# Station **POWER GENERATION PRODUCTS**

**OIL ANALYSIS REPORT** 

WEAR NORMAL CONTAMINATION NORMAL **FLUID CONDITION ABNORMAL** 

## **MOTION ELECTRICAL [86533]** 1316 DICKIE SETTLEME 2016144045 2016144045

#### **Right Diesel Engine**

### ESSO XD-3 EXTRA 15W40 (--- LTR)

RECOMMENDATION	
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No corrective action is recommended at this time. Resample at the next service interval to monitor.

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WWH		

Area

Metal levels are typical for a new component breaking in.

#### CONTAMINATION

Fuel content negligible. There is no indication of any contamination in the oil.

CONDITION	
CONDITION	

Viscosity of sample indicates oil is within SAE 30 range, advise investigate. The condition of the oil is acceptable for the time in service.

TestUOMMethodLimit/MCurrentHistory1History2Sample NumberClient Info28 May 2024Machine AgehrsClient Info23Oil AgehrsClient Info0Oil AgehrsClient Info0Filter AgehrsClient InfoChangedOil ChangedClient InfoChangedFilter ChangedClient InfoChangedSample StatusClient Info0IronppmASTMD5180m>100NickelppmASTMD5180m>50NickelppmASTMD5180m>50AluminumppmASTMD5180m>500AluminumppmASTMD5180m>101VanadiumppmASTMD5180m>101VanadiumppmASTMD5180m>201VanadiumppmASTMD5180m>201VanadiumppmASTMD5180m>201VanadiumppmASTMD5180m>201VanadiumppmASTMD5180m>201VanadiumppmASTMD5180m>201VanadiumppmASTMD5180m>20<							
Sample Date     Client Info     28 May 2024        Machine Age     hrs     Client Info     0        Oil Age     hrs     Client Info     0        Filter Age     hrs     Client Info     0        Oil Age     hrs     Client Info     Changed        Filter Age     hrs     Client Info     Changed        Sample Status      ABNORMAL         Iron     ppm     ASTM D5186/m     >10     0        Chromium     ppm     ASTM D5186/m     >50     0        Silver     ppm     ASTM D5186/m     >50     0        Aluminum     ppm     ASTM D5186/m     >40     2        Vanadium     ppm     ASTM D5186/m     >40     2        Vanadium     ppm     ASTM D5186/m     >40         Vanadium     ppm     ASTM D5186/m     >20     2	Test	UOM	Method	Limit/Abn	Current	History1	History2
Machine Age     hrs     Client Info     Q3         Filter Age     hrs     Client Info     O         Filter Age     hrs     Client Info     Changed         Filter Changed     Client Info     Changed         Sample Status     Client Info     Changed         Iron     ppm     ASTMD5185(m)     >10     0         Nickel     ppm     ASTMD5185(m)     >5     0         Aluminum     ppm     ASTMD5185(m)     >50     0         Vanadium     ppm     ASTMD5185(m)     >40     2         Vanadum     ppm     ASTMD5185(m)     >10          Vanadum     ppm     ASTMD5185(m)     >20     1         Vanadum     ppm     ASTMD5185(m)     >20     1	Sample Number		Client Info		PN0006110		
Oil Age     hrs     Client Info     0         Filter Age     hrs     Client Info     Changed         Filter Changed     Client Info     Changed         Filter Changed     Client Info     Changed         Sample Status     ASTM D5185(m)     >120     4         Chromium     ppm     ASTM D5185(m)     >10     0         Nickel     ppm     ASTM D5185(m)     >50     0         Silver     ppm     ASTM D5185(m)     >20     1         Copper     ppm     ASTM D5185(m)     >20     1         Vanaduinu     ppm     ASTM D5185(m)     >20     1         Veltow Metal     scalar     Visual*     NONE         Veltow Metal     scalar     Visual*     NONE         Veltow Metal<	Sample Date		Client Info		28 May 2024		
Filter Age     hrs     Client Info     0         Oil Changed     Client Info     Changed         Sample Status     ABNORMAL         Iron     ppm     ASTM05185(m)     >120     4        Iron     ppm     ASTM05185(m)     >10     0        Nickel     ppm     ASTM05185(m)     >50     0        Titanium     ppm     ASTM05185(m)     >50     0        Silver     ppm     ASTM05185(m)     >20     1        Copper     ppm     ASTM05185(m)     >40     2        Vanadum     ppm     ASTM05185(m)     >10     1        Vanadum     ppm     ASTM05185(m)     >20     1        Vanadum     ppm     ASTM05185(m)     >20     2        Vanadum     ppm     ASTM05185(m)     >20     2        Vanadum     ppm	Machine Age	hrs	Client Info				
Oil Changed     Client Info     Changed        Filter Changed     Client Info     Changed        Sample Status     ABNORMAL         Iron     ppm     ASTM D5185(m)     >120     4        Iron     ppm     ASTM D5185(m)     >50     0        Nickel     ppm     ASTM D5185(m)     55     0        Silver     ppm     ASTM D5185(m)     50     0        Aluminum     ppm     ASTM D5185(m)     >20     1	Oil Age	hrs	Client Info		0		
Filter Changed Sample Status     Client Info     Changed ABNORMAL         Iron     ppm     ASTM D5185(m) >120     4         Chromium     ppm     ASTM D5185(m) >10     0         Nickel     ppm     ASTM D5185(m) >55     0         Silver     ppm     ASTM D5185(m) >50     0         Aluminum     ppm     ASTM D5185(m) >40     2         Lead     ppm     ASTM D5185(m) >40     2         Vanadium     ppm     ASTM D5185(m) >40     2         Vanadium     ppm     ASTM D5185(m) >40     1         Vanadium     ppm     ASTM D5185(m) >20     15         Velow Metal     scalar     Visual*     NONE         Velow Metal     scalar     Visual*     NONE         Silicon     ppm     ASTM D5185(m) >20 <t< th=""><th>Filter Age</th><th>hrs</th><th>Client Info</th><th></th><th>0</th><th></th><th></th></t<>	Filter Age	hrs	Client Info		0		
Sample Status     ABNORMAL         Iron     ppm     ASTM D5185(m)     >10     0        Chromium     ppm     ASTM D5185(m)     >5     0         Nickel     ppm     ASTM D5185(m)     >5     0         Titanium     ppm     ASTM D5185(m)     >5     0         Silver     ppm     ASTM D5185(m)     >20     1         Lead     ppm     ASTM D5185(m)     >20     1         Vanadium     ppm     ASTM D5185(m)     >20     64         Vanadium     ppm     ASTM D5185(m)     >20     64         Vanadium     ppm     ASTM D5185(m)     >20     64         Vanadium     ppm     ASTM D5185(m)     >20     2         Vellow Metal     scalar     Visual*     NONE    <	Oil Changed		Client Info		Changed		
Iron     ppm     ASTM D5185(m)     >10     Q        Chromium     ppm     ASTM D5185(m)     >50         Nickel     ppm     ASTM D5185(m)     >50     0         Silver     ppm     ASTM D5185(m)     >50     0         Aluminum     ppm     ASTM D5185(m)     >20     1         Lead     ppm     ASTM D5185(m)     >20     1         Vanadium     ppm     ASTM D5185(m)     >300     64         Vanadium     ppm     ASTM D5185(m)     >10     1         Vanadium     ppm     ASTM D5185(m)     >20     2         Vanadium     ppm     ASTM D5185(m)     >20     2         Vallow     NONE     NONE          Solicon     ppm     ASTM D5185(m)<>20     15	Filter Changed		Client Info		Changed		
Chromium     ppm     ASTM D5185(m)     >10     0         Nickel     ppm     ASTM D5185(m)     >5     0         Titanium     ppm     ASTM D5185(m)     >5     0         Silver     ppm     ASTM D5185(m)     >20     1         Lead     ppm     ASTM D5185(m)     >20     1         Copper     ppm     ASTM D5185(m)     >20     64         Vanadium     ppm     ASTM D5185(m)     >10     1         Vanadium     ppm     ASTM D5185(m)     >10     1         Vanadium     ppm     ASTM D5185(m)     >20     64         Vanadium     ppm     ASTM D5185(m)     >20     2         Vanadium     ppm     ASTM D5185(m)     >20     2         Vanadium     ppm	Sample Status				ABNORMAL		
Chromium     ppm     ASTM D5185(m)     >10     0         Nickel     ppm     ASTM D5185(m)     >5     0         Titanium     ppm     ASTM D5185(m)     >5     0         Silver     ppm     ASTM D5185(m)     >20     1         Lead     ppm     ASTM D5185(m)     >20     1         Copper     ppm     ASTM D5185(m)     >20     64         Vanadium     ppm     ASTM D5185(m)     >10     1         Vanadium     ppm     ASTM D5185(m)     >10     1         Vanadium     ppm     ASTM D5185(m)     >20     64         Vanadium     ppm     ASTM D5185(m)     >20     2         Vanadium     ppm     ASTM D5185(m)     >20     2         Vanadium     ppm							
Nickel     ppm     ASTM D5185(m)     >5     0         Titanium     ppm     ASTM D5185(m)     >5     0         Silver     ppm     ASTM D5185(m)     >50     1         Aluminum     ppm     ASTM D5185(m)     >20     1         Lead     ppm     ASTM D5185(m)     >40     2         Copper     ppm     ASTM D5185(m)     >10     1         Vanadium     ppm     ASTM D5185(m)     >20     1         White Metal     scalar     Visual*     NONE          Yellow Metal     scalar     Visual*     NONE          Silicon     ppm     ASTM D5185(m)     >20     2         Water     WC Method     >0.1     NEG         Giycol     WC Method	Iron	ppm	ASTM D5185(m)	>120	4		
Titanium     ppm     ASTM D5185(m)     C         Silver     ppm     ASTM D5185(m)     >5     0         Aluminum     ppm     ASTM D5185(m)     >20     1         Lead     ppm     ASTM D5185(m)     >40     2         Copper     ppm     ASTM D5185(m)     >10     1         Vanadium     ppm     ASTM D5185(m)     >10     1         Vanadium     ppm     ASTM D5185(m)     >10     1         Vanadium     ppm     ASTM D5185(m)     >20     2         Vanadium     ppm     ASTM D5185(m)     >20     2         Yellow Metal     scalar     Visual*     NONE          Sulfcon     ppm     ASTM D7833*     >4.0     0         Water     WC Method     >0.1 <th>Chromium</th> <th>ppm</th> <th>ASTM D5185(m)</th> <th>&gt;10</th> <th>0</th> <th></th> <th></th>	Chromium	ppm	ASTM D5185(m)	>10	0		
Silver     ppm     ASTM D5185(m)     >5     0        Aluminum     ppm     ASTM D5185(m)     >20     1         Lead     ppm     ASTM D5185(m)     >40     2         Copper     ppm     ASTM D5185(m)     >10     1         Vanadium     ppm     ASTM D5185(m)     >10     1         White Metal     scalar     Visual*     NONE     NONE         Silicon     ppm     ASTM D5185(m)     >20     2         Silicon     ppm     ASTM D5185(m)     >20     2         Silicon     ppm     ASTM D5185(m)     >20     2         Fuel     %     ASTM D71857     >4.0     0.6         Giycol     WC Method     >0.1     NEG         Sot %     %     ASTM D7184*     0	Nickel	ppm	ASTM D5185(m)	>5	0		
Aluminum     ppm     ASTM D5185(m)     >20     1         Lead     ppm     ASTM D5185(m)     >40     2         Copper     ppm     ASTM D5185(m)     >300     64         Tin     ppm     ASTM D5185(m)     >10     1         Vanadium     ppm     ASTM D5185(m)     >10     0         White Metal     scalar     Visual*     NONE     NONE         Yellow Metal     scalar     Visual*     NONE     NONE         Silicon     ppm     ASTM D5185(m)     >20     2         Fuel     %     ASTM D7593*     >4.0     0.6         Glycol     WC Method     >0.1     NEG         Soot %     %     ASTM D7624*     >20     5.4         Sulfation     Abs/Imm     ASTM D7624*     >20 <th>Titanium</th> <th>ppm</th> <th>ASTM D5185(m)</th> <th></th> <th>0</th> <th></th> <th></th>	Titanium	ppm	ASTM D5185(m)		0		
Lead     ppm     ASTM DS185(m)     >40     2         Copper     ppm     ASTM DS185(m)     >300     64         Tin     ppm     ASTM DS185(m)     >10     1         Vanadium     ppm     ASTM DS185(m)     0         White Metal     scalar     Visual*     NONE     NONE         Yellow Metal     scalar     Visual*     NONE     NONE         Solicon     ppm     ASTM DS185(m)     >20     2         Potassium     ppm     ASTM D5185(m)     >20     2         Water     WC Method     >0.1     NEG          Solf %     %     ASTM D784*     >20     5.4         Sulfation     Abs/rm     ASTM D784*     >20     5.4         Sulfation     Abs/rm     ASTM D7	Silver	ppm	ASTM D5185(m)	>5	0		
Copper     ppm     ASTM D5185(m)     >300     64         Tin     ppm     ASTM D5185(m)     >10     1         Vanadium     ppm     ASTM D5185(m)     0     0         White Metal     scalar     Visual*     NONE     NONE         Yellow Metal     scalar     Visual*     NONE     NONE         Silicon     ppm     ASTM D5185(m)     >20     2         Fuel     %     ASTM D5185(m)     >20     2         Water     WC Method     >0.6           Giycol     WC Method     >0.1     NEG          Sulfation     Abs/rm     ASTM D7624*     >20     5.4         Sulfation     Abs/rm     ASTM D7624*     >20     5.4         Sulfation     Abs/rm     NONE <th>Aluminum</th> <th>ppm</th> <th>ASTM D5185(m)</th> <th>&gt;20</th> <th>1</th> <th></th> <th></th>	Aluminum	ppm	ASTM D5185(m)	>20	1		
Tin     ppm     ASTM D5185(m)     >10     1        Vanadium     ppm     ASTM D5185(m)     0         White Metal     scalar     Visual*     NONE     NONE        Yellow Metal     scalar     Visual*     NONE     NONE        Silicon     ppm     ASTM D5185(m)     >20     2        Potassium     ppm     ASTM D5185(m)     >20     2        Fuel     %     ASTM D5185(m)     >20     2        Water     WC Method     >0.1     NEG         Glycol     WC Method     >0.1     NEG         Solf %     %     ASTM D7624*<>20     5.4         Sulfation     Abs/.tmm     ASTM D7624*<>30     18.1         Debris     scalar     Visual*     NONE     NONE         Appearance     scalar     Visual*     NORML	Lead	ppm	ASTM D5185(m)	>40	2		
Vanadium     ppm     ASTM D5185(m)     0        White Metal     scalar     Visual*     NONE     NONE        Yellow Metal     scalar     Visual*     NONE     NONE        Silicon     ppm     ASTM D5185(m)     >25     15        Potassium     ppm     ASTM D5185(m)     >20     2        Fuel     %     ASTM D5185(m)     >20     2        Water     WC Method     >0.6         Glycol     WC Method     >0.1     NEG         Sott %     %     ASTM D7624*     >20     5.4         Sulfation     Abs/cm     ASTM D7624*     >20     5.4         Sulfation     Abs/cm     ASTM D7644*     NONE     NONE         Sulfation     Abs/cm     NONE     NONE       Sulfation     Abs/cm        Sand/Dirt<	Copper	ppm	ASTM D5185(m)	>300	64		
White Metal     scalar     Visual*     NONE     NONE        Yellow Metal     scalar     Visual*     NONE     NONE        Silicon     ppm     ASTM D5185(m)     >20     2        Potassium     ppm     ASTM D5185(m)     >20     2        Fuel     %     ASTM D5185(m)     >20     2        Water     WC Method     >0.1     NEG        Glycol     WC Method     >0.1     NEG        Sott %     %     ASTM D7834*     0         Glycol     WC Method     >0.1     NEG         Sott %     %     ASTM D7624*     >20     5.4         Sulfation     Abs/tmm     ASTM D713*     >30     18.1         Sulfation     Abs/tmm     ASTM D714*     >30     18.1         Sulfation     Abs/tmm     NORE     NORE     <	Tin	ppm	ASTM D5185(m)	>10	1		
Yellow Metal     scalar     Visual*     NONE     NONE        Silicon     ppm     ASTM D5185(m) >20     15         Potassium     ppm     ASTM D5185(m) >20     2         Fuel     %     ASTM D5185(m) >20     2         Water     WC Method     >0.1     NEG         Glycol     WC Method     >0.1     NEG         Soot %     %     ASTM D784*     0         Soot %     %     ASTM D7624     >20     5.4         Sulfation     Abs/tmm     ASTM D7115     >30     18.1         Sulfation     Abs/tmm     ASTM D7145     >30     18.1         Sulfation     Abs/tmm ASTM D7145     >30     18.1         Debris     scalar     Visual*     NORE         Appearance     scalar     Vi	Vanadium	ppm	ASTM D5185(m)		0		
Silicon     ppm     ASTM D5185(m)     >25     15        Potassium     ppm     ASTM D5185(m)     >20     2        Fuel     %     ASTM D5185(m)     >20     2        Water     WC Method     >0.1     NEG        Glycol     WC Method     >0.1     NEG        Soot %     %     ASTM D784*     0        Soot %     %     ASTM D762*     >20     5.4        Sulfation     Abs/tmm     ASTM D715*     >30     18.1        Sulfation     Abs/tmm     ASTM D714*     >30     18.1        Debris     scalar     Visual*     NONE         Appearance     scalar     Visual*     NORM     NORML        Odor     scalar     Visual*     NORM     NORML        Boron     ppm     ASTM D5185(m)     >10         Manganese     pm </th <th>White Metal</th> <th>scalar</th> <th>Visual*</th> <th>NONE</th> <th>NONE</th> <th></th> <th></th>	White Metal	scalar	Visual*	NONE	NONE		
Potassium     ppm     ASTM D5185(m)     >20     2        Fuel     %     ASTM D5793*     >4.0     0.6         Water     WC Method     >0.1     NEG         Glycol     WC Method     >0.1     NEG         Soot %     %     ASTM D784*     0         Nitration     Abs/cm     ASTM D762*     >20     5.4         Sulfation     Abs/rm     ASTM D762*     >20     5.4         Sulfation     Abs/rm     ASTM D762*     >20     5.4         Sulfation     Abs/rm     ASTM D716*     >30     18.1         Sulfation     Abs/rm     ASTM D716*     >30     18.1         Sulfation     scalar     Visual*     NONE     NONE         Appearance     scalar     Visual*     NORM     NORML	Yellow Metal	scalar	Visual*	NONE	NONE		
Potassium     ppm     ASTM D5185(m)     >20     2        Fuel     %     ASTM D5793*     >4.0     0.6         Water     WC Method     >0.1     NEG         Glycol     WC Method     >0.1     NEG         Soot %     %     ASTM D784*     0         Nitration     Abs/cm     ASTM D762*     >20     5.4         Sulfation     Abs/rm     ASTM D762*     >20     5.4         Sulfation     Abs/rm     ASTM D762*     >20     5.4         Sulfation     Abs/rm     ASTM D716*     >30     18.1         Sulfation     Abs/rm     ASTM D716*     >30     18.1         Sulfation     scalar     Visual*     NONE     NONE         Appearance     scalar     Visual*     NORM     NORML							
Fuel     %     ASTM D7593*     >4.0     0.6        Water     WC Method     >0.1     NEG        Glycol     WC Method     >0.1     NEG        Soot %     %     ASTM D7593*     >4.0     NEG        Nitration     Abs/cm     ASTM D7624*     >20     5.4         Sulfation     Abs/cm     ASTM D7624*     >20     5.4         Sulfation     Abs/cm     ASTM D7415*     >30     18.1         Sulfation     Abs/cm     ASTM D7415*     >30     18.1         Solar     Scalar     Visual*     NONE     NONE         Debris     scalar     Visual*     NORM     NORM         Appearance     scalar     Visual*     NORM     NORML         Sodium     ppm     ASTM D5185(m)     >102     1	Silicon	ppm	ASTM D5185(m)	>25	15		
Water     WC Method     >0.1     NEG        Glycol     WC Method     NEG         Soot %     %     ASTM D7844*     0         Nitration     Abs/cm     ASTM D7844*     0         Sulfation     Abs/cm     ASTM D7624*     >20     5.4         Sulfation     Abs/cm     ASTM D7624*     >20     5.4         Sulfation     Abs/.tmm     ASTM D7415*     >30     18.1         Sulfation     Abs/.tmm     ASTM D7415*     >30     18.1         Sulfation     scalar     Visual*     NONE     NONE         Debris     scalar     Visual*     NORM     NORML         Appearance     scalar     Visual*     NORM     NORML         Odor     scalar     Visual*     NORM     NORM	Potassium	ppm	ASTM D5185(m)	>20	2		
Glycol     WC Method     NEG        Soot %     %     ASTM D7844*     0        Nitration     Abs/cm     ASTM D7624*     >20     5.4        Sulfation     Abs/cm     ASTM D7624*     >20     5.4        Sulfation     Abs/cm     ASTM D7624*     >30     18.1        Sulfation     Abs/cm     ASTM D7415*     >30     18.1        Sulfation     Abs/cm     Visual*     NONE     NONE        Debris     scalar     Visual*     NONE     NONE        Sand/Dirt     scalar     Visual*     NORM     NORML        Appearance     scalar     Visual*     NORML         Odor     scalar     Visual*     NORML     NORML        Sodium     ppm     ASTM D5185(m)     >192     1        Boron     ppm     ASTM D5185(m)     300         Mo	Fuel	%	ASTM D7593*	>4.0	0.6		
Soot %     %     ASTM D7844*     0         Nitration     Abs/cm     ASTM D7624*     >20     5.4         Sulfation     Abs/cm     ASTM D7624*     >20     5.4         Sulfation     Abs/cm     ASTM D7624*     >30     18.1         Silt     scalar     Visual*     NONE     NONE         Debris     scalar     Visual*     NONE     NONE         Sand/Dirt     scalar     Visual*     NORM     NORML         Appearance     scalar     Visual*     NORM     NORML         Odor     scalar     Visual*     NORM     NORML         Boron     ppm     ASTM D5185(m)     >192     1         Barium     ppm     ASTM D5185(m)     300         Magnese     ppm     ASTM D5185(m)	Water		WC Method	>0.1	NEG		
NitrationAbs/cmASTM D7624*>205.4SulfationAbs/1mmASTM D7415*>3018.1SiltscalarVisual*NONENONEDebrisscalarVisual*NONENONESand/DirtscalarVisual*NORNONEAppearancescalarVisual*NORMNORMLOdorscalarVisual*NORMNORMLOdorscalarVisual*NORMNORMLSodiumppmASTM D5185(m)>1921BoronppmASTM D5185(m)>1921MolybdenumppmASTM D5185(m)>100MaganeseppmASTM D5185(m)MagnesiumppmASTM D5185(m)37803394ZincppmASTM D5185(m)15001130SulfurppmASTM D5185(m)15001130NophorusppmASTM D5185(m)38007287MagnesiumppmASTM D5185(m)38007287CalciumppmASTM D5185(m)15001130SulfurppmASTM D5185(m)38007287 <th>Glycol</th> <th></th> <th>WC Method</th> <th></th> <th>NEG</th> <th></th> <th></th>	Glycol		WC Method		NEG		
Sulfation     Abs/.tmm     ASTM D7415*     >30     18.1         Silt     scalar     Visual*     NONE     NONE         Debris     scalar     Visual*     NONE     NONE         Sand/Dirt     scalar     Visual*     NONE     NONE         Appearance     scalar     Visual*     NORM     NORML         Odor     scalar     Visual*     NORM     NORML         Odor     scalar     Visual*     NORM     NORML         Sodium     ppm     ASTM D5185(m)     >192     1         Boron     ppm     ASTM D5185(m)     >192     30         Molybdenum     ppm     ASTM D5185(m)     14         Maganese     ppm     ASTM D5185(m)     3780     3394         Magnesium     ppm	Soot %	%	ASTM D7844*		0		
SiltscalarVisual*NONENONEDebrisscalarVisual*NONENONESand/DirtscalarVisual*NONENONEAppearancescalarVisual*NORMNORMLOdorscalarVisual*NORMNORMLOdorscalarVisual*NORMNORMLEmulsified WaterscalarVisual*NORMNORMLSodiumppmASTM D5185(m)>1921BoronppmASTM D5185(m)>1921BariumppmASTM D5185(m)0MolybdenumppmASTM D5185(m)14MaganeseppmASTM D5185(m)37803394PhosphorusppmASTM D5185(m)15001130ZincppmASTM D5185(m)15001130MufurppmASTM D5185(m)38007287	Nitration	Abs/cm	ASTM D7624*	>20	5.4		
DebrisscalarVisual*NONENONESand/DirtscalarVisual*NONENONEAppearancescalarVisual*NORMLNORMLOdorscalarVisual*NORMLNORMLOdorscalarVisual*NORMLNORMLEmulsified WaterscalarVisual*>0.1NEGSodiumppmASTM D5185(m)>1921BoronppmASTM D5185(m)300BariumppmASTM D5185(m)0MolybdenumppmASTM D5185(m)MagneseppmASTM D5185(m)MagnesiumppmASTM D5185(m)37803394PhosphorusppmASTM D5185(m)13701020ZincppmASTM D5185(m)15001130SulfurppmASTM D5185(m)38007287OxidationAbs/.1mmASTM D7414*>2512.1	Sulfation	Abs/.1mm	ASTM D7415*	>30	18.1		
Sand/DirtscalarVisual*NONENONEAppearancescalarVisual*NORMLNORMLOdorscalarVisual*NORMLNORMLEmulsified WaterscalarVisual*>0.1NEGSodiumppmASTM D5185(m)>1921BoronppmASTM D5185(m)>19210BariumppmASTM D5185(m)0MolybdenumppmASTM D5185(m)0ManganeseppmASTM D5185(m)MagnesiumppmASTM D5185(m)37803394PhosphorusppmASTM D5185(m)13701020ZincppmASTM D5185(m)15001130SulfurppmASTM D5185(m)38007287OxidationAbs/.1mmASTM D7414*>2512.1	Silt	scalar	Visual*	NONE	NONE		
Appearance     scalar     Visual*     NORML     NORML        Odor     scalar     Visual*     NORML     NORML         Emulsified Water     scalar     Visual*     >0.1     NEG         Sodium     ppm     ASTM D5185(m)     >192     1         Boron     ppm     ASTM D5185(m)     >192     30         Barium     ppm     ASTM D5185(m)      0         Molybdenum     ppm     ASTM D5185(m)      14         Magnesium     ppm     ASTM D5185(m)       <1        Calcium     ppm     ASTM D5185(m)     3780     3394         Phosphorus     ppm     ASTM D5185(m)     1370     1020         Zinc     ppm     ASTM D5185(m)     1500     1130    Sulfur     ppm     ASTM D51	Debris	scalar	Visual*	NONE	NONE		
OdorscalarVisual*NORMLNORRMLEmulsified WaterscalarVisual*>0.1NEGSodiumppmASTM D5185(m)>1921BoronppmASTM D5185(m)>192300BariumppmASTM D5185(m)<	Sand/Dirt	scalar	Visual*	NONE	NONE		
Emulsified Water     scalar     Visual*     >0.1     NEG        Sodium     ppm     ASTM D5185(m)     >192     1         Boron     ppm     ASTM D5185(m)     >192     1         Barium     ppm     ASTM D5185(m)     0         Molybdenum     ppm     ASTM D5185(m)     0         Maganese     ppm     ASTM D5185(m)      14         Magnesium     ppm     ASTM D5185(m)      <102         Calcium     ppm     ASTM D5185(m)     3780     3394         Phosphorus     ppm     ASTM D5185(m)     1370     1020         Zinc     ppm     ASTM D5185(m)     1500     1130         Sulfur     ppm     ASTM D5185(m)     3800     7287         Oxidation     Abs/.1mm     ASTM D7414* <t< th=""><th>Appearance</th><th>scalar</th><th>Visual*</th><th>NORML</th><th>NORML</th><th></th><th></th></t<>	Appearance	scalar	Visual*	NORML	NORML		
Sodium     ppm     ASTM D5185(m)     >192     1         Boron     ppm     ASTM D5185(m)     30         Barium     ppm     ASTM D5185(m)     0         Molybdenum     ppm     ASTM D5185(m)     0         Manganese     ppm     ASTM D5185(m)      114         Magnesium     ppm     ASTM D5185(m)      <102         Calcium     ppm     ASTM D5185(m)     3780     3394         Phosphorus     ppm     ASTM D5185(m)     1370     1020         Zinc     ppm     ASTM D5185(m)     1370     1020         Sulfur     ppm     ASTM D5185(m)     1500     1130         Sulfur     ppm     ASTM D5185(m)     3800     7287         Oxidation     Abs/.1mm     ASTM D7414'     >2	Odor	scalar	Visual*	NORML	NORML		
Boron     ppm     ASTM D5185(m)     30         Barium     ppm     ASTM D5185(m)     0         Molybdenum     ppm     ASTM D5185(m)     14         Manganese     ppm     ASTM D5185(m)     <1         Magnesium     ppm     ASTM D5185(m)     <102         Calcium     ppm     ASTM D5185(m)     3780     3394         Phosphorus     ppm     ASTM D5185(m)     1370     1020         Zinc     ppm     ASTM D5185(m)     1370     1130         Sulfur     ppm     ASTM D5185(m)     3800     7287         Oxidation     Abs/.1mm     ASTM D7414*     >25     12.1	Emulsified Water	scalar	Visual*	>0.1	NEG		
Boron     ppm     ASTM D5185(m)     30         Barium     ppm     ASTM D5185(m)     0         Molybdenum     ppm     ASTM D5185(m)     14         Manganese     ppm     ASTM D5185(m)     <1         Magnesium     ppm     ASTM D5185(m)     <102         Calcium     ppm     ASTM D5185(m)     3780     3394         Phosphorus     ppm     ASTM D5185(m)     1370     1020         Zinc     ppm     ASTM D5185(m)     1370     1130         Sulfur     ppm     ASTM D5185(m)     3800     7287         Oxidation     Abs/.1mm     ASTM D7414*     >25     12.1							
Barium     ppm     ASTM D5185(m)     0        Molybdenum     ppm     ASTM D5185(m)     14         Manganese     ppm     ASTM D5185(m)     <11				>192			
Molybdenum     ppm     ASTM D5185(m)     14        Manganese     ppm     ASTM D5185(m)     <1        Magnesium     ppm     ASTM D5185(m)     <102        Calcium     ppm     ASTM D5185(m)     3394        Phosphorus     ppm     ASTM D5185(m)     1020        Zinc     ppm     ASTM D5185(m)     1370     1020        Sulfur     ppm     ASTM D5185(m)     1370     1020        Qxidation     ASTM D5185(m)     1500     1130		ppm	1 I I I I I I I I I I I I I I I I I I I				
Manganese     ppm     ASTM D5185(m)     <1		ppm					
Magnesium     ppm     ASTM D5185(m)     102         Calcium     ppm     ASTM D5185(m)     3780     3394         Phosphorus     ppm     ASTM D5185(m)     1370     1020         Zinc     ppm     ASTM D5185(m)     1500     1130         Sulfur     ppm     ASTM D5185(m)     3800     7287         Oxidation     Abs/.1mm     ASTM D7414*     >25     12.1	•	ppm	ASTM D5185(m)		14		
Calcium     ppm     ASTM D5185(m)     3780     3394         Phosphorus     ppm     ASTM D5185(m)     1370     1020         Zinc     ppm     ASTM D5185(m)     1500     1130         Sulfur     ppm     ASTM D5185(m)     3800     7287         Oxidation     Abs/.1mm     ASTM D7414*     >25     12.1		ppm	ASTM D5185(m)				
Phosphorus     ppm     ASTM D5185(m)     1370     1020         Zinc     ppm     ASTM D5185(m)     1500     1130         Sulfur     ppm     ASTM D5185(m)     3800     7287         Oxidation     Abs/.1mm     ASTM D7414*     >25     12.1	Magnesium	ppm	ASTM D5185(m)		102		
Zinc     ppm     ASTM D5185(m)     1500     1130         Sulfur     ppm     ASTM D5185(m)     3800     7287         Oxidation     Abs/.1mm     ASTM D7414*     >25     12.1	Calcium	ppm	ASTM D5185(m)	3780	3394		
Sulfur     ppm     ASTM D5185(m)     3800     7287         Oxidation     Abs/.1mm     ASTM D7414*     >25     12.1	Phosphorus	ppm	ASTM D5185(m)	1370	1020		
Oxidation Abs/.1mm ASTM D7414* >25 12.1	Zinc	ppm	ASTM D5185(m)	1500	1130		
	Sulfur	ppm	ASTM D5185(m)	3800	7287		
Visc@100°C cSt ASTM D7279(m) 15.4 🔺 12.4 /	Oxidation	Abs/.1mm	ASTM D7414*	>25	12.1		
	Visc @ 100°C	cSt	ASTM D7279(m)	15.4	🔺 12.4 🌙		



