CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	1999
DateRun:	05/24/1999
Experimenters:	Jason Marshall
ClientType:	Department of Public Works
ProjectNumber:	Project #1
Substrates:	Steel
PartType:	Coupon
Contaminants:	Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Gravimetric
Purpose:	To evaluate selected cleaners for the removal of specified CAS#s.
Experimental Procedure:	Table 1 lists the contaminants used by the client.

Table 1. Contaminant Listings

CAS Removal Search	Sources of Contaminants at SCL (Listed by SCL heading)								
Total	Cleaned Before								
CAS #	CAS #								
108-88-3	108-88-3	95-416	96-418	96-419	97-541	98-541	98-571	98-680	99-622
3159-62-4									
64741-88-4	64741-88-4	98-679	98-561						
64742-01-4	64742-01-4	98-679							
64742-53-6	64742-53-6			99-695	99-688	97-549	95-406	96-449	
64742-54-7	64742-54-7	98-679	98-561	99-695	99-692				
64742-57-0	64742-57-0	98-679		99-695					
64742-62-7	64742-62-7	98-679	98-561		95-406				
64742-65-0	64742-65-0	98-679	98-561						
68649-01-4									
72623-87-1	72623-87-1	98-679							
8032-32-4									

98-679	Castrol Motor Oil
99-695	W.A. Wood Oil

The eight chemistries used in the cleaning trial were selected based on results obtained from the SCL Effective Tests Conditions database and the Industrial Cleaning Survey: Directory of Vendors Tech Report # 15. Table 2 lists the ETC results

Table 2. ETC Search Results Based on CAS#.

Products Used to Remove Contaminants								
108-88-3	64741-88-4	64742-01-4	64742-53-6	64742-54-7	64742-62-7	64742-65-0	64742-57-0	7
AG Environmental	WR Grace	WR Grace	EMKAY	WR Grace	WR Grace	WR Grace	EMKAY	W
	Safe CleanUp	Safe CleanUp		Safe CleanUp	Safe CleanUp	Safe CleanUp		
	AG Environmental	AG Environmental		AG Environmental	AG Environmental	AG Environmental		
				EMKAY				

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Table 3 lists all cleaners selected and the concentrations used. The chemistries were diluted to the listed amounts in 400 mL beakers using DI water. The beakers were heated to 130 F (except Envirosolutions- room temp) on a hot plate.

Twenty-four preweighed coupons were contaminated with the mixture of the two oils and weighed again. Three coupons were cleaned in each beaker for five minutes using stir-bar-agitation. Coupons were rinsed in tap water at 120 F for 30 seconds and dried using a Master Appliance Corp, Hot-air gun model HG at 500 F for one minute. After the coupons cooled to room temperature, the final clean weights were recorded and cleaning efficiencies were calculated.

SUBSTRATE MATERIAL: Steel Coupons (202-1010-B79)
CONTAMINANTS: Oil: W.A Wood Co W-373 (CAS #s 64741-44-2, 64742-53-6, 64742-52-5); Castrol GTX Motor Oil SAE 10W-40 (CAS #s 64742-41-2, 64741-88-4, 64742-01-4, 64742-46-7, 64742-54-7, 64742-56-9, 64742-57-0, 64742-62-7, 64742-65-0, 72623-83-7, 72623-84-8, 72623-85-9, 72623-86-0, 72623-87-1)
CONTAMINATING PROCESS USED: The two oils were mixed together, using more of the Castrol oil. The mixed oil was then brushed onto coupons using a hand-held swab.

Results:

Three of the cleaners were capable of removing >90% of the contaminant, and only one product cleaned less than 70% of the contaminant from the coupons using stir-bar agitation. Envirosolutions was the most efficient cleaner removing nearly 100% of the oil mixture.

Table 4. Cleaning Efficiencies

	282 GF	Safety Wash	Super Neutral	7300	Solsafe 245	Soy Gold 2000	Micro 90	SC A&MC
Coupon 1	78.27	72.79	92.7	40.48	99.69	86.86	81.61	97.47
Coupon 2	81.63	70.84	94.03	14.14	99.23	90.21	69.54	88.18
Coupon 3	84.15	66.91	92.14	47.06	99.82	86.75	67.91	93.28
Ave	81.35	70.18	92.96	33.89	99.58	87.94	73.02	92.98
Std Dev	2.95	2.99	0.97	17.42	0.31	1.97	7.49	4.65

Summary:

Substrates:	Steel				
Contaminants:	Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Magnaflux	Daraclean 282 GF	5	81.35	☐	
Emkay Chemical Company	Safety Wash	5	70.18	☐	
Safe CleanUp Solutions	Super Neutral	10	92.96	☑	
Watson Technical Associates	Watson Formula 7300	5	33.89	☐	
Bio Chem Systems	Solsafe 245	100	99.58	☑	
AG Environmental Products	Soy Gold 2000	50	87.94	☑	
International Products Corporation	Micro 90 Conc.	5	73.02	☐	
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	5	92.98	☑	

Conclusion:

Increasing the concentrations of the products which cleaned less than 90% should increase the efficiencies. Additional testing could be performed to determine the optimum concentrations for cleaning nearly 100% of the contaminant from the coupons.
The Watson product will not be tested any further due to its limited success in removing the oil mixture.