

**REPORT OF THE 2006 LEUPP KILN CONFERENCE  
WAYNE KEENE AND WILLIAM A. LUCIUS**



The fourth gathering of the Leupp Kiln Conference was held near Yellow Jacket in Southwest Colorado on Memorial Day Weekend, May 27<sup>th</sup>, 28<sup>th</sup> and 29<sup>th</sup>, 2006. The event was organized and hosted by Wayne Keene, with the assistance of Tim Wilcox and sponsored by the Institute of Archaeological Ceramic Research (IACR) of Boulder, Colorado. Rick St. Johns, a local potter with an impressive knowledge of all things ceramics and an expert in the

replication of Ancestral Pueblo Black-on-white pottery firing technology, graciously accepted the task of supervising the firing of the large Black-on-white kiln. True to his professorial background, he also entertained us with a detailed presentation of the technical and experiential rationales for his particular approach to firing. A total of **FILL IN** registered participants attended the Conference but various other folks dropped by to observe, comment or just enjoy the conference. Thanks to everyone who helped make the conference a success either by helping with setting it up, attending or both.

To paraphrase the 2006 Conference invitation: “The conference, which began in Old Leupp Arizona in 2003, is a gathering of archaeologists and potters or people with an interest in Archaeology and ancient and modern ceramic technology in the Southwest. The highlights of the event are a Black-on-white firing supplemented with smaller firings of utilizing various techniques and the collection of clays from local sources. We fire in the old way or what some of you may know as a primitive firing or pit firing. These are misnomers since how can you call it primitive if we modern people have trouble reproducing it and not all the firings require a pit.”



Conference Host: Wayne Keene



Tim Wilcox



Kiln Boss: Rick St John

Clay gathering was the focus the Saturday activities, particularly since persistent gale force winds precluded any firings. We formed a caravan and drove down McElmo Canyon to a popular clay source near Cannonball Ruin. This well-known outcrop has long been used as slip clay for Black-on-white replication given its ability to absorb and protect organic paint. The amount of clay in this exposure is phenomenal! Some participants also collected clay from the Industrial Park source just west of Cortez for use as body clay. Others sampled a red clay source at the head of McElmo Canyon and another white clay source on the rim of nearby Woods Canyon was sampled after the firing. The following discussion and table documents the clay sample data.



Formal voucher samples were collected from four distinct clay sources. Following standardized ceramic resource sampling procedures developed by the Institute, a geology ore bag was filled with clay and assigned a unique Clay Voucher Sample # that correlates with the UTM coordinates of each sample location (See table below). Approximately ¼ of each sample was mixed with water to a workable consistency then rolled out and flattened to create a test tile with a wet length of 10 centimeters. After air-drying the test tiles were fired in an oxidizing atmosphere to 950 degrees C. The associated shrinkage of each test tile is noted below. A binocular microscope was used to inspect a broken corner of each test tile for identification of naturally occurring accessories. A Munsell Soil Color Chart was used to note the refired color of each clay sample.

**Process samples and rewrite all**

- 6CVS??
  
- 6CVS??
  
- 6CVS??
  
- 6CVS??

Sample	Northing	Easting	Locale	Facies	Refired Color	Accessories	Shrinkage
6CVS??	12S 0499893	3983526	McElmo Canyon	Morrison	?	?	%
6CVS??	12S 0527188	4030966	McElmo Canyon	Morrione	?	?	%
6CVS??	12S 0524690	4030253	Cortez	Mesa Verde	?	?	%

Upon our return from the clay gathering expeditions Rick determined that they initial Black-on-white kiln layout (a huge three meter long slab-lined monster) was too large and so with help reshaped it into a 1 meter kiln. Most of the potters unpacked their various wares and arranged them for viewing, only to have to repack them when it became apparent that the wind was not going to abate. Some potters used the time to continue painting their creations, an activity that continued throughout the conference.





Later in the afternoon Rick called everyone together for the lecture and then we all adjourned for the night, hoping that the wind would not interfere with a Sunday firing.



Despite our hopes, the wind returned the next morning, but not to the extent that it prevented the various demonstration firings to go ahead. Charlie Gilbert quickly fired three micaceous clay pots in the depression left from remodeling the kiln, using a minimal amount of wood in what was basically an oxidizing atmosphere (he used the flower pot in an attempt to smudge one of them). By late afternoon Charlie had filled the cooking jar with posole and had it boiling on the coals for dinner, an exceptional demonstration of the heat shock properties of micaceous pottery!



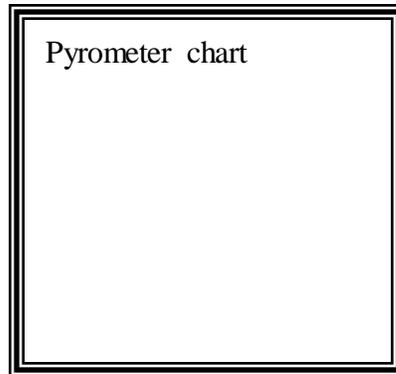
Charlie Gilbert



While Charlie was finishing his firing Bill Lucius prepared a small slab-lined pit for a firing black-on-red pottery. Following our standard procedure of preheating the pots outside of the pit, cold sandstone slabs were placed on the resulting coals, onto which the pots were arranged and allowed to continue heating. Subsequently small splits of juniper kindling were laid among the pots, which in retrospect was an error since when they ignited they created hot spots that caused spalling and cracking. The firing continued with the stacking of a substantial amount of juniper fuel across the slabs, which was allowed to burn down, creating a reducing covering over the pottery. Upon opening the pit it became apparent that the firing was too hot (see pyrometer chart) and too reducing. The various red clays used in the pots were vitrified almost to the point of being glassy and the surfaces came out dark brown to black, which obscured the painted iron and manganese designs. As always, we continue to learn from our mistakes!



Bill Lucius



Meanwhile Tim Wilcox began setting up his Modern Hopi Style firing by preheating pots around a warming fire (no pit). In this case Tim placed a layer of broken pottery (sherds) as kiln furniture, onto which the pots were placed. A carefully interlaced covering of roofing tin was then added and covered with coal, bricks of sheep dung and a few pieces of juniper. The whole affair reignited itself and was allowed to burn down slowly. The tin gradually reappeared slowly and when the kiln was opened sometime later it revealed oxidized, well-fired pottery with typical warm tones and blushes. Well done!



Almost simultaneously JoAnn Weldon and Wayne Keene started two different smudge firings, which involved covering the unfired pot (JoAnn's pot in upper left of Wayne's two bowls) with a metal container, which rests on a bed of coals formed by the warming fire. A teepee of juniper fuel was subsequently stacked over the container and allowed to burn furiously. After the flames had consumed most of the fuel the fires were smothered with powdered horse manure, which effectively saturates the atmosphere with free carbon. The carbon impregnates the clay bodies, resulting in matte paint designs on glossy, stone polished surfaces.



JoAnn Weldon



Following Rick's firing technique, we fired the Black-on-white kiln in the evening in order to let the wind subside, which can result in uneven kiln temperatures, and to better gauge the firing progress by flame color. As the sun was sinking low we filled the slab-lined pit with copious amounts of juniper fuel to create a thick bed of coals. The amount of wood consumed in this first step was considerable, resulting in a bed of coals approximately 8" deep over the



bottom slabs used to line the pit. The painted pots were brought out and set around the outside of the pit to preheat and Charlie performed his traditional blessing of the pots and potters with corn meal.

When the fuel had burned down to coals a loosely spaced bed of cold sandstone slabs was put down over the coals onto which the pots were carefully stacked.



The closed forms went on first (base down) and bowls were inverted over them, which prevents them from accumulating charcoal and smudging the interior. No cover sherds were used.



A pat of large cones was centrally placed with a sherd hood in order to record the effective temperature of the firing. Rather than immediately proceed with the firing, the pots were allowed to slowly accumulate heat from the coals below. As explained by Rick in his introductory lecture, this slow water-smoking period is essential since it ensures the remaining free water as well as the chemical water in the clay body is safely driven out of the pots.

Rick's approach to stacking the fuel over the pots was an example of a potter's intuitive approach. Using the upright slabs as well as stone bulwarks on either end of the kiln as supports, he began cribbing long branches of juniper into a loose framework above the pots.



When the cribbing reached waist high he instructed helpers to start an ancillary fire nearby, upon which he had the helpers place other branches across so that they would ignite in the middle of their lengths. When they were fully engulfed in flames they were lifted on top of the cribbing and allowed to continue burning.



This action created an updraft, which pulled the hot air from the coals up through the pots and into the air.



As the branches burned through, their weight pulled the unburned ends down, preventing them from falling onto the fragile pots and instead formed a simple tent structure that only dropped small embers into the firing chamber.

As the fire grew more and more branches were added to the cribbing until the pit was covered by a raging inferno of flames.





Again, the amount of fuel used in the firing was considerable, and Rick would have used more if any more were available. A final addition of recently dead pinyon branches resulted in a blaze of heat and light. As the fire burned down we observed distinct blue flames indicative of high temperatures dancing over the top of the burning mass of coals. Despite the amount of sparks being given off by the firing and the continued gusty winds that we had hoped to avoid by firing at night, we managed not to start any of the surrounding trees on fire. After watching the coals awhile we left the kiln to cool down overnight and went to bed.



The next morning we were greeted with the sight of extensive white ash with occasional exposed pottery mouths and vessel walls. It was readily apparent that the overnight wind gusts had kept the embers burning, resulting in oxidation observable as light orange blushes on exposed vessels.



Indeed, the exposed sandstone slabs of the kiln were distinctly orange from the oxidation. And glowing red coals could still be discerned under the ash covering. Although we should have waited another day for the pit to cool, we began a slow, methodical unloading of the kiln.



After losing one piece due to dunting in the cool breeze, we adopted the practice of merely lifting the pots out of the pit onto the still quite warm ash, allowing them to cool slowly. A short time later Rick arrived and the process of taking the kiln apart and discussion of the firing successes and failures continued until all pieces were recovered and removed from the pit.



It was immediately apparent that, despite the unwanted oxidation, the firing was wholly successful since we melted cone 7, indicating an achieved temperature of approximately 1200 C.

Additionally, without exception the carbon painted pots (especially those slipped with Lost Canyon White slip) revealed a rich, glossy black paint under the fine covering of ash that results from the incineration of the beeweed paint.



JoAnne's manganese and clay paint combination came out nicely black, where as the various iron painted pots failed to turn black, instead staying red to brown.



In contrast to previous kiln conference firings with high vessel breakage rates, only two vessels suffered steam explosions, both due to design flaws, and one bowl shattered when struck by a branch that fell while cribbing the fuel. We did note an unusual number of cracks, usually extending vertically down from the vessel rim, a fault that may be due in part by the wide range of body clays represented in the firing. Since it was noted that body clays of Industrial Park Gray did not exhibit such cracking, some body clays may be more appropriate for pit firing than others. Similarly, some vessels suffered from spalling, and in every case that was examined a small air bubble trapped within the vessel wall was the instigator. Vigorous kneading and use of a wire cutter may aid in air pocket removal but the association of this fault with commercially prepared clays suggests that they may be inappropriate for this type of pit firing.

In summary, a lot of folks attended the conference and all reported having a great time. We had the opportunity to gather several different clays to make pots for future conferences and fired a lot of pots in several different ways. We did not do everything correctly, and we still have a lot to learn but then that is a large part of the event. We learned a lot from Rick and by putting his teaching into practice came closer to successfully firing Black-on-white replicas in a pit kiln. Although we could have done without the demon wind, we all made new friends who we hope will talk us up with their friends so that the next kiln conference will be an even bigger and better experience.

Thanks again to everyone who attended and anyone else that we have forgotten. We offer special thanks to Owen Severance of Blanding, Utah, to Mercedes and Hank Beckerhoff of Farmington, NM and to Irene Lopez-Wessell IACR for taking the photos that grace this report.

This report as well reports of previous kiln conferences and miscellaneous submissions are available at our MSN Groups page <http://groups.msn.com/LeuppKilnConference>