

# **OIL ANALYSIS REPORT**

Sample Rating Trend



## Machine Id **PETERBILT 410**

#### Component Diesel Engine Fluid DIESEL ENGINE OIL SAE 15W40 (--- GAL)

### DIAGNOSIS

#### Recommendation

Resample at the next service interval to monitor. Please specify the brand, type, and viscosity of the oil on your next sample.

#### Wear

All component wear rates are normal.

#### Contamination

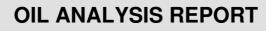
There is no indication of any contamination in the oil.

#### Fluid Condition

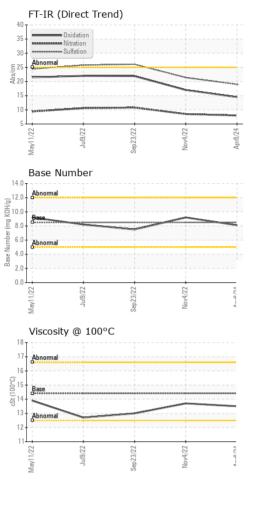
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Oil Age         mis         Client Info         0         15056         17106           Oil Changed         Client Info         Changed         Change	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Machine Age         mis         Client Info         559205         477942         465920           Oil Age         mis         Client Info         0         15055         17106           Oil Changed         Client Info         0         15055         17106           Sample Status         Imit/base         current         NoRMAL         NoRMAL           CONTAMINATION         method         Imit/base         current         Nistory1           Fuel         WC Method         >5         <1.0         <1.0         <1.0           Water         WC Method         >0.2         NEG         NEG         NEG           Glycol         WC Method         NEG         NEG         NEG         NEG           Chromium         ppm         ASTM 05185m         >20         1         <1         <1           Nickel         ppm         ASTM 05185m         >20         3         2         2         2           Itamium         ppm         ASTM 05185m         >3         1         0         0         0           Auminum         ppm         ASTM 05185m         >30         2         1         <1         1         <1         1         1         1	Sample Number		Client Info		PCA0106748	PCA0069502	PCA0069331
Oil Age         mis         Client Info         0         15056         17106           Oil Changed         Client Info         Changed         Change	Sample Date		Client Info		08 Apr 2024	04 Nov 2022	23 Sep 2022
Oli Changed     Client Info     Changed     Changed     Changed     Changed     Changed     Sample Status     NORMAL     NORMAL     NORMAL       CONTAMINATION     method     limit/base     current     history1     history2       Fuel     WC Method     >5.     <1.0	Machine Age	mls	Client Info		559205	477942	465920
Sample Status         NORMAL         NORMAL         NORMAL         NORMAL           CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >5         <1.0         <1.0         <1.0           Water         WC Method         >0.2         NEG         NEG         NEG           Glycol         WC Method         NEG         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5186m         >100         17         7         13           Chromium         ppm         ASTM D5186m         >20         1         <1         0         0           Itanium         ppm         ASTM D5186m         >3         <1         0         0         0           Aluminum         ppm         ASTM D5186m         >30         2         2         2         Lead         ppm         ASTM D5186m         <1         0         0         1         <1         1         1         1         1         1         1         1         1         1         1	Oil Age	mls	Client Info		0	15056	17106
CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >5         <1.0         <1.0         <1.0         <1.0           Water         WC Method         >0.2         NEG         NEG         NEG           Glysol         WC Method         NEG         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         17         7         13           Chromium         ppm         ASTM D5185m         >4         <1         0         0           Titanium         ppm         ASTM D5185m         >3         <1         0         0           Silver         ppm         ASTM D5185m         >3         <1         0         0           Copper         ppm         ASTM D5185m         >30         2         <1         3           Copper         ppm         ASTM D5185m         >1         <1         <1         <1           Cadmium         ppm         ASTM D5185m         10         0         0         0	Oil Changed		Client Info		Changed	Changed	Changed
Fuel         WC Method         >5         <1.0	Sample Status				NORMAL	NORMAL	NORMAL
Water         WC Method         >0.2         NEG         NEG         NEG         NEG           Glycol         WC Method         Imit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         17         7         13           Chromium         ppm         ASTM D5185m         >20         1         <1         <1           Nickel         ppm         ASTM D5185m         >4         <1         0         0           Silver         ppm         ASTM D5185m         >3         <1         0         0           Aluminum         ppm         ASTM D5185m         >4         <1         0         0           Aluminum         ppm         ASTM D5185m         >20         3         2         2           Lead         ppm         ASTM D5185m         >40         2         1         3           Copper         ppm         ASTM D5185m         >1         <1         <1         <1           Vanadium         ppm         ASTM D5185m         10         0         0         0           Adminum         ppm         ASTM D5185m         100         62         62	CONTAMINAT	ION	method	limit/base	current	history1	history2
Głycoł         WC Method         NEG         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >20         1         <1         <1           Nickel         ppm         ASTM D5185m         >20         1         <1         <1           Nickel         ppm         ASTM D5185m         >4         <1         0         0           Silver         ppm         ASTM D5185m         >20         3         2         2           Lead         ppm         ASTM D5185m         >20         3         2         1         <1         <1           Yanadium         ppm         ASTM D5185m         >15         1         <1         <1         <1           Vanadium         ppm         ASTM D5185m         15         130         <1         <1         <1           Vanadium         ppm         ASTM D5185m         100         62         62         81           Boron         ppm         ASTM D5185m         100         62         62         81           Magnesium         ppm         ASTM D518	Fuel		WC Method	>5	<1.0	<1.0	<1.0
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         17         7         13           Chromium         ppm         ASTM D5185m         >20         1         <1         <1           Nickel         ppm         ASTM D5185m         >20         1         <1         0         0           Titanium         ppm         ASTM D5185m         >3         <1         0         0           Aluminum         ppm         ASTM D5185m         >3         <1         0         0           Aluminum         ppm         ASTM D5185m         >20         3         2         2         2           Lead         ppm         ASTM D5185m         >330         2         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         1         <1 <t< th=""><th>Water</th><th></th><th>WC Method</th><th>&gt;0.2</th><th>NEG</th><th>NEG</th><th>NEG</th></t<>	Water		WC Method	>0.2	NEG	NEG	NEG
Iron         ppm         ASTM D5185m         >100         17         7         13           Chromium         ppm         ASTM D5185m         >20         1         <1	Glycol		WC Method		NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >20         1         <1	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel         ppm         ASTM D5185m         >4         <1	Iron	ppm	ASTM D5185m	>100	17	7	13
Titanium         ppm         ASTM D5185m         <1	Chromium	ppm	ASTM D5185m	>20	1	<1	<1
Silver         ppm         ASTM D5185m         >3         <1	Nickel	ppm	ASTM D5185m	>4	<1	0	0
Aluminum         ppm         ASTM D5185m         >20         3         2         2           Lead         ppm         ASTM D5185m         >40         2         1         3           Copper         ppm         ASTM D5185m         >330         2         <1         <1           Tin         ppm         ASTM D5185m         >1         <1         <1         <1           Vanadium         ppm         ASTM D5185m         >1         <1         0         <1           Cadmium         ppm         ASTM D5185m         250         9         15         130           Cadmium         ppm         ASTM D5185m         250         9         15         130           Boron         ppm         ASTM D5185m         10         0         0         0           Molybdenum         ppm         ASTM D5185m         100         62         62         81           Magnesium         ppm         ASTM D5185m         100         114         146         1426           Phosphorus         ppm         ASTM D5185m         3000         1110         1146         1426           Phosphorus         ppm         ASTM D5185m         1350	Titanium	ppm	ASTM D5185m		<1	0	0
Lead         ppm         ASTM D5185m         >40         2         1         3           Copper         ppm         ASTM D5185m         >330         2         <1         <1           Tin         ppm         ASTM D5185m         >15         1         <1         <1           Vanadium         ppm         ASTM D5185m         >15         1         <1         <1           Cadmium         ppm         ASTM D5185m         <1         0         <1         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         9         15         130           Barium         ppm         ASTM D5185m         10         0         0         0           Maganese         ppm         ASTM D5185m         100         62         62         81           Magnesium         ppm         ASTM D5185m         100         11         146         1426           Phosphorus         ppm         ASTM D5185m         3000         1110         1146         1426           Phosphorus         ppm         ASTM D5185m         155         127 </th <th>Silver</th> <th>ppm</th> <th>ASTM D5185m</th> <th>&gt;3</th> <th>&lt;1</th> <th>0</th> <th>0</th>	Silver	ppm	ASTM D5185m	>3	<1	0	0
Copper         ppm         ASTM D5185m         >330         2         <1	Aluminum	ppm	ASTM D5185m	>20	3	2	2
Tin         ppm         ASTM D5185m         >15         1         <1	Lead	ppm	ASTM D5185m	>40	2	1	3
Vanadium         ppm         ASTM D5185m         <1	Copper	ppm	ASTM D5185m	>330	2	<1	<1
Cadmium         ppm         ASTM D5185m         <1	Tin	ppm	ASTM D5185m	>15	1	<1	<1
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         9         15         130           Barium         ppm         ASTM D5185m         10         0         0         0           Molybdenum         ppm         ASTM D5185m         100         62         62         81           Manganese         ppm         ASTM D5185m         100         62         62         81           Magnesium         ppm         ASTM D5185m         1         <1         <1         <1           Magnesium         ppm         ASTM D5185m         450         908         924         587           Calcium         ppm         ASTM D5185m         1150         1148         1027         1082           Zinc         ppm         ASTM D5185m         1350         1272         1270         1373           Sulfur         ppm         ASTM D5185m         255         8         5         10           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20	Vanadium	ppm	ASTM D5185m		<1	0	<1
Boron         ppm         ASTM D5185m         250         9         15         130           Barium         ppm         ASTM D5185m         10         0         0         0           Molybdenum         ppm         ASTM D5185m         100         62         62         81           Manganese         ppm         ASTM D5185m         1         <1         <1         <1           Magnesium         ppm         ASTM D5185m         450         908         924         587           Calcium         ppm         ASTM D5185m         3000         1110         1146         1426           Phosphorus         ppm         ASTM D5185m         3000         1110         1027         1082           Zinc         ppm         ASTM D5185m         1350         1272         1270         1373           Sulfur         ppm         ASTM D5185m         4250         3563         3201         3407           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         <1         2           INFRA-RED         method         limit/base	Cadmium	ppm	ASTM D5185m		<1	0	0
Barium         ppm         ASTM D5185m         10         0         0         0           Molybdenum         ppm         ASTM D5185m         100         62         62         81           Manganese         ppm         ASTM D5185m         100         62         62         81           Magnesium         ppm         ASTM D5185m         450         908         924         587           Calcium         ppm         ASTM D5185m         450         908         924         587           Calcium         ppm         ASTM D5185m         3000         1110         1146         1426           Phosphorus         ppm         ASTM D5185m         100         1027         1082           Zinc         ppm         ASTM D5185m         1350         1272         1270         1373           Sulfur         ppm         ASTM D5185m         4250         3563         3201         3407           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         5         10           Sodium         ppm         ASTM D5185m         >20	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         100         62         62         81           Manganese         ppm         ASTM D5185m         1         <1         <1         <1           Magnesium         ppm         ASTM D5185m         450         908         924         587           Calcium         ppm         ASTM D5185m         3000         1110         1146         1426           Phosphorus         ppm         ASTM D5185m         100         1272         1270         1082           Zinc         ppm         ASTM D5185m         1350         1272         1270         1373           Sulfur         ppm         ASTM D5185m         4250         3563         3201         3407           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         5         10           Sodium         ppm         ASTM D5185m         >20         4         <1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         'ASTM D7624	Boron	ppm	ASTM D5185m	250	9	15	130
Manganese         ppm         ASTM D5185m         1         <1	Barium	ppm	ASTM D5185m	10	0	0	0
Magnesium         ppm         ASTM D5185m         450         908         924         587           Calcium         ppm         ASTM D5185m         3000         1110         1146         1426           Phosphorus         ppm         ASTM D5185m         1150         1148         1027         1082           Zinc         ppm         ASTM D5185m         1350         1272         1270         1373           Sulfur         ppm         ASTM D5185m         4250         3563         3201         3407           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         5         10           Sodium         ppm         ASTM D5185m         >158         <1         4         4           Potassium         ppm         ASTM D5185m         >20         4         <1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         0.3         0.4           Nitration         Abs/.Imm         *ASTM D7624 <th>Molybdenum</th> <th>ppm</th> <th>ASTM D5185m</th> <th>100</th> <th>62</th> <th>62</th> <th>81</th>	Molybdenum	ppm	ASTM D5185m	100	62	62	81
Calcium         ppm         ASTM D5185m         3000         1110         1146         1426           Phosphorus         ppm         ASTM D5185m         1150         1148         1027         1082           Zinc         ppm         ASTM D5185m         1350         1272         1270         1373           Sulfur         ppm         ASTM D5185m         4250         3563         3201         3407           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         5         10           Sodium         ppm         ASTM D5185m         >25         8         5         10           Sodium         ppm         ASTM D5185m         >25         8         5         10           Sodium         ppm         ASTM D5185m         >20         4         <1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         0.3         0.4           Nitration         Abs/.mm         *ASTM D7415 <td< th=""><th>Manganese</th><th>ppm</th><th>ASTM D5185m</th><th></th><th>1</th><th>&lt;1</th><th>&lt;1</th></td<>	Manganese	ppm	ASTM D5185m		1	<1	<1
Phosphorus         ppm         ASTM D5185m         1150         1148         1027         1082           Zinc         ppm         ASTM D5185m         1350         1272         1270         1373           Sulfur         ppm         ASTM D5185m         1350         1272         1270         1373           Sulfur         ppm         ASTM D5185m         4250         3563         3201         3407           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         5         10           Sodium         ppm         ASTM D5185m         >25         8         5         10           Sodium         ppm         ASTM D5185m         >20         4         <1	Magnesium	ppm	ASTM D5185m	450	908	924	587
Zinc         ppm         ASTM D5185m         1350         1272         1270         1373           Sulfur         ppm         ASTM D5185m         4250         3563         3201         3407           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         5         10           Sodium         ppm         ASTM D5185m         >25         8         5         10           Sodium         ppm         ASTM D5185m         >25         8         5         10           Sodium         ppm         ASTM D5185m         >20         4         <1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         0.3         0.4           Nitration         Abs/cm         *ASTM D7624         >20         8.0         8.5         10.8           Sulfation         Abs/.tmm         *ASTM D7415         >30         19.0         21.4         26.1           FLUID DEGRADATION         method         limit/base	Calcium	ppm	ASTM D5185m	3000	1110	1146	1426
Sulfur         ppm         ASTM D5185m         4250         3563         3201         3407           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         5         10           Sodium         ppm         ASTM D5185m         >158         <1         4         4           Potassium         ppm         ASTM D5185m         >20         4         <1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         0.3         0.4           Nitration         Abs/cm         *ASTM D7624         >20         8.0         8.5         10.8           Sulfation         Abs/.tm         *ASTM D7415         >30         19.0         21.4         26.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.tmm         *ASTM D7414         >25         14.5         17.0         21.9	Phosphorus	ppm	ASTM D5185m	1150	1148	1027	1082
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         5         10           Sodium         ppm         ASTM D5185m         >158         <1         4         4           Potassium         ppm         ASTM D5185m         >20         4         <1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         0.3         0.4           Nitration         Abs/cm         *ASTM D7624         >20         8.0         8.5         10.8           Sulfation         Abs/.imm         *ASTM D7415         >30         19.0         21.4         26.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.imm         *ASTM D7414         >25         14.5         17.0         21.9	Zinc	ppm	ASTM D5185m	1350	1272	1270	1373
Silicon         ppm         ASTM D5185m         >25         8         5         10           Sodium         ppm         ASTM D5185m         >158         <1	Sulfur	ppm	ASTM D5185m	4250	3563	3201	3407
Sodium         ppm         ASTM D5185m         >158         <1	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         4         <1	Silicon	ppm	ASTM D5185m	>25	8	5	10
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         0.3         0.4           Nitration         Abs/cm         *ASTM D7624         >20         8.0         8.5         10.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.0         21.4         26.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.5         17.0         21.9	Sodium	ppm	ASTM D5185m	>158	<1	4	4
Soot %         %         *ASTM D7844         >3         0.5         0.3         0.4           Nitration         Abs/cm         *ASTM D7624         >20         8.0         8.5         10.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.0         21.4         26.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.5         17.0         21.9	Potassium	nnm	ASTM D5185m	>20	4	<1	2
Nitration         Abs/cm         *ASTM D7624         >20         8.0         8.5         10.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.0         21.4         26.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.5         17.0         21.9	1 otassium	ppm		- 10			
Sulfation         Abs/.1mm         *ASTM D7415         >30         19.0         21.4         26.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.5         17.0         21.9		PPm			current		history2
FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     14.5     17.0     21.9			method	limit/base		history1	
Oxidation         Abs/.1mm         *ASTM D7414         >25         14.5         17.0         21.9	INFRA-RED Soot %	%	method *ASTM D7844	limit/base >3	0.5	history1 0.3	0.4
	INFRA-RED Soot % Nitration	% Abs/cm	method *ASTM D7844 *ASTM D7624	limit/base >3 >20	0.5 8.0	history1 0.3 8.5	0.4 10.8
Base Number (BN)         mg KOH/g         ASTM D2896         8.5         8.1         9.2         7.5	INFRA-RED Soot % Nitration Sulfation	% Abs/cm Abs/.1mm	method *ASTM D7844 *ASTM D7624 *ASTM D7415	limit/base >3 >20 >30	0.5 8.0 19.0	history1 0.3 8.5 21.4	0.4 10.8 26.1
	INFRA-RED Soot % Nitration Sulfation FLUID DEGRAD	% Abs/cm Abs/.1mm DATION	method *ASTM D7844 *ASTM D7624 *ASTM D7415 method	limit/base >3 >20 >30 limit/base	0.5 8.0 19.0 current	history1 0.3 8.5 21.4 history1	0.4 10.8 26.1 history2





VISUAL



Laboratory Sample No. Lab Number Unique Number Test Package To discuss this sample repor * - Denotes test methods tha			PCA0106748 06156698 10992121 FLEET	Recei Teste Diagr	d : 23 Apr 2024 losed : 23 Apr 2024 - Wes Davis 00-237-1369.			10895 E Contact: J	LEFEBVRE AND SONS 10895 171ST AVE NW ELK RIVER, MN US 55330 Contact: JAY LEFEBVRE jay.lefebvre@leftruck.com T:	
			12 11 11 12 11 12 12 11 12 12 12 12 12 1	Sep23/22	Nov4/22	42000 April 2000	0 -	Sep23/22	Nov4/22	
		Neur Fi Por	3 15 3 14 13 Abnormal			0.10.1 8.0 9.8 Mrumper 8.9 88 8.9 4.0	D - Abnormal	~		
			17 - Abnormal 16 -			14.0 12.0 PH10.0	Abnormal			
			Viscosity @ 100°C	Sep23/22	Nov4/22	Apr8/24	Base Number			
			2	/22		724				
			6- 4-							
Sep23/22	Nov4/22	NC/ Brunk	Non-ferrous Meta	ls						
			May11/22	Sep23/22	Nov4/22	Apr8/24				
					$\checkmark$					
Sep23/22 -	Nov4/22 -	NC/Brev	16 iron 14 chromium 12 -	$\overline{}$	_ /					
			GRAPHS Ferrous Alloys							
			FLUID PROPE Visc @ 100°C	RTIES cSt	method ASTM D445	limit/base 14.4	current 13.5	history1 13.7	history2 13.0	
		1	Emulsified Water Free Water	scalar scalar	*Visual *Visual	>0.2	NEG NEG	NEG NEG	NEG NEG	
Sep23/22	Nov4/22	Apr8/24	Appearance Odor	scalar scalar	*Visual *Visual	NORML NORML	NORML NORML	NORML NORML	NORML NORML	
annes a state of the state of t			Debris Sand/Dirt	scalar scalar	*Visual *Visual	NONE	NONE	NONE	NONE	
		Te Sky	Yellow Metal Precipitate Silt	scalar scalar scalar	*Visual *Visual	NONE	NONE	NONE	NONE NONE NONE	
			White Metal	scalar	*Visual *Visual	NONE NONE	NONE NONE	NONE NONE	NONE	

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Contact/Location: JAY LEFEBVRE - LEFELK Page 2 of 2