CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2008
DateRun:	11/23/2008
Experimenters:	Heidi Wilcox
ClientType:	Electrical Manufacturer
ProjectNumber:	Project #1
Substrates:	Alloys, Brass, Copper, Stainless Steel, Steel, Sterling/Silver
PartType:	Coupon
Contaminants:	Oil
Cleaning Methods:	Manual Wipe
Analytical Methods:	
Purpose:	Conduct on-site assessment of current acetone and methanol cleaning processes
Experimental Procedure:	Company request in helping them replace acetone and methanol in their plant. They are using both for wipe, rag applications throughout the plant. They want to find a safer cleaner to take the oil off the brass and copper alloy strip. They also clean the tools for the machines in methanol and a mineral spirit, petroleum distillate type cleaner before methanol is used if they are dirty enough so this is something else to look at changing. The petroleum product is used in a small parts washer or with a brush and applied by hand.
Results:	The plant uses and works with metals, brass, copper, silver alloys, in rolled form mainly. They bond, stamp, roll, cut the metals in different parts of the plant and even melt and produce their own rolled silver alloy, silver, cadmium. The walk through included a tour of the plant and showed many of its operations. Procedures were demonstrated by operators on the floor. Bonding Department The bonding line was where they bond copper or brass or some other metal with a thin silver strip. When doing this they are rolling the coiled metal out straight and introducing the second metal then heating it to bond it. Before the larger metal strip, brass, copper etc goes to bond, there is a rag placed before one of the rollers it enters and this rag is soaked with methanol. The purpose of the methanol is to take any contaminants off the metal roll so the bond is better. The soils are not heavy and more from shipping and handling then anything. Obviously, they need something that will evaporate quickly, not leave a film and hopefully have a better EH&S profile then the methanol. On this line the worker is soaking the rag with a squirt bottle and walking away. So it is evaporating into the air but the worker is not sitting right over it. After the bonding process they recoil the metal and oil it. Pressing & Welding Department The metal goes into the next room where there is welding, pressing, cutting and stamping applications going on. This room is the press and welding room. There are many machines with different ”tools” in them that can be switched out to make different parts in each machine. At this step in the process the recoiled, bonded rolls of metal alloys are unrolled as they are fed into the machines. Here another rag is put around the coils at the entrance to the machine and it is soaked with methanol to remove the oils on the metal. The strip metal goes into the machines and depending on the tool different parts are made. The strip is cut, punched, folded and makes small parts for light switches. The parts come out oily, and then immediately go into a wash unit. The machine spray washes the parts. It is enclosed and about 4 feet long. The parts come out clean and dry. A solvent is used as no water can be introduced. In the welding line, they sometimes need to clean before they weld, so they have a brush line that has a cold brush and a hot rinse in it. Other cleaning applications are that the press workers use methanol to spray into the machine periodically to make sure they don’t get too dirty and also to clean the inside of the machine out when a tool is taken out and a new one is being put in for another job. They use methanol and probably can't use a water-based cleaner they said due to the parts of the machine and tool being steel. The tools are kept on shelves over by the tool room. They are clean when put on the shelves and are ready to use again. Tool Room Department When they tools are taken out of the machine they go to the tool room. If they are very dirty, they go to the parts washer and are cleaned there with a flow of RM#1 thinner, a Stoddard solvent. The solvent come s out of a hose in the washer and they had a large round paint brush there they use to brush into spaces of the part to clean and to brush off fines. Then the tool is taken back to the work bench and is cleaned with methanol and air blown dry.

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If a part is not overly dirty it goes to the workers bench directly, they use methanol to remove any lithium grease off the posts, any dykem marker on the tool and oil. They squirt the methanol on and wipe by hand with miscellaneous rags, shirts etc. The air was saturated with the smell of methanol, this is the most exposed area. It is mostly enclosed and is where they are using the most chemicals at one time. The tools go there to the storage rack.

Silver rooms (making and cutting working with silver are two different places in plant)
Other application of methanol is in the silver room vault. It is a secure area, lots of silver. Only the room where the silver strip is was seen but not the room where they melt, mold and make it.

Finishing department
They have two different lines. One has a citric acid cleaner and some tumbling and corn cob drying. They are open mixer type machines where the tumbling media and the corn cob is visible. They collect and dispose the cob periodically. There is nothing her that needs to be changed.

The other line they use an aqueous solution, the Angler 120 F. It is and HMIS of 2, 2, 0. They are using it at 130-140 degrees, they have it controlled in the machine. Is it another 4 foot long machine with spray, rinse and dry in it. At some point maybe the lab can help them change the cleaner to something a little more benign. They are using it in a 0.5% solution (2 liters per 100 gallons).

Summary:

Conclusion:

Testing needed:
Lithium grease, dykem ink and penetrant oil off of steel - simulate tool cleaning with methanol and Stoddard solvent

Penetrant oil off brass, copper, bronze simulate roll cleaning with methanol before bonding and before machining

Oil off silver to simulate cleaning of silver strip

Aqueous cleaners on brass, silver, copper - to simulate finish cleaning.