CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	1999
DateRun:	07/19/1999
Experimenters:	Jason Marshall
ClientType:	Consultant
ProjectNumber:	Project #1
Substrates:	Liquid
PartType:	Part
Contaminants:	Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil
Cleaning Methods:	
Analytical Methods:	Surfactant Titration
Purpose:	To compare surfactant levels of a cleaning solution

Experimental Procedure:

To compare surfactant levels of a cleaning solution before & after passing through separation equipment (Aqueous Recovery Resources, Inc., Suparator, oil-water separator) and a virgin sample of the solution. Three titrations were per sample were tested for nonionic surfactant content using Bama Chem Nonionic Surfactant Kit. The general procedure is as follows:
1. ADD APPROXIMATELY 25 ML OF WATER TO MIXING VIAL
2. ADD 8 DROPS OF INDICATOR SOLUTION TO VIAL. COLOR SHOULD BE GREEN.
3. ADD 15 DROPS OF 20% SULFURIC ACID TO VIAL (20 DROPS IF STRONGLY ALKALINE DETERGENTS ARE TESTED) AND SWIRL. COLOR SHOULD NOW BE PURPLE. (CAUTION: HANDLE THIS SOLUTION WITH CARE. IT IS CORROSIVE AND MAY CAUSE BURNS.)
4. ADD 0.5ML OF NONIONIC DETERGENT SOLUTION TO VIAL AND SWIRL, COLOR SHOULD NOW TURN BACK TO GREEN OR YELLOW-GREEN.
5. ADD TITRATING SOLUTION DROPWISE WHILE COUNTING UNTIL THE COLOR CHANGES TO A WINE-RED OR PURPLE. (ABOUT HALFWAY TO THE ENDPOINT THE COLOR WILL BE TAN OR LIGHT BROWN). NOTE THE NUMBER OF DROPS NEEDED AND MULTIPLY BY 0.5 TO GET % BY VOLUME OF NONIONIC DETERGENT. EACH DROP IS EQUIVALENT TO 0.0028 GRAMS OF SURFACTANT.
CHOOSE SAMPLE SIZE THAT WILL REQUIRE 10-20 DROPS OF TITRANT FOR BETTER ACCURACY. FOR VERY CONCENTRATED SURFACTANT SOLUTIONS USE A 0.10ML SAMPLE SO AS TO CONSERVE REAGENTS. FOR A 0.10ML SAMPLE USE A FACTOR OF 2.5.
FOR WEAKER SOLUTIONS:
1.00ML SAMPLE USE A FACTOR OF 0.25
10.00ML SAMPLE USE A FACTOR OF 0.025
100.00ML SAMPLE USE A FACTOR OF 0.0025
SOME INTERFERENCES - ACID SOLUBLE ANIONIC DETERGENTS CATIONIC DETERGENTS SOME AMINES STRONG OXIDIZERS SUCH AS HYPOCHLORITES, NITRITES, ETC. HIGHLY CONCENTRATED DYES
The chemistries used were:

SITE	CLEANER MFR	PRODUCT	NOTES
West Bend	Environmentally Sensitive Solutions	ES -5000	10 % by Volume
West Bend	Environmentally Sensitive Solutions	ES -5000	Influent to Suparator
West Bend	Environmentally Sensitive Solutions	ES -5000	Effluent from Suparator

Results:

After passing through the oil-water separator, the West Bend cleaning solution surfactant levels almost returned to the initial clean level. Table 1 lists the three stages and the surfactant levels.
Table 1. Surfactant Levels

Site:	West Bend	
Cleaner	Influent	Effluent
2.5	1.67	1.96
2.08	1.5	2.19
2.75	1.61	2.03
2.44	1.59	2.06

Table 2 Data From Each Stage

Experimenter	Marshall	
Date	7/20/99	

CLEANING LABORATORY EVALUATION SUMMARY

Client Type	Consultant	
SCL #	99-7104-02-5	
Test Type	Nonionic	
Cleaner Mfr	West Bend Cleaner	
Product Name	Environmentally Sensitive Solutions ES-5000	
Concetration Used	10	%
Drops Required	10	
Sample Size	10	mL
Wt of Surfactant	0.028	grams
drop * f	0.25	% by volume of nonionic surfactant
Dilution correction	10	
Total Surfactant	2.5	
Mfr	West Bend Cleaner	
Product	Environmentally Sensitive Solutions ES-5000	
Conc. %	10	
Volume	10	
Wt of Surf	0.028	in Sample
% Surf.	0.25	in Sample
Total Surf %	2.5	Full strength
Experimenter	Marshall	
Date	7/20/99	
Client Type	Consultant	
SCL #	99-7104-02-5	
Test Type	Nonionic	
Cleaner Mfr	West Bend Cleaner	
Product Name	Environmentally Sensitive Solutions ES-5000	
Concentration Used	10	%
Drops Required	5	
Sample Size	6	mL
Wt of Surfactant	0.014	grams
drop * f	0.20833	% by volume of nonionic surfactant
Dilution correction	10	
Total Surfactant	2.08333	
Mfr	West Bend Cleaner	
Product	Environmentally Sensitive Solutions ES-5000	
Conc. %	10	
Volume	6	
Wt of Surf	0.014	in Sample
% Surf.	0.208333	in Sample
Total Surf %	2.083333	Full strength
Experimenter	Marshall	

CLEANING LABORATORY EVALUATION SUMMARY

Date	7/20/99	
Client Type	Consultant	
SCL #	99-7104-02-5	
Test Type	Nonionic	
Cleaner Mfr	West Bend Cleaner	
Product Name	Environmentally Sensitive Solutions ES-5000	
Concentration Used	10	%
Drops Required	11	
Sample Size	10	mL
Wt of Surfactant	0.0308	grams
drop * f	0.275	% by volume of nonionic surfactant
Dilution correction	10	
Total Surfactant	2.75	
Mfr	West Bend Cleaner	
Product	Environmentally Sensitive Solutions ES-5000	
Conc. %	10	
Volume	10	
Wt of Surf	0.0308	in Sample
% Surf.	0.275	in Sample
Total Surf %	2.75	
Experimenter	Marshall	
Date	7/20/99	
Client Type	Consultant	
SCL #	99-7104-02-5	
Test Type	Nonionic	
Cleaner Mfr	West Bend Influent	
Product	Name Environmentally Sensitive Solutions ES-5000	
Concentration Used	10	%
Drops Required	6	
Sample Size	10	mL
Wt of Surfactant	0.0168	grams
drop * f	0.15	% by volume of nonionic surfactant
Dilution correction	10	
Total Surfactant	1.5	
Mfr	West Bend Influent	
Product	Environmentally Sensitive Solutions ES-5000	
Conc. %	10	
Volume	10	
Wt of Surf	0.0168 I	n Sample
% Surf.	0.15	in Sample
Total Surf %	1.5	Full strength

CLEANING LABORATORY EVALUATION SUMMARY

Experimenter	Marshall	
Date	7/20/99	
Client	Consultant	
SCL #	99-7104-02-5	
Test Type	Nonionic	
Cleaner Mfr	West Bend Influent	
Product Name	Environmentally Sensitive Solutions ES-5000	
Concentration Used	10	%
Drops Required	8	
Sample Size	12	mL
Wt of Surfactant	0.0224	grams
drop * f	0.167	% by volume of nonionic surfactant
Dilution correction	10	
Total Surfactant	1.67	
Mfr	West Bend Influent	
Product	Environmentally Sensitive Solutions ES-5000	
Conc. %	10	
Volume	12	
Wt of Surf	0.0224	in Sample
% Surf.	0.167	in Sample
Total Surf %	1.67	Full strength
Experimenter	Marshall	
Date	7/20/99	
Client Type	Consultant	
SCL #	99-7104-02-5	
Test Type	Nonionic	
Cleaner Mfr	West Bend Influent	
Product Name	Environmentally Sensitive Solutions ES-5000	
Concentration Used	10	%
Drops Required	9	
Sample Size	14	mL
Wt of Surfactant	0.0252	grams
drop * f	0.161	% by volume of nonionic surfactant
Dilution correction	10	
Total Surfactant	1.61	
Mfr	West Bend Influent	
Product	Environmentally Sensitive Solutions ES-5000	
Conc. %	10	
Volume	14	

CLEANING LABORATORY EVALUATION SUMMARY

Wt of Surf	0.0252	in Sample
% Surf.	0.161	in Sample
Total Surf %	1.61	Full strength
Experimenter	Marshall	
Date	7/20/99	
Client Type	Consultant	
SCL #	99-7104-02-5	
Test Type	Nonionic	
Cleaner Mfr	West Bend Effluent	
Product Name	Environmentally Sensitive Solutions ES-5000	
Concentration Used	10	%
Drops Required	11	
Sample Size	14	mL
Wt of Surfactant	0.0308	grams
drop * f	0.196	% by volume of nonionic surfactant
Dilution correction	10	
Total Surfactant	1.96	
Mfr	West Bend Effluent	
Product	Environmentally Sensitive Solutions ES-5000	
Conc. %	10	
Volume	14	
Wt of Surf	0.0308	in Sample
% Surf.	0.196	in Sample
Total Surf %	1.96	Full strength
Experimenter	Marshall	
Date	7/20/99	
Client Type	Consultant	
SCL #	99-7104-02-5	
Test Type	Nonionic	
Cleaner Mfr	West Bend Effluent	
Product Name	Environmentally Sensitive Solutions ES-5000	
Concentration Used	10	%
Drops Required	14	
Sample Size	16	mL
Wt of Surfactant	0.0392	grams
drop * f	0.219	% by volume of nonionic surfactant
Dilution correction	10	
Total Surfactant	2.19	
Mfr	West Bend Effluent	
Product		

CLEANING LABORATORY EVALUATION SUMMARY

	Environmentally Sensitive Solutions ES-5000	
Conc. %	10	
Volume	16	
Wt of Surf	0.0392	in Sample
% Surf	0.219	in Sample
Total Surf %	2.19	Full strength
Experimenter	Marshall	
Date	7/20/99	
Client	Consultant	
SCL #	99-7104-02-5	
Test Type	Nonionic	
Cleaner Mfr	West Bend Effluent	
Product Name	Environmentally Sensitive Solutions ES-5000	
Concentration Used	10	%
Drops Required	13	
Sample Size	16	mL
Wt of Surfactant	0.0364	grams
drop * f	0.203	% by volume of nonionic surfactant
Dilution correction	10	
Total Surfactant	2.03	
Mfr	West Bend Effluent	
Product	Environmentally Sensitive Solutions ES-5000	
Conc. %	10	
Volume	16	
Wt of Surf	0.0364	in Sample
% Surf.	0.203	in Sample
Total Surf %	2.03	Full strength

Summary:

Conclusion: The concentration of surfactant in the cleaning solutions were not decreased by passing through the Superator Oil-Water separator.