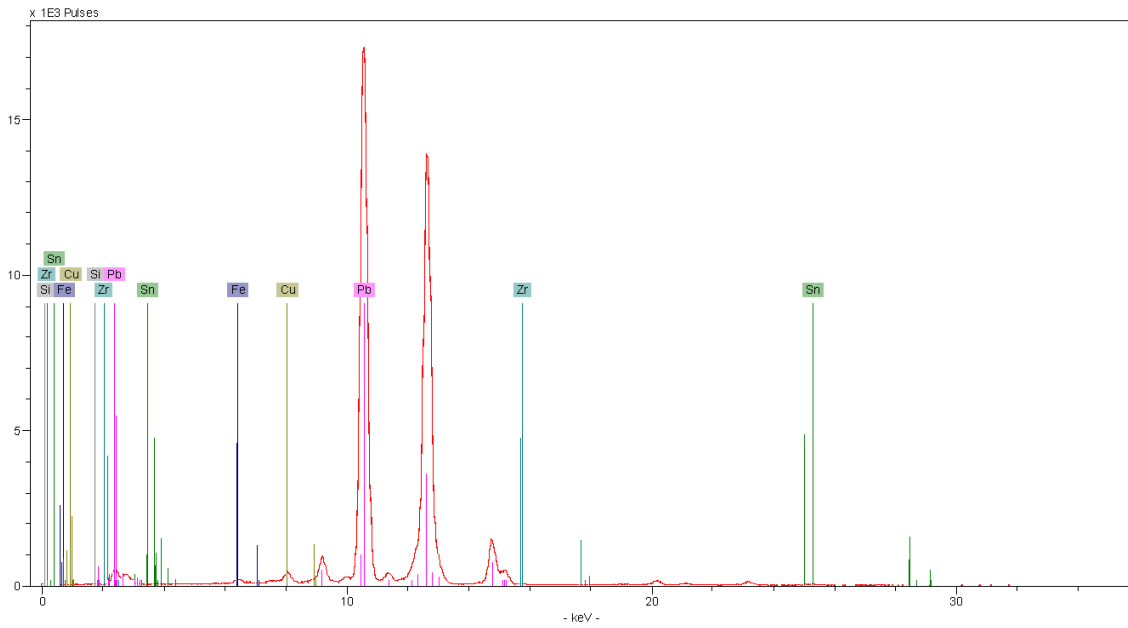
Notable peaks: Pb, Hg, Fe, Ni, Cu

Spot 04, blue



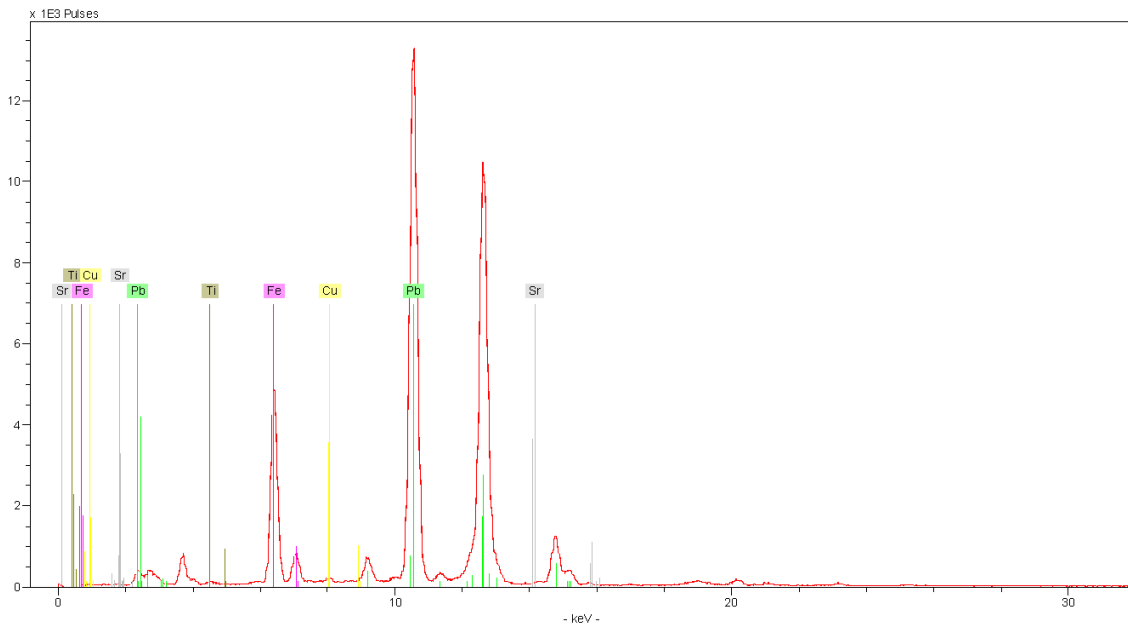
Notable peaks: Cu, Fe, Pb

Spot 05, light flesh tone



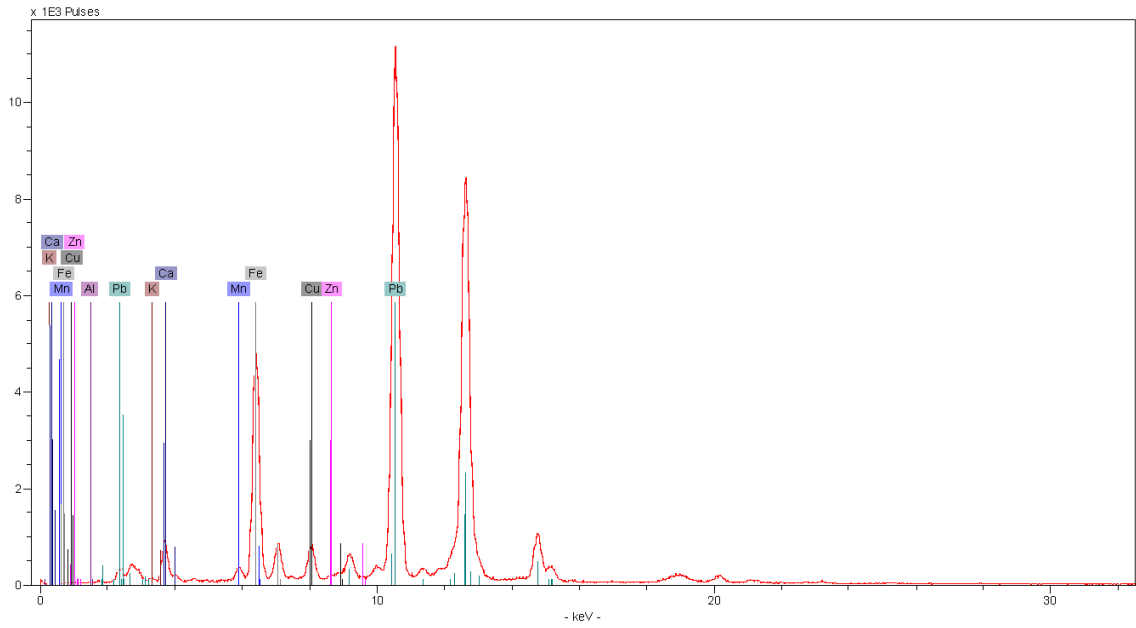
Notable peaks: Pb, Sn, Fe, Cu, Si

Spot 06, yellow brown



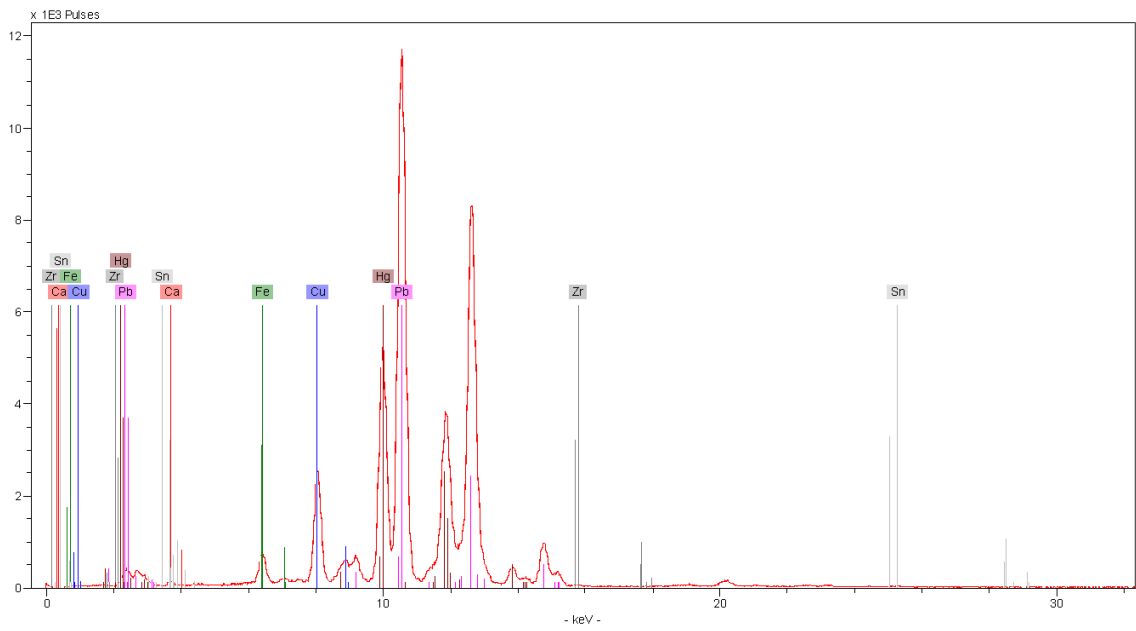
Notable peaks: Fe, Sr, Pb, Cu

Spot 07, brown



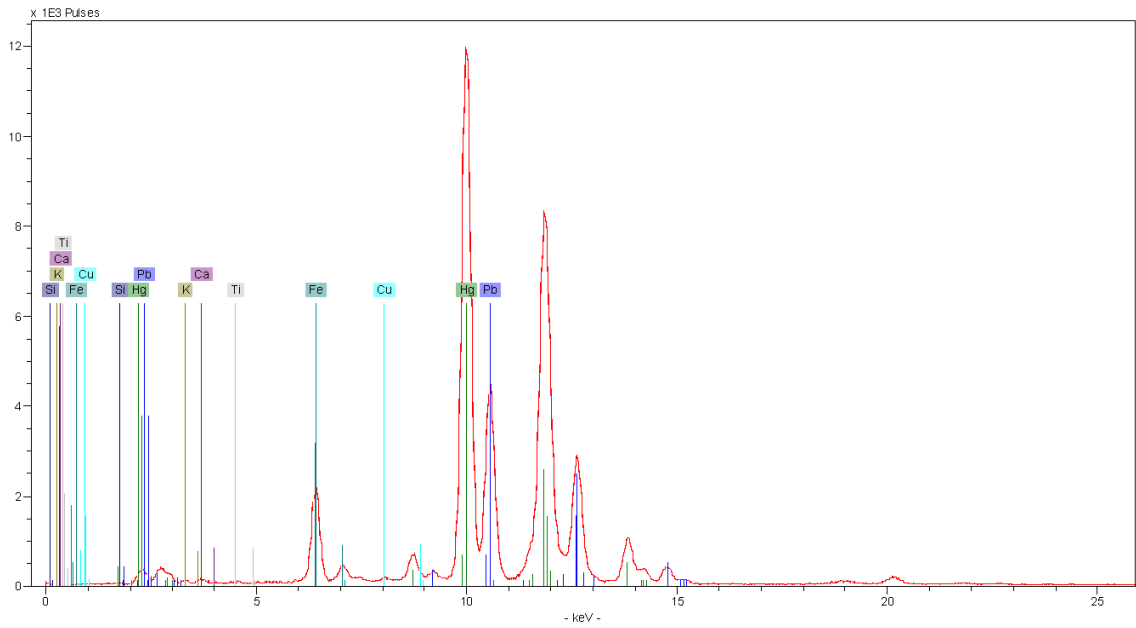
Notable peaks: Fe, Ca, K, Mn, Pb, Al

Spot 08, red brown



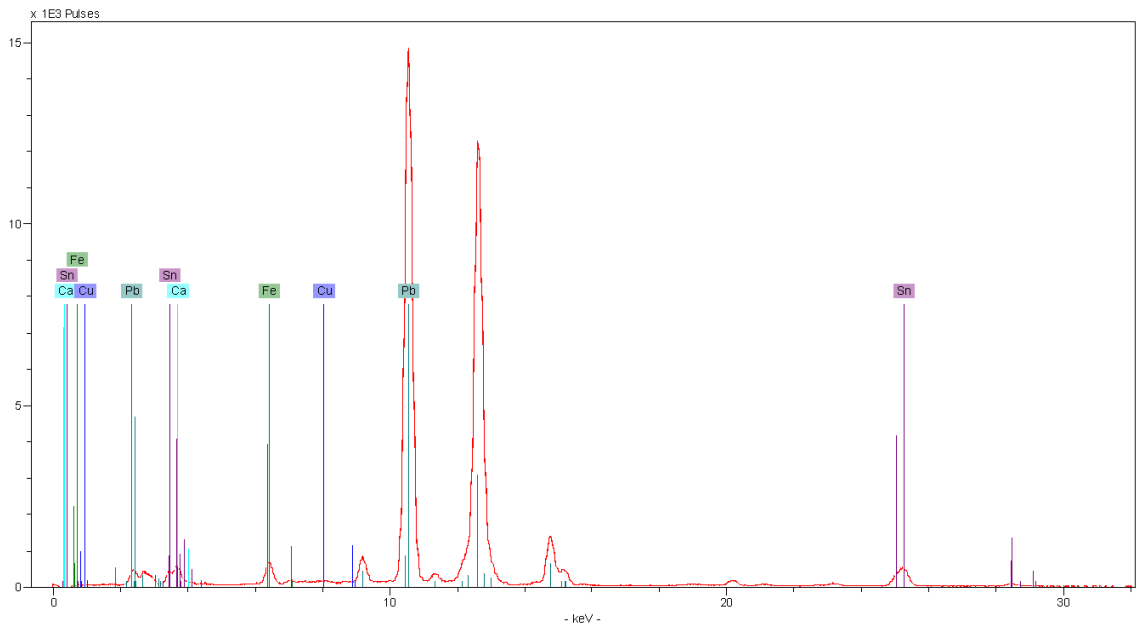
Notable peaks: Fe, Hg, Pb, Cu, Sn

Spot 09, red



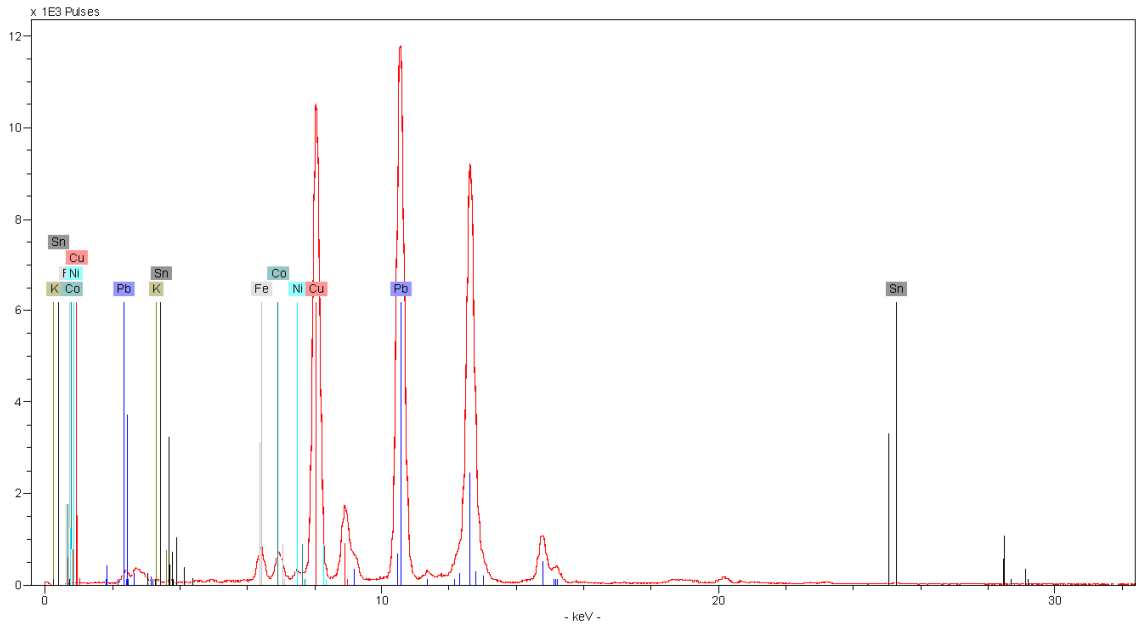
Notable peaks: Hg, Pb, Fe

Spot 10, yellow



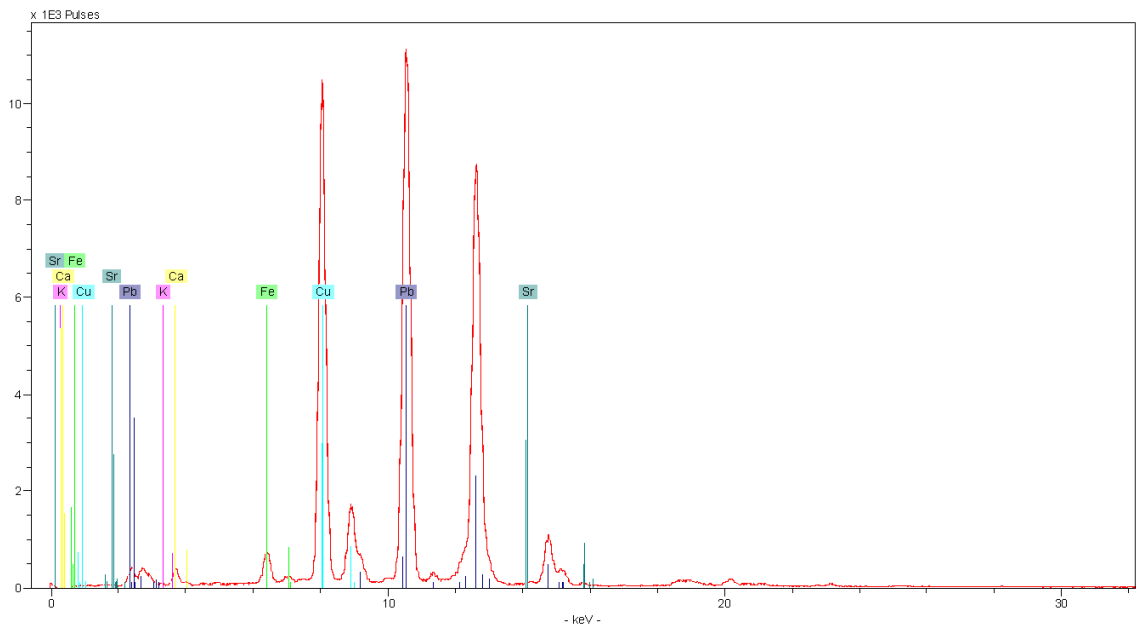
Notable peaks: Sn, Pb, Fe

Spot 11, blue-green



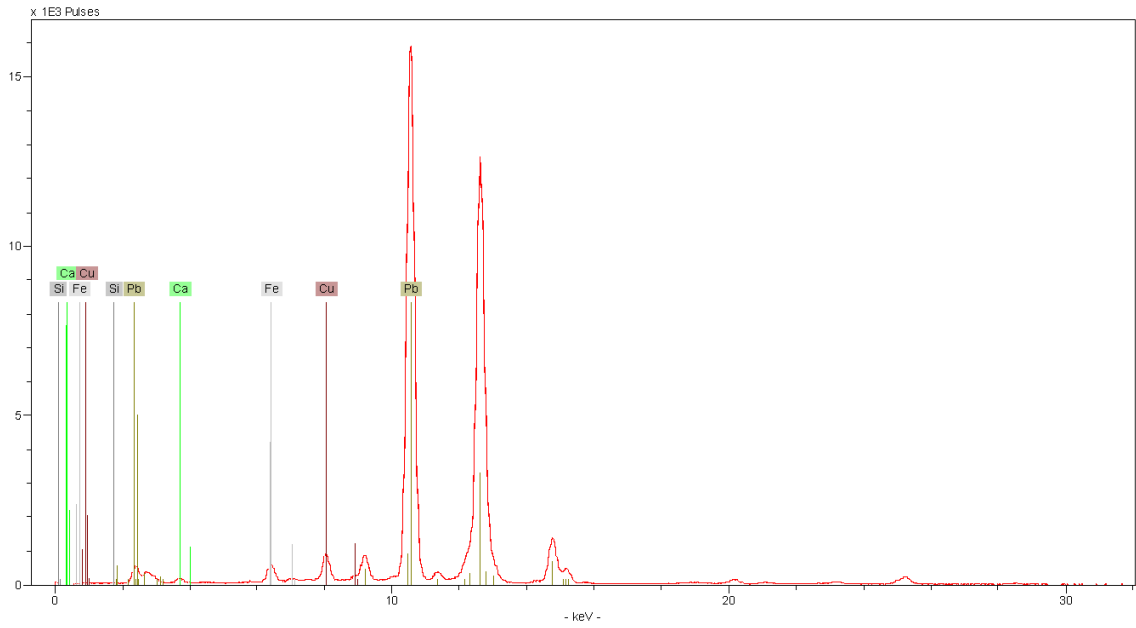
Notable peaks: Cu, Co, Pb, Sn, Fe

Spot 12, warm green



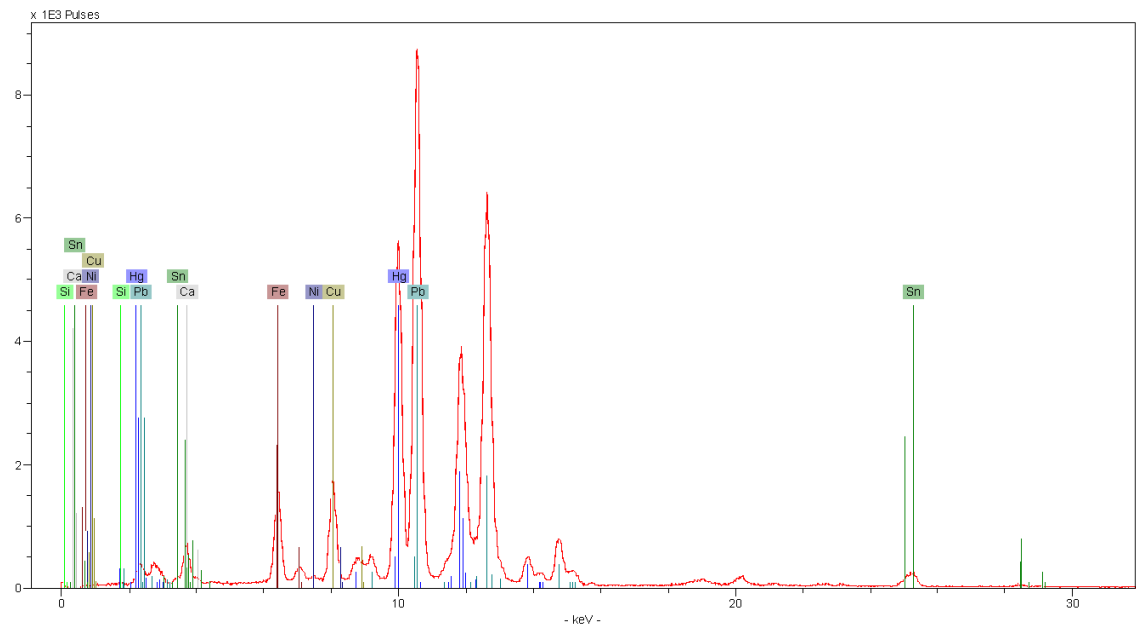
Notable peaks: Cu, Fe, Pb, Sr

Spot 13, white



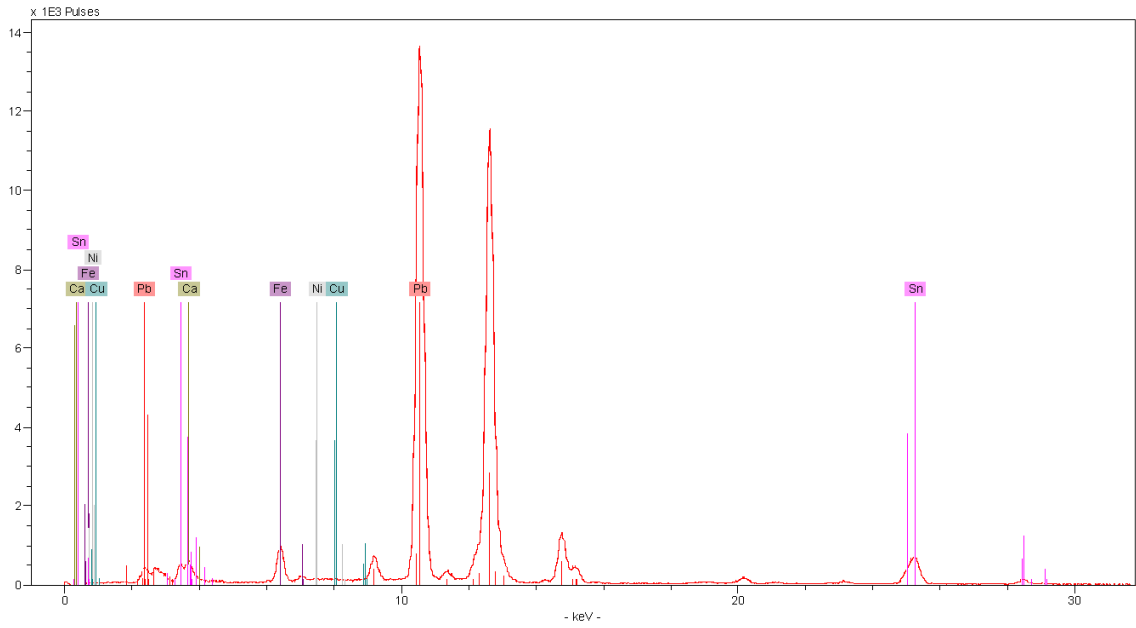
Notable peaks: Pb, Fe, Cu

Spot 14, dark pink over yellow



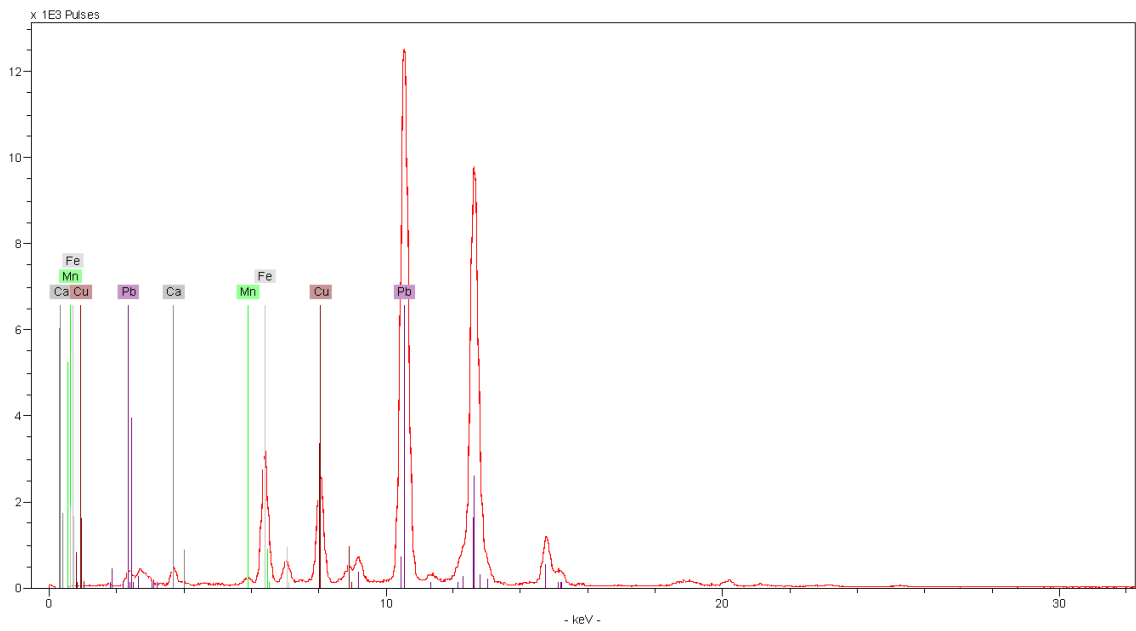
Notable peaks: Hg, Pb, Sn, Cu, Fe, Si

Spot 15, yellow-white



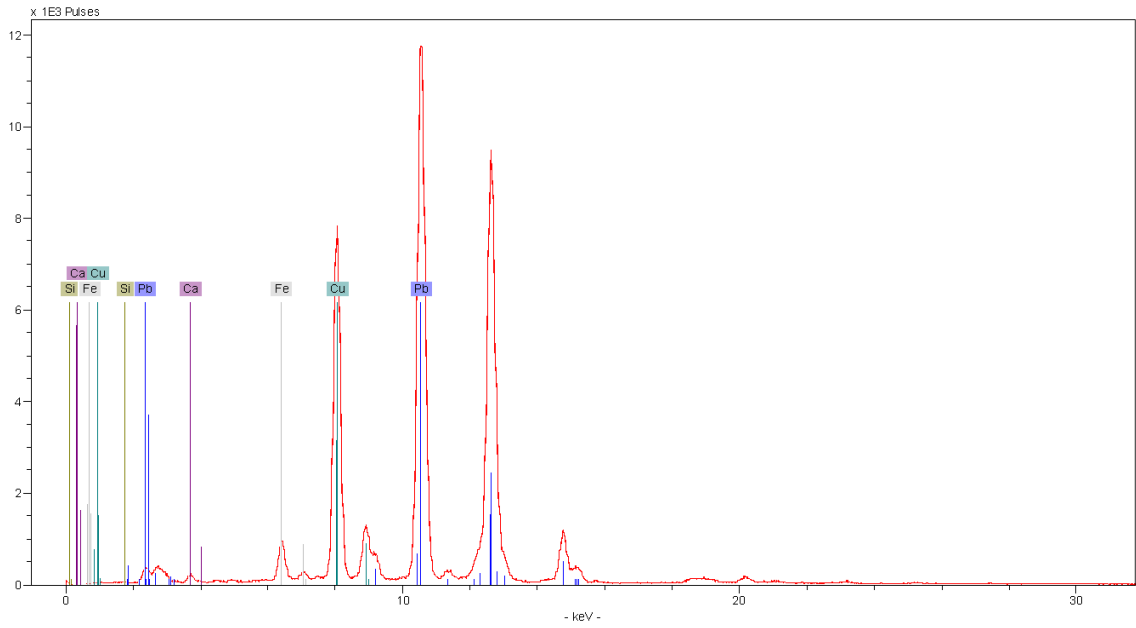
Notable peaks: Pb, Sn, Fe

Spot 16, brown



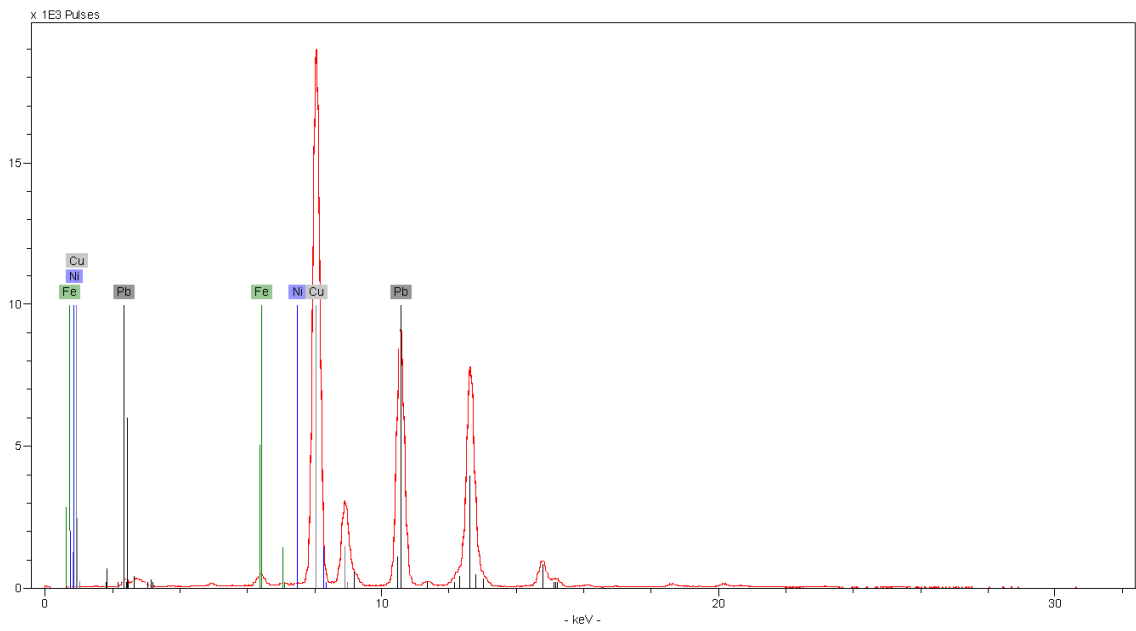
Notable peaks: Fe, Mn, Cu, Pb

Spot 17, green



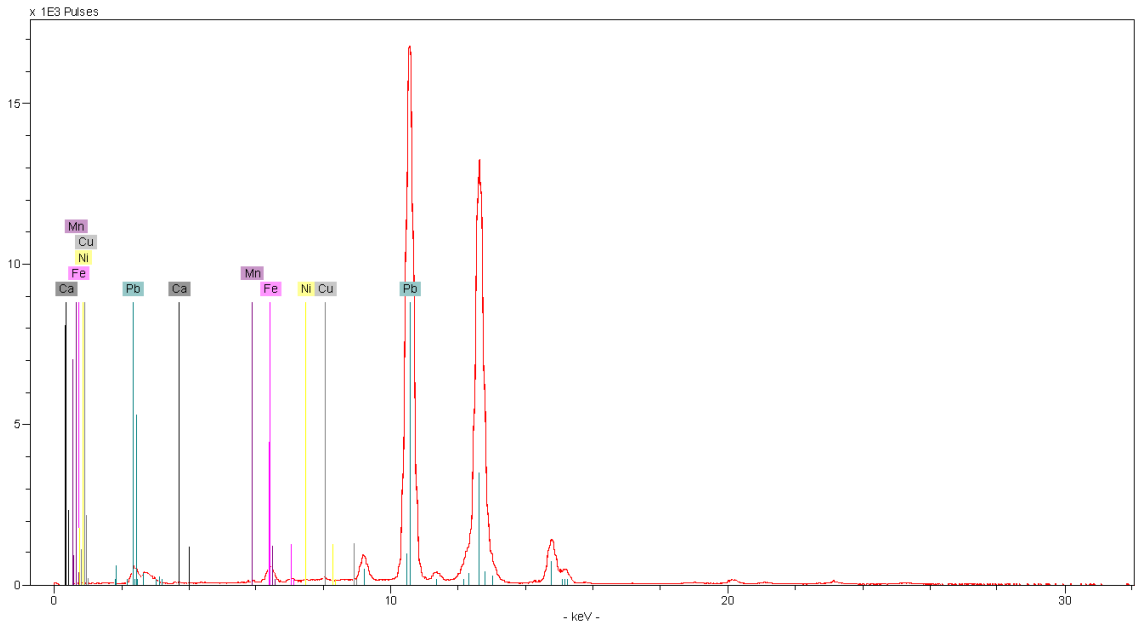
Notable peaks: Cu, Fe, Pb

Spot 18, blue



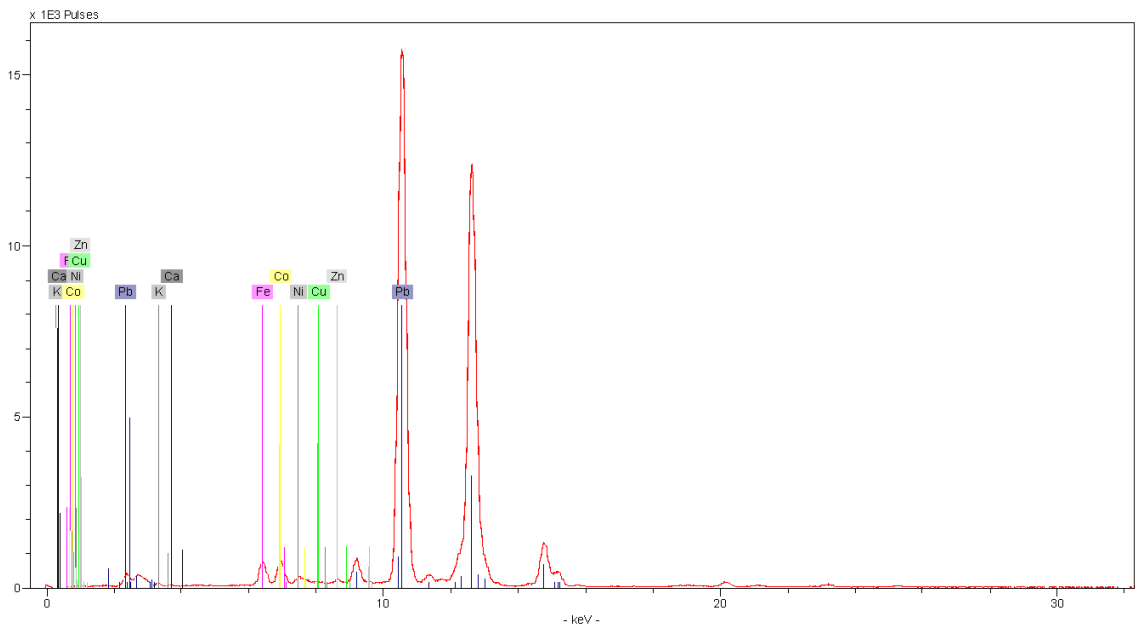
Notable peaks: Cu, Fe, Pb

Spot 19, gray



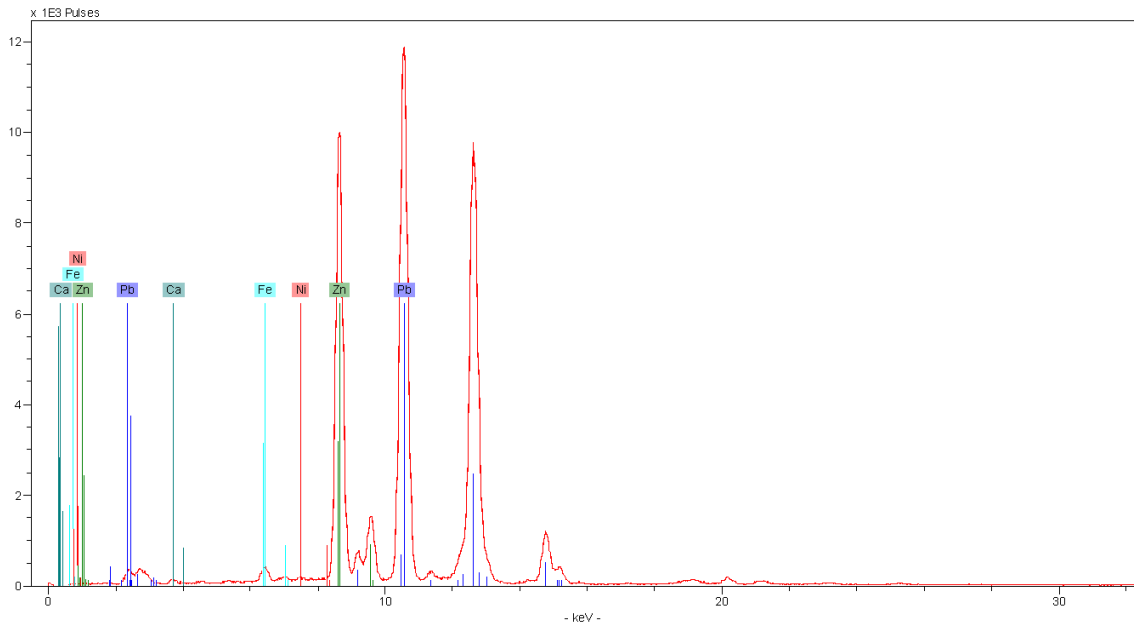
Notable peaks: Pb, Mn, Fe, Cu, Ca

Spot 20, light blue



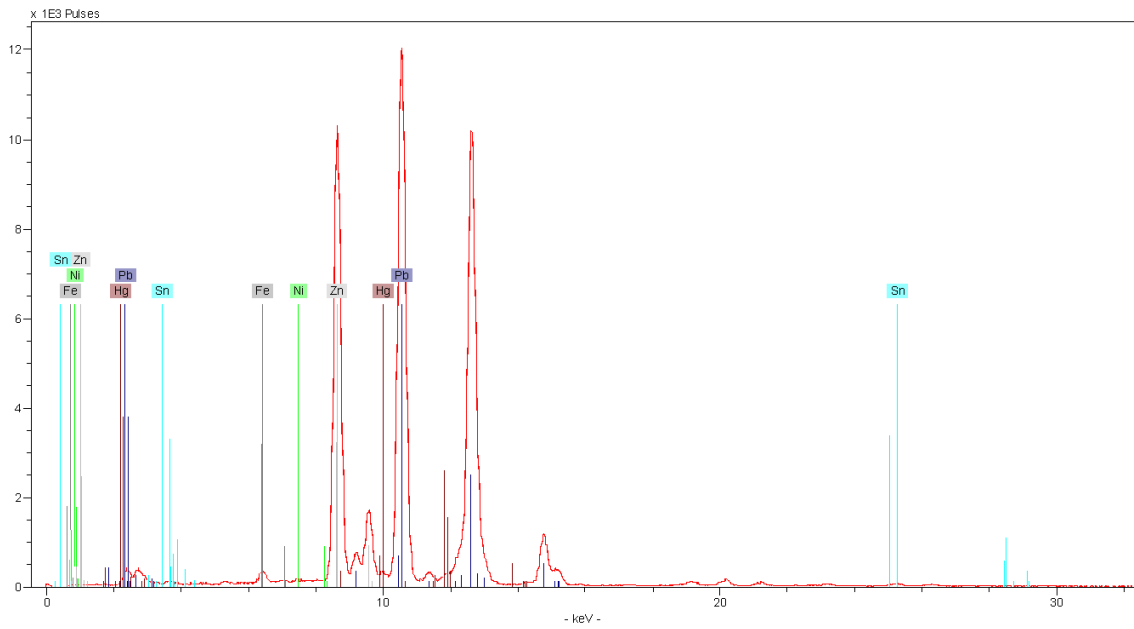
Notable peaks: Cu, Pb, Co, Zn, Fe

Spot 21, light blue



Notable peaks: Zn, Pb, Fe

Spot 22, warm white



Notable peaks: Zn, Pb, Hg, Sn, Fe