



BLOCK C-M-541



SERVICE REPORT – PSV SIEM GIANT (STATION #47)

Client:	Total E&P do Brasil
Client Document Number:	SG-CM541-20-139
Oceaneering Document Number:	200392-OII-RPT-139-R0
Project Name:	C-M-541 Field Development – ROV & Survey Inspections
Vessel:	PSV Siem Giant
Location:	Campos Basin

Rev	Reason For Issue	Author	Reviewed	Approved	Rev Date
0	Issued for Information	SR/GA	LP/BT	EC	27-03-2020



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 		ID: 200392-OII-RPT-139-R0
SERVICE REPORT		
BLOCK C-M-541 – EBS - Station #47		DATE: 27-03-2020
<i>PSV Siem Giant</i>		PAG: 2/20
MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.		ATTACHMENTS: 01

REVISION HISTORY:

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		ID: 200392-OII-RPT-139-R0
SERVICE REPORT		DATE: 27-03-2020
BLOCK C-M-541 – EBS - Station #47		PAG: 3/20
<i>PSV Siem Giant</i>		ATTACHMENTS: 01
MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.		

Contents

1.	INTRODUCTION	4
1.1.	Project Overview.....	4
1.2.	Scope of Document	5
1.3.	Scope of Work	5
2.	OPERATIONAL PLAN.....	6
3.	PROJECT INFORMATION.....	8
3.1.	Sound Velocity Profile	9
4.	OPERATIONAL SEQUENCE.....	10
5.	PICTURES.....	11
6.	CONCLUSION.....	17
7.	ATTACHMENTS.....	18
8.	ACCEPTANCE	19

TABLE INDEX

Table 1 – Operational Team	8
Table 2 – Geodetic Parameters.....	8
Table 3 – Survey Instruments.....	8
Table 3 – Environmental Conditions.....	9
Table 4 – Sound Velocity Profile.....	9

		ID: 200392-OII-RPT-139-R0
SERVICE REPORT		
BLOCK C-M-541 – EBS - Station #47		DATE: 27-03-2020
<i>PSV Siem Giant</i>		PAG: 4/20
MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.		ATTACHMENTS:01

C-M-541 BLOCK EBS (Station #47)	
FIELD	LOCATION(S)
C-M-541	Campos Basin

1. INTRODUCTION

1.1. Project Overview

Total E&P do Brasil (Total) has contracted Oceaneering – Marine Production Systems do Brasil (OII) to provide ROV & Survey services for Umbilical, Flowlines and Risers Inspections (UFR) and Field Operations Development at LAPA Field (Production phase) and Block C-M-541 (Exploration phase).

The deep offshore block C-M-541 under exploration is situated in the pre-salt Campos Basin in approximately 3,000m water depth.

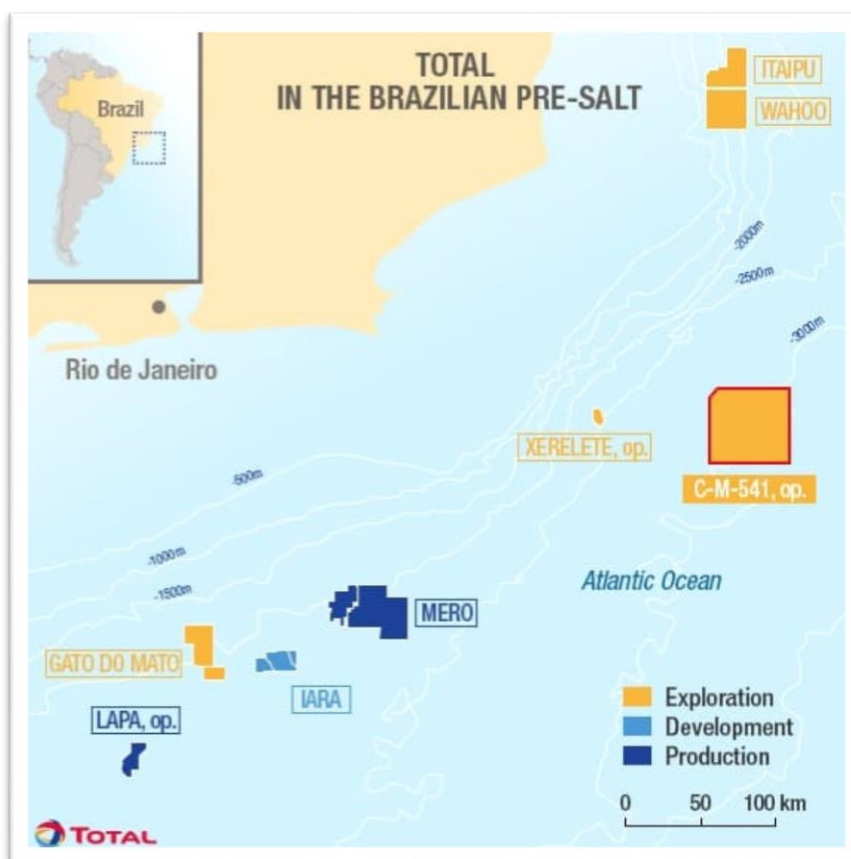




Figure 1 – TOTAL E&P in Brazilian Pre-Salt

		ID: 200392-OII-RPT-139-R0
SERVICE REPORT		
BLOCK C-M-541 – EBS - Station #47		DATE: 27-03-2020
<i>PSV Siem Giant</i>		PAG: 5/20
MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.		ATTACHMENTS: 01

1.2. Scope of Document

The purpose of this document is to present a detailed summary of operations and results acquired by Oceaneering on board of PSV Siem Giant, during the Environmental Baseline Survey (EBS) at Block C-M-541, in search features such as carbonate formation, or any other marine or anthropogenic features that may affect further activities in this area.

1.3. Scope of Work

The Scope of Work comprises in perform a General Visual Inspection (GVI) denominated Environmental Baseline Survey (EBS) in some pre-selected stations and points at the Block C-M-41 in order to present to the environmental agencies and organizations.

The acquisition of video images for the EBS shall follow the lines around the center of each of 09 (nine) pre-selected stations.

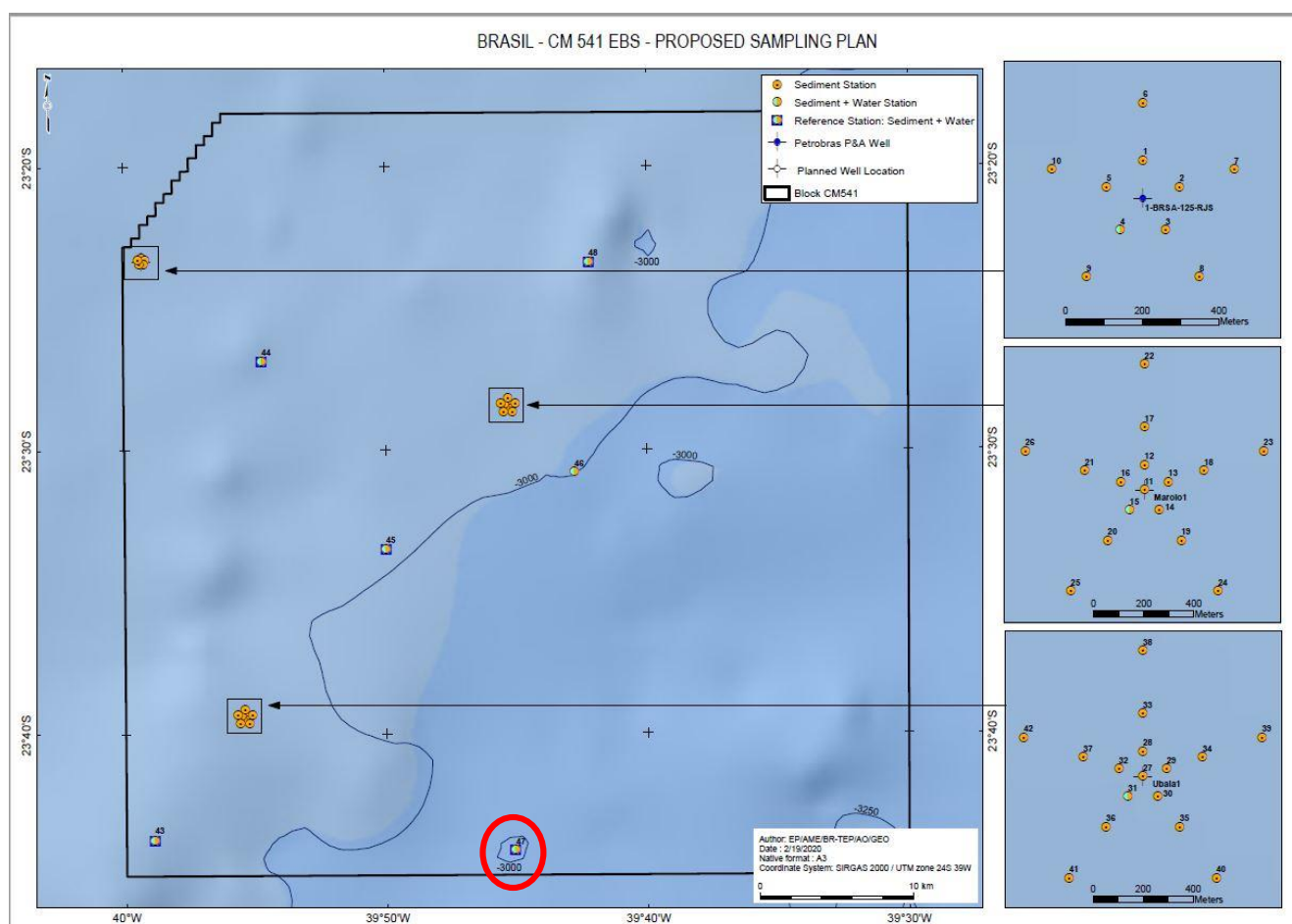




Figure 2 – EBS – Proposal Sampling Plan at Block C-M-541

		ID: 200392-OII-RPT-139-R0
SERVICE REPORT		
BLOCK C-M-541 – EBS - Station #47		DATE: 27-03-2020
<i>PSV Siem Giant</i>		PAG: 6/20
MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.		ATTACHMENTS:01

2. OPERATIONAL PLAN

It was proposed by the client that this inspection should be performed by ROV on paths along Cardinal Directions (N, NE, E, SE, S, SW, W and NW), and as well a running circles radius around the center point of each station.

The acquisition of images for the baseline survey followed lines around the center of each of the nine stations, similar to the example in the figure below:

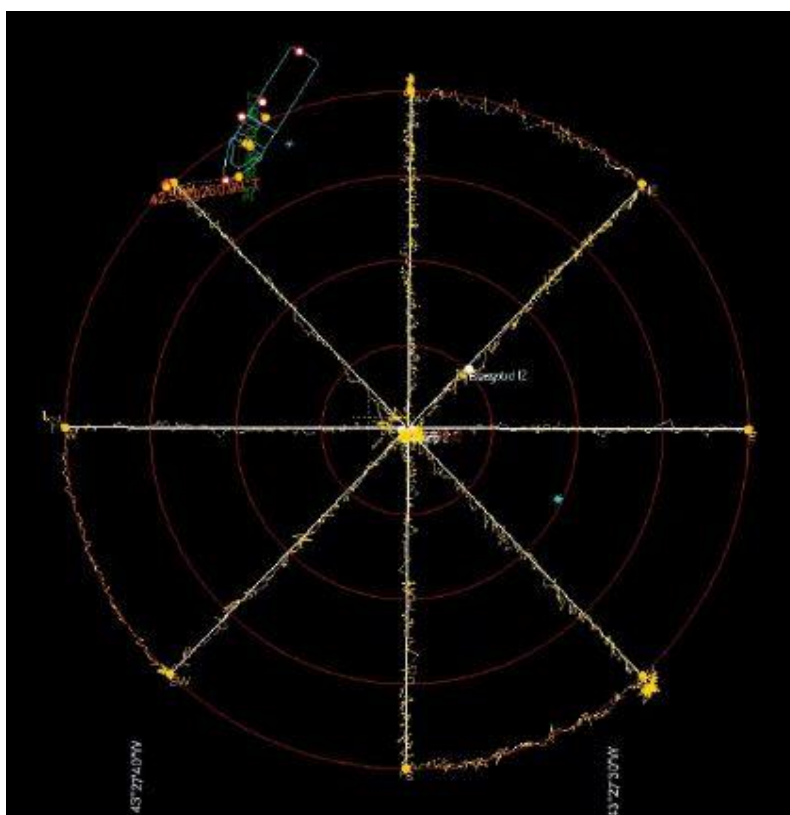




Figure 3 – Example of navigation path during the baseline survey

Instructions were received by client, and proposed coordinates for each survey were indicated on map (Figure 2). This report focuses on Station # 47 only.



Station #47					
Northing	Easting	Latitude	Longitude	Estimated Depht	As Found Depht
7.374.930,75	423.316,34	23° 44' 05,31" S	039° 45' 08,59" W	NA	2.982

 		ID: 200392-OII-RPT-139-R0
SERVICE REPORT		DATE: 27-03-2020
BLOCK C-M-541 – EBS - Station #47		PAG: 7/20
<i>PSV Siem Giant</i>		ATTACHMENTS:01
MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.		

All coordinates refer to DATUM SIRGAS 2000 UTM 24S.
Different location have different length of the radial lines.

Sampling Plan of BLOCK C-M-541				
IDENTIFIER	STATION NAME	Radius (m) Distance from center	SIRGAS 2000 UTM 24S	
			X	Y
1	Poço 1-BRSA-125-RJS	200	-39° 59' 18.805"	-23° 23' 16.687"
2	2	200	-39° 59' 15.471"	-23° 23' 18.954"
3	3	200	-39° 59' 16.778"	-23° 23' 22.582"
4	4	200	-39° 59' 20.919"	-23° 23' 22.555"
5	5	200	-39° 59' 22.172"	-23° 23' 18.912"
6	6	200	-39° 59' 18.763"	-23° 23' 11.810"
7	7	200	-39° 59' 10.435"	-23° 23' 17.479"
8	8	200	-39° 59' 13.702"	-23° 23' 26.547"
9	9	200	-39° 59' 24.054"	-23° 23' 26.481"
10	10	200	-39° 59' 27.185"	-23° 23' 17.373"
11	MAROLO 1	400	-39° 45' 19.006"	-23° 28' 27.188"
12	12	400	-39° 45' 18.987"	-23° 28' 23.937"
13	13	400	-39° 45' 15.647"	-23° 28' 26.200"
14	14	400	-39° 45' 16.949"	-23° 28' 29.829"
15	15	400	-39° 45' 21.092"	-23° 28' 29.809"
16	16	400	-39° 45' 22.352"	-23° 28' 26.167"
17	17	400	-39° 45' 18.959"	-23° 28' 19.059"
18	18	400	-39° 45' 10.610"	-23° 28' 24.717"
19	19	400	-39° 45' 13.863"	-23° 28' 33.790"
20	20	400	-39° 45' 24.223"	-23° 28' 33.739"
21	21	400	-39° 45' 27.372"	-23° 28' 24.636"
22	22	400	-39° 45' 18.913"	-23° 28' 10.930"
23	23	400	-39° 45' 2.215"	-23° 28' 22.245"
24	24	400	-39° 45' 8.721"	-23° 28' 40.391"
25	25	400	-39° 45' 29.440"	-23° 28' 40.291"
26	26	400	-39° 45' 35.739"	-23° 28' 22.083"
27	UBAIA 1	400	-39° 55' 26.269"	-23° 39' 24.301"
28	28	400	-39° 55' 26.246"	-23° 39' 21.050"
29	29	400	-39° 55' 22.905"	-23° 39' 23.317"
30	30	400	-39° 55' 24.212"	-23° 39' 26.944"
31	31	400	-39° 55' 28.362"	-23° 39' 26.919"
32	32	400	-39° 55' 29.618"	-23° 39' 23.277"
33	33	400	-39° 55' 26.211"	-23° 39' 16.173"
34	34	400	-39° 55' 17.859"	-23° 39' 21.839"
35	35	400	-39° 55' 21.128"	-23° 39' 30.908"
36	36	400	-39° 55' 31.502"	-23° 39' 30.846"
37	37	400	-39° 55' 34.643"	-23° 39' 21.739"
38	38	400	-39° 55' 26.154"	-23° 39' 8.045"
39	39	400	-39° 55' 9.449"	-23° 39' 19.377"
40	40	400	-39° 55' 15.987"	-23° 39' 37.515"
41	41	400	-39° 55' 36.735"	-23° 39' 37.391"
42	42	400	-39° 55' 43.018"	-23° 39' 19.177"
43	43	200	-39° 58' 55.125"	-23° 43' 44.216"
44	44	200	-39° 54' 44.307"	-23° 26' 53.137"
45	45	200	-39° 50' 0.419"	-23° 33' 31.040"
46	46	200	-39° 42' 46.781"	-23° 30' 49.028"
47	47	200	-39° 45' 6.200"	-23° 44' 7.566"
48	48	200	-39° 42' 12.596"	-23° 23' 24.641"

Figure 4 – Table of Station Locations



 		ID: 200392-OII-RPT-139-R0
SERVICE REPORT		DATE: 27-03-2020
BLOCK C-M-541 – EBS - Station #47		PAG: 8/20
<i>PSV Siem Giant</i>		ATTACHMENTS: 01
MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.		

3. PROJECT INFORMATION

The tables below details the project information regarding the personnel involved on operations, survey parameters, and the equipment to be inspected (**Table 1** to **Table 5**).

Table 1 – Operational Team		
Name	Function	Company
Leandro Pichkardt	Surveyor Supervisor	Oceaneering
Gabriel Azzolini	Online Surveyor	Oceaneering
Stefan Reuwsaat	Online Surveyor	Oceaneering
Vitor Elias	ROV Supervisor	Oceaneering
Carlos Henrique Silveira	ROV Supervisor	Oceaneering
Mike Gladson	Captain	Siem Offshore

Table 2 – Geodetic Parameters	
DATUM PARAMETERS	
DATUM	SIRGAS 2000 (ITRF2000 at epoch 2000.40) EPSG Code 6674
ELLIPSOID	GRS 1980 (GRS) EPSG Code 7019
SEMI MAJOR AXIS (a)	6 378 137.000 m
SEMI MINOR AXIS (b)	6 356 752.314 m
ECCENTRICITY SQUARE (e^2)	0.006 694 380 02
INVERSE FLATTENING (1/f)	298.257 222 101
COORDINATE SYSTEM PARAMETERS	
PROJECTION	Universal Transverse Mercator
ZONE	24 South
CENTRAL MERIDIAN	039° West Greenwich
LATITUDE OF ORIGIN	000° Equator
FALSE EASTING	500 000.0 m
FALSE NORTHING	10 000 000.0 m
SCALE FACTOR	0.9996
PROJECTED CRS:	SIRGAS 2000 / UTM Zone 24 S EPSG Code 31984
Table 3 – Survey Instruments	
Operation Mode	SSBL
Depth Gauge	
Model	DIGIQUARTZ 8CB4000

 		ID: 200392-OII-RPT-139-R0
SERVICE REPORT		DATE: 27-03-2020
BLOCK C-M-541 – EBS - Station #47		PAG: 9/20
<i>PSV Siem Giant</i>		ATTACHMENTS: 01
MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.		

Time	
Universal Time Coordinate	UTC - 3 Hours
Vertical Datum	
Datum	LMSL
Tide	TPXO Model / Atlantic Ocean

Table 4 – Environmental Conditions			
Date	Wind (kts)	Swell (m)	Surface DP Current (kts)
22-03-2020	15kts@330°	1,8m@180°	0,7kts@200°

3.1. Sound Velocity Profile

At the beginning of operations, the ROV MILL 048 dived till the seabed at constant speed in order to collect the sound velocity, and its results were updated on the HIPAP USBL system and survey navigation system. The figure below presents the profile during the downcast.

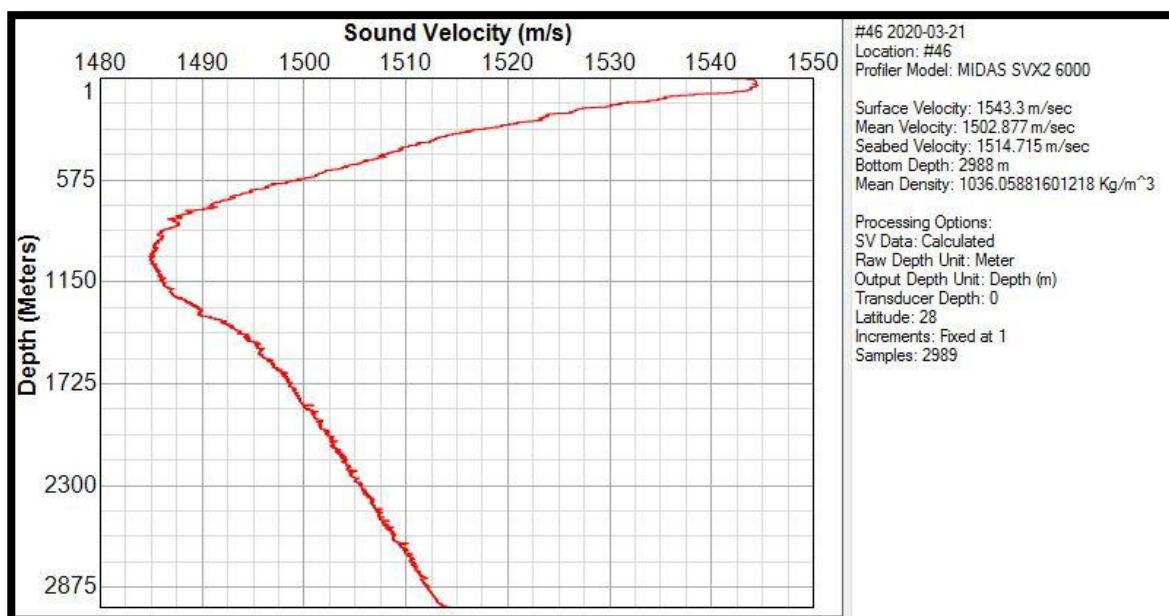




Figure 5 – SVP representation



Table 5 – Sound Velocity Profile			
Date	UTM Coordinates		Mean Sound Velocity (m/s)
	N (m)	E (m)	
21-03-2020	7.399.654,00	427.100,00	1502,08

		ID: 200392-OII-RPT-139-R0
SERVICE REPORT		
BLOCK C-M-541 – EBS - Station #47		DATE: 27-03-2020
<i>PSV Siem Giant</i>		PAG: 10/20
MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.		ATTACHMENTS:01

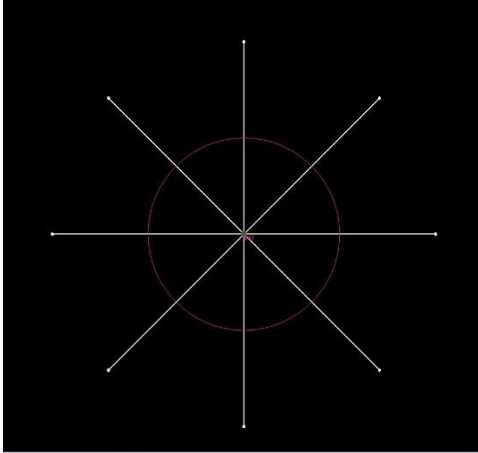
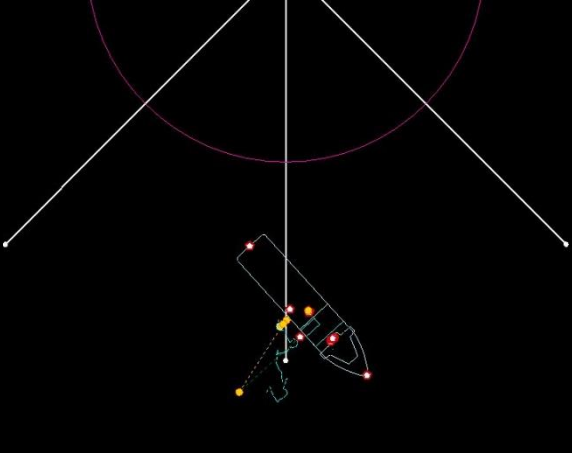
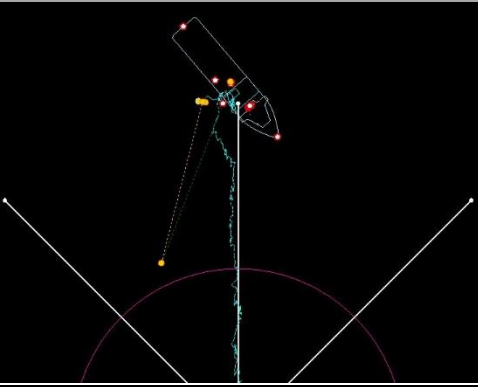
4. OPERATIONAL SEQUENCE

The ROV dived and commenced the inspection of the environmental baselines at Station #47, following sequence:

- EBS Station #47 – EBS Plan View (**Picture 1**);
- EBS at Station #47 – from S to N (**Picture 2 to Picture 6**);
- EBS at Station #47 – from NW to SE (**Picture 8Picture 7 to Picture 12**);
- EBS at Station #47 – from E to W (**Picture 13 to Picture 17**);
- EBS at Station #47 – from SW to NE (**Picture 18Picture 25 to Picture 25**);
- EBS at Station #47 – on the circle of 100m radius in a clockwise direction and the center of Location (**Picture 26 to Picture 33**Erro! Fonte de referência não encontrada.).

			ID: 200392-OII-RPT-139-R0
SERVICE REPORT			
BLOCK C-M-541 – EBS - Station #47			DATE: 27-03-2020
PSV Siem Giant			PAG: 11/20
MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.			ATTACHMENTS:01

5. PICTURES

	
Picture 1 – Station #47 – EBS Plan View	Picture 2 – S to N Baseline – Start – Plan View
<div> <div> NW N008 NE </div> <div> CAGE THR: 195.20 DPT: 2813.83 HDG: 56.19 Turns: -1.2 </div> <div> P: 1.30 Turns: -1.3 R: 2.50 DPT: 2992.21 ALT: 0.770 BTY: 2993.10 </div> <div> UEH DPT: 2992.21 ALT: 1.800 BTY: 2984.12 </div> </div> <div> CP Probe: -0.055 E: 423309.29 N: 7374795.90 C-M-541 EBS (#47) DIVE: 326 21:15:01 22.03.20 OCEANEERING Millennium 048 </div>	<div> <div> N 035 NE E </div> <div> CAGE THR: 211.20 DPT: 2812.23 HDG: 11.89 Turns: -1.3 </div> <div> P: 1.70 Turns: -1.2 R: 2.40 DPT: 2992.26 ALT: 1.800 BTY: 2984.12 </div> <div> UEH DPT: 2992.26 ALT: 1.800 BTY: 2984.12 </div> </div> <div> CP Probe: -0.020 E: 423309.46 N: 7375094.22 C-M-541 EBS (#47) DIVE: 326 21:50:20 22.03.20 OCEANEERING Millennium 048 </div>
Picture 3 – S to N Baseline – Start – Seabed View	Picture 4 – Marine Life on Seabed
	<div> <div> N 028 NE </div> <div> CAGE THR: 230.80 DPT: 2812.59 HDG: 14.99 Turns: -1.3 </div> <div> P: 2.60 Turns: -1.2 R: 2.20 DPT: 2984.82 ALT: 1.070 BTY: 2985.91 </div> <div> UEH DPT: 2984.82 ALT: 1.070 BTY: 2985.91 </div> </div> <div> CP Probe: -0.018 E: 423312.45 N: 7375120.29 C-M-541 EBS (#47) DIVE: 326 21:55:41 22.03.20 OCEANEERING Millennium 048 </div>
Picture 5 – S to N Baseline – End – Plan View	Picture 6 – S to N Baseline – End – Seabed View



ID:
200392-OII-RPT-139-
R0

SERVICE REPORT

BLOCK C-M-541 – EBS - Station #47

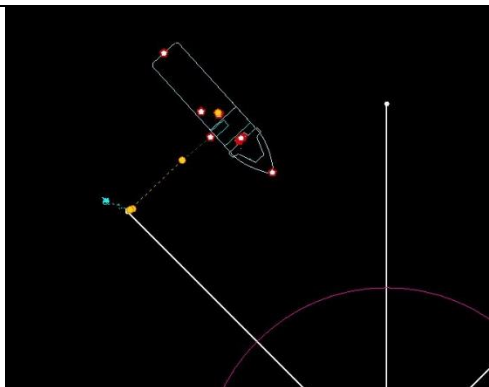
DATE:
27-03-2020

PSV Siem Giant

PAG: 12/20

MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.

ATTACHMENTS:01



Picture 7 – NW to SE Baseline – Start – Plan View



Picture 8 – NW to SE Baseline – Start – Seabed



Picture 9 – Marine Life on Seabed



Picture 10 – Marine Life on Seabed



Picture 11 – NW to SE Baseline – End– Plan View



Picture 12 – NW to SE Baseline – End– Seabed View



ID:
200392-OII-RPT-139-
R0

SERVICE REPORT

BLOCK C-M-541 – EBS - Station #47

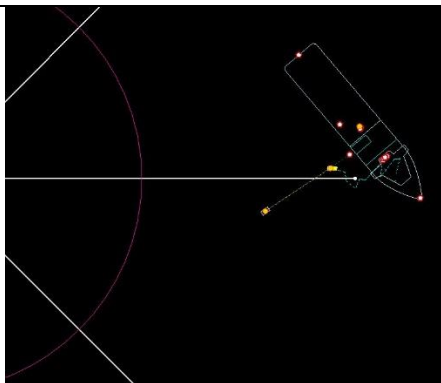
DATE:
27-03-2020

PSV Siem Giant

PAG: 13/20

MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.

ATTACHMENTS:01



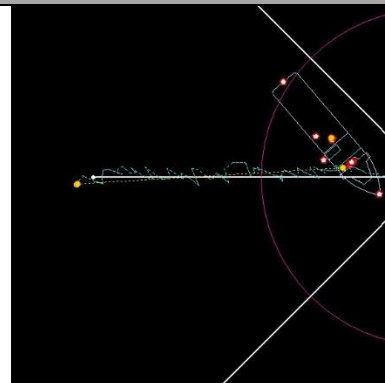
Picture 13 – E to W Baseline – Start – Plan View



Picture 14 – E to W Baseline – Start – Seabed View



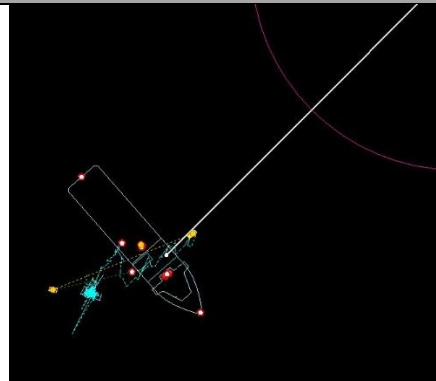
Picture 15 – Marine Life on Seabed



Picture 16 – E to W Baseline – End – Plan View



Picture 17 – E to W Baseline – End – Seabed View



Picture 18 – SW to NE Baseline – Start – Plan View



ID:
200392-OII-RPT-139-
R0

SERVICE REPORT

BLOCK C-M-541 – EBS - Station #47

DATE:
27-03-2020

PSV Siem Giant

PAG: 14/20

MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.

ATTACHMENTS:01



Picture 19 – SW to NE Baseline – Start – Seabed View



Picture 20 – Marine Life on Seabed



Picture 21 – Marine Life on Seabed



Picture 22 – Marine Life on Seabed



Picture 23 – Marine Life on Seabed



Picture 24 – SW to NE Baseline – End – Plan View



ID:
200392-OII-RPT-139-
R0

SERVICE REPORT

BLOCK C-M-541 – EBS - Station #47

DATE:
27-03-2020

PSV Siem Giant

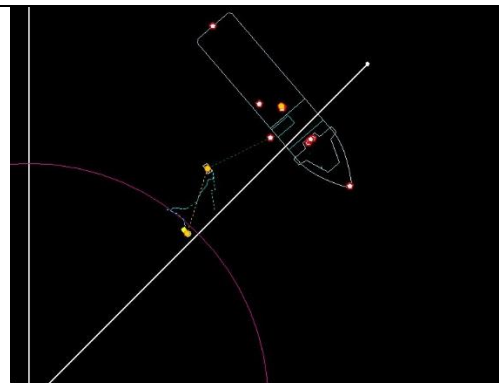
PAG: 15/20

MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.

ATTACHMENTS:01



Picture 25 – SW to NE Baseline – End – Seabed View



Picture 26 – Start of inspection on the circle of 100m radius - direction clockwise - Plan View



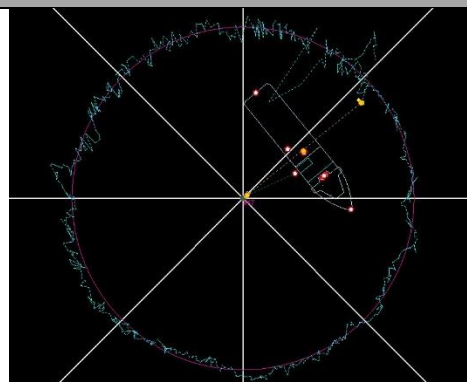
Picture 27 – Start of inspection on the circle of 100m radius - direction clockwise - Seabed View





Picture 28 – Marine Life on Seabed



Picture 29 – Marine Life on Seabed

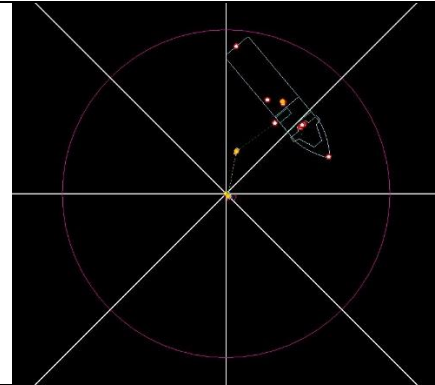


Picture 30 – End of inspection on the circle of 100m radius - direction clockwise - Plan View

			ID: 200392-OII-RPT-139-R0
SERVICE REPORT			
BLOCK C-M-541 – EBS - Station #47			DATE: 27-03-2020
PSV Siem Giant			PAG: 16/20
MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.			ATTACHMENTS:01





Picture 31 – End of inspection on the circle of 100m radius - direction clockwise - Seabed View



Picture 32 – Center of the Location – Plan View





Picture 33 – Center of the Location – Seabed View

		ID: 200392-OII-RPT-139-R0
SERVICE REPORT		
BLOCK C-M-541 – EBS - Station #47		DATE: 27-03-2020
<i>PSV Siem Giant</i>		PAG: 17/20
MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.		ATTACHMENTS: 01



6. CONCLUSION

- During the Station #47 survey, the sections South and South East reaches 3000m water depth what exceed the ROV operation limits. The position of the center of the Station #47 needed to changed, following the client instructions, the station was moved 100 meters to 315° to reach a shallow area, less than 3000 meters.
- The EBS operation at Station #47 in the C-M-541 Block was conducted with success and identified some marine life events at the location;

		ID: 200392-OII-RPT-139-R0
SERVICE REPORT		
BLOCK C-M-541 – EBS - Station #47		DATE: 27-03-2020
<i>PSV Siem Giant</i>		PAG: 18/20
MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.		ATTACHMENTS: 01

7. ATTACHMENTS

- 01 HD with the images, videos, report and other files of the operation:
 - Images of Operation (*.jpeg);
 - Videos of Operation (*.mpg);
 - Report (*.pdf);
 - JSEA and RA (*.pdf);
 - SVP files (*.usr, *.000).

 		ID: 200392-OII-RPT-139-R0
SERVICE REPORT		
BLOCK C-M-541 – EBS - Station #47		DATE: 27-03-2020
<i>PSV Siem Giant</i>		PAG: 19/20
MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.		ATTACHMENTS:01

8. ACCEPTANCE

Leandro Pickhardt		27-03-2020
Survey Supervisor - OSS	Signature	Date

No CSR on board		
Total Representative - CSR	Signature	Date



We Solve the Unsolvable.