

MPUA discussion on Caterpillar 3516 Diesel Oxidation Catalyst (DOC) retrofit

1. Summary of key items we see in the final rule
 - Requires 70% CO reduction
 - Pre / Post emissions testing to verify compliance
 - Re-test every 8760 hrs or every 3 years
 - Continuously monitor inlet temp and delta P at DOC
 - Closed Crankcase Ventilation (CCV) filter system
 - Change to ultra low sulfur diesel fuel (ULSD)
 - 30 minute start / warm-up window to meet minimum exhaust temperature

2. Cat 3516 DOC & CCV installation cost estimate
 - \$40 - \$100K per unit
 - Estimate includes:
 - a. DOC (variable cost)
 - b. Temp. & Pressure monitoring system
 - c. Pre/Post Testing
 - d. CCV filtration system
 - e. Installation (most variable cost)
 - f. Exhaust silencer (optional)
 - g. Exhaust system insulation (optional)
 - h. Commissioning & training

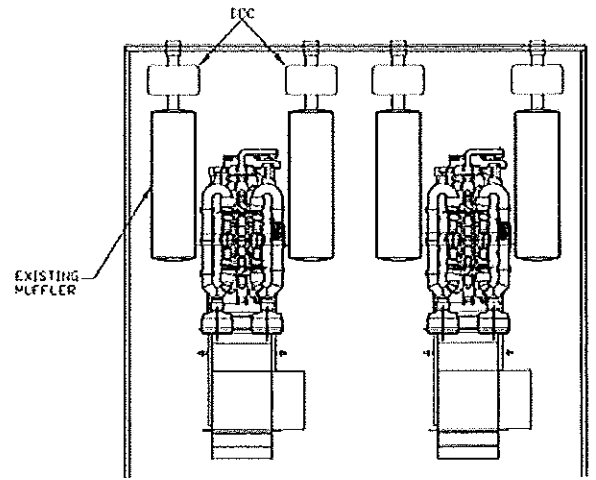
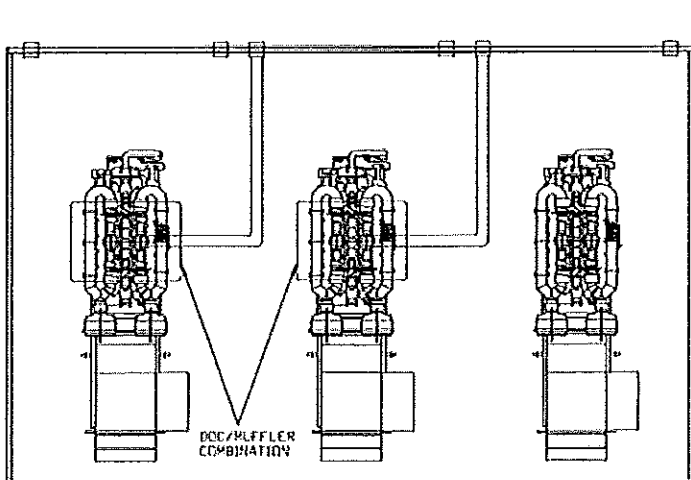
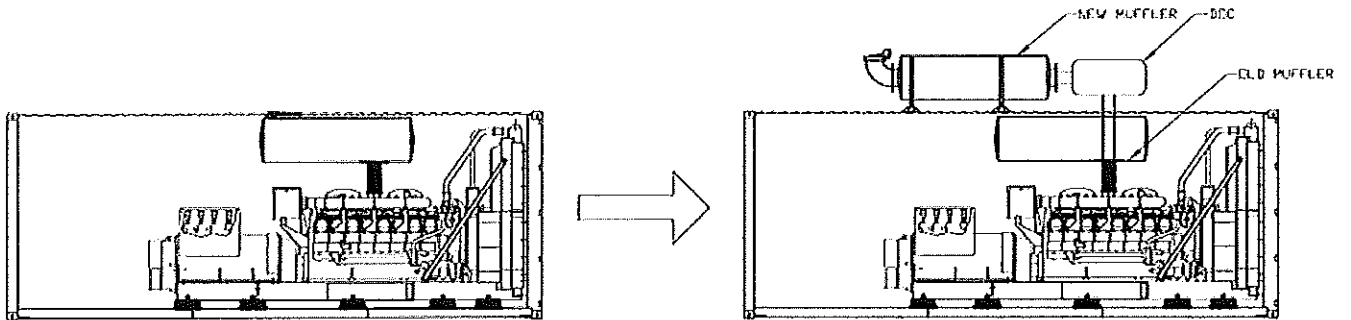
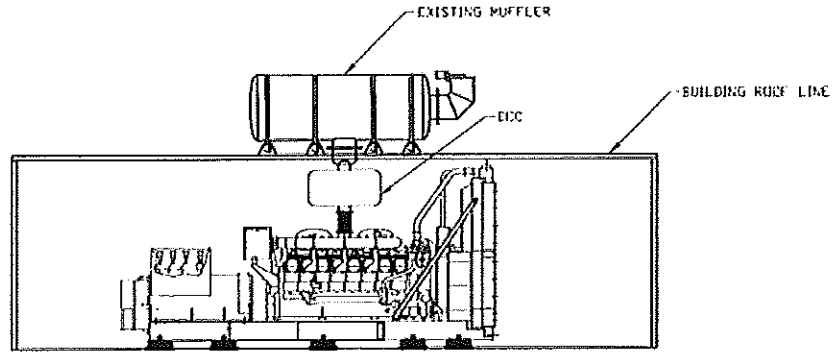
3. DOC installation considerations / challenges
 - Adequate space for DOC, including clearance for DOC element removal / inspection
 - Adequate exhaust temp at DOC

- Not exceeding allowable engine backpressure
- Structural support for DOC
- DOC & exhaust system insulation
- Single or dual exhaust – requiring one or two DOC's
- Monitoring requirements (single or dual exhaust)
- Sound level requirements, exhaust silencer internal to DOC or separate silencer
- Controlling soot / blow-by during cold start to prevent DOC element coating
- Routine inspection and maintenance of DOC & CCV
- Safety & aesthetics
- Personnel training

4. New Source Performance Standards (NSPS) for compression ignition engines. Tier 2 to Tier 4 transition.

- Current engines are Tier 2 compliant. Engines manufactured after December 31, 2010 must be Tier 4 compliant.
- Tier 2 product purchased this year will have until December 31, 2012 to be installed and commissioned.
- Current production backlog could close the Tier 2 order board by mid year 2010, however the exact date is uncertain at this time.
- Tier 4 units will be factory fitted with a selective catalytic reduction (SCR) system. The SCR will add cost: components, maintenance and O&M
- Current estimates are the Tier 4 genset package will be up to 50% higher than Tier 2 product. Increased installation cost can also be expected.

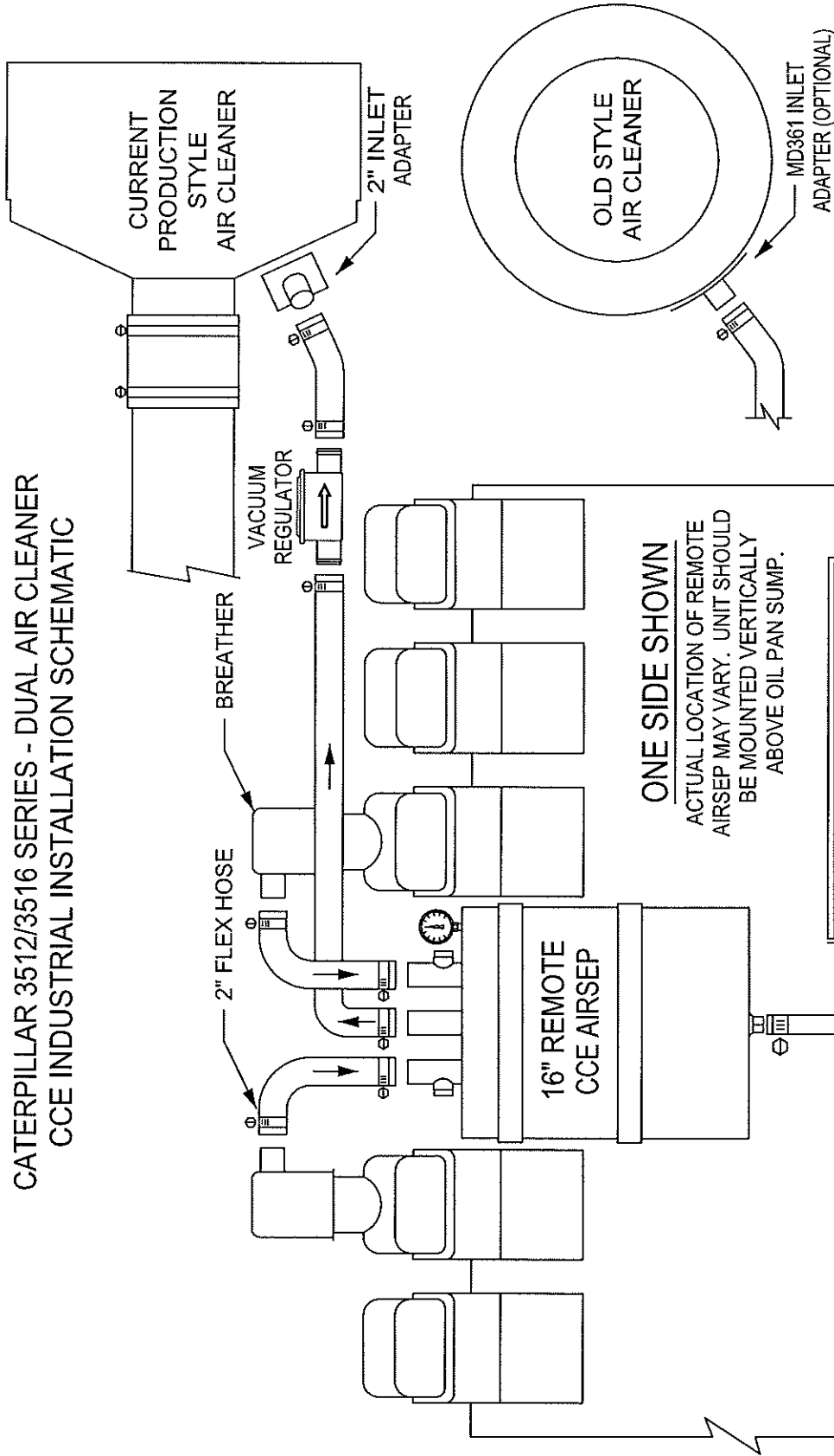
SAMPLE OF POSSIBLE DDC INSTALLATIONS



NOT TO SCALE

CATERPILLAR 3512/3516 SERIES - DUAL AIR CLEANER CCE INDUSTRIAL INSTALLATION SCHEMATIC

DATE	REV.	DESCRIPTION
02-01-01		NEW DRAWING
11-15-06	A	UPDATE TO NEW DESIGN LID
11-15-07	B	UPDATE INSTALLATION



NOTE
CHECK VALVE ANGLE NOT TO EXCEED 30 DEGREES FROM PERPENDICULAR
ARROW ON BODY POINTS DOWN

INSTALL CHECK VALVE AS CLOSE TO THE OIL RETURN POINT AS POSSIBLE. RETURN POINT MUST BE ABOVE ENGINE OIL LEVEL. INSURE SMOOTH GRAVITY FLOW.

ONE SIDE SHOWN
ACTUAL LOCATION OF REMOTE AIRSEP MAY VARY. UNIT SHOULD BE MOUNTED VERTICALLY ABOVE OIL PAN SUMP.

SAE ACCESS PLATE

SCALE: NONE	TITLE: CAT	TOLERANCE UNLESS OTHERWISE NOTED
DRAWN BY: MB / PHILLIP F.	3512/3516	X# ±
DATE: 02-01-01	INSTALL	XX# ±
APPROVED BY:		XXX# ±
REVISED: 11-15-07		
PART NUMBER: KWCC3512-2R		DRAWING NO.:
PART NUMBER: KWCC3516-2R		DQE3