Clean Creek
iron and manganese
2014
Clean Creek: Iron and Manganese

Brief History of Abandoned Mine Drainage
In Pennsylvania, coal has been mined for over 200 years. The first known commercial mine was opened in 1761 on Coal Hill, which is now known as Mt. Washington in Pittsburgh. While coal has fueled our economy, heated our homes, and provided countless kilowatt-hours of electricity, historical mining activities have left a legacy of scarred landscapes and polluted streams. An estimated 4,000 miles of streams (more than any other state) have been degraded by abandoned mine drainage (AMD). In many instances, metal precipitates have coated the bottom of streams destroying the habitat of the macroinvertebrates (“stream bugs”) that are so extremely important in the aquatic food chain. Only the most tolerant of species are able to survive with some streams being designated as “dead.”

Resource Recovery
Within the last 15 years, government agencies, watershed groups, nonprofits, academic institutions, and private industries have developed and implemented environmentally friendly systems to treat these abandoned mine discharges in a cost effective manner. The installation of passive treatment systems has resulted in turning streams that had been lifeless for decades to healthy, aquatic habitats capable of supporting a great diversity of reproducing fish populations. Many of these passive systems remove literally tons of metals before the drainage from abandoned mine sites enter our streams. The accumulation of these metal solids has the potential of being an asset. The question is, “What can we do with the metal precipitates?”

Clean Creek Products
Clean Creek Products (CCP) recovers iron that precipitates from acid mine drainage and manganese which precipitates on limestone. The recovery of these metals has fostered our focus upon using them as pigments.

Information sited from the Clean Creek web site:
www.cleancreek.org

Curator’s Statement
Iron and manganese are commonly used in ceramics produced by large scale factories as well as small scale studio potteries. Iron oxide and manganese dioxide are available to ceramicists in chemically pure forms produced by industrial manufacture. The Clean Creek iron and manganese are precipitated as a by-product of a watershed recovering from a mine discharge. The recovered materials are available to ceramicists at the same cost as the manufactured materials. The recovered iron and manganese represent a new “green” option for ceramicists.

Ceramicists have a tradition of sharing. mTechniques are not often kept secret. Clay and glaze recipes are usually given freely from one artist to another. The aim of this exhibition is to showcase a variety of possible outcomes when using these materials. The participating artists have agreed to share their glaze information in order to allow other ceramicists to have a starting point with the recovered materials.

Shelly Cubarney, Pamela Esch, Robert E. Isenberg, and Amanda Wolf were the first artists to experiment with the recovered materials. The majority of work produced by these artists incorporates the recovered materials.

Linda Arbuckle (Florida), William Brouillard (Ohio), Susan Filley (North Carolina), and Matt Long (Mississippi) are all nationally known and highly respected ceramic artists invited to participate in this exhibition. These artists created works using the Clean Creek materials specifically for this exhibition.

Norma Acord (Adjunct Instructor) and Jamey Biggs (Associate Professor) are currently teaching ceramic courses at Concord University. The Clean Creek iron is used in the Concord University ceramics studio for student work.

Chemical Analysis of the Clean Creek iron and manganese are available from Clean Creek Products. The Clean Creek materials are not chemically pure and existing glazes may require adjustment and testing to incorporate the recovered materials.

-Jamey Biggs
Curator

Any user of the supplied glaze formulas assumes responsibility for glaze results, glaze hazards, and proper safety precautions when creating and using glazes. Concord University, Clean Creek Products, and the participating artists, will not be held responsible for any damages or injuries incurred though the use or misuse of supplied glaze formulas or ingredients. Test all glazes before use.
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## CLEAN CREEK ARTISTS

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</table>
Title: Pitcher and Cups
Process: Stoneware, Cone 10 Wood and Soda Fired
Measurements: Pitcher, 8.5" H x 8" W x 5" D
Cups, 3.5" H x 3.5" W
Clean Creek Shino #3
Cone 10, Reduction
Nepheline Syenite .................. 75%
Ball Clay ........................... 20%
EPK Kaolin ......................... 5%
Soda Ash ........................... 5%
Spodumene .......................... 5%
Clean Creek Iron .................... 10%

www.normaacordceramics.com
Title:  "Chawan"


Thrown and Altered, Saggar fired in wood kiln 1200c.

Measurements:  10 cm x 11.5 cm x 11.5 cm

Title:  "Two Piece Vases"

Process:  Porcelain, Cone 10, Gas Reduction Measurements:  16" H x 7" W x 7" D
Jamey Biggs

Clean Creek Temmoku
Cone 10, Reduction

Custer Feldspar .................. 48.8%
Flint ............................ 16.7%
Whiting .......................... 13.8%
EPK Kaolin ......................... 6.0%
Clean Creek Iron ................. 14.7%

www.jameybiggs.com
Title: Iron Maiden: Floral Server (platter)

Process: Earthenware, Cone 04

Measurements: 2.5" H x 11" W x 15.5" L
Rust-to-Golden Mottled Opaque

Cone 04 Visual / 03 Sitter, Oxidation

Gerstley Borate .................. 37.1%
Lithium Carbonate ............... 9.8%
Wollastonite .................... 22.4%
Custer Feldspar ................. 7.3%
EPK Kaolin ...................... 4.9%
Flint .......................... 18.5%

TOTAL .......................... 100

Clean Creek Iron ................. 5%
Tin Oxide ........................ 10%
Bentonite ........................ 2%

Rust thin, mottled tan thick. Breaks to rust over texture. Will go maroon over chrome slips due to chrome-tin pinking.

Variation:

Cordovan (deep red-brown)

Drop tin to 8%, raise iron to 15%

www.lindaarbuckle.com
Title: Dinnerware for the Machine Age
Process: Porcelain, Cone 6, Oxidation
Measurements: Plate, 1.5” H x 7.5” W
Cups, 3.5” H x 4.5” W x 5.5” D
Majolica Style Glaze

Cone 6, Oxidation

Over-glaze painting, front and back, using raw Clean Creek materials and commercial stains, mixed with frit.

www.cia.edu/academics/ceramics/faculty/william-brouillard
Title: Draped Bowl  
Process: Porcelain, Cone 10, Reduction  
Measurements: 7.5" H x 13" W x 9.5" D
Clean Creek Honey Temmoku
Cone 10, Reduction
Potash Feldspar (g200) .......... 77%
Whiting ................................7%
EPK Kaolin ...........................4%
Gerstley Borate ................. 12%
Clean Creek Iron ................. 8%

Variation:
Rust Temmoku
Increase Iron to ................. 10g

www.susanfilley.com
Title: Whiskey Bottle and Rocks Glasses
Process: Porcelain, Cone 11, Soda Fired
Measurements: Bottle: 8” H x 5” W x 5” D
Glasses: 4” H x 3.5” W
Flashing Slip Recipe

Cone 10-12, Soda

EPK Kaolin ...................... 42%
Ball ............................. 42%
Zircopax ...................... 10.5%
Borax ..........................  5.5%

**Total** .............................. 100%
Clean Creek Iron ................. 1%

www.fullvictory.com
www.redlodgeclaycenter.com
Title: Nest Expression
Process: Porcelain, Cone 6, Oxidation, Water Slip Decal by Goethe
Measurements: 3.5" H x 8" W x 8" D
Mossy Juniata Spruce Creek Satin

Cone 6, Oxidation

Tenn. Ball Clay .................. 30.2%
Frit 3134 .......................... 5.7%
Nepheline Syenite ............... 32.5%
Wollastonite ..................... 16.3%
Whiting .......................... 4.9%
Flint ............................. 10.4%

Add:

Cobalt Carbonate ............. .25%
Clean Creek Iron ............... 3%

www.shellycubarney.com
Title: Untitled
Process: Cone 6, Oxidation
Measurements: 8" H x 18" W x 12" D
S.D.’s Altered Tan

Cone 6, Oxidation

- Flint: 25.4%
- Gerstley Borate: 5.1%
- Custer Feldspar: 35%
- Whiting: 5.6%
- Ball Clay: 3.6%
- Frit 3134: 25.4%

Add:

- Powdered Ilmenite: 6%
- Clean Creek Iron: 2.0%
Title: Moon Jar
Process: Stoneware, Cone 10, Gas Reduction
Measurements: 16" H x 15" W x 15" D
Slippery Rock Creek Glaze

Cone 10, Reduction

Cornwall Stone ................. 46%
Whiting .......................... 34%
EPK Kaolin ..................... 20%

Add:
Clean Creek Manganese ....... 4%
Tin Oxide ......................... 4%
Title: Forget Me Knot Basket
Process: Cone 6, Oxidation
Measurements: 12.5" H x 7.5" W x 7.5" D
**Iron Honey Glaze**

Cone 6, Oxidation

Soda Feldspar ................. 43%
China Clay ..................... 5%
Bentonite ....................... 2%
Whiting .......................... 23%
Zinc Oxide ...................... 6%
Silica ........................... 22%
Clean Creek Iron ............... 5%

Amanda Wolf
Concord University Art Department

Based upon the conviction that the artist is of essential value to his or her time and culture, the programs of study offered by the Department of Art are designed to provide the creative individual with opportunities to develop his or her talents. The Department of Art offers the Bachelor of Arts in Graphic Design and the Bachelor of Arts in Studio Art. Studio Art candidates specialize in: Ceramics, Sculpture, Drawing, Printmaking, Painting, or Photography. Graphic Design candidates may concentrate their studies in Print Media Production, Typography, Web Design, and Illustration. The Department of Art at Concord University also offers the Bachelor of Science in Art Education.

Concord University provides its students and community access to nationally and internationally known visual artists through the Artist Lecture Series. Concord University brings an average of two visiting artists to its campus per year. Workshops, demonstrations, lectures and exhibitions are made available to students and the community free of charge.

Ceramics Facilities

- Bailey downdraft gas kiln - indoors
- 3 L&L manual electric kilns – indoors
- Large Skutt computer controlled kiln - indoors
- Raku kiln - outdoors
- Wood fired Train kiln - shelter
- Active engagement in building experimental temporary kilns
- Twelve potters’ wheels
- Slab roller
- Large extruder
- Spray booth
- Clay mixing facility with Soldner Mixer
- Digital Photographic Documentation equipment for completed works
- HEPA filtered workspace

Contact

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