CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1998

DateRun: 07/27/1998

Experimenters: Jason Marshall

ClientType: Aerospace Industry

ProjectNumber: Project #1

Substrates: Alloys, Nickel

PartType: Part

Contaminants: Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil

Cleaning Methods: Ultrasonics

Analytical Methods: Black light, Gravimetric

Purpose: To compare current oil vendor cleaner to other aqueous cleaner.

Experimental Procedure: Preweighed turbine engine sections were immersed into the fluorescent oil. The parts were weighed again to determine the amount of contaminant which remained on the parts. Observations were made under black light conditions to determine a baseline level of fluorescence. The two supplied cleaners were made to the specified concentrations in 1500 mL beakers. The beakers were placed into a 40 kHz Crest ultrasonic unit and heated to 150 F. One part was placed into each beaker and cleaned for three minutes with the ultrasonic unit working. Parts were removed and rinsed with tap water at 120 F for 20 seconds and allowed to air dry. The cleaning and rinsing cycles were repeated using a second part in each cleaner. Final weights and black light observations were made.

SUBSTRATE MATERIAL: Nickel Alloy-Inconel
CONTAMINANTS: Oil--Zyglo Penetrant ZL-27A

Results: The Magnaflux product removed more of the contaminant from the turbine parts. It was noted that the position of the parts in the beakers would increase the contaminant removal efficiency. Table 1 lists the gravimetric calculations made for each cleaner.

Table 1. Cleaning Efficiency

Cleaner	Part ID	Initial Weight	Dirty Weight	Clean Weight	Percent Removal
ZR-10B	CL 22	313.4	315.2	313.4	100
ZR-10B	CL 29	321.4	324.3	321.6	93.1
Blue Gold	CL 265	328.5	332	328.9	88.6
Blue Gold	CL 2	314.8	317.3	315.3	80

Upon inspection under black light the location of the remaining contaminant was made. Most oil started to leak out of the holes that were not allowed to drain during the cleaning in the ultrasonic tank. If the parts had been rotated during the cleaning, more oil may have been removed. This will be incorporated into the next experiment.

Summary:

Substrates:	Alloys, Nickel				
Contaminants:	Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Magnaflux	Zyglo Emulsifier ZR 10B	20	96.55	☑	
Carroll Company	Blue Gold Heavy Industrial Cleaner	5	84.30	☐	

Conclusion: The Magnaflux product initially appears to remove more of the fluorescent oil than the Modern Chemical product. The addition of the rotation to the parts may increase the efficiency of the cleaning, but it should improve the cleaning for both chemistries.
During the next experiment other aqueous cleaners will be tested and compared to the results of the Maganflux product. Once a possible cleaner has been found, this new cleaner or cleaners will be used in another experiment using the EDM oil as the contaminant. The results of the EDM oil contaminant will be compared to the Modern Chemical product.