

A horizontal band with a wood grain texture, showing various shades of brown and tan, positioned between the top blue header and the yellow title band.

Experience with After Treatment Technologies at Newmont USA Limited

Leeville Complex Carlin Nevada

Troy Terrillion
Leeville Mobile Maintenance

WHAT EXPERIENCE HAS TAUGHT US

1. EBMP is essential for DPM compliance.
2. There is no “Silver Bullet” to DPM reduction.
3. Must have corporate “buy in” for success.
4. Maintenance must be key stakeholder.
5. Temperature profiling
6. Keep good records(IE duty cycle, design, material)
7. Use available resources (Data,MSHA, NIOSH)
8. Attending conferences beneficial
9. Use quality components for measurements. (ECOM)
- 10.CJ4 Oil requirement

2006

ECS Passive and Active DPF

- Ceramic Monolith Wallflow
- Engineering Dept. main stake holder
- No EBMP
- Installation- 4 and 6 yard Loaders
- High overall expense (Oven, regen station on equipment, DPF's)
- Required removal and lengthy regeneration process for passive filters (12hr)
- Active filters required plug in and down time to regenerate
- No CO reduction, requiring additional DOC
- No NO2 suppressant
- No operator and mechanic training at time of installation
- No BP monitoring device
- Required dampening on mounting or failure could result
- 85%-95% efficiency on PM reduction

ULD021

Elphinstone 1300 W/906 Mercedes

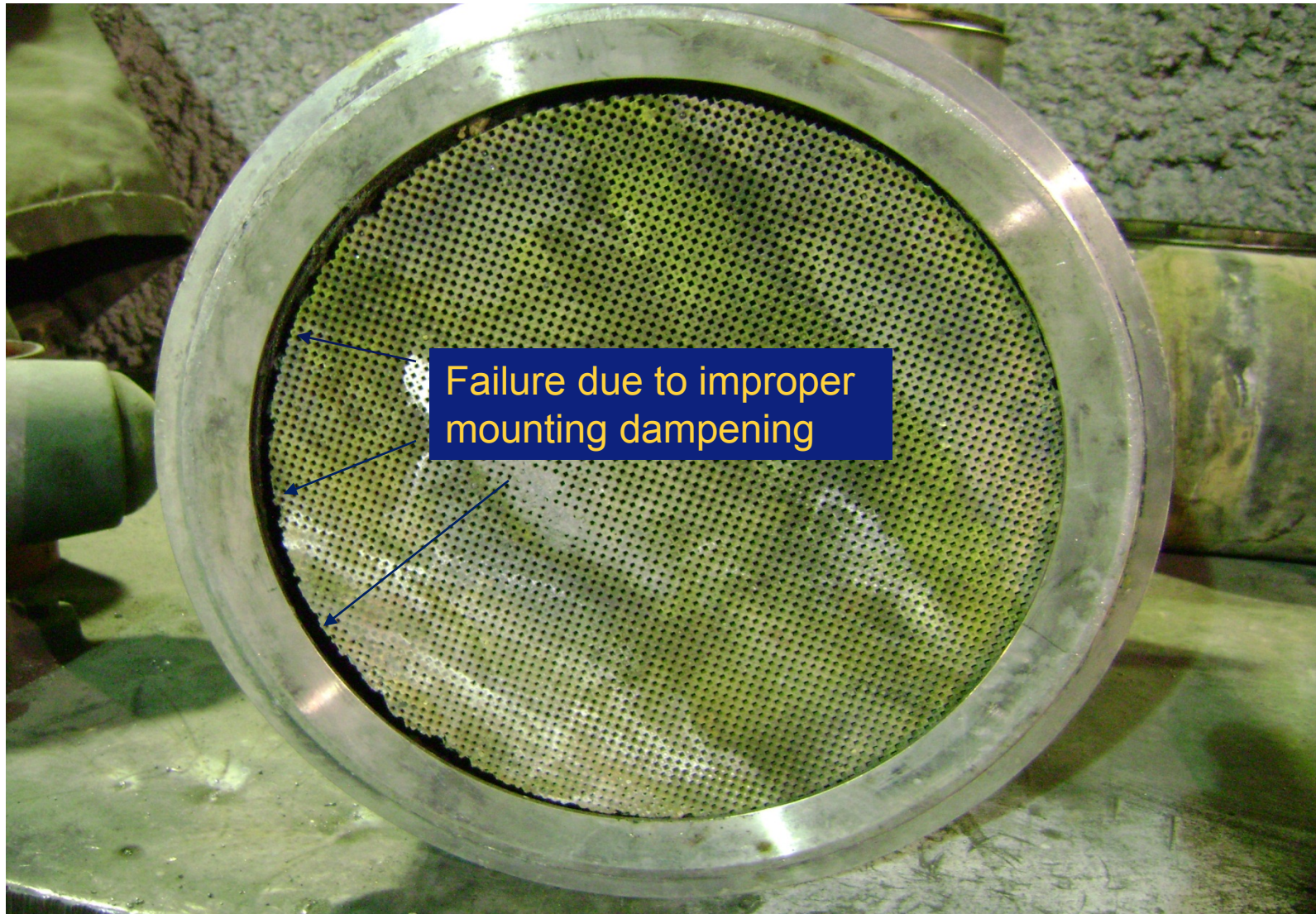


Clean Emissions
DOC

Old DPF Regeneration Station



SUBSTRATE FAILURES



DPF
Uncontrolled
regeneration



Early 2008

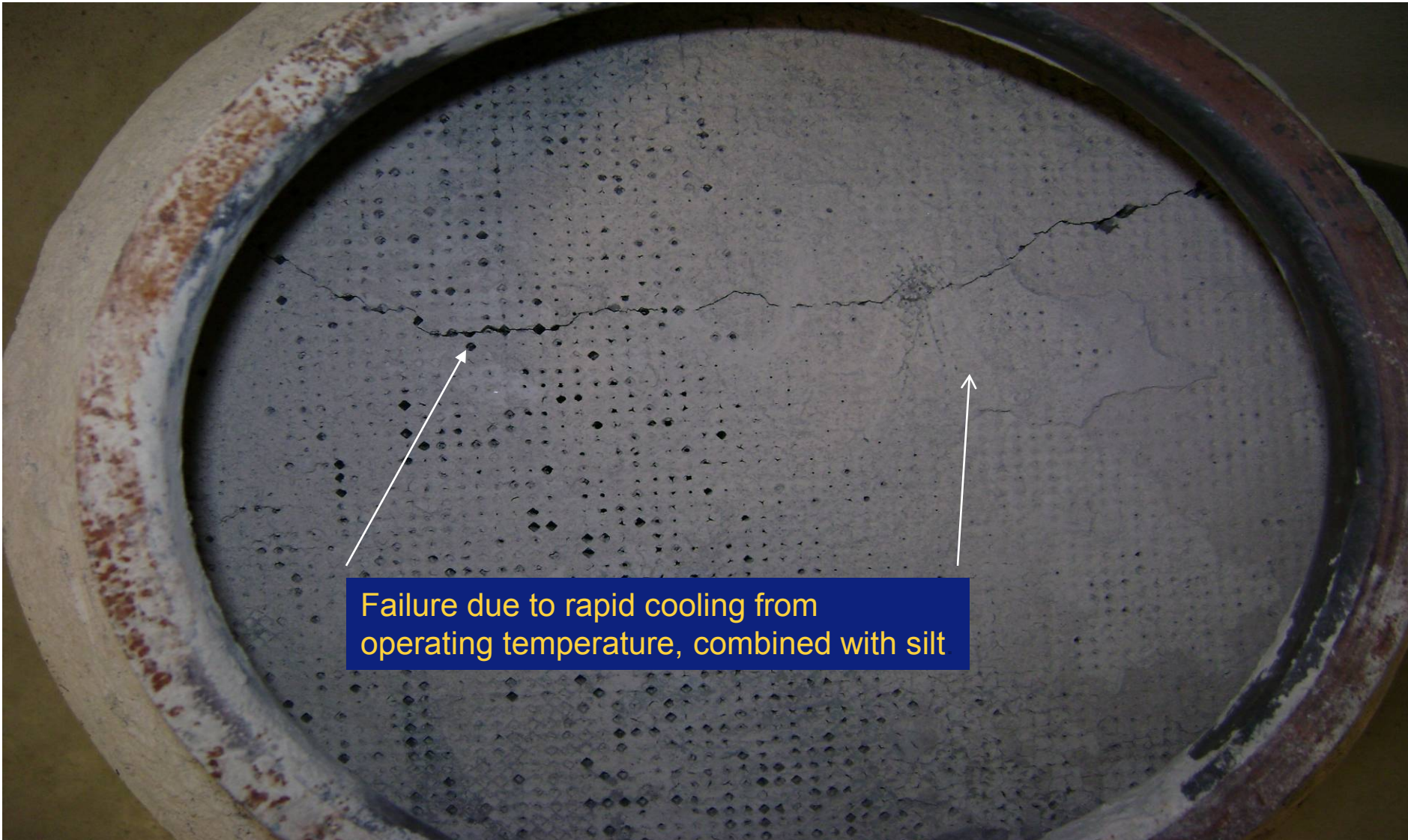
NETT “S” Series Passive DPF

- Cordierite Monolith Wallflow with proprietary coating
- Engineering Dept. main stake holder
- No EBMP
- Operator and Mechanic Training was initiated (still lacking in completion)
- Initial installation- 6 yard Loaders
- Moderate expense
- Low NO₂ (Proprietary metal catalyst)
- No additive
- Shorter “Baking” intervals than previously encountered
- Operator interaction via BP monitor
- High DPM efficiency (95+%)
- Not compatible with B50 initially thought (ash,soot,phosphorous)

ULD047



Atlas Copco ST1020 W/50 Series Detroit



Failure due to rapid cooling from operating temperature, combined with silt.

ULD “Snorkel” exhaust



ULD “Snorkel” exhaust



UHT064

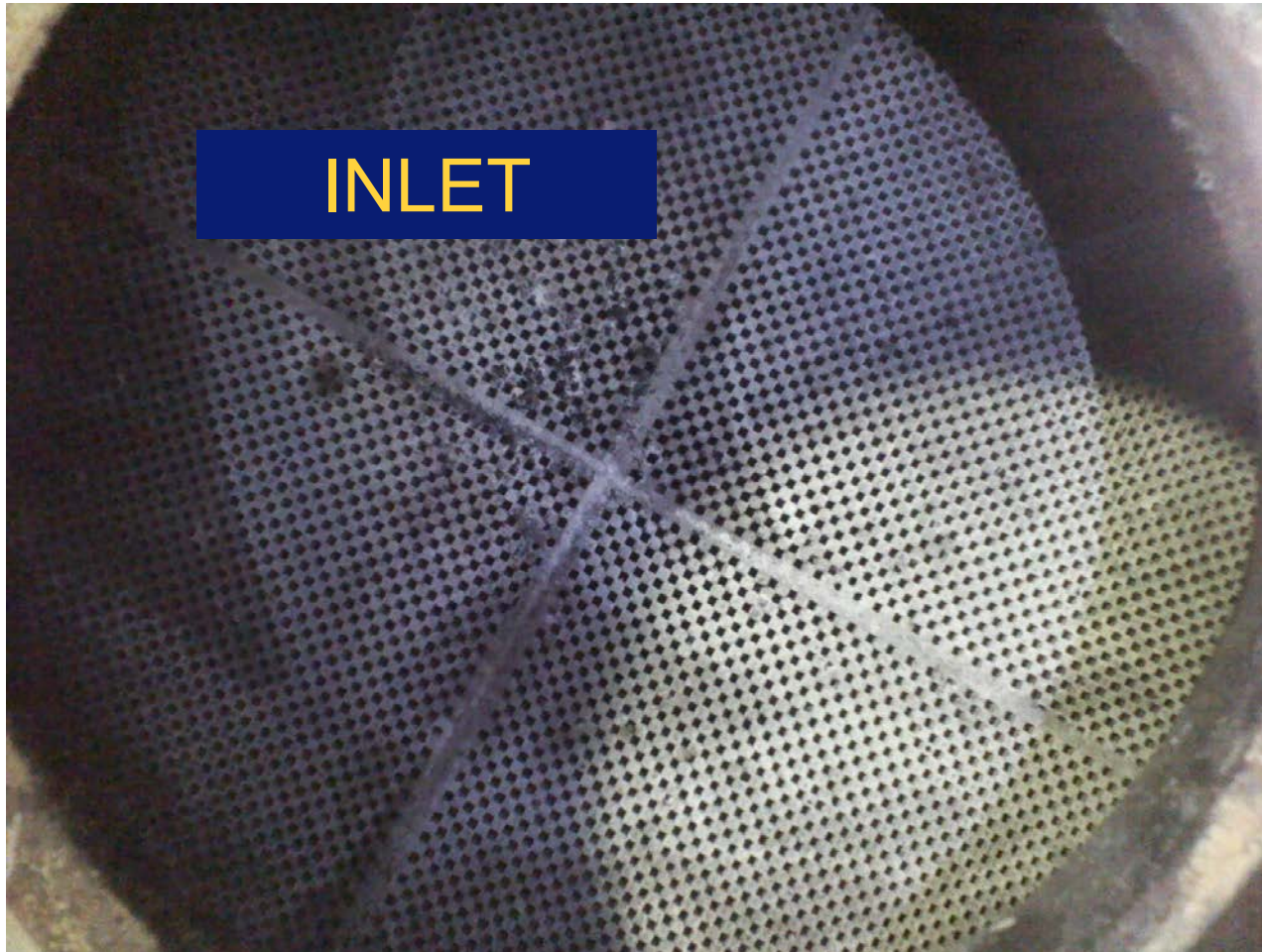


EJC 30SX W/ 50 Series Detroit

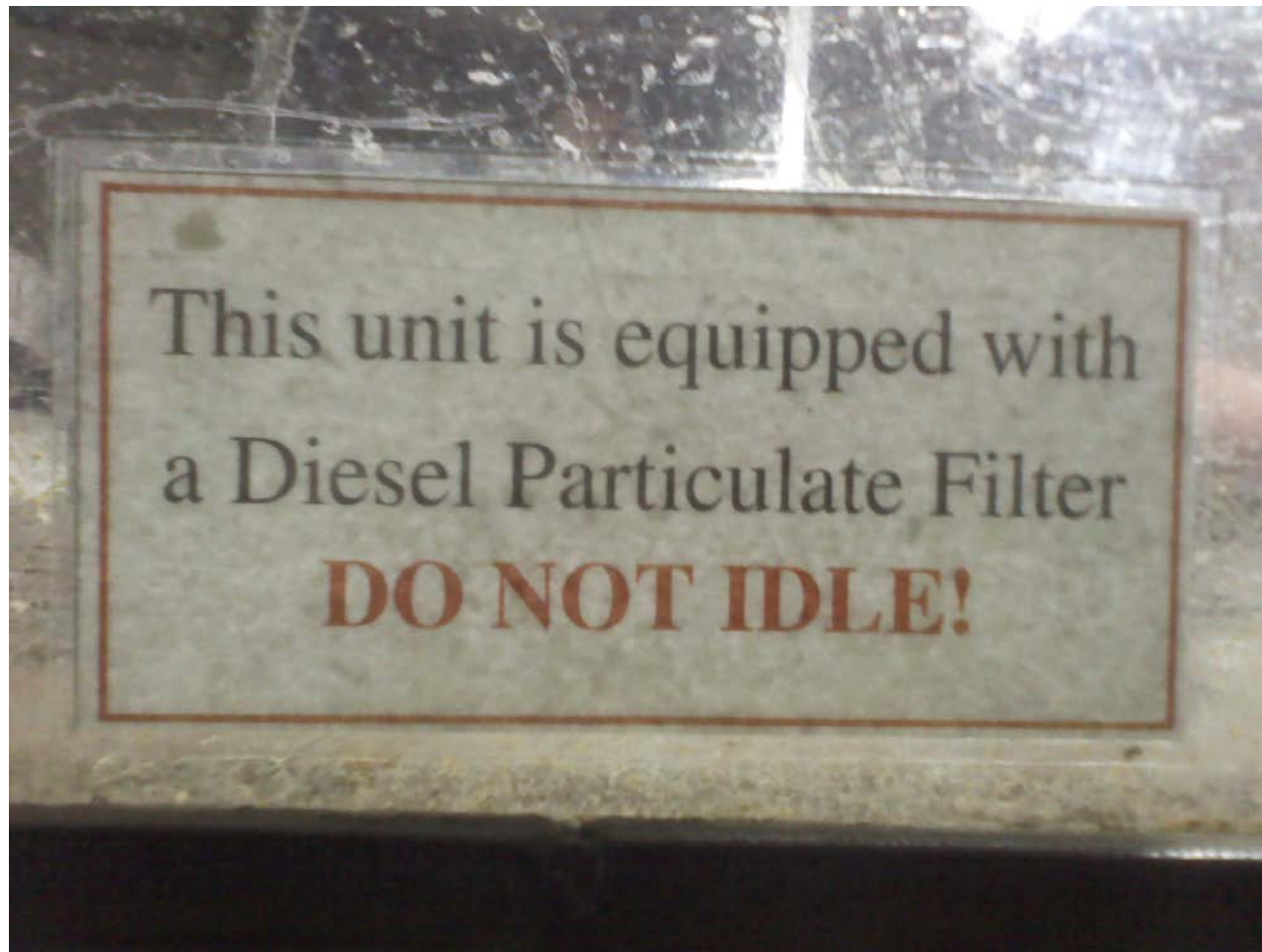
Equipment Emissions Data										
DOC/DPF		DPF								
Mine:		Leeville								
Unit Number:		UHT064								
Unit Type, Mfg. & Model; Engine Mfg., Model, Hp.:		EJC30 SX Sandvik Mining Company Detroit Diesel 50 Series 315HP								
DOC Mfg., Model, Exhaust Diameter:		NETT S-series DPF Passive Filter SN1500-5								
Exhaust Analyzer Make & Model:		ECOM AC			ECOM AC					
Date:		08/18/11			11/18/11					
Location		DETB			DETB					
Time										
Hour Meter Reading:		DDEC 7591			DDEC 3431					
Hour Meter When DOC/DPF installed		DDEC 4543			DDEC 3361					
Cumul hours on DOC/DPF		3,058			70					
		Pre DOC	Post DOC	% Change	Pre DOC	Post DOC	% Change	Pre DOC	Post DOC	% Change
Boost Pressure		31.9			31.9					
TPS Counts										
Fuel Pressure										
Cut out Test										
No cutout pulse										
1-4 Pulse Width										
1										
2										
3										
4										
Response Times										
1										
2										
3										
4										
Rated RPM										
RPM Stall Speed		1728			1,720					
Fault Y/N										
Fuel Temperature		117			106					
Coolant Temperature		189			188					
Oil Temperature		176			180					
Air Temperature		104			110					
High Idle Torque Stall										
Temp. Air		88.0	83.0		75.0	76.0				
Temp Gas		842.0	639.0		818.0	689.0				
O ₂ %		8.8	9.1		9.5	9.3				
CO ppm		67.0	9.0	-87	179.0	15.0	-92			
NO ppm		594.0	495.0	-17	674.0	646.0	-4			
NO ₂ ppm		15.0	18.0	20	55.0	41.0	-25			
NOx ppm		609.0	513.0	-16	729.0	687.0	-6			
CO ₂ %		8.9			8.4	8.6				
Operator Noise Db										
Smoke No.		4.5	0	-100	6	0	-100			
Back Pres. In. W.G.		20.0			20.0					
Gear		3			3					

UHT064- DPF changed out during Mid-life on 11-11-11.

NETT DPF W/ Over 4000hrs



Window Placards



2009

DCL “F series” Ultra Flow-Through Passive DPF

- Metallic substrate trapezoidal duct and metal fiber fleece
- Installation- Utility Equipment w/ 904 Mercedes (174hp)
- Moderate expense
- No NO₂ suppressant
- No operator interaction
- No additive required
- No BP monitor
- No special dampening required
- “Fit and forget it”
- Limited PM reduction (20%)
- Low BP
- Increase of NO₂ after “de-greening”

UMB008

Normet Utimec W/904
Mercedes



Equipment Emissions Data									
DOC/DPF	DCL Ultra			DCL Ultra					
Mine:	Leeville			Leeville					
Unit Number:	UMB008			UMB008					
Unit Type, Mfg. & Model; Engine Mfg., Model, Hp.:	Normet Utimec Mercedes 904 174 HP								
DOC Mfg., Model, Exhaust Diameter:	DCL Ultra 3 "								
Exhaust Analyzer Make & Model:	Enerac 500			Enerac 500					
Date:	06/30/09			07/28/09					
Location	DDS 12			DDS 12					
Oil Change									
Hour Meter Reading:	1,051			1,181					
Hour Meter When DOC/DPF installed	Installation date 4/13/09 /								
Cumul hours on DOC/DPF				130 To date as known					
	Pre Test	Post Test	% Change	Pre Test	Post Test	% Change	Pre Test	Post Test	% Change
Boost Pressure				2318MB					
Rated RPM		2,300		2,300	2,300				
RPM Stall Speed		2,200	#DIV/0!	2,220	2,100	-5			
Fault Y/N									
High Idle Torque Stall									
Temp. Air	72.0	71.0		82.0	72.0				
Temp Gas	792.0	467.0		806.0	487.0				
O ₂ %	7.8	7.6	-3	7.8	7.7	-1			
CO ppm	154.0	0.0	-100	150.0	0.0	-100			
NO ppm	543.0	514.0	-5	554.0	446.0	-19			
NO ₂ ppm	7.0	61.0	771	9.0	101.0	1,022			
NOx ppm	550.0	576.0	5	564.0	548.0	-3			
CO ₂ %	9.7	9.9	2	9.7	9.8	1			
Operator Noise Db									
Smoke No.	5.5	4	-27	4.5	4	-11			
Back Pres. In. W.G.	10.0	0.0		19.0	0.0				
Gear	3	3		3	3				
UMB008- Installation as indicated.									
Unit was tested using dual Enerac units simultaneoulsy.									

ULD045



Flow-Through Filter failure due to mud
and silt plugging substrate.

Early 2010

Mann+Hummel SMF-AR DPF

- Sintered Metal Filter with Automatic Regeneration
- Installation- Haulage truck
- High upfront expense
- Requires minimal operator interaction
- Requires additive (\$125.00 gal)
- No increase in NO₂
- On board electrical regeneration via systems electrical coil
- Easy ash cleaning (pressure wash)
- Solid Construction
- Own Control Module for system monitoring and operation
- High DPM reduction (99%)

UHT055

DCL DOC

Mann+Hummel DPF

Mercedes 926 322HP



Equipment Emissions Data										
DOC/DPF		DPF			DPF			DPF		
Mine:		Leeville			Leeville			Leeville		
Unit Number:		UHT055			UHT055			UHT055		
Unit Type, Mfg. & Model; Engine Mfg., Model, Hp.:										
DOC Mfg., Model, Exhaust Diameter:										
Exhaust Analyzer Make & Model:		Enerac			ECOM AC			ECOM AC		
Date:		05/06/10			05/19/10			05/27/10		
Location		Surface Shop			Emissions Bay			Emissions Bay		
Time										
Hour Meter Reading:		6 PLD								
Hour Meter When DOC/DPF installed		1 PLD								
Cumul hours on DOC/DPF		5								
		Pre DPF	Post DPF	% Change	Pre DPF	Post DPF	% Change	Pre DPF	Post DPF	% Change
Boost Pressure		2520.0			2580.0					
TPS Counts										
Fuel Pressure										
Cut out Test										
No cutout pulse										
1-4 Pulse Width										
1										
2										
3										
4										
Response Times										
1										
2										
3										
4										
Rated RPM										
RPM Stall Speed		1750			1,785					
Fault Y/N										
High Idle Torque Stall										
Temp. Air		66.0	67.0		69.0	71.0		67.0		
Temp Gas		712.0	753.0		782.0	690.0		885.0		
O ₂ %		8.0	8.1		7.6	7.3		7.2		
CO ppm		334.0	104.0	-69	528.0	229.0	-57	656.0		
NO ppm		716.0	726.0	1	679.0	721.0	6	726.0		
NO ₂ ppm		29.0	21.0	-28	42.0	16.0	-62	26.0		
NOx ppm		746.0	748.0	0	721.0	737.0	2	752.0		
CO ₂ %		9.6	9.5		9.8	10.0		10.1		
Operator Noise Db										
Smoke No.		5	0	-100	6.5	0	-100	6		
Back Pres. In. W.G.		32.0			38.0			42.0		
Gear		3								

Mid 2010

AirFlow Catalyst EZCat

- Ceramic Monolith w/ Proprietary Coating
- Installation- Light, medium and heavy duty application
- Moderate to high expense (Depending upon application)
- No operator interaction
- No additive
- Made in USA (Rochester NY)
- Passive regeneration requiring no external cooking (unless severely loaded)
- Wrapping assists in regeneration in lower HP applications
- High DPM efficiency (97%)
- Easy installation
- Low BP
- Increase in NO₂

UHT056

The "Twins"

EJC 30SX W/926 Mercedes

EXHAUST EMISSION DATA										
DOC/DPF		DPF								
Mine:		Leeville								
Unit Number:		UHT056								
Unit Type, Mfg. & Model; Engine Mfg., Model, Hp.:		EJC 30SX Haulage Truck 926 Mercedes 322 HP								
DPF Mfg., Model, Exhaust Diameter:		Airflow EZCat 4" exhaust								
Exhaust Analyzer Make & Model:		ECOM AC			ECOM EN2			ECOM AC		
Date:		12/07/10			02/10/11			03/09/11		
Location		Emissions Bay			Emissions Bay			Emissions Bay		
Time										
Hour Meter Reading:		2,306 PLD			PLD 2983			PLD 3204		
Hour Meter When DOC/DPF installed		811 PLD			811			811		
Cumul hours on DOC/DPF		1,495			2,172			2,493		
		Pre DPF	Post DPF	% Change	Pre Test	Post Test	% Change	Pre Test	Post Test	% Change
Boost Pressure		2250.0			2650.0			2640.0		
TPS Counts										
Fuel Pressure										
Cut out Test										
No cutout pulse										
1-4 Pulse Width										
1										
2										
3										
4										
Response Times										
RPM		2,100			1,790			1,785		
Fault Y/N										
Fuel Temperature					56			34		
Coolant Temperature					85			81		
Oil Temperature					93			75		
Air Temperature					49			34		
High Idle Torque Stall										
Temp. Air		75.0	77.0		83.0	85.0		70.0	70.0	
Temp Gas		800.0	643.0		819.0	673.0		832.0	489.0	
O ₂ %		7.7	7.4	-4	7.3	7.0		7.9	7.8	
CO ppm		279.0	2.0	-99	375.0	2.0	-99	326.0	3.0	-99
NO ppm		579.0	181.0	-69	656.0	335.0	-49	664.0	317.0	-52
NO ₂ ppm		30.0	231.0	670	30.0	316.0	953	28.0	253.0	804
NOx ppm		609.0	412.0	-32	686.0	651.0	-5	692.0	570.0	-18
CO ₂ %		9.8	10.0	2	10.0	10.3		9.6	9.7	
Operator Noise Db										
Smoke No.		6.5	0	-100	6	0	-100	7.5	0	-100
Back Pres. In. W.G.		23.0			35.0			38.0		
Gear		3			3			3		

ULT007



Normet W/904 Mercedes

EXHAUST EMISSION DATA

DOC/DPF	DPF								
Mine:	Leeville								
Unit Number:	ULT007								
Unit Type, Mfg. & Model; Engine Mfg., Model, Hp.:	Normet Utimec 904 Mercedes 174 HP								
DPF Mfg., Model, Exhaust Diameter:	Airflow EZCat Serial #10101 4" exhaust								

Exhaust Analyzer Make & Model:	ECOM AC			ECOM EN2			ECOM AC		
Date:	10/27/10			12/08/10			06/28/11		
Location	Emissions Bay			Emissions Bay			Emissions Bay		
Time									
Hour Meter Reading:	9763 PLD			10,162			PLD 11442		
Hour Meter When DOC/DPF installed	8869 PLD			8,869			PLD 8869		
Cumul hours on DOC/DPF	894			1,293			2,573		
	Pre DPF	Post DPF	% Change	Pre DPF	Post DPF	% Change	Pre DPF	Post DPF	% Change
Boost Pressure	2250.0			2400.0			2460.0		
TPS Counts									
Fuel Pressure									
Cut out Test									
No cutout pulse									
1-4 Pulse Width									
	1								
	2								
	3								
	4								
Response Times									
RPM	2,100			2,130			2095		
Fault Y/N									
Fuel Temperature				53			45		
Coolant Temperature				87			88		
Oil Temperature				100			99		
Air Temperature				65			72		
High Idle Torque Stall									
Temp. Air	66.0	66.0		73.0	72.0		84.0	81.0	
Temp Gas	824.0	609.0		803.0	668.0		832.0	677.0	
O ₂ %	12.1	11.8	-2	9.5	9.3	-2	8.5	8.4	
CO ppm	157.0	1.0	-99	136.0	0.0	-100	187.0	2.0	-99
NO ppm	537.0	242.0	-55	568.0	332.0	-42	388.0	244.0	-37
NO ₂ ppm	27.0	404.0	1,396	31.0	253.0	716	19.0	219.0	1,053
NOx ppm	564.0	646.0	15	599.0	585.0	-2	407.0	463.0	14
CO ₂ %	6.5	6.7	3	8.4	8.6	2	9.2	9.2	0
Operator Noise Db									
Smoke No.	6.5	0	-100	6	0	-100	7	0	-100
Back Pres. In. W.G.	22.0						52.0		
Gear	3			3			3		

DCL “Low NO₂” Passive DPF

- Cordierite Monolith with Proprietary Coating
- Installation- Haulage truck
- Moderate expense
- Requires minimal operator interaction/via BP monitoring
- Passive Regeneration with level 1 cleaning (depending upon application and temperature)
- Low NO₂
- Low NO_x
- Easy installation (Depending upon applications)
- No additive needed
- High PM efficiency (90+%)
- Low BP

2011-12



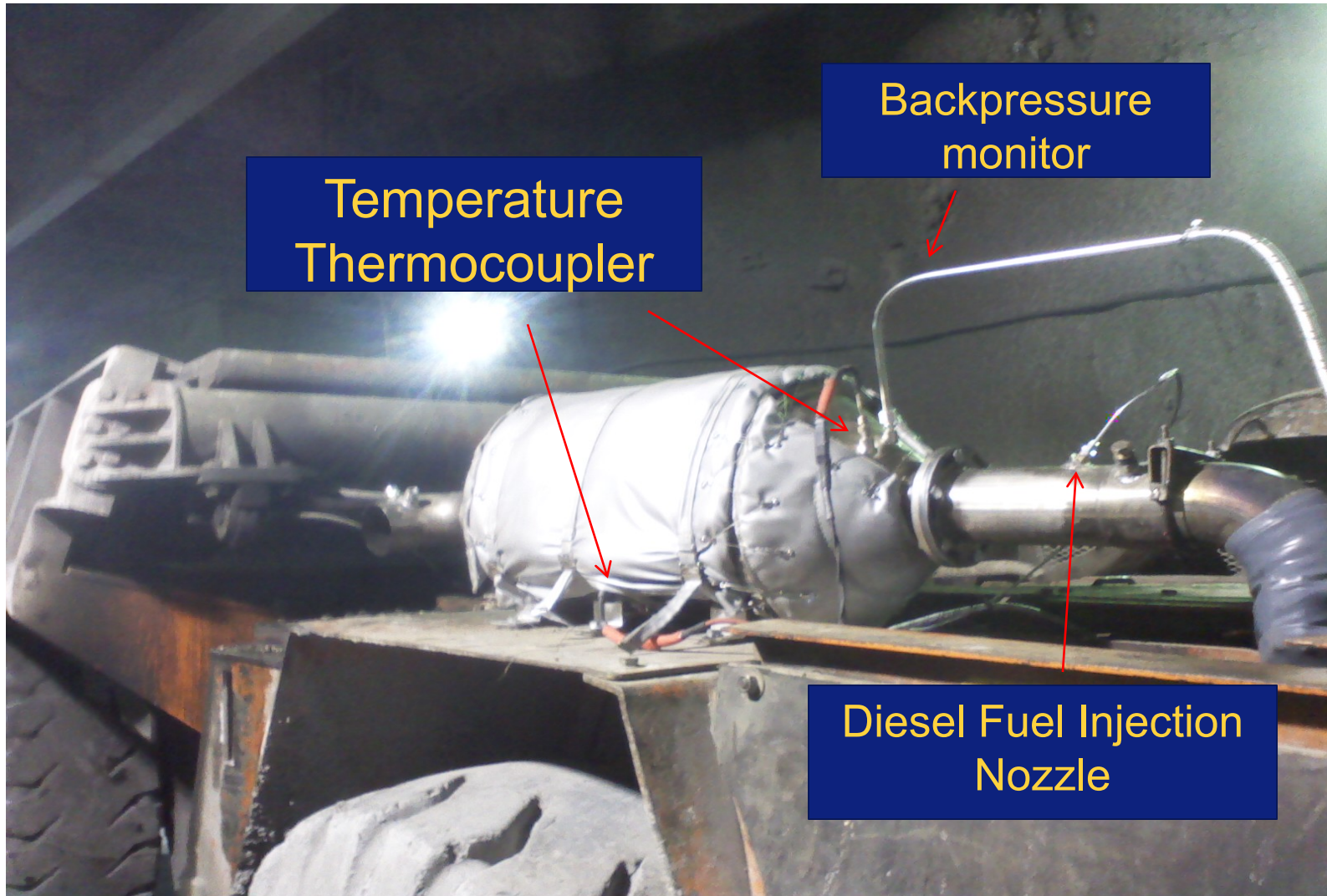
EJC 30SX W/926 Mercedes

Equipment Emissions Data										
DOC/DPF										
Mine:		DPF								
Unit Number:		Leeville								
Unit Type, Mfg. & Model; Engine Mfg., Model, Hp.:		UHT056								
DOC Mfg., Model, Exhaust Diameter:		EJC30 SX Sandvik Mining Company Detroit Diesel 50 Series 315HP								
		DCL Low NO2 DPF 959P-SA-5425-21 5" Exhaust								
Exhaust Analyzer Make & Model:		ECOM AC			ECOM AC			ECOM AC		
Date:		05/26/11			07/12/11			01/17/12		
Location		Emissions Bay			DET8			DET8		
Time										
Hour Meter Reading:		MR2 4237			4885 MR2			7716 MR2		
Hour Meter When DOC/DPF Installed		3,556			3556 MR2			3556 MR2		
Cumul hours on DOC/DPF		681			1,329			4,160		
		Pre DPF	Post DPF	% Change	Pre DPF	Post DPF	% Change	Pre DPF	Post DPF	% Change
Boost Pressure		2625.0			2650.0			2700.0		
TPS Counts										
Fuel Pressure										
Cut out Test										
No cutout pulse										
1-4 Pulse Width										
1										
2										
3										
4										
Response Times										
1										
2										
3										
4										
Rated RPM										
RPM Stall Speed		1785			1775			1720		
Fault Y/N										
Fuel Temperature		56			61			83		
Coolant Temperature		88			86			58		
Oil Temperature		99			87			38		
Air Temperature		48			50					
High Idle Torque Stall										
Temp. Air		74.0	75.0		84.0	85.0		67.0	68.0	
Temp Gas		896.0	813.0		885.0	792.0		746.0	652.0	
O ₂ %		7.1	7.0		7.1	6.9		8.5	8.3	
CO ppm		470.0	72.0	-85	447.0	93.0	-79	320.0	78.0	-76
NO ppm		648.0	652.0	1	646.0	644.0	0	958.0	966.0	1
NO ₂ ppm		20.0	10.0	-50	18.0	7.0	-61	79.0	132.0	67
NOx ppm		668.0	662.0	-1	664.0	651.0	-2	1037.0	1098.0	6
CO ₂ %		10.2	10.3		10.2	10.3	1	9.2	9.3	1
Operator Noise Db										
Smoke No.		7	0	-100	6	0		5	0	-100
Back Pres. In. W.G.		20.0			22.0			22.0		
Gear		3			3			3		

Puri Tech DAS DBS

- Silicone Carbide Wall flow with Proprietary Coating
- Installation- Haulage Truck
- Moderate Expense
- Passive/Active system with Selective Diesel Fuel Injection.
- Regeneration (Active/Passive) depending upon unit, BP and Duty Cycle.
- Minimal operator input (BP monitor)
- NO2 Slip
- Low Nox
- High CO reduction
- Easy installation (Although lengthy) Size is relatively small for HP
- No additional additive needed
- High PM efficiency (99%)
- Low BP

UHT051

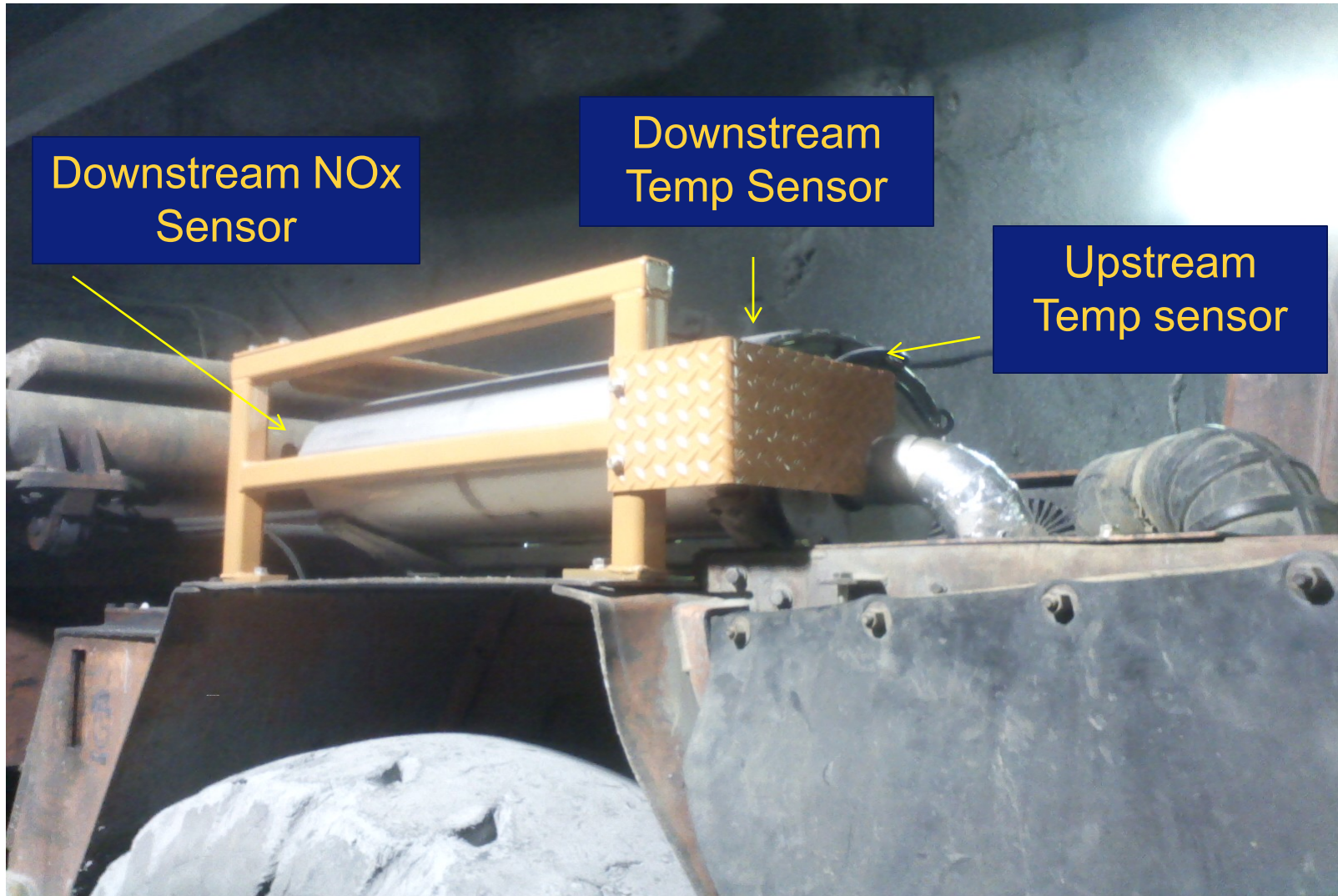


Equipment Emissions Data									
DOC/DPF	DPF								
Mine:	Leeville								
Unit Number:	UHT051								
Unit Type, Mfg. & Model; Engine Mfg., Model, Hp.:	EJC 30SX Sandvik 926 Tier III Mercedes 322 HP								
DOC Mfg., Model, Exhaust Diameter:	Puri Tech DBS Fuel Catalyst 13" Serial # 73861.7.1.0.3.1.2.0.0311								
Exhaust Analyzer Make & Model:	ECOM AC	ECOM EN2		ECOM EN	ECOM AC		ECOM AC		
Date:	06/08/11			09/26/11			03/19/12		
Location	Emissions Bay			DET B			DET B		
Hour Meter Reading:	3589 MR2			4709 MR2			6664 MR2		
Hour Meter When DOC/DPF installed	3257 MR2			3257 MR2			3257 MR2		
Cumul hours on DOC/DPF	332			1,452			3,407		
	Pre DPF	Post DPF	% Change	Pre Test	Post Test	% Change	Pre Test	Post Test	% Change
Boost Pressure	2430.0		-100	2680.0		-100			#DIV/0!
TPS Counts									
Fuel Pressure									
Cut out Test									
No cutout pulse									
1-4 Pulse Width									
1									
2									
3									
4									
Response Times									
1									
2									
3									
4									
Rated RPM									
RPM Stall Speed	1,755		-100	1768		-100			#DIV/0!
Fault Y/N									
Fuel Temperature				56					
Coolant Temperature				83					
Oil Temperature				95					
Air Temperature				59					
High Idle Torque Stall									
Temp. Air	74.0	87.0		87.0	81.0		63.0	64.0	
Temp Gas	911.0	787.0		865.0	746.0		805.0	699.0	
O ₂ %	6.9	7.0	1	7.8	7.9		7.9	8.1	
CO ppm	582.0	3.0	-99	414.0	2.0	-100	477.0	2.0	-100
NO ppm	557.0	480.0	-14	780.0	464.0	-41	766.0	596.0	-22
NO ₂ ppm	16.0	80.0	400	11.0	104.0	845	59.0	404.0	585
NOx ppm	573.0	560.0	-2	791.0	568.0	-28	825.0	1000.0	21
CO ₂ %	10.3	10.3	0	9.7	9.6		9.6	9.5	-1
Operator Noise Db									
Smoke No.	7	0	-100	6	0	-100	5.5		-100
Back Pres. In. W.G.	30.0			30.0			32.0		
Gear	3			3			3		

Mercedes T4i with SCR

- Mercedes Benz OM926LA EU3b-T4i
- Engine family BMBXL07.2RJB
- 7.2 Liter 322 HP
- Non EGR/ All controls are internal
- Tier 2 application
- No particulate filter
- Low G/HR
- SCR system has its own integrated control module that communicates through CAN bus with engine MR2 to control sequence of events.
- Will not dose if catalyst is below 200 degrees C.
- If Nox is above set limit, post catalyst, engine will de-rate.
- DEF consumption rate varies 3%-11%. (Depending on duty cycle/ Engine performance)
- Non toxic
- Comprised of 32.7% synthetic Urea/ 67.3% water

SCR Catalyst

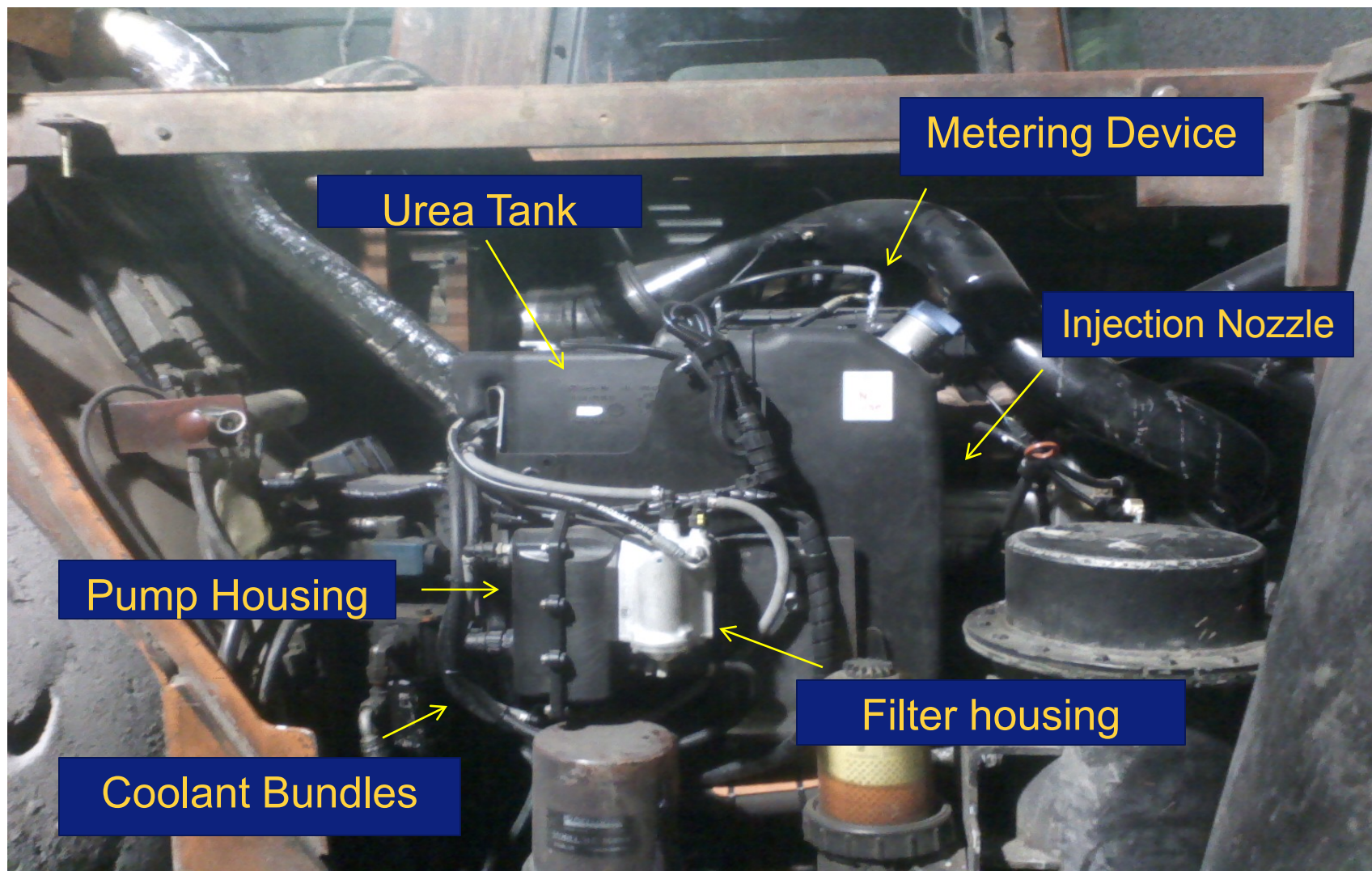


Downstream NOx
Sensor

Downstream
Temp Sensor

Upstream
Temp sensor

UHT059



Mercedes T4i w/SCR

Equipment Emissions Data										
DOC/DPF		SCR								
Mine:		Leeville								
Unit Number:		UHT059								
Unit Type, Mfg. & Model; Engine Mfg., Model, Hp.:		Tamrock EJC 30sx W/Mercedes 926 T4i w/SCR 322 HP								
DOC Mfg., Model, Exhaust Diameter:		SCR Mercedes 4" Exhaust								
Exhaust Analyzer Make & Model:		ECOM AC			ECOM AC			ECOM AC		
Date:		02/24/11			03/10/11			04/28/11		
Location		Emissions Bay			Emissions Bay			Emissions Bay		
Oil Change										
Hour Meter Reading:					101 MR2			631 MR2		
Hour Meter When DOC/DPF installed		3.3 PLD			1 MR2			1 MR2		
Cumul hours on DOC/DPF					100			630		
		Pre SCR	Post SCR	% Change	Pre SCR	Post SCR	% Change	Pre SCR	Post SCR	% Change
Boost Pressure		37lbs		#VALUE!	37lbs		#VALUE!	36lbs		#VALUE!
TPS Counts										
Fuel Pressure		62.0								
Cut out Test										
No cutout pulse										
1-4 Pulse Width										
1										
2										
3										
4										
Response Times										
1										
2										
3										
4										
RPM Stall Speed		1,845			1855.0			1855.0		
Rated RPM										
Fuel Temperature		100 F			87.0			134.0		
Coolant Temperature		177 F			186.0			190.0		
Oil Temperature		181.0			190.0			184.0		
Air Temperature		95.0			92.0			120.0		
High Idle Torque Stall										
Temp. Air		69.0	68.0		74.0	74.0		72.0	74.0	
Temp Gas		950.0	688.0		959.0	722.0		963.0	770.0	
O ₂ %		6.7	6.9	3	6.4	6.2		6.3	5.4	
CO ppm		102.0	10.0	-90	118.0	14.0	-88	116.0	24.0	-79
NO ppm		1040.0	88.0	-92	1069.0	101.0	-91	1145.0	112.0	-90
NO ₂ ppm		35.0	5.0	-86	31.0	8.0	-74	22.0	5.0	-77
NOx ppm		1075.0	93.0	-91	1100.0	109.0	-90	1167.0	117.0	-90
CO ₂ %		10.5	10.3	-2	10.7	10.9	2	10.8	11.4	
Operator Noise Db										
Smoke No.		4	3	-25	2.5	2.5	0	5	3.5	-30
Back Pres. In. W.G.			0.0							
Gear		3	3		3	3				

UHT059- Readings before and after SCR system. After run time of 100 hours, will re-sample emissions.

DOC



Airflow MinNo Cat



Equipment Emissions Data										
DOC/DPF		DPF								
Mine:		Leeville								
Unit Number:		UHT057								
Unit Type, Mfg. & Model; Engine Mfg., Model, Hp.:		EJC 30 SX Sandvik Ramp Rabbit Detroit 50 Series 315 HP								
DOC Mfg., Model, Exhaust Diameter:		AirFlow MinNo Cat. M# M15ZS12OZP5P5 S# 10293								
Exhaust Analyzer Make & Model:		ECOM AC			ECOM AC					
Date:		01/25/12			03/19/12					
Location		DET B			DET B					
Time										
Hour Meter Reading:		22143 DDEC			22822 DDEC					
Hour Meter When DOC/DPF installed		SAME			22143 DDEC					
Cumul hours on DOC/DPF		0			679					
		Pre DPF	Post DPF	% Change	Pre DPF	Post DPF	% Change	Pre Test	Post Test	% Change
Boost Pressure		31.9			31.9					
TPS Counts										
Fuel Pressure										
Cut out Test										
No cutout pulse										
1-4 Pulse Width										
1										
2										
3										
4										
Response Times										
1										
2										
3										
4										
Rated RPM										
RPM Stall Speed		1690			1,690					
Fault Y/N										
Fuel Temperature		77			134					
Coolant Temperature		180			187					
Oil Temperature		160			179					
Air Temperature		88			112					
High Idle Torque Stall										
Temp. Air		68.0	69.0		66.0	66.0				
Temp Gas		832.0	695.0		953.0	734.0				
O ₂ %		9.0	8.8		7.9	7.9				
CO ppm		76.0	10.0	-87	140.0	8.0	-94			
NO ppm		705.0	696.0	-1	892.0	840.0	-6			
NO ₂ ppm		41.0	61.0	49	47.0	142.0	202			
NOx ppm		746.0	757.0	1	939.0	982.0	5			
CO ₂ %		8.8	8.9		9.6	9.6				
Operator Noise Db										
Smoke No.		5	0	-100	5	0	-100			
Back Pres. In. W.G.		20.0			32.0					
Gear		3								



Questions?

Thank you!