	DYNAMIC GAS BLENDING ENGINE GENERATOR PACKAGE FOR PERTAMINA TANJUNG PROJECT	Doc No. : S369-0001
	FACTORY ACCEPTANCE TEST PROCEDURE FOR DYNAMIC GAS BLENDING ENGINE GENERATOR PACKAGES AT CATERPILLAR FACTORY, USA	Date: 13 Feb 2018 Sheet 1 of 6

1.0 INTRODUCTION

The intent of this procedure is to define the objectives, scope, procedures and detailed content for the Factory Acceptance Test for two units of Caterpillar model 3516B Dynamic Gas Blending Engine Generator Sets. The factory acceptance test for all generator sets shall be carried out at Caterpillar's factory in USA immediately upon completion of the manufacture of the units.

2.0 OBJECTIVES

The primary purpose of the testing of the Caterpillar model 3516B Dynamic Gas Blending Engine Generator set packages are to demonstrate the mechanical and electrical integrity of the assembled engines and generators which have individually undergone their own tests.

Specifically, the objectives of the Factory Acceptance Test are to establish the following:

- Perform a cursory visual inspection of the complete generator sets prior to the load test;
- Generator set load tests to verify that the generator sets operate properly during the load test and all engine instrument monitoring readings are within Caterpillar's specifications;


3.0 SCOPE

The Caterpillar model 3516B dynamic gas blending generator sets used for the Pertamina Tanjung project are standard production generator sets from Caterpillar factory. Caterpillar has made arrangements for these generator sets to be set up at their factory test facility to carry out the factory acceptance test of these units, based on Caterpillar's standard practice.

The individual engine and generator performance tests have already been carried out by the respective equipment manufacturers prior to the generator sets assembly.

All the Cat 3516B dynamic gas blending generator sets shall be load tested consecutively in separate load test cells at Caterpillar factory. However, the generator sets shall be load tested as stand-alone units, utilizing factory test load banks (with power factor of 0.8), and the generator sets shall not be operated in parallel to each other or to the public utility.

The factory acceptance test shall only be carried out on the assembled engines and generators, and shall not include other accessories / auxiliary equipment installed, such as the actual radiators, fuel gas filter packages, etc. The main reason for this is because these accessories / auxiliary equipment shall be packaged together with the dynamic gas blending generator sets after the generator sets are delivered to customer at site. All other tests of the complete generator set packages shall be carried out at site during the

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Precommissioning / Commissioning Test subsequently, after all equipment have been installed at site. The Precommissioning / Commissioning Procedure shall be submitted by Vendor in a separate document later.

The Cat 3516B Dynamic Gas Blending Engine Generator Sets shall be load tested up to Caterpillar's published rating at 1600 eKW, 2000 KVA, 6600 VAC, 1500 RPM, 50 Hz (based on prime rating). The fuel available for the generator set test is clean, diesel fuel and piped natural gas, which fully meets the engine fuel gas composition requirements, and the engine cooling system utilizes a separate heat exchanger type cooling circuit, which is used primarily for testing purposes only. As such, there shall not be any generator set power deration due to fuel gas composition issues or parasitic loss due to any engine driven radiator cooling for the generator set witness load test conducted at Caterpillar factory.

4.0 GENERATOR SET TESTS

4.1 TEST EQUIPMENT


The Factory Acceptance Test at Caterpillar factory shall take place using the following equipment:


- Two (02) units of Caterpillar Model 3516B Dynamic Gas Blending Engine Generator sets, each rated at 1600 eKW, 2000 KVA, 6600 VAC, 1500 RPM, 50 Hz, (based on prime rating);
- Caterpillar factory's standard Load Test Cells, inclusive of all test controls and monitoring equipment;
- Test Load Banks (0.8 Power Factor) and temporary power cables;
- Diesel fuel and piped natural gas available at Caterpillar factory;
- Caterpillar's standard cooling system, and other auxiliary equipment required for the load testing of the generator sets.

4.2 CUSTOMER WITNESS TEST

There shall be two units of the Cat 3516B Dynamic Gas Blending Engine Generator sets that will be set-up and tested concurrently for customer to witness at the Caterpillar factory's load test facility.

All test records shall be electronically recorded and shall be made available to the customer for review upon completion of all tests.

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<p>4.2.1 Pre-Test Inspection Prior to the start-up of the generator sets, some time shall be allocated for a cursory visual inspection of both generator sets and the test set- up.</p> <p>4.2.2 Generator set Load Test The Generator Set load tests shall be witnessed by Customer, with all results electronically recorded. The duration of the load test shall follow Caterpillar's standard factory procedure.</p> <p>The two generator set load tests shall be conducted consecutively in different load test cells. All generator set load tests shall be conducted at 0.8 power factor.</p> <p>4.2.3 Post-Test Inspection Upon completion of all generator set tests, some time may be allocated for a cursory visual inspection of all generator sets.</p> <p>5.0 REVIEW AND ACCEPTANCE</p> <p>Upon completion of the Cat 3516B Dynamic Gas Blending Engine Generator Set tests, all test records shall be compiled and submitted to the Customer for their review and acceptance. All comments, if any, shall be listed in the minutes of meeting and/or punch list during the review of the results. If there are any outstanding issues that cannot be resolved within the witness test period, Trakindo shall inform the Customer when the appropriate rectification works will be carried out, ready for final inspection and close out (to be performed either in Singapore or at site).</p> <p>On the successful or agreed conclusion of the Cat 3516B Dynamic Gas Blending Engine Generator Set tests, all test records shall be signed by Caterpillar, Trakindo and customer, and these shall be minuted down in the meeting minutes.</p> <p><u>ATTACHMENTS:</u></p> <p>A – PERFORMANCE TEST ACTIVITY SCHEDULE (AT CATERPILLAR FACTORY) B – ATTENDANCE SHEET (DAY 1 – 27TH – 29TH Mar 2018)</p>		
<p align="center">PT. TRAKINDO UTAMA SINGAPORE BRANCH</p>		

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ATTACHMENT A

**FACTORY ACCEPTANCE TEST ACTIVITY SCHEDULE (AT
CATERPILLAR FACTORY)**

27th Mar 2018

Arrive in Chicago, USA

28th Mar 2018

0630 to 0700 hrs - Arrive at Caterpillar factory and Introduction


0700 to 1200 hrs - Generator set Performance Testing

1200 to 1300 hrs - Lunch Break

1300 to 1600 hrs - Review Load Test Results, Q&A and Debrief

29th Mar 2017

0800 to 1200 hrs - Contingency Plan


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ATTACHMENT B

ATTENDANCE SHEET (FOR 27TH – 29TH Mar 2017)

No.	Name	Designation	Organization	Sign
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PT. TRAKINDO UTAMA SINGAPORE BRANCH

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**FACTORY ACCEPTANCE TEST CERTIFICATE FOR DYNAMIC
GAS BLENDING ENGINE GENERATOR SETS AT CATERPILLAR
FACTORY, USA**

**DYNAMIC GAS BLENDING ENGINE GENERATORS – 2 UNITS OF
CATERPILLAR MODEL 3516B DYNAMIC GAS BLENDING GENERATOR
SETS**

PROJECT	:	PERTAMINA TANJUNG PROJECT
BUYER	:	PT. BUDI ARTA SAKTI / RAYCO TRADING CO. PTE. LTD
COMPANY	:	PT. PERTAMINA EP
BUYER P.O. NO.	:	4500168578
TEST LOCATION	:	Caterpillar, Inc. 3701 South Street, Lafayette USA, IN47905
TESTING DATE	:	28 th and 29 th Mar 2018

The Performance Testing and Acceptance Test for the Gas Engine Generator
Sets at Caterpillar factory, USA have been performed according to Vendor's
approved Test Procedure.
Attached are the record and documentation.

CONDUCTING PARTY REPRESENTATIVE

 PT. TRAKINDO UTAMA

WITNESSING PARTIES

PT. PERTAMINA EP

PT. BUDI ARTA SAKTI

TBA

SKK MIGAS