

**LAMPIRAN I - VI**

**ANALISIS DAMPAK LINGKUNGAN HIDUP  
(ANDAL)**

**KEGIATAN TERPADU**

**PROYEK PENGEMBANGAN TANGGUH LNG**

Kabupaten Teluk Bintuni dan Kabupaten Fakfak,  
Provinsi Papua Barat



Juli 2014



**SKKMIGAS**  
Wisma Mulia Lantai 35  
Jl. Jend. Gatot Su $\square$ roto No. 42  
Jakarta 12710



**BP Indonesia**  
Perkantoran Hijau Arkadia  
Tower D & E  
Jl. T.B. Simatupang Kav. 88  
Jakarta Selatan 12520

## DAFTAR LAMPIRAN

<b>Lampiran I</b>	<b>Keputusan Kesepakatan Kerangka Acuan ANDAL</b>
<b>Lampiran II</b>	<b>Data Rona Lingkungan</b>
II.1	Data Rona Lingkungan : Kualitas Air Laut ( <i>Sea Water</i> ), Sedimen ( <i>Sediment</i> ), Kualitas Air Permukaan ( <i>Surface Water</i> ), Kualitas Air Tanah ( <i>Groundwater</i> ), dan Kualitas Udara ( <i>Air Ambient</i> )  <u>(Dry Season 2012)</u>
II.2	Data Rona Lingkungan : Kualitas Air Laut ( <i>Sea Water</i> ), Sedimen ( <i>Sediment</i> ), Kualitas Air Sungai ( <i>River Water</i> ), Kualitas Air Tanah ( <i>Groundwater</i> ), dan Kualitas Udara ( <i>Air Ambient</i> )  <u>(Wet Season 2013)</u>
II.3	Data Rona Lingkungan : Sampel Air Laut dan Muara (Plankton dan Benthos)  <u>(Dry Season 2012)</u>
II.4	Data Rona Lingkungan : Sampel Air Laut dan Muara (Plankton dan Benthos)  <u>(Wet Season 2013)</u>
II.5	Data Rona Lingkungan : Sampel Kualitas Tanah
II.6	Data Meteorologi <ul style="list-style-type: none"> <li>• Data Meteorologi Fakfak (1958-1983 dan 2004-2008)</li> <li>• Data Meteorologi Manokwari (1998-2011)</li> <li>• Data Meteorologi AERMET MM5 (2002-2012)</li> </ul>
II.7	Data Biologi Terrestrial
<b>Lampiran III</b>	<b>Foto Dokumentasi</b>

---

**Lampiran IV Hasil Permodelan**

IV.1 *Drilling Cutting and Mud Dispersion Simulation*

IV.2 Pemodelan Dampak Lingkungan Dari Proyek Pengembangan Tangguh LNG

- Pemodelan Hidrodinamik
- Pemodelan Pembuangan Air Limbah Yang Tercampur
- Pemodelan Pembuangan Air Hidrotes
- Pemodelan Pembuangan Air Gabungan Air Limbah dan Air Hidrotes
- Pemodelan Pengerukan
- Pemodelan Pembuangan Material Pengerukan
- Model Pembuangan Lumpur dan Serbuk Bor Ke Laut

IV.3 Permodelan Dispersi Pencemar Udara dari Kegiatan Operasional Tangguh LNG

IV.4 Pemodelan Sebaran Kebisingan dari Kegiatan Konstruksi Tangguh LNG

IV.5 Pemodelan Air Tanah

**Lampiran V Indikator Evaluasi Dampak Penting Hipotetik dan Tingkat Sensitivitas Dampak**

**Lampiran VI Pembahasan Aspek Non Teknis**

**Lampiran VII Notulensi dan Kompilasi Masukan Tertulis**



Lampiran I

**Keputusan Kesepakatan Kerangka  
Acuan ANDAL**



**KEPUTUSAN DEPUTI MENTERI LINGKUNGAN HIDUP  
BIDANG TATA LINGKUNGAN  
SELAKU KETUA KOMISI PENILAI AMDAL PUSAT  
KEMENTERIAN LINGKUNGAN HIDUP  
NOMOR 30 TAHUN 2013**

**TENTANG  
KERANGKA ACUAN ANALISIS DAMPAK LINGKUNGAN HIDUP  
(KA-ANDAL) RENCANA KEGIATAN TERPADU PROYEK PENGEMBANGAN  
TANGGUH LNG, DI KABUPATEN TELUK BINTUNI DAN KABUPATEN FAKFAK,  
PROVINSI PAPUA BARAT OLEH BP BERAU LTD**

**KEPUTUSAN KETUA KOMISI PENILAI AMDAL PUSAT,**

**Menimbang**

- a. bahwa rencana Kegiatan Terpadu Proyek Pengembangan Tangguh LNG, di Kabupaten Teluk Bintuni dan Kabupaten Fakfak, Provinsi Papua Barat oleh BP Berau Ltd, termasuk kegiatan yang wajib menyusun Analisis Mengenai Dampak Lingkungan Hidup (AMDAL);
- b. bahwa Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA-ANDAL) Rencana Kegiatan Terpadu Proyek Pengembangan Tangguh LNG, di Kabupaten Teluk Bintuni dan Kabupaten Fakfak, Provinsi Papua Barat oleh BP Berau Ltd, sebagai salah satu bagian dari studi AMDAL wajib mendapatkan kesepakatan berdasarkan hasil penilaian Komisi Penilai AMDAL Pusat;
- c. bahwa berdasarkan pertimbangan sebagaimana dimaksud dalam huruf a dan huruf b, perlu menetapkan Keputusan Ketua Komisi Penilai Amdal Pusat Kementerian Lingkungan Hidup tentang Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA-ANDAL) Rencana Kegiatan Terpadu Proyek Pengembangan Tangguh LNG, di Kabupaten Teluk Bintuni dan Kabupaten Fakfak, Provinsi Papua Barat oleh BP Berau Ltd.

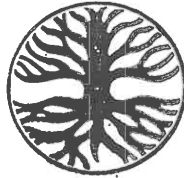
**Mengingat**

1. Undang-Undang Nomor 5 Tahun 1990 tentang Konservasi Sumber Daya Alam Hayati dan Ekosistemnya (Lembaran Negara Republik Indonesia Tahun 1990 Nomor 49, Tambahan Lembaran Negara Republik Indonesia Nomor 3419);
2. Undang-Undang Nomor 32 Tahun 2004 tentang Pemerintahan Daerah (Lembaran Negara Republik Indonesia Tahun 2004 Nomor 125, Tambahan Lembaran Negara Republik Indonesia Nomor 4437), sebagaimana



telah beberapa kali diubah, terakhir dengan Undang-Undang Nomor 12 Tahun 2008 tentang Perubahan Kedua atas Undang-Undang Nomor 32 Tahun 2004 tentang Pemerintahan Daerah (Lembaran Negara Republik Indonesia Nomor 59, Tambahan Lembaran Negara Nomor 4844);

3. Undang-Undang Nomor 26 Tahun 2007 tentang Penataan Ruang (Lembaran Negara Republik Indonesia Tahun 2007 Nomor 68, Tambahan Lembaran Negara Republik Indonesia Nomor 3838);
4. Undang-Undang Nomor 32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup (Lembaran Negara Republik Indonesia Tahun 2009 Nomor : 140, Tambahan Lembaran Negara Republik Indonesia Nomor : 5059);
5. Peraturan Pemerintah Nomor 27 Tahun 2012 tentang Izin Lingkungan (Lembaran Negara Republik Indonesia Tahun 2012 Nomor 48, Tambahan Lembaran Negara Republik Indonesia Nomor 5285);
6. Peraturan Presiden Nomor 91 Tahun 2011 tentang Perubahan Ketiga Atas Peraturan Presiden Nomor 47 Tahun 2009 tentang Pembentukan dan Organisasi Kementerian Negara;
7. Peraturan Presiden Nomor 92 Tahun 2011 tentang Perubahan Kedua Atas Peraturan Presiden Nomor 24 Tahun 2010 tentang Kedudukan, Tugas, dan Fungsi Kementerian Negara Serta Susunan Organisasi, Tugas, dan Fungsi Eselon I Kementerian Negara;
8. Peraturan Menteri Negara Lingkungan Hidup Republik Indonesia Nomor 16 Tahun 2010 tentang Organisasi dan Tata Kerja Kementerian Negara Lingkungan Hidup Republik Indonesia;
9. Peraturan Menteri Negara Lingkungan Hidup Nomor 05 Tahun 2012 tentang Jenis Rencana Usaha dan/atau Kegiatan Yang Wajib Memiliki Analisis Mengenai Dampak Lingkungan Hidup;
10. Keputusan Menteri Negara Lingkungan Hidup Nomor 356 Tahun 2005 tentang Pendelegasian Kewenangan Untuk Menandatangani Surat Keputusan Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA-ANDAL).



**Memperhatikan :** Hasil Rapat Tim Teknis Komisi Penilai AMDAL Pusat pada tanggal 30 November 2012 di Jakarta dan Hasil Rapat Tim Teknis Komisi Penilai AMDAL Pusat Lanjutan pada tanggal 17 Desember 2012 di Jakarta, mengenai penilaian KA-ANDAL Kegiatan Terpadu Proyek Pengembangan Tangguh LNG, di Kabupaten Teluk Bintuni dan Kabupaten Fakfak, Provinsi Papua Barat oleh BP Berau Ltd.

**MEMUTUSKAN:**

**Menetapkan** :  
**PERTAMA** : **KEPUTUSAN KETUA KOMISI PENILAI AMDAL PUSAT KEMENTERIAN LINGKUNGAN HIDUP TENTANG KERANGKA ACUAN ANALISIS DAMPAK LINGKUNGAN HIDUP (KA-ANDAL) RENCANA KEGIATAN TERPADU PROYEK PENGEMBANGAN TANGGUH LNG, DI KABUPATEN TELUK BINTUNI DAN KABUPATEN FAKFAK, PROVINSI PAPUA BARAT OLEH BP BERAU LTD.**

**KEDUA** : Ruang lingkup Keputusan Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA-ANDAL) Rencana Kegiatan Terpadu Proyek Pengembangan Tangguh LNG, di Kabupaten Teluk Bintuni dan Kabupaten Fakfak, Provinsi Papua Barat oleh BP Berau Ltd, sebagaimana dimaksud dalam diktum **PERTAMA**, meliputi:

a. Berita Acara Rapat Tim Teknis Komisi Penilai AMDAL Pusat Nomor: 231/BA/Komisi/Dep.I/LH/11/2012 tanggal 30 November 2012 dan Berita Acara Rapat Tim Teknis Komisi Penilai AMDAL Pusat Lanjutan Nomor: 246/BA/Komisi/Dep.I/LH/12/2012 tanggal 17 Desember 2012; dan

b. dokumen KA-ANDAL, sebagaimana tercantum dalam lampiran yang merupakan bagian tidak terpisahkan dari Keputusan Ketua Komisi Penilai Amdal Pusat ini.

**KETIGA** : Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA-ANDAL) Rencana Kegiatan Terpadu Proyek Pengembangan Tangguh LNG, di Kabupaten Teluk Bintuni dan Kabupaten Fakfak, Provinsi Papua Barat oleh BP Berau Ltd, wajib digunakan sebagai acuan dalam pelaksanaan kajian Analisis Dampak Lingkungan Hidup (ANDAL), Rencana Pengelolaan Lingkungan Hidup (RKL), dan Rencana Pemantauan Lingkungan Hidup (RPL).





- KEEMPAT** : Keputusan Ketua Komisi Penilai Amdal Pusat Kementerian Lingkungan Hidup ini dinyatakan kadaluwarsa, apabila pemrakarsa tidak melakukan penyusunan dokumen ANDAL, RKL dan RPL paling lambat 3 (tiga) tahun sejak Keputusan Ketua Komisi Penilai Amdal Pusat Kementerian Lingkungan Hidup ini ditetapkan.
- KELIMA** : Keputusan Ketua Komisi Penilai Amdal Pusat Kementerian Lingkungan Hidup ini mulai berlaku pada tanggal ditetapkan.

Ditetapkan di Jakarta  
pada tanggal: 24 Juli 2013

-----  
DEPUTI MENTERI LINGKUNGAN HIDUP  
BIDANG TATA LINGKUNGAN,

selaku Ketua Komisi Penilai Amdal Pusat  
Kementerian Lingkungan Hidup,



**Imam Hendargo Abu Ismoyo**

Keputusan Deputi ini disampaikan kepada Yth.:

1. Menteri Dalam Negeri;
2. Menteri Pekerjaan Umum;
3. Menteri Kehutanan;
4. Menteri Energi dan Sumber Daya Mineral;
5. Menteri Perhubungan;
6. Menteri Kelautan dan Perikanan;
7. Menteri Pertanian;
8. Menteri Kesehatan;
9. Gubernur Papua Barat;
10. Bupati Teluk Bintuni;
11. Bupati Fakfak;
12. Kepala Badan Pertanahan Nasional;
13. Kepala Badan Pengendalian Dampak Lingkungan Hidup Daerah Provinsi Papua Barat;
14. Kepala Kantor Lingkungan Hidup Kabupaten Teluk Bintuni;
15. Kepala Badan Lingkungan Hidup Kabupaten Fakfak;
16. Kepala Pusat Pengelolaan Ekoregion Papua;
17. Yang Bersangkutan.



## Lampiran II

# Data Rona Lingkungan

## Lampiran II.1

### **Data Rona Lingkungan :**

**Kualitas Air Laut (*Sea Water*), Sedimen (*Sediment*), Kualitas Air Permukaan (*Surface Water*), Kualitas Air Tanah (*Groundwater*), dan Kualitas Udara (*Air Ambient*)  
(*Dry Season 2012*)**

## ENVIRONMENTAL TEST REPORT

**Mr. Yahya Husin**  
 PT ERM Indonesia  
 Wisma Aldiron Dirgantara, 2nd Floor, Suite # 238-239  
 Jl. Gatot Subroto Kav. 72  
 Jakarta 12780  
 Indonesia

<b>Job Number :</b>	<b>EV120601rev.1</b>	<b>Date received :</b>	<b>02-Aug-2012</b>
<b>Client Ref :</b>	<b>1241.r1/IUS-EV/VII/2012</b>	<b>Date reported :</b>	<b>24-Sep-2012</b>

**Number of samples :** 8

**Report Comprising :** Cover Sheet, Sample Information, Results, QC

**Total Pages :** 18

**Notes :**

- N.A = Not Analyzed
- I.S = Insufficient Sample
- \* = Non Accredited Test
- \*\* = Sub Contracted Test
- 1) = Field Measurement
- I.P = In Progress

**Project Name :** **Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd**

**Approved Signature for:**



**Reginald C. de Wit**  
**Technical Advisor - Environmental**

All work is performed in accordance with Intertek Standard Terms and Conditions of work  
<http://www.intertek.com/terms/>

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as received.

This report was prepared solely for the use of the client named in this report. PT Intertek Utama Services accepts no responsibility for any loss, damage or liability suffered by any third party as a result of any reliance upon or use of this report.

**DO NOT PHOTOCOPY**

### SAMPLE INFORMATION

Job Number : EV120601rev.1  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

No.	Laboratory Sample I.D.	Customer Sample I.D.	Sample Matrix	Date Sampled	Time Sampled	Date Reported	Sampled by	Coordinates	
								South	East
1	EV120601-01	NS - 07	Seawater	29-Jul-12	14:25	02-Aug-12	Winarno, Ali, dan Ajiraga	02° 13' 43.3"	133° 15' 00.9"
2	EV120601-02	NS - 08	Seawater	29-Jul-12	11:30	02-Aug-12	Winarno, Ali, dan Ajiraga	02° 17' 19.0"	132° 52' 49.1"
3	EV120601-03	NS - 09	Seawater	29-Jul-12	10:05	02-Aug-12	Winarno, Ali, dan Ajiraga	02° 18' 25.9"	132° 39' 43.4"
4	EV120601-04	OS - 08	Seawater	29-Jul-12	16:04	02-Aug-12	Winarno, Ali, dan Ajiraga	02° 18' 58.0"	133° 08' 17.0"
5	EV120601-05	OS - 11	Seawater	29-Jul-12	15:10	02-Aug-12	Winarno, Ali, dan Ajiraga	02° 15' 54.0"	133° 11' 07.0"
6	EV120601-06	NS - 07	Sediment	29-Jul-12	14:25	02-Aug-12	Winarno, Ali, dan Ajiraga	02° 13' 43.3"	133° 15' 00.9"
7	EV120601-07	NS - 08	Sediment	29-Jul-12	11:30	02-Aug-12	Winarno, Ali, dan Ajiraga	02° 17' 19.0"	132° 52' 49.1"
8	EV120601-08	NS - 09	Sediment	29-Jul-12	10:05	02-Aug-12	Winarno, Ali, dan Ajiraga	02° 18' 25.9"	132° 39' 43.4"

Job Number : EV120601rev.1  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/VI/2012

Laboratory Sample I.D :					EV120601-01	EV120601-02
Customer Sample I.D :					NS - 07	NS - 08
Date Sampled :					29-Jul-12	29-Jul-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sach disc	>3	<1	<1
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.94	7.73
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.2	14.2
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.6	27.3
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	20	33
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	11.8	35.2
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.165	0.156
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	<0.005	<0.005
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	33
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0008	0.0008
2	Cadmium, Cd	mg/L	GFAAS	0.001	0.0001	0.0012
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	0.001	0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	0.008	0.007

Job Number : EV120601rev.1  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/VI/2012

Laboratory Sample I.D :					EV120601-01	EV120601-02
Customer Sample I.D :					NS - 07	NS - 08
Date Sampled :					29-Jul-12	29-Jul-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
	Miscellaneous					
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	4	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.04	6.12
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
	Organic Tests**					
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted



Job Number : EV120601rev.1  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-03	EV120601-04
Customer Sample I.D :					NS - 09	OS - 08 (Composite)
Date Sampled :					29-Jul-12	29-Jul-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sechl disc	>3	<1	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	-
4	Oil Film <sup>1)</sup>	-	Visual	-	None	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.96	-
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	26.7	-
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	27.0	-
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	28	7
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	27.0	-
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.203	0.179
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	<0.005	<0.005
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	incubation	1000	49	ND
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0006	0.0009
2	Cadmium, Cd	mg/L	GFAAS	0.001	0.0001	0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	0.006	0.006

Job Number : EV120601rev.1  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EVM/IV2012

Laboratory Sample I.D :					EV120601-03	EV120601-04
Customer Sample I.D :					NS - 09	OS - 08 (Composite)
Date Sampled :					29-Jul-12	29-Jul-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	2	2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.33	-
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ ECD/ MS	0.003	<0.0001	<0.0001

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

Job Number : EV120601rev.1  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120801-05
Customer Sample I.D :					OS - 11 (Composite)
Date Sampled :					29-Jul-12
Sample Matrix :					Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results
<b>Physical Tests</b>					
1	Brightness <sup>1)</sup>	m	Sacht disc	>3	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	-
4	Oil Film <sup>1)</sup>	-	Visual	-	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	-
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	-
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	-
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	9
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	-
<b>Anions</b>					
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005
<b>Nutrients</b>					
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.126
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	<0.005
<b>Microbiology Tests</b>					
1	Total Coliform	MPN/100ml	Incubation	1000	ND
<b>Dissolved Metals</b>					
1	Arsenic, As	mg/L	HVAAS	0.012	0.0008
2	Cadmium, Cd	mg/L	GFAAS	0.001	0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	0.005

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VI/2012

<b>Laboratory Sample I.D :</b>					EV120601-05
<b>Customer Sample I.D :</b>					OS - 11 (Composite)
<b>Date Sampled :</b>					29-Jul-12
<b>Sample Matrix :</b>					Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results
	Miscellaneous				
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	-
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001
	<b>Organic Tests<sup>2)</sup></b>				
1	Polycyclic Aromatic Hydrocarbons, PAHs <sup>2)</sup>	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001

Note: Regulation Limit based on KapMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

<sup>2)</sup> = Subcontracted

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VI/2012

Laboratory Sample I.D :					EV120801-01	EV120801-02	EV120801-03
Customer Sample I.D :					NS - 07	NS - 08	NS - 09
Date Sampled :					29-Jul-12	29-Jul-12	29-Jul-12
Sample Matrix :					Seawater	Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results	Results
<b>Physical Tests</b>							
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	<1	<1	<1
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.94	7.73	7.96
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.2	14.2	26.7
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.8	27.3	27.0
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	11.8	35.2	27.0
<b>Miscellaneous</b>							
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.04	6.12	6.33

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III  
<sup>1)</sup> = Field Measurement

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VII/2012

<b>Laboratory Sample I.D :</b>					EV120601-04		
<b>Customer Sample I.D :</b>					OS - 08		
<b>Date Sampled :</b>					28-Jul-12		
<b>Sample Matrix :</b>					Seawater		
No.	Test Description	Unit	Technique	Regulation Limit	Results		
	<b>Physical Tests</b>				<b>Top 2 m</b>	<b>Middle 25 m</b>	<b>Bottom 48m</b>
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	4	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	-	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	-	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.94	7.99	7.99
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.9	30.5	30.8
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.6	27.9	27.5
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	4.2	-	-
	<b>Miscellaneous</b>						
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.84	5.23	5.01

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III  
<sup>1)</sup> = Field Measurement

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/US-EV/VII/2012

<b>Laboratory Sample I.D :</b>					EV120601-05		
<b>Customer Sample I.D :</b>					OS - 11		
<b>Date Sampled :</b>					28-Jul-12		
<b>Sample Matrix :</b>					Seawater		
No.	Test Description	Unit	Technique	Regulation Limit	Results		
	<b>Physical Tests</b>				<b>Top 2 m</b>	<b>Middle 20 m</b>	<b>Bottom 38m</b>
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	3	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	-	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	-	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.94	7.98	7.98
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.7	30.4	30.8
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.6	28.2	27.8
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	2.4	-	-
	<b>Miscellaneous</b>						
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.85	5.41	5.08

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III  
<sup>1)</sup> = Field Measurement

### QUALITY CONTROL - PRECISION

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.71/IUS-EVM/II/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-05	EV120601-05 (Replicate)	
<b>Physical Tests</b>					
1	Brightness <sup>1)</sup>	m	3	-	-
2	Floating Matter <sup>1)</sup>	-	None	-	-
3	Odor <sup>1)</sup>	-	Odorless	-	-
4	Oil Film <sup>1)</sup>	-	None	-	-
5	pH <sup>1)</sup>	-	7.94	-	-
6	Salinity <sup>1)</sup>	‰	29.7	-	-
7	Temperature <sup>1)</sup>	°C	28.6	-	-
8	Total Suspended Solids, TSS	mg/L	9	8	2.9%
9	Turbidity <sup>1)</sup>	NTU	2.4	-	-
<b>Anions</b>					
1	Sulphide as H <sub>2</sub> S	mg/L	<0.002	-	-
2	Total Cyanide, CN	mg/L	<0.005	<0.005	-
<b>Nutrients</b>					
1	Ammonia, NH <sub>3</sub> -N	mg/L	<0.02	<0.02	-
2	Nitrate, NO <sub>3</sub> -N	mg/L	0.126	0.127	-
3	Total Phosphorus as P	mg/L	<0.005	<0.005	-
<b>Microbiology Tests</b>					
1	Total Coliform	MPN/100ml	ND	-	-
<b>Dissolved Metals</b>					
1	Arsenic, As	mg/L	0.0008	0.0008	0.0%
2	Cadmium, Cd	mg/L	0.0001	0.0001	4.0%
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	<0.002	<0.002	-
4	Copper, Cu	mg/L	<0.001	<0.001	-
5	Lead, Pb	mg/L	<0.001	<0.001	-
6	Mercury, Hg	mg/L	<0.00005	<0.00005	-
7	Nickel, Ni	mg/L	<0.02	<0.02	-
8	Zinc, Zn	mg/L	0.005	0.005	2.9%



**QUALITY CONTROL - PRECISION**

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/III/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-05	EV120601-05 (Replicate)	
	<b>Miscellaneous</b>				
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	<2	<2	-
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	5.85	-	-
3	Surfactants, MBAS	mg/L	<0.01	<0.01	-
4	Oil & Grease	mg/L	<1	-	-
5	Total Phenols	mg/L	<0.001	<0.001	-
	<b>Organic Tests**</b>				
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	<0.0001	-	-

**QUALITY CONTROL - PRECISION**

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh Expansion Project BP Barau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/II/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-08	EV120601-08 (Replicate)	
	<b>Total Metals</b>				
1	Antimony, Sb	mg/dry Kg	0.34	0.35	0.8%
2	Arsenic, As	mg/dry Kg	9.57	9.08	5.5%
3	Cadmium, Cd	mg/dry Kg	<0.1	<0.1	-
4	Chromium, Cr	mg/dry Kg	27	27	1.3%
5	Copper, Cu	mg/dry Kg	13.1	13.0	0.8%
6	Lead, Pb	mg/dry Kg	11	12	5.4%
7	Mercury, Hg	mg/dry Kg	0.040	0.044	9.3%
8	Nickel, Ni	mg/dry Kg	27.2	26.7	1.8%
9	Selenium, Se	mg/dry Kg	0.17	0.19	10.3%
10	Silver, Ag	mg/dry Kg	<0.4	<0.4	-
11	Zinc, Zn	mg/dry Kg	72.4	73.8	1.9%
	<b>Organic Tests</b>				
1	TPH	mg/dry Kg	<2	-	-

### QUALITY CONTROL - ACCURACY

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/II/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
<b>Physical Tests</b>							
1	Brightness <sup>1)</sup>	m	-	-	-	-	-
2	Floating Matter <sup>1)</sup>	-	-	-	-	-	-
3	Odor <sup>1)</sup>	-	-	-	-	-	-
4	Oil Film <sup>1)</sup>	-	-	-	-	-	-
5	pH <sup>1)</sup>	-	-	-	-	-	-
6	Salinity <sup>1)</sup>	ppt	-	-	-	-	-
7	Temperature <sup>1)</sup>	°C	-	-	-	-	-
8	Total Suspended Solids, TSS	mg/L	1	<1	39	40	102%
9	Turbidity (in lab)	NTU	0.5	<0.5	-	-	-
<b>Anions</b>							
1	Sulphide as H <sub>2</sub> S	mg/L	0.002	<0.002	2.25	2.25	100%
2	Total Cyanide, CN	mg/L	0.005	<0.005	0.848	0.769	91%
<b>Nutrients</b>							
1	Ammonia, NH <sub>3</sub> -N	mg/L	0.02	<0.02	9.17	9.10	99%
2	Nitrate, NO <sub>3</sub> -N	mg/L	0.005	<0.005	4.35	4.49	103%
3	Total Phosphorus as P	mg/L	0.005	<0.005	8.88	8.55	96%
<b>Microbiology Tests</b>							
1	Total Coliform	MPN/100ml	1	-	-	-	-
<b>Dissolved Metals</b>							
1	Arsenic, As	mg/L	0.0005	<0.0005	0.347	0.349	101%
2	Cadmium, Cd	mg/L	0.0001	<0.0001	0.427	0.407	95%
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	0.002	<0.002	0.348	0.331	96%
4	Copper, Cu	mg/L	0.001	<0.001	0.217	0.217	100%
5	Lead, Pb	mg/L	0.001	<0.001	0.754	0.779	103%
6	Mercury, Hg	mg/L	0.00005	<0.00005	0.0173	0.0178	103%
7	Nickel, Ni	mg/L	0.001	<0.001	0.51	0.49	97%
8	Zinc, Zn	mg/L	0.005	<0.005	0.975	0.938	96%

### QUALITY CONTROL - ACCURACY

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/US-EV/II/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
<b>Miscellaneous</b>							
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	2	<2	82	80	98%
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	-	-	-	-	-
3	Surfactants, MBAS	mg/L	0.01	<0.01	0.35	0.35	100%
4	Oil & Grease ( Spike)	mg/L	1	<1	202	184	91%
5	Total Phenols	mg/L	0.001	<0.001	0.163	0.159	98%
<b>Total Metals (Sediment)</b>							
1	Antimony, Sb	mg/dry Kg	0.01	<0.01	113	107	95%
2	Arsenic, As	mg/dry Kg	0.01	<0.01	237	232	98%
3	Cadmium, Cd	mg/dry Kg	0.1	<0.1	191	189	99%
4	Chromium, Cr	mg/dry Kg	1	<1	128	132	103%
5	Copper, Cu	mg/dry Kg	0.2	<0.2	123	119	97%
6	Lead, Pb	mg/dry Kg	1	<1	103	98	95%
7	Mercury, Hg	mg/dry Kg	0.001	<0.001	12.4	12.6	102%
8	Nickel, Ni	mg/dry Kg	0.4	<0.4	118	112	95%
9	Selenium, Se	mg/dry Kg	0.01	<0.01	110	120	109%
10	Silver, Ag	mg/dry Kg	0.4	<0.4	-	-	-
11	Zinc, Zn	mg/dry Kg	0.1	<0.1	183	179	98%
<b>Organic Tests**</b>							
1	TPH	mg/dry Kg	2	<2	148	156	105%
<b>Organic Tests**</b>							
<b>Polycyclic Aromatic Hydrocarbons, PAHs**</b>							
1	Acenaphthene	mg/L	0.0001	<0.0001	4.00	3.38	85%
2	Acenaphthylene	mg/L	0.0001	<0.0001	4.00	3.42	86%
3	Anthracene	mg/L	0.0001	<0.0001	4.00	3.84	96%
4	Benzo(a)anthracene	mg/L	0.0001	<0.0001	4.00	3.76	94%
5	Benzo(a)pyrene	mg/L	0.0001	<0.0001	4.00	4.12	103%
6	Benzo(g,h,i)perylene	mg/L	0.0001	<0.0001	4.00	4.34	109%
7	Benzo(k)fluoranthene	mg/L	0.0001	<0.0001	4.00	4.12	103%
8	Chrysene	mg/L	0.0001	<0.0001	4.00	4.22	106%

### QUALITY CONTROL - ACCURACY

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/US-EV/II/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
9	Dibenz(a,h)anthracene	mg/L	0.0001	<0.0001	4.00	4.32	108%
10	Fluoranthene	mg/L	0.0001	<0.0001	4.00	4.14	104%
11	Fluorene	mg/L	0.0001	<0.0001	4.00	3.36	84%
12	Indeno(1,2,3-cd)pyrene	mg/L	0.0001	<0.0001	4.00	4.34	109%
13	Naphthalene	mg/L	0.0001	<0.0001	4.00	3.84	96%
14	Phenanthrene	mg/L	0.0001	<0.0001	4.00	3.92	98%
15	Pyrene	mg/L	0.0001	<0.0001	4.00	4.32	108%

Note: <sup>1)</sup> = Field Measurement



**PT. Intertek Utama Services**  
Jl. Raya Bogor Km. 28  
Jakarta Timur 13710  
Indonesia  
Telp. : +62 21 29384454  
Fax. : +62 21 29384465  
Email: indo.office@intertek.com  
Website: www.intertek.com

## ENVIRONMENTAL TEST REPORT

**Mr. Yahya Husin**  
PT ERM Indonesia  
Wisma Aldiron Dirgantara, 2nd Floor, Suite # 238-239  
Jl. Gatot Subroto Kav. 72  
Jakarta 12780  
Indonesia

**Job Number :** EV120601rev.1 **Date received :** 02-Aug-2012  
**Client Ref :** 1241.r1/IUS-EV/VII/2012 **Date reported :** 24-Sep-2012

**Number of samples :** 8

**Report Comprising :** Cover Sheet, Sample Information, Results, QC

**Total Pages :** 18

**Notes :**  
N.A = Not Analyzed  
I.S = Insufficient Sample  
\* = Non Accredited Test  
\*\* = Sub Contracted Test  
1) = Field Measurement  
I.P = In Progress

**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh  
Expansion Project BP Berau Ltd

Approved Signature for:

**Reginald C. de Wit**  
Technical Advisor - Environmental

All work is performed in accordance with Intertek Standard Terms and Conditions of work  
<http://www.intertek.com/terms/>

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as received.

This report was prepared solely for the use of the client named in this report. PT Intertek Utama Services accepts no responsibility for any loss, damage or liability suffered by any third party as a result of any reliance upon or use of this report.

**DO NOT PHOTOCOPY**



SA

### SAMPLE INFORMATION

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VII/2012

No.	Laboratory Sample I.D.	Customer Sample I.D.	Sample Matrix	Date Sampled	Time Sampled	Date Received	Sampled By	Coordinates	
								South	East:
1	EV120601-01	NS - 07	Seawater	29-Jul-12	14:25	02-Aug-12	Winamo, Ali, dan Ajiraga	02° 13' 43.3"	133° 15' 00.9"
2	EV120601-02	NS - 08	Seawater	29-Jul-12	11:30	02-Aug-12	Winamo, Ali, dan Ajiraga	02° 17' 19.0"	132° 52' 49.1"
3	EV120601-03	NS - 09	Seawater	28-Jul-12	10:05	02-Aug-12	Winamo, Ali, dan Ajiraga	02° 18' 25.9"	132° 39' 43.4"
4	EV120601-04	OS - 08	Seawater	29-Jul-12	16:04	02-Aug-12	Winamo, Ali, dan Ajiraga	02° 18' 58.0"	133° 08' 17.0"
5	EV120601-05	OS - 11	Seawater	29-Jul-12	15:10	02-Aug-12	Winamo, Ali, dan Ajiraga	02° 15' 54.0"	133° 11' 07.0"
6	EV120601-06	NS - 07	Sediment	29-Jul-12	14:25	02-Aug-12	Winamo, Ali, dan Ajiraga	02° 13' 43.3"	133° 15' 00.9"
7	EV120601-07	NS - 08	Sediment	29-Jul-12	11:30	02-Aug-12	Winamo, Ali, dan Ajiraga	02° 17' 19.0"	132° 52' 49.1"
8	EV120601-08	NS - 09	Sediment	28-Jul-12	10:05	02-Aug-12	Winamo, Ali, dan Ajiraga	02° 18' 25.9"	132° 39' 43.4"

BP

**Job Number :** EV120601 rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-01	EV120601-02
Customer Sample I.D :					NS - 07	NS - 08
Date Sampled :					29-Jul-12	29-Jul-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	<1	<1
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.94	7.73
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.2	14.2
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.6	27.3
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	20	33
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	11.8	35.2
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.165	0.156
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	<0.005	<0.005
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	33
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0008	0.0008
2	Cadmium, Cd	mg/L	GFAAS	0.001	0.0001	0.0012
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	0.001	0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	0.008	0.007



**Job Number :** EV120601 rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.1/IUS-EV/VI/2012

<b>Laboratory Sample I.D :</b>					EV120601-01	EV120601-02
<b>Customer Sample I.D :</b>					NS - 07	NS - 08
<b>Date Sampled :</b>					29-Jul-12	29-Jul-12
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	4	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.04	6.12
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

**Job Number :** EV120601 rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VI/2012

Laboratory Sample I.D :					EV120601-03	EV120801-04
Customer Sample I.D :					NS - 09	OS - 08 (Composite)
Date Sampled :					29-Jul-12	29-Jul-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	<1	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	-
4	Oil Film <sup>1)</sup>	-	Visual	-	None	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.96	-
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	26.7	-
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	27.0	-
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	28	7
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	27.0	-
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.203	0.179
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	<0.005	<0.005
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	49	ND
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0006	0.0009
2	Cadmium, Cd	mg/L	GFAAS	0.001	0.0001	0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	0.006	0.006

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VI/2012

<b>Laboratory Sample I.D :</b>					EV120601-03	EV120601-04
<b>Customer Sample I.D :</b>					NS - 09	OS - 08 (Composite)
<b>Date Sampled :</b>					29-Jul-12	29-Jul-12
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
	<b>Miscellaneous</b>					
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	2	2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.33	-
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
	<b>Organic Tests<sup>2)</sup></b>					
1	Polycyclic Aromatic Hydrocarbons, PAHs <sup>3)</sup>	mg/L	Solvent Extraction GC/ ECD/ MS	0.003	<0.0001	<0.0001

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

<sup>3)</sup> = Subcontracted

Job Number : EV120601rev.1  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EVM/II/2012

Laboratory Sample I.D :					EV120601-05
Customer Sample I.D :					OS - 11 (Composite)
Date Sampled :					29-Jul-12
Sample Matrix :					Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results
<b>Physical Tests</b>					
1	Brightness <sup>1)</sup>	m	Sachl disc	>3	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	-
4	Oil Film <sup>1)</sup>	-	Visual	-	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	-
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	-
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	-
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	9
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	-
<b>Anions</b>					
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005
<b>Nutrients</b>					
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.126
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	<0.005
<b>Microbiology Tests</b>					
1	Total Coliform	MPN/100ml	Incubation	1000	ND
<b>Dissolved Metals</b>					
1	Arsenic, As	mg/L	HVAAS	0.012	0.0008
2	Cadmium, Cd	mg/L	GFAAS	0.001	0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002
4	Copper, Cu	mg/L	GFAAS	0.003	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	0.005

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/II/2012

<b>Laboratory Sample I.D :</b>					EV120601-05
<b>Customer Sample I.D :</b>					OS - 11 (Composite)
<b>Date Sampled :</b>					29-Jul-12
<b>Sample Matrix :</b>					Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results
<b>Miscellaneous</b>					
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	-
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001
<b>Organic Tests**</b>					
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry  
 Season AMDAL Tangguh Expansion  
 Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/II/2012

Laboratory Sample I.D :					EV120601-01	EV120601-02	EV120601-03
Customer Sample I.D :					NS - 07	NS - 08	NS - 09
Date Sampled :					29-Jul-12	29-Jul-12	29-Jul-12
Sample Matrix :					Seawater	Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results	Results
<b>Physical Tests</b>							
1	Brightness <sup>1)</sup>	m	Secchi disc	>3	<1	<1	<1
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.94	7.73	7.86
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.2	14.2	26.7
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.6	27.3	27.0
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	11.8	35.2	27.0
<b>Miscellaneous</b>							
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.04	6.12	6.33

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III  
<sup>1)</sup> = Field Measurement

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry  
 Season AMDAL Tangguh Expansion  
 Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/II/2012

<b>Laboratory Sample i.D :</b>					EV120601-04		
<b>Customer Sample i.D :</b>					OS - 08		
<b>Date Sampled :</b>					29-Jul-12		
<b>Sample Matrix :</b>					Seawater		
No.	Test Description	Unit	Technique	Regulation Limit	Results		
					Top 2 m	Middle 25 m	Bottom 48m
<b>Physical Tests</b>							
1	Brightness <sup>1)</sup>	m	Sachl disc	>3	4	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	-	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	-	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.94	7.99	7.99
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.9	30.6	30.8
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.6	27.9	27.5
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	4.2	-	-
<b>Miscellaneous</b>							
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.94	5.23	5.01

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry  
 Season AMDAL Tangguh Expansion  
 Project BP Berau Ltd  
**Customer Ref :** 1241.r1/US-EV/II/2012

<b>Laboratory Sample I.D :</b>					EV120601-05		
<b>Customer Sample I.D :</b>					OS - 11		
<b>Date Sampled :</b>					29-Jul-12		
<b>Sample Matrix :</b>					Seawater		
No.	Test Description	Unit	Technique	Regulation Limit	Results		
	<b>Physical Tests</b>				<b>Top 2 m</b>	<b>Middle 20 m</b>	<b>Bottom 38m</b>
1	Brightness <sup>1)</sup>	m	Sachl disc	>3	3	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	-	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	-	-
5	pH <sup>1)</sup>	-	Probs	7.0-8.5	7.94	7.98	7.98
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.7	30.4	30.8
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.6	28.2	27.8
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	2.4	-	-
	<b>Miscellaneous</b>						
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.85	5.41	5.08

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement



### QUALITY CONTROL - PRECISION

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/MI/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-05	EV120601-05 (Replicate)	
<b>Physical Tests</b>					
1	Brightness <sup>1)</sup>	m	3	-	-
2	Floating Matter <sup>1)</sup>	-	None	-	-
3	Odor <sup>1)</sup>	-	Odorless	-	-
4	Oil Film <sup>1)</sup>	-	None	-	-
5	pH <sup>1)</sup>	-	7.94	-	-
6	Salinity <sup>1)</sup>	‰	29.7	-	-
7	Temperature <sup>1)</sup>	°C	28.6	-	-
8	Total Suspended Solids, TSS	mg/L	8	8	2.9%
9	Turbidity <sup>1)</sup>	NTU	2.4	-	-
<b>Anions</b>					
1	Sulphide as H <sub>2</sub> S	mg/L	<0.002	-	-
2	Total Cyanide, CN	mg/L	<0.005	<0.005	-
<b>Nutrients</b>					
1	Ammonia, NH <sub>3</sub> -N	mg/L	<0.02	<0.02	-
2	Nitrate, NO <sub>3</sub> -N	mg/L	0.126	0.127	-
3	Total Phosphorus as P	mg/L	<0.005	<0.005	-
<b>Microbiology Tests</b>					
1	Total Coliform	MPN/100ml	ND	-	-
<b>Dissolved Metals</b>					
1	Arsenic, As	mg/L	0.0008	0.0008	0.0%
2	Cadmium, Cd	mg/L	0.0001	0.0001	4.0%
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	<0.002	<0.002	-
4	Copper, Cu	mg/L	<0.001	<0.001	-
5	Lead, Pb	mg/L	<0.001	<0.001	-
6	Mercury, Hg	mg/L	<0.00005	<0.00005	-
7	Nickel, Ni	mg/L	<0.02	<0.02	-
8	Zinc, Zn	mg/L	0.005	0.005	2.9%

**QUALITY CONTROL - PRECISION**

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/II/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-05	EV120601-05 (Replicate)	
	<b>Miscellaneous</b>				
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	<2	<2	-
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	5.85	-	-
3	Surfactants, MBAS	mg/L	<0.01	<0.01	-
4	Oil & Grease	mg/L	<1	-	-
5	Total Phenols	mg/L	<0.001	<0.001	-
	<b>Organic Tests**</b>				
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	<0.0001	-	-

**QUALITY CONTROL - PRECISION**

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VIU2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-08	EV120601-08 (Replicate)	
	<b>Total Metals</b>				
1	Antimony, Sb	mg/dry Kg	0.34	0.35	0.8%
2	Arsenic, As	mg/dry Kg	9.57	9.06	5.5%
3	Cadmium, Cd	mg/dry Kg	<0.1	<0.1	-
4	Chromium, Cr	mg/dry Kg	27	27	1.3%
5	Copper, Cu	mg/dry Kg	13.1	13.0	0.8%
6	Lead, Pb	mg/dry Kg	11	12	5.4%
7	Mercury, Hg	mg/dry Kg	0.040	0.044	9.3%
8	Nickel, Ni	mg/dry Kg	27.2	26.7	1.8%
9	Selenium, Se	mg/dry Kg	0.17	0.19	10.3%
10	Silver, Ag	mg/dry Kg	<0.4	<0.4	-
11	Zinc, Zn	mg/dry Kg	72.4	73.8	1.9%
	<b>Organic Tests</b>				
1	TPH	mg/dry Kg	<2	-	-

### QUALITY CONTROL - ACCURACY

Job Number : EV120601rev.1  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
<b>Physical Tests</b>							
1	Brightness <sup>1)</sup>	m	-	-	-	-	-
2	Floating Matter <sup>1)</sup>	-	-	-	-	-	-
3	Odor <sup>1)</sup>	-	-	-	-	-	-
4	Oil Film <sup>1)</sup>	-	-	-	-	-	-
5	pH <sup>1)</sup>	-	-	-	-	-	-
6	Salinity <sup>1)</sup>	ppt	-	-	-	-	-
7	Temperature <sup>1)</sup>	°C	-	-	-	-	-
8	Total Suspended Solids, TSS	mg/L	1	<1	39	40	102%
9	Turbidity (in lab)	NTU	0.5	<0.5	-	-	-
<b>Anions</b>							
1	Sulphide as H <sub>2</sub> S	mg/L	0.002	<0.002	2.25	2.25	100%
2	Total Cyanide, CN	mg/L	0.005	<0.005	0.848	0.769	91%
<b>Nutrients</b>							
1	Ammonia, NH <sub>3</sub> -N	mg/L	0.02	<0.02	9.17	9.10	99%
2	Nitrate, NO <sub>3</sub> -N	mg/L	0.005	<0.005	4.35	4.49	103%
3	Total Phosphorus as P	mg/L	0.005	<0.005	8.88	8.55	96%
<b>Microbiology Tests</b>							
1	Total Coliform	MPN/100ml	1	-	-	-	-
<b>Dissolved Metals</b>							
1	Arsenic, As	mg/L	0.0005	<0.0005	0.347	0.349	101%
2	Cadmium, Cd	mg/L	0.0001	<0.0001	0.427	0.407	95%
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	0.002	<0.002	0.346	0.331	96%
4	Copper, Cu	mg/L	0.001	<0.001	0.217	0.217	100%
5	Lead, Pb	mg/L	0.001	<0.001	0.754	0.779	103%
6	Mercury, Hg	mg/L	0.00005	<0.00005	0.0173	0.0178	103%
7	Nickel, Ni	mg/L	0.001	<0.001	0.51	0.49	97%
8	Zinc, Zn	mg/L	0.005	<0.005	0.975	0.938	96%

### QUALITY CONTROL - ACCURACY

Job Number : EV120601rev.1  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/VII/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
<b>Miscellaneous</b>							
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	2	<2	82	80	98%
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	-	-	-	-	-
3	Surfactants, MBAS	mg/L	0.01	<0.01	0.35	0.35	100%
4	Oil & Grease ( Spike)	mg/L	1	<1	202	184	91%
5	Total Phenols	mg/L	0.001	<0.001	0.163	0.159	98%
<b>Total Metals (Sediment)</b>							
1	Antimony, Sb	mg/dry Kg	0.01	<0.01	113	107	95%
2	Arsenic, As	mg/dry Kg	0.01	<0.01	237	232	98%
3	Cadmium, Cd	mg/dry Kg	0.1	<0.1	191	189	99%
4	Chromium, Cr	mg/dry Kg	1	<1	128	132	103%
5	Copper, Cu	mg/dry Kg	0.2	<0.2	123	119	97%
6	Lead, Pb	mg/dry Kg	1	<1	103	98	95%
7	Mercury, Hg	mg/dry Kg	0.001	<0.001	12.4	12.6	102%
8	Nickel, Ni	mg/dry Kg	0.4	<0.4	118	112	95%
9	Selenium, Se	mg/dry Kg	0.01	<0.01	110	120	109%
10	Silver, Ag	mg/dry Kg	0.4	<0.4	-	-	-
11	Zinc, Zn	mg/dry Kg	0.1	<0.1	183	179	98%
<b>Organic Tests**</b>							
1	TPH	mg/dry Kg	2	<2	148	156	105%
<b>Organic Tests**</b>							
<b>Polycyclic Aromatic Hydrocarbons, PAHs**</b>							
1	Acenaphthene	mg/L	0.0001	<0.0001	4.00	3.38	85%
2	Acenaphthylene	mg/L	0.0001	<0.0001	4.00	3.42	86%
3	Anthracene	mg/L	0.0001	<0.0001	4.00	3.84	96%
4	Benzo(a)anthracene	mg/L	0.0001	<0.0001	4.00	3.76	94%
5	Benzo(a)pyrene	mg/L	0.0001	<0.0001	4.00	4.12	103%
6	Benzo(g,h,i)perylene	mg/L	0.0001	<0.0001	4.00	4.34	109%
7	Benzo(k)fluoranthene	mg/L	0.0001	<0.0001	4.00	4.12	103%
8	Chrysene	mg/L	0.0001	<0.0001	4.00	4.22	106%

**QUALITY CONTROL - ACCURACY**

**Job Number :** EV120601 rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/US-EV/VII/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
9	Dibenz(a,h)anthracene	mg/L	0.0001	<0.0001	4.00	4.32	108%
10	Fluoranthene	mg/L	0.0001	<0.0001	4.00	4.14	104%
11	Fluorene	mg/L	0.0001	<0.0001	4.00	3.36	84%
12	Indeno(1,2,3-cd)pyrene	mg/L	0.0001	<0.0001	4.00	4.34	109%
13	Naphthalene	mg/L	0.0001	<0.0001	4.00	3.84	96%
14	Phenanthrene	mg/L	0.0001	<0.0001	4.00	3.92	98%
15	Pyrene	mg/L	0.0001	<0.0001	4.00	4.32	108%

Note: <sup>1)</sup> = Field Measurement



**PT. Intertek Utama Services**  
Cilandak Commercial Estate 103E  
Jl. Cilandak KKO  
Jakarta 12560  
Indonesia  
Tel: +6221 7808011  
Fax: +6221 7807929  
Email: indo.office@intertek.com  
Website: www.intertek.com

## ENVIRONMENTAL TEST REPORT

**Mr. Yahya Husin**  
PT ERM Indonesia  
Wisma Aldiron Dirgantara, 2nd Floor, Suite # 238-239  
Jl. Gatot Subroto Kav. 72  
Jakarta 12780  
Indonesia

**Job Number :** EV120601-B **Date received :** 14-Aug-2012  
**Client Ref :** 1241.r1/IUS-EV/III/2012 **Date received :** 16-Aug-2012  
**Date reported :** 26-Sep-2012

**Number of samples :** 8

**Report Comprising :** Cover Sheet, Sample Information, Results, QC

**Total Pages :** 19

**Notes :**  
N.A = Not Analyzed  
I.S = Insufficient Sample  
\* = Non Accredited Test  
\*\* = Sub Contracted Test  
1) = Field Measurement  
I.P = In Progress

**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh  
Expansion Project BP Berau Ltd

**Approved Signature for:**

**Reginald C. de Wit**  
**Technical Advisor - Environmental**

All work is performed in accordance with Intertek Standard Terms and Conditions of work  
<http://www.intertek.com/terms/>

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as received.

This report was prepared solely for the use of the client named in this report. PT Intertek Utama Services accepts no responsibility for any loss, damage or liability suffered by any third party as a result of any reliance upon or use of this report.

**DO NOT PHOTOCOPY**

Page 1 of 19

### SAMPLE INFORMATION

**Job Number :** EV120601-B  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VII/2012

No	Laboratory Sample I.D.	Customer Sample I.D	Sample Matrix	Date Sampled	Time Sampled	Date Received	Sampled By	Coordinates	
								South	East
1	EV120601-24	OS - 01	Seawater	7-Aug-12	14:00	14-Aug-12	Winarno, Ali, dan Ajiraga	02° 20' 32.0"	132° 57' 31.0"
2	EV120601-25	OS - 05	Seawater	7-Aug-12	15:00	14-Aug-12	Winarno, Ali, dan Ajiraga	02° 20' 44.0"	132° 48' 38.0"
3	EV120601-26	OS - 09	Seawater	7-Aug-12	16:00	14-Aug-12	Winarno, Ali, dan Ajiraga	02° 22' 36.0"	132° 6' 39.0"
4	EV120601-27	SW - 03	Surface Water	9-Aug-12	15:30	14-Aug-12	Winarno, Ali, dan Ajiraga	02° 31' 54.8"	132° 16' 29.3"
5	EV120601-28	OS - 09	Sediment	7-Aug-12	16:00	14-Aug-12	Winarno, Ali, dan Ajiraga	02° 22' 36.0"	132° 6' 39.0"
6	EV120601-29	SW - 03	Sediment	9-Aug-12	15:30	14-Aug-12	Winarno, Ali, dan Ajiraga	02° 31' 54.8"	132° 16' 29.3"
7	EV120601-30	NS - 03	Sediment	13-Aug-12	9:25	16-Aug-12	Winarno, Ali, dan Ajiraga	02° 25' 49.6"	133° 07' 18.0"
8	EV120601-31	NS - 03	Seawater	13-Aug-12	9:25	16-Aug-12	Winarno, Ali, dan Ajiraga	02° 25' 49.6"	133° 07' 18.0"



Job Number : EV120601-B  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/AUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-24	EV120601-25
Customer Sample I.D :					OS - 01 (Composite)	OS - 05 (Composite)
Date Sampled :					07-Aug-12	07-Aug-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	-	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	-	-
4	Oil Film <sup>1)</sup>	-	Visual	-	-	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	-	-
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	-	-
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	-	-
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	2	4
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	-	-
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.080	0.087
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.010	0.005
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0007	0.0006
2	Cadmium, Cd	mg/L	GFAAS	0.001	0.0001	0.0006
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	0.008	0.007

Job Number : EV120601-B  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :				EV120601-24	EV120601-25	
Customer Sample I.D :				OS - 01 (Composite)	OS - 05 (Composite)	
Date Sampled :				07-Aug-12	07 Aug 12	
Sample Matrix :				Seawater	Seawater	
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.17	5.68
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

Job Number : EV120601-B  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-26	EV120601 3'
Customer Sample I.D :					OS - 09 (Composite)	NS 03 (Composite)
Date Sampled :					07-Aug-12	13-Aug 12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	-	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	-	-
4	Oil Film <sup>1)</sup>	-	Visual	-	-	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	-	-
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	-	-
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	-	-
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	11	22
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	-	-
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.121	0.120
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	<0.005	0.034
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	4
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0007	0.0015
2	Cadmium, Cd	mg/L	GFAAS	0.001	0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	0.006	0.008

Job Number : EV120601-B  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-26	EV120601 31
Customer Sample I.D :					OS - 08 (Composite)	NS - 03 (Composite)
Date Sampled :					07-Aug-12	13-Aug 12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	4.86	5.16
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

Job Number : EV120601-B  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-24		
Customer Sample I.D :					OS - 01		
Date Sampled :					07-Aug-12		
Sample Matrix :					Seawater		
No.	Test Description	Unit	Technique	Regulation Limit	Results		
	<b>Physical Tests</b>				<b>Top 2m</b>	<b>Middle33m</b>	<b>Bottom 64m</b>
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	4	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	-	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	-	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.71	7.75	7.69
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.1	31.0	31.0
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	29.0	28.5	28.2
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	<0.5	-	-
	<b>Miscellaneous</b>						
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.17	5.10	4.37

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

Job Number : EV120601-B  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IJS-EV/VII/2012

Laboratory Sample I.D :					EV120601-25		
Customer Sample I.D :					OS - 05		
Date Sampled :					07-Aug-12		
Sample Matrix :					Seawater		
No.	Test Description	Unit	Technique	Regulation Limit	Results		
	<b>Physical Tests</b>				<b>Top 2m</b>	<b>Middle18m</b>	<b>Bottom 37m</b>
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	3	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	-	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	-	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.71	7.77	7.79
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	30.8	30.8	30.9
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.5	28.2	28.1
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	3.6	-	-
	<b>Miscellaneous</b>						
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.68	4.90	4.17

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

Job Number : EV120601-B  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-26	
Customer Sample I.D :					OS - 09	
Date Sampled :					07-Aug-12	
Sample Matrix :					Seawater	
No.	Test Description	Unit	Technique	Regulation Limit	Results	
<b>Physical Tests</b>					<b>Top 2m</b>	<b>Bottom 11m</b>
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	2	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.70	-
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	30.3	30.5
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.8	28.6
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	10.1	-
<b>Miscellaneous</b>						
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	4.86	4.68

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

Job Number : EV120601-B  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/II/2012

Laboratory Sample I.D :					EV120601 31	
Customer Sample I.D :					NS - 03	
Date Sampled :					13-Aug-12	
Sample Matrix :					Seawater	
No.	Test Description	Unit	Technique	Regulation Limit	Results	
	<b>Physical Tests</b>				<b>Top 2m</b>	<b>Bottom 11m</b>
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	<1	
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.70	7.68
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	30.0	30
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.0	27.8
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	11.2	
	<b>Miscellaneous</b>					
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.16	4.89

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

°= Subcontracted





PT. Intertek Utama Services  
Cilandak Commercial Estate 103E  
Jl. Cilandak KKO  
Jakarta 12560  
Indonesia  
Tel: +6221 7808011  
Fax: +6221 7807929  
Email: indo.office@intertek.com  
Website: www.intertek.com

## ENVIRONMENTAL TEST REPORT

Mr. Yahya Husin  
PT ERM Indonesia  
Wisma Aldiron Dirgantara, 2nd Floor, Suite # 238-239  
Jl. Gatot Subroto Kav. 72  
Jakarta 12780  
Indonesia

Job Number : EV120864 Date received : 30-Oct-2012  
Client Ref : 1241.r1/US-EV/VII/2012 Date reported : 14-Dec-2012

Number of samples : 19

Report Comprising : Cover Sheet, Sample Information, Results, QC

Total Pages : 22

Notes :  
N.A = Not Analyzed  
I.S = Insufficient Sample  
\* = Non Accredited Test  
\*\* = Sub Contracted Test  
1) = Field Measurement  
I.P = In Progress

Project Name : Environmental Baseline Survey Dry Season AMDAL Tangguh  
Expansion Project BP Berau Ltd

Approved Signature for:

  
**Reginald C. de Wit**  
Technical Advisor - Environmental

All work is performed in accordance with Intertek Standard Terms and Conditions of work  
<http://www.intertek.com/terms/>

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as received.

This report was prepared solely for the use of the client named in this report. PT Intertek Utama Services accepts no responsibility for any loss, damage or liability suffered by any third party as a result of any reliance upon or use of this report.

**DO NOT PHOTOCOPY**

### SAMPLE INFORMATION

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/VII/2012

No.	Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampling	Time Collected	Date Received	Sampled By	Coordinates	
								South	East
1	EV120864-01	OS - 03	Seawater	27-Oct-12	10:05	30-Oct-12	Ali Miftah	02° 41' 50.3"	132° 44' 40.4"
2	EV120864-02	OS - 04	Seawater	27-Oct-12	11:00	30-Oct-12	Ali Miftah	02° 34' 28.5"	132° 39' 05.2"
3	EV120864-03	OS - 06	Seawater	27-Oct-12	12:37	30-Oct-12	Ali Miftah	02° 30' 42.2"	132° 58' 32.2"
4	EV120864-04	OS - 07	Seawater	27-Oct-12	13:28	30-Oct-12	Ali Miftah	02° 28' 01.4"	133° 01' 22.8"
5	EV120864-05	NS - 05	Seawater	27-Oct-12	14:35	30-Oct-12	Ali Miftah	02° 27' 53.3"	133° 19' 55.5"
6	EV120864-06	OS - 07	Sediment	20-Oct-12	10:40	30-Oct-12	Ali Miftah	02° 26' 01.4"	133° 01' 22.8"
7	EV120864-07	OS - 01	Sediment	20-Oct-12	15:20	30-Oct-12	Ali Miftah	02° 20' 31.8"	133° 57' 30"
8	EV120864-08	OS - 08	Sediment	21-Oct-12	10:16	30-Oct-12	Ali Miftah	02° 18' 58"	133° 08' 17"
9	EV120864-09	OS - 10	Sediment	21-Oct-12	12:50	30-Oct-12	Ali Miftah	02° 22' 53.5"	133° 11' 43.5"
10	EV120864-10	OS - 11	Sediment	21-Oct-12	10:57	30-Oct-12	Ali Miftah	02° 15' 54.2"	133° 11' 07.4"
11	EV120864-11	OS - 12	Sediment	21-Oct-12	11:56	30-Oct-12	Ali Miftah	02° 18' 22.7"	133° 17' 15.7"
12	EV120864-12	OS - 03	Sediment	27-Oct-12	10:05	30-Oct-12	Ali Miftah	02° 41' 50.3"	132° 44' 40.4"
13	EV120864-13	OS - 04	Sediment	27-Oct-12	11:00	30-Oct-12	Ali Miftah	02° 34' 28.5"	132° 39' 05.2"
14	EV120864-14	OS - 06	Sediment	27-Oct-12	12:37	30-Oct-12	Ali Miftah	02° 30' 42.2"	132° 58' 32.2"
15	EV120864-15	NS - 05	Sediment	27-Oct-12	14:35	30-Oct-12	Ali Miftah	02° 27' 53.3"	133° 19' 55.5"
16	EV120864-16	AQN - 09	Ambient Air	27-Oct-12	8:45	01-Nov-12	Hilman Sakhawi	02° 28' 02"	133° 01' 21"
17	EV120864-17	AQN - 10	Ambient Air	27-Oct-12	13:05	01-Nov-12	Hilman Sakhawi	02° 20' 32"	132° 57' 31"
18	EV120864-18	AQN - 11	Ambient Air	28-Oct-12	9:45	01-Nov-12	Hilman Sakhawi	02° 15' 54"	133° 11' 07"
19	EV120864-19	AQN - 12	Ambient Air	28-Oct-12	13:40	01-Nov-12	Hilman Sakhawi	02° 22' 52"	133° 11' 47"

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau  
 Customer Ref : 1241.r1/US-EV/VI/2012

Laboratory Sample I.D :					EV120864-03	EV120864-04
Customer Sample I.D :					OS - 08	OS - 07
Date Sampled :					27-Oct-12	27-Oct-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachl disc	>3	3	3
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	8.58	8.55
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	31.2	31.2
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.1	30.1
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	12	11
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	2.1	4.7
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.033	0.049
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.048	0.043
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0016	0.0018
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau  
 Customer Ref : 1241.1/US-EV/VI/2012

Laboratory Sample I.D :					EV120864-01	EV120864-02
Customer Sample I.D :					OS - 03	OS - 04
Date Sampled :					27-Oct-12	27-Oct-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.88	5.35
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Organic Tests**</b>						
	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ ECD/ MS	0.003	<0.0001	<0.0001
1	Naphthalene	mg/L		-	<0.0001	<0.0001
2	2-Methylnaphthalene	mg/L		-	<0.0001	<0.0001
3	Acenaphthylene	mg/L		-	<0.0001	<0.0001
4	Acenaphthene	mg/L		-	<0.0001	<0.0001
5	Fluorene	mg/L		-	<0.0001	<0.0001
6	Phenanthrene	mg/L		-	<0.0001	<0.0001
7	Anthracene	mg/L		-	<0.0001	<0.0001
8	Fluoranthene	mg/L		-	<0.0001	<0.0001
9	Pyrene	mg/L		-	<0.0001	<0.0001
10	Benzo(a)anthracene	mg/L		-	<0.0001	<0.0001
11	Chrysene	mg/L		-	<0.0001	<0.0001
12	Benzo(b)fluoranthene	mg/L		-	<0.0001	<0.0001
13	Benzo(k)fluoranthene	mg/L		-	<0.0001	<0.0001
14	Benzo(a)pyrene	mg/L		-	<0.0001	<0.0001
15	Indeno(1,2,3-c,d)pyrene	mg/L		-	<0.0001	<0.0001
16	Dibenz(a,h)anthracene	mg/L		-	<0.0001	<0.0001
17	Benzo(ghi)perylene	mg/L	-	<0.0001	<0.0001	

Note: Regulation Limit based on KepMenLH No. 81 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau  
 Customer Ref : 1241.r1/US-EV/VI/2012

Laboratory Sample ID :					EV120864-01	EV120864-02
Customer Sample ID :					OS - 03	OS - 04
Date Sampled :					27-Oct-12	27-Oct-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	2	5
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	8.61	8.63
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	31.1	31.9
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.2	29.8
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	8	11
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	3.9	1.5
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.033	0.051
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.128	0.323
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0018	0.0018
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau  
 Customer Ref : 1241.r1/IUS-EV/VI/2012

Laboratory Sample ID :					EV120864-03	EV120864-04
Customer Sample ID :					OS - 06	OS - 07
Date Sampled :					27-Oct-12	27-Oct-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	8.33	5.91
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Organic Tests**</b>						
	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ ECD/ MS	0.003	<0.0001	<0.0001
1	Naphthalene	mg/L		-	<0.0001	<0.0001
2	2-Methylnaphthalene	mg/L		-	<0.0001	<0.0001
3	Acenaphthylene	mg/L		-	<0.0001	<0.0001
4	Acenaphthene	mg/L		-	<0.0001	<0.0001
5	Fluorene	mg/L		-	<0.0001	<0.0001
6	Phenanthrene	mg/L		-	<0.0001	<0.0001
7	Anthracene	mg/L		-	<0.0001	<0.0001
8	Fluoranthene	mg/L		-	<0.0001	<0.0001
9	Pyrene	mg/L		-	<0.0001	<0.0001
10	Benzo(a)anthracene	mg/L		-	<0.0001	<0.0001
11	Chrysene	mg/L		-	<0.0001	<0.0001
12	Benzo(b)fluoranthene	mg/L		-	<0.0001	<0.0001
13	Benzo(k)fluoranthene	mg/L		-	<0.0001	<0.0001
14	Benzo(a)pyrene	mg/L		-	<0.0001	<0.0001
15	Indeno(1,2,3-c,d)pyrene	mg/L		-	<0.0001	<0.0001
16	Dibenz(a,h)anthracene	mg/L		-	<0.0001	<0.0001
17	Benzo(ghi)perylene	mg/L	-	<0.0001	<0.0001	

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau  
 Customer Ref : 1241.r1/IUS-EV/VI/2012

Laboratory Sample I.D :					EV120864-06
Customer Sample I.D :					NS - 05
Date Sampled :					27-Oct-12
Sample Matrix :					Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results
<b>Physical Tests</b>					
1	Brightness <sup>1)</sup>	m	Sachl disc	>3	<1
2	Floating Matter <sup>1)</sup>	-	Visual	-	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	8.54
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	31
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	31.1
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	86
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	80.0
<b>Anions</b>					
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005
<b>Nutrients</b>					
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.078
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.046
<b>Microbiology Tests</b>					
1	Total Coliform	MPN/100ml	Incubation	1000	ND
<b>Dissolved Metals</b>					
1	Arsenic, As	mg/L	HVAAS	0.012	0.0021
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau  
 Customer Ref : 1241.r1/IUS-EV/VIU/2012

Laboratory Sample I.D :					EV120864-05
Customer Sample I.D :					MS - 05
Date Sampled :					27-Oct-12
Sample Matrix :					Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results
<b>Miscellaneous</b>					
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>3	3.18
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001
<b>Organic Tests**</b>					
Polycyclic Aromatic Hydrocarbons, PAHs**		mg/L	Solvent Extraction GC/ ECD/ MS	0.003	<0.0001
1	Naphthalene	mg/L		-	<0.0001
2	2-Methylnaphthalene	mg/L		-	<0.0001
3	Acenaphthylene	mg/L		-	<0.0001
4	Acenaphthene	mg/L		-	<0.0001
5	Fluorene	mg/L		-	<0.0001
6	Phenanthrene	mg/L		-	<0.0001
7	Anthracene	mg/L		-	<0.0001
8	Fluoranthene	mg/L		-	<0.0001
9	Pyrene	mg/L		-	<0.0001
10	Benz(a)anthracene	mg/L		-	<0.0001
11	Chrysene	mg/L		-	<0.0001
12	Benzo(b)fluoranthene	mg/L		-	<0.0001
13	Benzo(k)fluoranthene	mg/L		-	<0.0001
14	Benzo(a)pyrene	mg/L		-	<0.0001
15	Indeno(1,2,3-c,d)pyrene	mg/L		-	<0.0001
16	Dibenz(a,h)anthracene	mg/L		-	<0.0001
17	Benzo(ghi)perylene	mg/L	-	<0.0001	

Note: Regulation Limit based on KepMenLH No. 81 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\* = Subcontracted



Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP  
 Berau Ltd  
 Customer Ref : 1241.r1/RUS-EV/VI/2012

Laboratory Sample I.D :					EV120864-01	EV120864-02
Customer Sample I.D :					OS - 03	OS - 04
Date Sampled :					27-Oct-12	27-Oct-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	2	5
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	8.61	8.63
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	31.1	31.9
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.2	29.8
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	3.9	1.5
<b>Miscellaneous</b>						
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.88	5.35

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III  
<sup>1)</sup> = Field Measurement

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP  
 Berau Ltd  
 Customer Ref : 1241.r1/US-EV/MI/2012

Laboratory Sample I.D :					EV120864-03	EV120864-04
Customer Sample I.D :					OS - 06	OS - 07
Date Sampled :					27-Oct-12	27-Oct-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	3	3
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	8.58	8.65
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	31.2	31.2
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.1	30.1
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	2.1	4.7
<b>Miscellaneous</b>						
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.33	5.81

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III  
<sup>1)</sup> = Field Measurement

**Job Number :** EV120864  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP  
 Berau Ltd  
**Customer Ref :** 1241.r1/AUS-EV/VI/2012

<b>Laboratory Sample I.D :</b>					EV120864-05
<b>Customer Sample I.D :</b>					NS - 05
<b>Date Sampled :</b>					27-Oct-12
<b>Sample Matrix :</b>					Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results
<b>Physical Tests</b>					
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	<1
2	Floating Matter <sup>1)</sup>	-	Visual	-	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	8.54
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	31
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	31.1
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	60.0
<b>Miscellaneous</b>					
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.16

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III  
<sup>1)</sup> = Field Measurement

## ENVIRONMENTAL TEST REPORT

**Mr. Yahya Husin**  
PT ERM Indonesia  
Wisma Aldiron Dirgantara, 2nd Floor, Suite # 238-239  
Jl. Gatot Subroto Kav. 72  
Jakarta 12780  
Indonesia

**Job Number :** EV120601-A **Date received :** 07-Aug-2012  
**Client Ref :** 1241.r1/US-EV/II/2012 **Date reported :** 24-Sep-2012

**Number of samples :** 15

**Report Comprising :** Cover Sheet, Sample Information, Results, QC

**Total Pages :** 28

**Notes :**  
N.A = Not Analyzed  
I.S = Insufficient Sample  
\* = Non Accredited Test  
\*\* = Sub Contracted Test  
1) = Field Measurement  
I.P = In Progress

**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh  
Expansion Project BP Berau Ltd

**Approved Signature for:**



**Reginald C. de Wit**  
**Technical Advisor - Environmental**

All work is performed in accordance with Intertek Standard Terms and Conditions of work  
<http://www.intertek.com/terms/>

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as received.

This report was prepared solely for the use of the client named in this report. PT Intertek Utama Services accepts no responsibility for any loss, damage or liability suffered by any third party as a result of any reliance upon or use of this report.

**DO NOT PHOTOCOPY**

### SAMPLE INFORMATION

Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/II/2012

No	Laboratory Sample I.D.	Customer Sample I.D	Sample Matrix	Date Sampled	Time Sampled	Date Received	Sampled By	Coordinates	
								South	East
1	EV120601-09	OS - 02	Seawater	5-Aug-12	13:30	07-Aug-12	Winarno, Ali, dan Ajiraga	02° 24' 42.0"	132° 37' 43.0"
2	EV120601-10 <sup>b)</sup>	OS - 09	Seawater	3-Aug-12	15:10	07-Aug-12	Winarno, Ali, dan Ajiraga	-	-
3	EV120601-11	OS - 10	Seawater	4-Aug-12	14:00	07-Aug-12	Winarno, Ali, dan Ajiraga	02° 22' 52.0"	133° 11' 47.0"
4	EV120601-12	OS - 12	Seawater	4-Aug-12	13:00	07-Aug-12	Winarno, Ali, dan Ajiraga	02° 19' 22.0"	133° 17' 19.0"
5	EV120601-13	OS - 13	Seawater	4-Aug-12	11:30	07-Aug-12	Winarno, Ali, dan Ajiraga	02° 20' 06.0"	133° 26' 20.0"
6	EV120601-14	OS - 14	Seawater	4-Aug-12	10:00	07-Aug-12	Winarno, Ali, dan Ajiraga	02° 21' 16.0"	132° 41' 00.0"
7	EV120601-15	NS - 01	Seawater	5-Aug-12	15:00	07-Aug-12	Winarno, Ali, dan Ajiraga	02° 39' 32.3"	132° 32' 18.9"
8	EV120601-16	NS - 02	Seawater	3-Aug-12	16:30	07-Aug-12	Winarno, Ali, dan Ajiraga	02° 38' 09.0"	132° 05' 31.0"
9	EV120601-17	NS - 04	Seawater	4-Aug-12	14:45	07-Aug-12	Winarno, Ali, dan Ajiraga	02° 25' 13.2"	133° 10' 51.9"
10	EV120601-18	NS - 06	Seawater	4-Aug-12	9:00	07-Aug-12	Winarno, Ali, dan Ajiraga	02° 22' 19.9"	133° 49' 15.6"
11	EV120601-19	OS - 14	Sediment	4-Aug-12	10:00	07-Aug-12	Winarno, Ali, dan Ajiraga	02° 21' 16.0"	132° 41' 00.0"
12	EV120601-20	NS - 01	Sediment	5-Aug-12	15:00	07-Aug-12	Winarno, Ali, dan Ajiraga	02° 39' 32.3"	132° 32' 18.9"
13	EV120601-21	NS - 02	Sediment	3-Aug-12	16:30	07-Aug-12	Winarno, Ali, dan Ajiraga	02° 38' 09.0"	132° 05' 31.0"
14	EV120601-22	NS - 04	Sediment	4-Aug-12	14:45	07-Aug-12	Winarno, Ali, dan Ajiraga	02° 25' 13.2"	133° 10' 51.9"
15	EV120601-23	NS - 06	Sediment	4-Aug-12	9:00	07-Aug-12	Winarno, Ali, dan Ajiraga	02° 22' 19.9"	133° 49' 15.6"

Note <sup>b)</sup> = Sample was changed become EV120601-26

Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV:20601-09	EV120601 10
Customer Sample I.D :					OS - 02 ( Composite)	OS 09
Date Sampled :					05-Aug-12	03-Aug 12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	-	N.A
2	Floating Matter <sup>1)</sup>	-	Visual	-	-	N.A
3	Odor <sup>1)</sup>	-	Organoleptic	natural	-	N.A
4	Oil Film <sup>1)</sup>	-	Visual	-	-	N.A
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	-	N.A
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	-	N.A
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	-	N.A
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	9	N.A
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	-	N.A
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	N.A
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	N.A
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	N.A
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.091	N.A
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	<0.005	N.A
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	N.A
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0011	N.A
2	Cadmium, Cd	mg/L	GFAAS	0.001	0.0003	N.A
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	N.A
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	N.A
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	N.A
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	N.A
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	N.A
8	Zinc, Zn	mg/L	FAAS	0.05	0.007	N.A

**Job Number :** EV120601-A  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VII/2012

<b>Laboratory Sample I.D :</b>					EV120601-09	EV120601-10
<b>Customer Sample I.D :</b>					OS - 02 ( Composite)	OS 09
<b>Date Sampled :</b>					05-Aug-12	03 Aug 12
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	N.A
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.70	N.A
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	N.A
4	Oil & Grease	mg/L	Gravimetric	1	<1	N.A
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	N.A
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ ECD/ MS	0.003	<0.0001	N A

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/II/2012

Laboratory Sample I.D :					EV120601-11	EV120601 12
Customer Sample I.D :					OS - 10 ( Composite)	OS - 12 ( Composite)
Date Sampled :					04-Aug-12	04-Aug-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	-	-
3	Odor <sup>2)</sup>	-	Organoleptic	natural	-	-
4	Oil Film <sup>1)</sup>	-	Visual	-	-	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	-	-
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	-	-
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	-	-
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	18	10
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	-	-
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.149	0.159
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	<0.005	0.006
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0005	0.0006
2	Cadmium, Cd	mg/L	GFAAS	0.001	0.0001	0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	0.006	0.007



Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample i.D :					EV120601-11	EV120601-12
Customer Sample i.D :					OS - 10 ( Composite)	OS - 12 ( Composite)
Date Sampled :					04-Aug-12	04-Aug-12
Sample Matrix :					Seawater	Soawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.13	5.35
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ ECD/ MS	0.003	<0.0001	<0.0001

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III  
<sup>1)</sup> = Field Measurement  
<sup>\*\*</sup> = Subcontracted

Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/II/2012

Laboratory Sample I.D :					EV120601-13	EV120601 14
Customer Sample I.D :					OS - 13 ( Composite)	OS 14
Date Sampled :					04-Aug-12	04-Aug-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	-	1
2	Floating Matter <sup>1)</sup>	-	Visual	-	-	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	-	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	-	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	-	7.50
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	-	28.0
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	-	28.5
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	17	19
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	-	8.4
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrates, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.180	0.231
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	<0.005	<0.005
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0007	0.0005
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	0.007	0.009

Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-13	EV120601-14
Customer Sample I.D :					OS - 13 ( Composite)	OS 14
Date Sampled :					04-Aug-12	04-Aug-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
	Miscellaneous					
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.13	5.13
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
	Organic Tests**					
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/II/2012

Laboratory Sample I.D :					EV120601-15	EV120601-16
Customer Sample I.D :					NS - 01	NS - 02
Date Sampled :					05-Aug-12	03-Aug-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	3	<1
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.89	7.89
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	32.1	30.0
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.4	28.7
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	5	193
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	0.2	138
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.065	0.064
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	<0.005	0.076
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	4	ND
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0005	0.0011
2	Cadmium, Cd	mg/L	GFAAS	0.001	0.0005	0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	0.009	0.010

Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-15	EV120601 15
Customer Sample I.D :					NS - 01	NS 02
Date Sampled :					05-Aug-12	03-Aug-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
	Miscellaneous					
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.40	5.95
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/l.	Colorimetric	0.002	<0.001	<0.001
	<b>Organic Tests**</b>					
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/MS	0.003	<0.0001	<0.0001

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-17	I-V120601-18
Customer Sample I.D :					NS - 04	NS 06
Date Sampled :					04-Aug-12	04-Aug 12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	<1	<1
2	Floating Matter <sup>2)</sup>	-	Visual	-	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.75	7.72
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	30.0	24.4
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.1	28.6
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	43	60
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	36.7	49.4
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.170	0.288
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.015	0.038
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0007	<0.0005
2	Cadmium, Cd	mg/L	GFAAS	0.001	0.0001	0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	0.008	0.014

Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-17	EV120601 18
Customer Sample I.D :					NS - 04	NS 06
Date Sampled :					04-Aug-12	04-Aug 12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.04	4.87
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ ECD/ MS	0.003	<0.0001	<0.0001

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

**Job Number :** EV120601-A  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VII/2012

<b>Laboratory Sample I.D :</b>					EV120601-09		
<b>Customer Sample I.D :</b>					OS - 02		
<b>Date Sampled :</b>					05-Aug-12		
<b>Sample Matrix :</b>					Seawater		
No.	Test Description	Unit	Technique	Regulation Limit	Results		
					Top 2 m	Middle 35 m	Bottom 68m
<b>Physical Tests</b>							
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	4	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	-	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	-	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.87	7.82	7.84
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	31.2	32.1	32.1
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.4	28.2	28.1
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	0.8	-	-
<b>Miscellaneous</b>							
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.70	5.24	5.33

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement



**Job Number :** EV120601-A  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/II/2012

<b>Laboratory Sample I.D :</b>					EV120601-10
<b>Customer Sample I.D :</b>					OS - 09
<b>Date Sampled :</b>					03-Aug-12
<b>Sample Matrix :</b>					Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results
<b>Physical Tests</b>					<b>Top 2 m</b>
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	N.A
2	Floating Matter <sup>1)</sup>	-	Visual	-	N.A
3	Odor <sup>1)</sup>	-	Organoleptic	natural	N.A
4	Oil Film <sup>1)</sup>	-	Visual	-	N.A
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	N.A
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	N.A
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	N.A
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	N.A
<b>Miscellaneous</b>					
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	N.A

Note: Regulation Limit based on KepManLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

**Job Number :** EV120601-A  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VII/2012

<b>Laboratory Sample I.D :</b>					EV120601-11		
<b>Customer Sample I.D :</b>					OS - 10		
<b>Date Sampled :</b>					04-Aug-12		
<b>Sample Matrix :</b>					Seawater		
No.	Test Description	Unit	Technique	Regulation Limit	Results		
	<b>Physical Tests</b>				<b>Top 2 m</b>	<b>Middle 13 m</b>	<b>Bottom 24m</b>
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	2	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	-	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	-	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.79	7.79	7.68
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.6	30.1	30.2
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	29.3	28.8	28.8
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	10.9	-	-
	<b>Miscellaneous</b>						
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.13	5.13	4.93

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III  
<sup>1)</sup> = Field Measurement

51

**Job Number :** EV120601-A  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VI/2012

<b>Laboratory Sample I.D :</b>					EV120601-12		
<b>Customer Sample I.D :</b>					OS - 12		
<b>Date Sampled :</b>					04-Aug-12		
<b>Sample Matrix :</b>					Seawater		
No.	Test Description	Unit	Technique	Regulation Limit	Results		
					Top 2 m	Middle 28 m	Bottom 55m
<b>Physical Tests</b>							
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	3	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	-	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	-	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.61	7.61	7.69
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.0	30.3	30.5
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	29.3	28.8	28.7
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	3.3	-	-
<b>Miscellaneous</b>							
1	Dissolved Oxygen. DO <sup>1)</sup>	mg/L	Probe	>5	5.35	5.04	4.63

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/II/2012

Laboratory Sample I.D :					EV120601-13		
Customer Sample I.D :					OS - 13		
Date Sampled :					04-Aug-12		
Sample Matrix :					Seawater		
No.	Test Description	Unit	Technique	Regulation Limit	Results		
					Top 2 m	Middle 17 m	Bottom 32m
<b>Physical Tests</b>							
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	2	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	-	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	-	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.65	7.63	7.51
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	28.9	29.8	30.7
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	29.2	28.9	28.9
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	5.4	-	-
<b>Miscellaneous</b>							
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.13	4.93	4.34

Note: Regulation Limit based on KepMen.LH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement



**PT. Intertek Utama Services**  
 Cilandak Commercial Estate 103E  
 Jl. Cilandak KKO  
 Jakarta 12560  
 Indonesia  
 Tel: +6221 7808011  
 Fax: +6221 7807929  
 Email: indo.office@intertek.com  
 Website: www.intertek.com

**Job Number :** EV120601-A  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-14	EV120601-15	EV120601-16
Customer Sample I.D :					OS - 14	NS - 01	NS - 02
Date Sampled :					04-Aug-12	05-Aug-12	03-Aug 12
Sample Matrix :					Seawater	Soawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results	Results
<b>Physical Tests</b>							
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	1	3	<1
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.50	7.89	7.89
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	28.0	32.1	30.0
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.5	28.4	28.7
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	8.4	<0.5	138
<b>Miscellaneous</b>							
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.13	5.40	5.95

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/11/2012

Laboratory Sample I.D :					EV120601-17	EV120601-18
Customer Sample I.D :					NS - 04	NS - 06
Date Sampled :					04-Aug-12	04-Aug-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	<1	<1
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.75	7.22
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	30.0	24.4
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.1	28.6
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	36.6	49.5
<b>Miscellaneous</b>						
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.04	4.87

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III  
<sup>1)</sup> = Field Measurement

## ENVIRONMENTAL TEST REPORT

**Mr. Yahya Husin**  
PT ERM Indonesia  
Wisma Aldiron Dirgantara, 2nd Floor, Suite # 238-239  
Jl. Gatot Subroto Kav. 72  
Jakarta 12780  
Indonesia

**Job Number :** EV120601 **Date received :** 02-Aug-2012  
**Client Ref :** 1241.r1/IUS-EV/VII/2012 **Date reported :** 24-Sep-2012

**Number of samples :** 8

**Report Comprising :** Cover Sheet, Sample Information, Results, QC

**Total Pages :** 18

**Notes :**  
N.A = Not Analyzed  
I.S = Insufficient Sample  
\* = Non Accredited Test  
\*\* = Sub Contracted Test  
1) = Field Measurement  
I.P = In Progress

**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh  
Expansion Project BP Berau Ltd

**Approved Signature for:**



**Reginald C. de Wit**  
Technical Advisor - Environmental

All work is performed in accordance with Intertek Standard Terms and Conditions of work  
<http://www.intertek.com/terms/>

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as received.

This report was prepared solely for the use of the client named in this report. PT Intertek Utama Services accepts no responsibility for any loss, damage or liability suffered by any third party as a result of any reliance upon or use of this report.

**DO NOT PHOTOCOPY**

### SAMPLE INFORMATION

Job Number : EV120601  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

No.	Laboratory Sample I.D	Customer Sample I.D.	Sample Matrix	Date Sampled	Time Sampled	Date Received	Sampled By	Coordinates	
								South	East
1	EV120601-01	NS - 07	Seawater	29-Jul-12	-	02-Aug-12	Winarno, Ali, dan Ajiraga	02° 13' 43.3"	133° 15' 00 9"
2	EV120601-02	NS - 08	Seawater	29-Jul-12	-	02-Aug-12	Winarno, Ali, dan Ajiraga	02° 17' 19.0"	132° 52' 43 1"
3	EV120601-03	NS - 09	Seawater	29-Jul-12	-	02-Aug-12	Winarno, Ali, dan Ajiraga	02° 18' 25.9"	132° 39' 43 4"
4	EV120601-04	OS - 08	Seawater	20-Jul-12	-	02-Aug-12	Winarno, Ali, dan Ajiraga	02° 18' 58.0"	133° 08' 17 0"
5	EV120601-05	OS - 11	Seawater	29-Jul-12	-	02-Aug-12	Winarno, Ali, dan Ajiraga	02° 15' 54.0"	133° 11' 07 0"
6	EV120601-06	NS - 07	Sediment	29-Jul-12	-	02-Aug-12	Winarno, Ali, dan Ajiraga	02° 13' 43.3"	133° 15' 00 9"
7	EV120601-07	NS - 08	Sediment	29-Jul-12	-	02-Aug-12	Winarno, Ali, dan Ajiraga	02° 17' 19.0"	132° 52' 49 1"
8	EV120601-08	NS - 09	Sediment	29-Jul-12	-	02-Aug-12	Winarno, Ali, dan Ajiraga	02° 18' 25.9"	132° 39' 43 4"



Job Number : EV120601  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-01	EV120601-02
Customer Sample I.D :					NS - 07	NS 08
Date Sampled :					29-Jul-12	29 Jul 12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	<1	<1
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.94	7.73
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.2	14.2
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.6	27.3
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	20	33
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	11.8	35.2
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.165	0.156
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	<0.005	<0.005
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	33

Job Number : EV120601  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-01	EV120601 02
Customer Sample I.D :					NS - 07	NS - 08
Date Sampled :					29-Jul-12	29-Jul-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0008	0.0008
2	Cadmium, Cd	mg/L	GFAAS	0.001	0.0001	0.0012
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	0.001	0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	0.008	0.007
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	4	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	8.04	6.12
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/MS	0.003	<0.0001	<0.0001

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

Job Number : EV120601  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/VII/2012

Laboratory Sample I.D :					EV120601-03	EV120601 04
Customer Sample I.D :					NS - 09	OS - 08 (Composite)
Date Sampled :					29-Jul-12	29 Jul-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	<1	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	-
4	Oil Film <sup>1)</sup>	-	Visual	-	None	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.96	-
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	26.7	-
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	27.0	-
8	Total Suspended Solids. TSS	mg/L	Gravimetric	natural	28	/
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	27.0	-
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.203	0.179
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	<0.005	<0.005
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	49	ND

Job Number : EV120601  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-03	EV120601 04
Customer Sample I.D :					NS - 09	OS 08 (Composite)
Date Sampled :					29-Jul-12	29 Jul-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0006	0.0009
2	Cadmium, Cd	mg/L	GFAAS	0.001	0.0001	0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	0.006	0.006
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	2	?
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.33	
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ ECD/ MS	0.003	<0.0001	<0.0001

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

Job Number : EV120601  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-05
Customer Sample I.D :					OS - 11 (Composite)
Date Sampled :					29-Jul-12
Sample Matrix :					Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results
<b>Physical Tests</b>					
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	
2	Floating Matter <sup>1)</sup>	-	Visual	-	
3	Odor <sup>1)</sup>	-	Organoleptic	natural	
4	Oil Film <sup>1)</sup>	-	Visual	-	
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	9
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	
<b>Anions</b>					
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005
<b>Nutrients</b>					
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.128
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	<0.005
<b>Microbiology Tests</b>					
1	Total Coliform	MPN/100ml	Incubation	1000	ND

Job Number : EV120601  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-05
Customer Sample I.D :					OS - 11 (Composite)
Date Sampled :					29-Jul 12
Sample Matrix :					Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results
<b>Dissolved Metals</b>					
1	Arsenic, As	mg/L	HVAAS	0.012	0.0008
2	Cadmium, Cd	mg/L	GFAAS	0.001	0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001
5	Lead, Pb	mg/L	GFAAS	3.008	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	0.005
<b>Miscellaneous</b>					
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001
<b>Organic Tests**</b>					
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

Job Number : EV120601  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-01	EV120601-02	EV120601-03
Customer Sample I.D :					NS - 07	NS - 08	NS - 09
Date Sampled :					29-Jul-12	29-Jul-12	29 Jul-12
Sample Matrix :					Seawater	Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results	Results
<b>Physical Tests</b>							
1	Brightness <sup>1)</sup>	m	Sachl disc	>3	<1	<1	<1
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.94	7.73	7.96
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.2	14.2	26.1
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.8	27.3	27.0
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	11.8	35.2	27.0
<b>Miscellaneous</b>							
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.04	6.12	6.33

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III  
<sup>1)</sup> = Field Measurement

Job Number : EV120601  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :					EV120601-04		
Customer Sample I.D :					OS - 08		
Date Sampled :					28-Jul-12		
Sample Matrix :					Seawater		
No.	Test Description	Unit	Technique	Regulation Limit	Results		
	<b>Physical Tests</b>				<b>Top 2 m</b>	<b>Middle 25 m</b>	<b>Bottom 48m</b>
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	4	-	
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	-	
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	-	
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.94	7.99	7.99
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.9	30.6	30.8
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.6	27.9	27.5
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	4.2	-	
	<b>Miscellaneous</b>						
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.94	5.23	5.01

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III  
<sup>1)</sup> = Field Measurement



**Job Number :** EV120601  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VI/2012

<b>Laboratory Sample I.D :</b>					EV120601-05		
<b>Customer Sample I.D :</b>					OS - 11		
<b>Date Sampled :</b>					29-Jul 12		
<b>Sample Matrix :</b>					Seawater		
No.	Test Description	Unit	Technique	Regulation Limit	Results		
	<b>Physical Tests</b>				<b>Top 2 m</b>	<b>Middle 20 m</b>	<b>Bottom 38m</b>
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	3	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	-	-
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	-	-
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	7.94	7.98	7.98
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.7	30.4	30.8
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	28.6	28.2	27.8
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	2.4	-	-
	<b>Miscellaneous</b>						
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.85	5.41	5.08

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III  
<sup>1)</sup> = Field Measurement

Job Number : EV120601  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VIU/2012

Laboratory Sample I.D :				EV120601-06	EV120601-07	EV120601-08
Customer Sample I.D :				NS - 07	NS - 08	NS - 09
Date Sampled :				29-Jul-12	29-Jul-12	29-Jul-12
Sample Matrix :				Sediment	Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results	Results
<b>Total Metals</b>						
1	Antimony, Sb	mg/dry Kg	HVAAS	0.22	0.87	0.34
2	Arsenic, As	mg/dry Kg	HVAAS	8.09	17.1	9.57
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	34	22	27
5	Copper, Cu	mg/dry Kg	FAAS	6.0	26.2	13.1
6	Lead, Pb	mg/dry Kg	FAAS	6	18	11
7	Mercury, Hg	mg/dry Kg	CVAAS	0.016	0.077	0.040
8	Nickel, Ni	mg/dry Kg	FAAS	46.4	23.9	27.2
9	Selenium, Se	mg/dry Kg	HVAAS	0.07	0.30	0.17
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	72.7	81.3	72.4
<b>Organic Tests</b>						
1	TPH	mg/dry Kg	GC-FID	<2	18	<2

**QUALITY CONTROL - PRECISION**

Job Number : EV120601  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/II/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-05	EV120601-05 (Replicate)	
<b>Physical Tests</b>					
1	Brightness <sup>1)</sup>	m	3	-	-
2	Floating Matter <sup>1)</sup>	-	None	-	-
3	Odor <sup>1)</sup>	-	Odorless	-	-
4	Oil Film <sup>1)</sup>	-	None	-	-
5	pH <sup>1)</sup>	-	7.94	-	-
6	Salinity <sup>1)</sup>	‰	29.7	-	-
7	Temperature <sup>1)</sup>	°C	28.6	-	-
8	Total Suspended Solids, TSS	mg/L	9	8	2.9%
9	Turbidity <sup>1)</sup>	NTU	2.4	-	-
<b>Anions</b>					
1	Sulphide as H <sub>2</sub> S	mg/L	<0.002	-	-
2	Total Cyanide, CN	mg/L	<0.005	<0.005	-
<b>Nutrients</b>					
1	Ammonia, NH <sub>3</sub> -N	mg/L	<0.02	<0.02	-
2	Nitrate, NO <sub>3</sub> -N	mg/L	0.126	0.127	-
3	Total Phosphorus as P	mg/L	<0.005	<0.005	-
<b>Microbiology Tests</b>					
1	Total Coliform	MPN/100ml	ND	-	-
<b>Dissolved Metals</b>					
1	Arsenic, As	mg/L	0.0008	0.0008	0.0%
2	Cadmium, Cd	mg/L	0.0001	0.0001	4.0%
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	<0.002	<0.002	-
4	Copper, Cu	mg/L	<0.001	<0.001	-
5	Lead, Pb	mg/L	<0.001	<0.001	-
6	Mercury, Hg	mg/L	<0.00005	<0.00005	-
7	Nickel, Ni	mg/L	<0.02	<0.02	-
8	Zinc, Zn	mg/L	0.005	0.005	2.9%

### QUALITY CONTROL - PRECISION

**Job Number :** EV120601  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/II/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-05	EV120601-05 (Replicate)	
	Miscellaneous				
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	<2	<2	
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	5.85	-	-
3	Surfactants, MBAS	mg/L	<0.01	<0.01	-
4	Oil & Grease	mg/L	<1	-	-
5	Total Phenols	mg/L	<0.001	<0.001	-
	Organic Tests**				
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	<0.0001	-	-

**QUALITY CONTROL - PRECISION**

Job Number : EV120601  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-08	EV120601-08 (Replicate)	
	<b>Total Metals</b>				
1	Antimony, Sb	mg/dry Kg	0.34	0.35	0.8%
2	Arsenic, As	mg/dry Kg	9.57	9.06	5.5%
3	Cadmium, Cd	mg/dry Kg	<0.1	<0.1	-
4	Chromium, Cr	mg/dry Kg	27	27	1.3%
5	Copper, Cu	mg/dry Kg	13.1	13.0	0.8%
6	Lead, Pb	mg/dry Kg	11	12	5.4%
7	Mercury, Hg	mg/dry Kg	0.040	0.044	9.3%
8	Nickel, Ni	mg/dry Kg	27.2	26.7	1.8%
9	Selenium, Se	mg/dry Kg	0.17	0.19	10.3%
10	Silver, Ag	mg/dry Kg	<0.4	<0.4	-
11	Zinc, Zn	mg/dry Kg	72.4	73.8	1.9%
	<b>Organic Tests</b>				
1	TPH	mg/dry Kg	<2	-	-

**QUALITY CONTROL - ACCURACY**

Job Number : EV120601  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/VII/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
<b>Physical Tests</b>							
1	Brightness <sup>1)</sup>	m	-	-	-	-	-
2	Floating Matter <sup>1)</sup>	-	-	-	-	-	-
3	Odor <sup>1)</sup>	-	-	-	-	-	-
4	Oil Film <sup>1)</sup>	-	-	-	-	-	-
5	pH <sup>1)</sup>	-	-	-	-	-	-
6	Salinity <sup>1)</sup>	ppt	-	-	-	-	-
7	Temperature <sup>1)</sup>	°C	-	-	-	-	-
8	Total Suspended Solids, TSS	mg/L	1	<1	39	40	102%
9	Turbidity (in lab)	NTU	0.5	<0.5	-	-	-
<b>Anions</b>							
1	Sulphide as H <sub>2</sub> S	mg/L	0.002	<0.002	2.25	2.25	100%
2	Total Cyanide, CN	mg/L	0.005	<0.005	0.848	0.769	91%
<b>Nutrients</b>							
1	Ammonia, NH <sub>3</sub> -N	mg/L	0.02	<0.02	9.17	9.10	99%
2	Nitrate, NO <sub>3</sub> -N	mg/L	0.005	<0.005	4.35	4.49	103%
3	Total Phosphorus as P	mg/L	0.005	<0.005	8.88	8.55	96%
<b>Microbiology Tests</b>							
1	Total Coliform	MPN/100ml	1	-	-	-	-
<b>Dissolved Metals</b>							
1	Arsenic, As	mg/L	0.0005	<0.0005	0.347	0.349	101%
2	Cadmium, Cd	mg/L	0.0001	<0.0001	0.427	0.407	95%
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	0.002	<0.002	0.346	0.331	96%
4	Copper, Cu	mg/L	0.001	<0.001	0.217	0.217	100%
5	Lead, Pb	mg/L	0.001	<0.001	0.754	0.779	103%
6	Mercury, Hg	mg/L	0.00005	<0.00005	0.0173	0.0178	103%
7	Nickel, Ni	mg/L	0.001	<0.001	0.51	0.49	97%
8	Zinc, Zn	mg/L	0.005	<0.005	0.975	0.938	96%

### QUALITY CONTROL - ACCURACY

Job Number : EV120601  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VI/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
	<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	2	<2	82	80	98%
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	-	-	-	-	-
3	Surfactants, MBAS	mg/L	0.01	<0.01	0.35	0.35	100%
4	Oil & Grease ( Spike)	mg/L	1	<1	202	184	91%
5	Total Phenols	mg/L	0.001	<0.001	0.163	0.159	98%
	<b>Total Metals (Sediment)</b>						
1	Antimony, Sb	mg/dry Kg	0.01	<0.01	113	107	95%
2	Arsenic, As	mg/dry Kg	0.01	<0.01	237	232	98%
3	Cadmium, Cd	mg/dry Kg	0.1	<0.1	191	189	99%
4	Chromium, Cr	mg/dry Kg	1	<1	128	132	103%
5	Copper, Cu	mg/dry Kg	0.2	<0.2	123	119	97%
6	Lead, Pb	mg/dry Kg	1	<1	103	98	95%
7	Mercury, Hg	mg/dry Kg	0.001	<0.001	12.4	12.6	102%
8	Nickel, Ni	mg/dry Kg	0.4	<0.4	118	112	95%
9	Selenium, Se	mg/dry Kg	0.01	<0.01	110	120	109%
10	Silver, Ag	mg/dry Kg	0.4	<0.4	-	-	-
11	Zinc, Zn	mg/dry Kg	0.1	<0.1	183	179	98%
	<b>Organic Tests**</b>						
1	TPH	mg/dry Kg	2	<2	148	156	105%
	<b>Organic Tests**</b>						
	<b>Polycyclic Aromatic Hydrocarbons, PAHs**</b>						
1	Acenaphthene	mg/L	0.0001	<0.0001	4.00	3.38	85%
2	Acenaphthylene	mg/L	0.0001	<0.0001	4.00	3.42	86%
3	Anthracene	mg/L	0.0001	<0.0001	4.00	3.84	96%
4	Benzo(a)anthracene	mg/L	0.0001	<0.0001	4.00	3.76	94%
5	Benzo(a)pyrene	mg/L	0.0001	<0.0001	4.00	4.12	103%
6	Benzo(g,h,i)perylene	mg/L	0.0001	<0.0001	4.00	4.34	109%
7	Benzo(k)fluoranthene	mg/L	0.0001	<0.0001	4.00	4.12	103%
8	Chrysene	mg/L	0.0001	<0.0001	4.00	4.22	106%

**QUALITY CONTROL - ACCURACY**

**Job Number :** EV120601  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VII/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
9	Dibenz(a,h)anthracene	mg/L	0.0001	<0.0001	4.00	4.32	108%
10	Fluoranthene	mg/L	0.0001	<0.0001	4.00	4.14	104%
11	Fluorene	mg/L	0.0001	<0.0001	4.00	3.36	84%
12	Indeno(1,2,3-cd)pyrene	mg/L	0.0001	<0.0001	4.00	4.34	109%
13	Naphthalene	mg/L	0.0001	<0.0001	4.00	3.84	96%
14	Phenanthrene	mg/L	0.0001	<0.0001	4.00	3.92	98%
15	Pyrene	mg/L	0.0001	<0.0001	4.00	4.32	108%

Note: <sup>1)</sup> = Field Measurement





**PT. Intertek Utama Services**  
Cilandak Commercial Estate 103E  
Jl. Cilandak KKO  
Jakarta 12560  
Indonesia  
Tel: +6221 7808011  
Fax: +6221 7807929  
Email: indo.office@intertek.com  
Website: www.intertek.com

## ENVIRONMENTAL TEST REPORT

**Mr. Yahya Husin**  
PT ERM Indonesia  
Wisma Aldiron Dirgantara, 2nd Floor, Suite # 238-239  
Jl. Gatot Subroto Kav. 72  
Jakarta 12780  
Indonesia

**Job Number :** EV120864 **Date received :** 30-Oct-2012  
**Client Ref :** 1241.r1/US-EV/VII/2012 **Date reported :** 14-Dec-2012

**Number of samples :** 19

**Report Comprising :** Cover Sheet, Sample Information, Results, QC

**Total Pages :** 22

**Notes :**  
N.A = Not Analyzed  
I.S = Insufficient Sample  
\* = Non Accredited Test  
\*\* = Sub Contracted Test  
f) = Field Measurement  
I.P = In Progress

**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh Expansion Project BP Berau Ltd

**Approved Signature for:**

  
**Reginald C. de Wit**  
Technical Advisor - Environmental

All work is performed in accordance with Intertek Standard Terms and Conditions of work  
<http://www.intertek.com/terms/>

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as received.

This report was prepared solely for the use of the client named in this report. PT Intertek Utama Services accepts no responsibility for any loss, damage or liability suffered by any third party as a result of any reliance upon or use of this report.

**DO NOT PHOTOCOPY**

### SAMPLE INFORMATION

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/VII/2012

No.	Lab/Station Name/ID	Customer Sample ID	Sample Matrix	Date Collected	Time Collected	Date Reported	Sampled By	Geographical	
								South	East
1	EV120864-01	OS - 03	Seawater	27-Oct-12	10:05	30-Oct-12	Ali Miftah	02° 41' 50.3"	132° 44' 40.4"
2	EV120864-02	OS - 04	Seawater	27-Oct-12	11:00	30-Oct-12	Ali Miftah	02° 34' 28.5"	132° 38' 05.2"
3	EV120864-03	OS - 08	Seawater	27-Oct-12	12:37	30-Oct-12	Ali Miftah	02° 30' 42.2"	132° 58' 32.2"
4	EV120864-04	OS - 07	Seawater	27-Oct-12	13:28	30-Oct-12	Ali Miftah	02° 26' 01.4"	133° 01' 22.8"
5	EV120864-05	NS - 05	Seawater	27-Oct-12	14:35	30-Oct-12	Ali Miftah	02° 27' 53.3"	133° 18' 55.5"
6	EV120864-06	OS - 07	Sediment	20-Oct-12	10:40	30-Oct-12	Ali Miftah	02° 26' 01.4"	133° 01' 22.8"
7	EV120864-07	OS - 01	Sediment	20-Oct-12	15:20	30-Oct-12	Ali Miftah	02° 20' 31.8"	133° 57' 30"
8	EV120864-08	OS - 08	Sediment	21-Oct-12	10:15	30-Oct-12	Ali Miftah	02° 18' 58"	133° 08' 17"
9	EV120864-09	OS - 10	Sediment	21-Oct-12	12:50	30-Oct-12	Ali Miftah	02° 22' 53.5"	133° 11' 43.5"
10	EV120864-10	OS - 11	Sediment	21-Oct-12	10:57	30-Oct-12	Ali Miftah	02° 15' 54.2"	133° 11' 07.4"
11	EV120864-11	OS - 12	Sediment	21-Oct-12	11:56	30-Oct-12	Ali Miftah	02° 18' 22.7"	133° 17' 15.7"
12	EV120864-12	OS - 03	Sediment	27-Oct-12	10:05	30-Oct-12	Ali Miftah	02° 41' 50.3"	132° 44' 40.4"
13	EV120864-13	OS - 04	Sediment	27-Oct-12	11:00	30-Oct-12	Ali Miftah	02° 34' 28.5"	132° 38' 05.2"
14	EV120864-14	OS - 06	Sediment	27-Oct-12	12:37	30-Oct-12	Ali Miftah	02° 30' 42.2"	132° 58' 32.2"
15	EV120864-15	NS - 05	Sediment	27-Oct-12	14:35	30-Oct-12	Ali Miftah	02° 27' 53.3"	133° 18' 55.5"
16	EV120864-16	AQN - 09	Ambient Air	27-Oct-12	8:45	01-Nov-12	Hilman Sakhawi	02° 28' 02"	133° 01' 21"
17	EV120864-17	AQN - 10	Ambient Air	27-Oct-12	13:05	01-Nov-12	Hilman Sakhawi	02° 20' 32"	132° 57' 31"
18	EV120864-18	AQN - 11	Ambient Air	28-Oct-12	9:45	01-Nov-12	Hilman Sakhawi	02° 15' 54"	133° 11' 07"
19	EV120864-19	AQN - 12	Ambient Air	28-Oct-12	13:40	01-Nov-12	Hilman Sakhawi	02° 22' 52"	133° 11' 47"

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau  
 Customer Ref : 1241.r1/AUS-EV/VI/2012

Laboratory Sample I.D :					EV120864-03	EV120864-04
Customer Sample I.D :					OS - 08	OS - 07
Date Sampled :					27-Oct-12	27-Oct-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachl disc	>3	3	3
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	8.56	8.55
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	31.2	31.2
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.1	30.1
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	12	11
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	2.1	4.7
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.033	0.049
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.046	0.043
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0016	0.0018
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tanggah Expansalon Project BP Berau  
 Customer Ref : 1241.r1/US-EV/VI/2012

Laboratory Sample I.D :					EV120864-01	EV120864-02
Customer Sample I.D :					OS - 03	OS - 04
Date Sampled :					27-Oct-12	27-Oct-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.88	5.35
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Organic Tests**</b>						
	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ ECD/ MS	0.003	<0.0001	<0.0001
1	Naphthalene	mg/L		-	<0.0001	<0.0001
2	2-Methylnaphthalene	mg/L		-	<0.0001	<0.0001
3	Acenaphthylene	mg/L		-	<0.0001	<0.0001
4	Acenaphthene	mg/L		-	<0.0001	<0.0001
5	Fluorene	mg/L		-	<0.0001	<0.0001
6	Phenanthrene	mg/L		-	<0.0001	<0.0001
7	Anthracene	mg/L		-	<0.0001	<0.0001
8	Fluoranthene	mg/L		-	<0.0001	<0.0001
9	Pyrene	mg/L		-	<0.0001	<0.0001
10	Benzo(a)anthracene	mg/L		-	<0.0001	<0.0001
11	Chrysene	mg/L		-	<0.0001	<0.0001
12	Benzo(b)fluoranthene	mg/L		-	<0.0001	<0.0001
13	Benzo(k)fluoranthene	mg/L		-	<0.0001	<0.0001
14	Benzo(a)pyrene	mg/L		-	<0.0001	<0.0001
15	Indeno(1,2,3-c,d)pyrene	mg/L		-	<0.0001	<0.0001
16	Dibenz(a,h)anthracene	mg/L		-	<0.0001	<0.0001
17	Benzo(ghi)perylene	mg/L	-	<0.0001	<0.0001	

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\* = Subcontracted

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMIDAL Tangguh Expansion Project BP Berau  
 Customer Ref : 1241.r1/US-EV/VI/2012

Laboratory Sample I.D :					EV120864-01	EV120864-02
Customer Sample I.D :					OS - 03	OS - 04
Date Sampled :					27-Oct-12	27-Oct-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	2	3
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	8.61	8.63
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	31.1	31.9
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.2	29.8
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	8	11
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	3.9	1.5
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.033	0.051
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.128	0.323
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0018	0.0018
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 ANDAL Tangguh Expansion Project BP Berau  
 Customer Ref : 1241.r1/US-EV/VI/2012

Laboratory Sample I.D :					EV120864-03	EV120864-04
Customer Sample I.D :					OS - 06	OS - 07
Date Sampled :					27-Oct-12	27-Oct-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.33	5.81
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Organic Tests**</b>						
	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ ECD/ MS	0.003	<0.0001	<0.0001
1	Naphthalene	mg/L		-	<0.0001	<0.0001
2	2-Methylnaphthalene	mg/L		-	<0.0001	<0.0001
3	Acenaphthylene	mg/L		-	<0.0001	<0.0001
4	Acenaphthene	mg/L		-	<0.0001	<0.0001
5	Fluorene	mg/L		-	<0.0001	<0.0001
6	Phenanthrene	mg/L		-	<0.0001	<0.0001
7	Anthracene	mg/L		-	<0.0001	<0.0001
8	Fluoranthene	mg/L		-	<0.0001	<0.0001
9	Pyrene	mg/L		-	<0.0001	<0.0001
10	Benzo(a)anthracene	mg/L		-	<0.0001	<0.0001
11	Chrysene	mg/L		-	<0.0001	<0.0001
12	Benzo(b)fluoranthene	mg/L		-	<0.0001	<0.0001
13	Benzo(k)fluoranthene	mg/L		-	<0.0001	<0.0001
14	Benzo(a)pyrene	mg/L		-	<0.0001	<0.0001
15	Indeno(1,2,3-c,d)pyrene	mg/L		-	<0.0001	<0.0001
16	Dibenz(a,h)anthracene	mg/L		-	<0.0001	<0.0001
17	Benzo(ghi)perylene	mg/L	-	<0.0001	<0.0001	

Note: Regulation Limit based on KepmenLH No. 61 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau  
 Customer Ref : 1241.r1/IUS-EV/MV/2012

Laboratory Sample I.D :					EV120864-05
Customer Sample I.D :					NS - 05
Date Sampled :					27-Oct-12
Sample Matrix :					Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results
<b>Physical Tests</b>					
1	Brightness <sup>1)</sup>	m	Sachl disc	>3	<1
2	Floating Matter <sup>1)</sup>	-	Visual	-	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	8.54
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	31
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	31.1
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	66
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	60.0
<b>Anions</b>					
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005
<b>Nutrients</b>					
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.078
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.048
<b>Microbiology Tests</b>					
1	Total Coliform	MPN/100ml	Incubation	1000	ND
<b>Dissolved Metals</b>					
1	Arsenic, As	mg/L	HVAAS	0.012	0.0021
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.008	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005

Job Number : EV120884  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau  
 Customer Ref : 1241.r1/US-EV/VI/2012

Laboratory Sample I.D :					EV120884-05
Customer Sample I.D :					NS - 05
Date Sampled :					27-Oct-12
Sample Matrix :					Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results
<b>Miscellaneous</b>					
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.16
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001
<b>Organic Tests**</b>					
Polycyclic Aromatic Hydrocarbons, PAHs**		mg/L	Solvent Extraction GC/ ECD/ MS	0.003	<0.0001
1	Naphthalene	mg/L		-	<0.0001
2	2-Methylnaphthalene	mg/L		-	<0.0001
3	Acenaphthylene	mg/L		-	<0.0001
4	Acenaphthene	mg/L		-	<0.0001
5	Fluorene	mg/L		-	<0.0001
6	Phenanthrene	mg/L		-	<0.0001
7	Anthracene	mg/L		-	<0.0001
8	Fluoranthene	mg/L		-	<0.0001
9	Pyrene	mg/L		-	<0.0001
10	Benz(a)anthracene	mg/L		-	<0.0001
11	Chrysene	mg/L		-	<0.0001
12	Benzo(b)fluoranthene	mg/L		-	<0.0001
13	Benzo(k)fluoranthene	mg/L		-	<0.0001
14	Benzo(a)pyrene	mg/L		-	<0.0001
15	Indeno(1,2,3-c,d)pyrene	mg/L		-	<0.0001
16	Dibenz(a,h)anthracene	mg/L		-	<0.0001
17	Benzo(ghi)perylene	mg/L	-	<0.0001	

Note: Regulation Limit based on KepMenLH No. 81 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

\*\*= Subcontracted



Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP  
 Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VI/2012

Laboratory Sample I.D :					EV120864-01	EV120864-02
Customer Sample I.D :					OS - 03	OS - 04
Date Sampled :					27-Oct-12	27-Oct-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	2	5
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	8.61	8.63
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	31.1	31.0
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.2	29.8
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	3.9	1.5
<b>Miscellaneous</b>						
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.88	5.35

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III  
<sup>1)</sup> = Field Measurement

**Job Number :** EV120864  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP  
 Berau Ltd  
**Customer Ref :** 1241.r1/US-EV/VII/2012

Laboratory Sample I.D :					EV120864-03	EV120864-04
Customer Sample I.D :					OS - 06	OS - 07
Date Sampled :					27-Oct-12	27-Oct-12
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	>3	3	3
2	Floating Matter <sup>1)</sup>	-	Visual	-	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	8.58	8.55
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	31.2	31.2
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.1	30.1
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	2.1	4.7
<b>Miscellaneous</b>						
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.33	5.81

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III  
<sup>1)</sup> = Field Measurement

Job Number : EV120884  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP  
 Berau Ltd  
 Customer Ref : 1241.r1/US-EV/III/2012

<b>Laboratory Sample ID :</b>					<b>EV120884-05</b>
<b>Customer Sample ID :</b>					<b>NS - 05</b>
<b>Date Sampled :</b>					<b>27-Oct-12</b>
<b>Sample Matrix :</b>					<b>Seawater</b>
No.	Test Description	Unit	Technique	Regulation Limit	Results
<b>Physical Tests</b>					
1	Brightness <sup>1)</sup>	m	Sachl disc	>3	<1
2	Floating Matter <sup>1)</sup>	-	Visual	-	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	-	None
5	pH <sup>1)</sup>	-	Probe	7.0-8.5	8.54
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	31
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	31.1
8	Turbidity <sup>1)</sup>	NTU	Turbidimetric	<5	60.0
<b>Miscellaneous</b>					
1	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.16

Note: Regulation Limit based on KepMenLH No. 51 Tahun 2004 Appendix III

<sup>1)</sup> = Field Measurement

Job Number : EV120601-B  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/II/2012

Laboratory Sample I.D :					EV120601-27
Customer Sample I.D :					SW - 03
Date Sampled :					09-Aug-12
Sample Matrix :					Surface Water
No.	Test Description	Unit	Technique	Regulation Limit	Results
<b>Physical Tests</b>					
1	pH <sup>1)</sup>	-	Probe	6 - 9	6.9
2	Temperature <sup>1)</sup>	°C	Thermometer	3 deviation	27.9
3	Total Dissolved Solids, TDS	mg/L	Gravimetric	1000	33200
4	Total Suspended Solids, TSS	mg/L	Gravimetric	50	33
<b>Anions</b>					
1	Chloride, Cl <sup>-</sup>	mg/L	Titrimetric	600	12600
2	Fluoride, F <sup>-</sup>	mg/L	Ion Chromatography	0.5	0.54
3	Sulphate, SO <sub>4</sub>	mg/L	Ion Chromatography	400	1860
4	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.002	<0.002
5	Total Cyanide, CN	mg/L	Colorimetric	0.02	<0.005
<b>Nutrients</b>					
1	Free Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.5	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Ion Chromatography	10	0.081
3	Nitrite, NO <sub>2</sub> -N	mg/L	Ion Chromatography	0.06	0.030
4	Total Phosphorus as P	mg/L	Colorimetric	0.2	<0.005
<b>Microbiology Tests</b>					
1	E.Coli	MPN/100ml	Incubation	100	201
2	Total Coliform	MPN/100ml	Incubation	1000	>2420
<b>Dissolved Metals</b>					
1	Arsenic, As	mg/L	HVAAS	0.05	0.0007
2	Barium, Ba	mg/L	FAAS	1	<0.2
3	Boron, B	mg/L	ICP -AES	1	3.3
4	Cadmium, Cd	mg/L	FAAS	0.01	<0.005
5	Chromium Hexavaient, Cr <sup>6+</sup>	mg/L	Colorimetric	0.05	<0.002
6	Cobalt, Co	mg/L	FAAS	0.2	<0.02
7	Copper, Cu	mg/L	FAAS	0.02	<0.01
8	Iron, Fe	mg/L	FAAS	0.3	<0.05

Job Number : EV120601-B  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/II/2012

<b>Laboratory Sample I.D :</b>					EV120601-27
<b>Customer Sample I.D :</b>					SW - 03
<b>Date Sampled :</b>					09-Aug-12
<b>Sample Matrix :</b>					Surface Water
No.	Test Description	Unit	Technique	Regulation Limit	Results
9	Lead, Pb	mg/L	GFAAS	0.03	<0.001
10	Manganese, Mn	mg/L	FAAS	0.1	0.03
11	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005
12	Selenium, Se	mg/L	HVAAS	0.01	<0.0005
13	Zinc, Zn	mg/L	FAAS	0.05	0.009
<b>Miscellaneous</b>					
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	2	<2
2	Chemical Oxygen Demand, COD	mg/L	Titrimetric	10	11
3	Chlorine, Cl <sub>2</sub>	mg/L	Colorimetric	0.03	<0.01
4	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	6	3.2
5	Oil & Grease	mg/L	Gravimetric	1	<1
6	Surfactants, MBAS	mg/L	Colorimetric	200	<0.01
7	Total Phenols	mg/L	Colorimetric	1	<0.001

Note: Regulation Limit based on PP No. 82 Tahun 1982  
<sup>1)</sup> = Field Measurement

**QUALITY CONTROL - PRECISION**

Job Number : EV120601-B  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/VII/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-26	EV120601-26 (Replicate)	
<b>Physical Tests</b>					
1	Brightness <sup>1)</sup>	m	2		
2	Floating Matter <sup>1)</sup>	-	None	-	
3	Odor <sup>1)</sup>	-	Odorless	-	
4	Oil Film <sup>1)</sup>	-	None		
5	pH <sup>1)</sup>	-	7.70	7.83	0.9%
6	Salinity <sup>1)</sup>	‰	30,3	-	-
7	Temperature <sup>1)</sup>	°C	28,8		
8	Total Suspended Solids, TSS	mg/L	11	12	
9	Turbidity <sup>1)</sup>	NTU	10,1		
<b>Anions</b>					
1	Sulphide as H <sub>2</sub> S	mg/L	<0.002		-
2	Total Cyanide, CN	mg/L	<0.005	<0.005	-
<b>Nutrients</b>					
1	Ammonia, NH <sub>3</sub> -N	mg/L	<0.02	<0.02	
2	Nitrate, NO <sub>3</sub> -N	mg/L	0.121	0.122	0.8%
3	Total Phosphorus as P	mg/L	<0.005		
<b>Microbiology Tests</b>					
1	Total Coliform	MPN/100ml	ND		
<b>Dissolved Metals</b>					
1	Arsenic, As	mg/L	0.0007	0.0008	3.1%
2	Cadmium, Cd	mg/L	0.0001	0.0001	-
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	<0.002	<0.002	
4	Copper, Cu	mg/L	<0.001	<0.001	-
5	Lead, Pb	mg/L	<0.001	<0.001	-
6	Mercury, Hg	mg/L	<0.00005	<0.00005	-
7	Nickel, Ni	mg/L	<0.02	<0.02	
8	Zinc, Zn	mg/L	0.006	0.006	

QUALITY CONTROL - PRECISION

Job Number : EV120601-B  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-26	EV120601-26 (Replicate)	
	<b>Miscellaneous</b>				
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	<2	<2	
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	4.86		
3	Surfactants, MBAS	mg/L	<0.01	<0.01	
4	Oil & Grease	mg/L	<1		
5	Total Phenols	mg/L	<0.001	<0.001	
	<b>Organic Tests**</b>				
1	PAH**	mg/L	<0.0001		

**QUALITY CONTROL - PRECISION**

Job Number : EV120601-B  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-29	EV120601-29 (Replicate)	
	<b>Total Metals</b>				
1	Antimony, Sb	mg/dry Kg	0.16	0.15	6.1%
2	Arsenic, As	mg/dry Kg	5.10	5.27	3.2%
3	Cadmium, Cd	mg/dry Kg	<0.1	<0.1	-
4	Chromium, Cr	mg/dry Kg	4	4	2.0%
5	Copper, Cu	mg/dry Kg	0.9	0.8	2.8%
6	Lead, Pb	mg/dry Kg	2	2	3.4%
7	Mercury, Hg	mg/dry Kg	0.004	0.004	4.4%
8	Nickel, Ni	mg/dry Kg	5.7	5.3	8.3%
9	Selenium, Se	mg/dry Kg	0.06	0.07	6.9%
10	Silver, Ag	mg/dry Kg	<0.4	<0.4	
11	Zinc, Zn	mg/dry Kg	12.5	12.1	2.1%
	<b>Organic Tests</b>				
1	TPH	mg/dry Kg	<2	<2	-



### QUALITY CONTROL - ACCURACY

Job Number : EV120601-B  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/III/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
<b>Physical Tests</b>							
1	Brightness <sup>1)</sup>	m	-	-	-	-	-
2	Floating Matter <sup>1)</sup>	-	-	-	-	-	-
3	Odor <sup>1)</sup>	-	-	-	-	-	-
4	Oil Film <sup>1)</sup>	-	-	-	-	-	-
5	pH <sup>1)</sup>	-	-	-	-	-	-
6	Salinity <sup>1)</sup>	ppt	-	-	-	-	-
7	Temperature <sup>1)</sup>	°C	-	-	-	-	-
8	Total Dissolved Solids, TDS	mg/L	1	<1	335	328	98%
9	Total Suspended Solids, TSS	mg/L	1	<1	39	40	102%
10	Turbidity <sup>1)</sup>	NTU	0.5	<0.5	-	-	-
<b>Anions</b>							
1	Chloride, Cl <sup>-</sup>	mg/L	0.5	<0.5	62.8	66.8	106%
2	Fluoride, F <sup>-</sup>	mg/L	0.02	<0.02	1.99	1.90	95%
3	Sulphate, SO <sub>4</sub>	mg/L	2	<2	28	28	99%
4	Sulphide as H <sub>2</sub> S	mg/L	0.002	<0.002	2.25	2.14	95%
5	Total Cyanide, CN	mg/L	0.005	<0.005	0.926	0.893	96%
<b>Nutrients</b>							
1	Ammonia, NH <sub>3</sub> -N	mg/L	0.02	<0.02	10.9	11.7	107%
3	Nitrate, NO <sub>3</sub> -N	mg/L	0.005	<0.005	4.35	4.50	103%
4	Nitrite, NO <sub>2</sub> -N	mg/L	0.001	<0.001	1.64	1.57	96%
5	Total Phosphorus as P	mg/L	0.005	<0.005	8.88	8.55	96%
<b>Microbiology Tests</b>							
1	E.Coli	MPN/100ml	1	ND	-	-	-
2	Total Coliform	MPN/100ml	1	ND	-	-	-
<b>Dissolved Metals</b>							
1	Arsenic, As	mg/L	0.0005	<0.0005	0.347	0.349	101%
2	Barium, Ba	mg/L	0.1	<0.1	2.4	2.3	97%
3	Boron, B	mg/L	0.1	<0.1	1.7	1.8	106%
4	Cadmium, Cd	mg/L	0.0001	<0.0001	0.443	0.409	92%

QUALITY CONTROL - ACCURACY

Job Number : EV120601-B  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/AUS-EV/VII/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
5	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	0.002	<0.002	0.346	0.346	100%
6	Cobalt, Co	mg/L	0.02	<0.02	0.360	0.390	108%
7	Copper, Cu	mg/L	0.01	<0.01	0.22	0.23	106%
8	Copper, Cu	mg/L	0.001	<0.001	0.217	0.231	106%
9	Iron, Fe	mg/L	0.05	<0.05	1.07	1.10	103%
10	Lead, Pb	mg/L	0.001	<0.001	0.754	0.789	105%
11	Manganese, Mn	mg/L	0.01	<0.01	1.86	1.97	106%
12	Mercury, Hg	mg/L	0.00005	<0.00005	0.0173	0.0178	103%
13	Nickel, Ni	mg/L	0.02	<0.02	0.51	0.52	102%
14	Selenium, Se	mg/L	0.0005	<0.0005	1.62	1.60	99%
15	Zinc, Zn	mg/L	0.005	<0.005	0.975	1.02	105%
<b>Miscellaneous</b>							
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	2	<2	82	77	94%
2	Chemical Oxygen Demand, COD	mg/L	2	<2	132	130	98%
3	Chlorine, Cl <sub>2</sub>	mg/L	-	-	-	-	-
4	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	-	-	-	-	-
5	Oil & Grease	mg/L	1	<1	264	252	95%
6	Surfactants, MBAS	mg/L	0.01	<0.01	0.35	0.35	100%
7	Total Phenols	mg/L	0.001	<0.001	0.163	0.155	95%
<b>Organic Tests**</b>							
<b>Polycyclic Aromatic Hydrocarbons, PAHs**</b>							
1	Acenaphthene	mg/L	0.0001	<0.0001	4.00	4.30	108%
2	Acenaphthylene	mg/L	0.0001	<0.0001	4.00	4.22	106%
3	Anthracene	mg/L	0.0001	<0.0001	4.00	3.72	93%
4	Benzo(a)anthracene	mg/L	0.0001	<0.0001	4.00	4.02	101%
5	Benzo(a)pyrene	mg/L	0.0001	<0.0001	4.00	3.94	99%
6	Benzo(g,h,i)perylene	mg/L	0.0001	<0.0001	4.00	3.74	94%
7	Benzo(k)fluoranthene	mg/L	0.0001	<0.0001	4.00	4.00	100%
8	Chrysene	mg/L	0.0001	<0.0001	4.00	4.02	101%
9	Dibenz(a,h)anthracene	mg/L	0.0001	<0.0001	4.00	4.42	111%
10	Fluoranthene	mg/L	0.0001	<0.0001	4.00	3.72	93%
11	Fluorene	mg/L	0.0001	<0.0001	4.00	3.90	98%

**QUALITY CONTROL - ACCURACY**

Job Number : EV120601-B  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
12	Indeno(1,2,3-cd)pyrene	mg/L	0.0001	<0.0001	4.00	3.70	93%
13	Naphthalene	mg/L	0.0001	<0.0001	4.00	4.02	101%
14	Phenanthrene	mg/L	0.0001	<0.0001	4.00	3.68	92%
15	Pyrene	mg/L	0.0001	<0.0001	4.00	4.00	100%
	<b>Total Metals (Sediment)</b>						
1	Antimony, Sb	mg/dry Kg	0.01	< 0.01	113	104	92%
2	Arsenic, As	mg/dry Kg	0.01	< 0.01	237	232	98%
3	Cadmium, Cd	mg/dry Kg	0.1	< 0.1	191	181	95%
4	Chromium, Cr	mg/dry Kg	1	< 1.0	128	123	96%
5	Copper, Cu	mg/dry Kg	0.2	< 0.2	123	122	99%
6	Lead, Pb	mg/dry Kg	1	< 1	103	98	95%
7	Mercury, Hg	mg/dry Kg	0.001	< 0.001	12.4	12.0	97%
8	Nickel, Ni	mg/dry Kg	0.4	< 0.4	118	110	94%
9	Selenium, Se	mg/dry Kg	0.01	< 0.01	110	108	99%
10	Silver, Ag	mg/dry Kg	0.4	< 0.4	-	-	-
11	Zinc, Zn	mg/dry Kg	0.1	< 0.1	183	186	102%
	<b>Organic Tests**</b>						
1	TPH	mg/dry Kg	2	<2	2380	2160	91%

Note: <sup>11</sup> = Field Measurement

Job Number : EV120601-C  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/VII/2012

Laboratory Sample I.D :					EV120601-37
Customer Sample I.D :					SW - 01
Date Sampled :					09-Aug 12
Sample Matrix :					Surface Water
No.	Test Description	Unit	Technique	Regulation Limit	Results
<b>Physical Tests</b>					
1	pH <sup>1)</sup>	-	Probe	6 - 9	7.4
2	Temperature <sup>1)</sup>	°C	Thermometer	3 deviation	28.2
3	Total Dissolved Solids, TDS	mg/L	Gravimetric	1000	27700
4	Total Suspended Solids, TSS	mg/L	Gravimetric	50	51
<b>Anions</b>					
1	Chloride, Cl <sup>-</sup>	mg/L	Ion Chromatography	600	13800
2	Fluoride, F <sup>-</sup>	mg/L	Ion Chromatography	0.5	0.47
3	Sulphate, SO <sub>4</sub>	mg/L	Ion Chromatography	400	1860
4	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.002	<0.002
5	Total Cyanide, CN	mg/L	Colorimetric	0.02	<0.005
<b>Nutrients</b>					
1	Free Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.5	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Ion Chromatography	10	0.078
3	Nitrite, NO <sub>2</sub> -N	mg/L	Ion Chromatography	0.06	0.010
4	Total Phosphorus as P	mg/L	Colorimetric	0.2	0.074
<b>Microbiology Tests</b>					
1	E. Coli	MPN/100ml	Incubation	100	47
2	Total Coliform	MPN/100ml	Incubation	1000	1550

Job Number : EV120601-C  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/II/2012

Laboratory Sample I.D :					EV120601-3 /
Customer Sample I.D :					SW - 01
Date Sampled :					09-Aug-12
Sample Matrix :					Surface Water
No.	Test Description	Unit	Technique	Regulation Limit	Results
<b>Dissolved Metals</b>					
1	Arsenic, As	mg/L	HVAAS	0.05	0.0012
2	Barium, Ba	mg/L	FAAS	1	<0.1
3	Boron, B	mg/L	ICP -AES	1	3.7
4	Cadmium, Cd	mg/L	FAAS	0.01	<0.0001
5	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.05	<0.002
6	Cobalt, Co	mg/L	FAAS	0.2	<0.02
7	Copper, Cu	mg/L	FAAS	0.02	<0.01
8	Iron, Fe	mg/L	FAAS	0.3	<0.05
9	Lead, Pb	mg/L	GFAAS	0.03	<0.001
10	Manganese, Mn	mg/L	FAAS	0.1	0.030
11	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005
12	Selenium, Se	mg/L	HVAAS	0.01	<0.0005
13	Zinc, Zn	mg/L	FAAS	0.05	0.01 /
<b>Miscellaneous</b>					
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	2	<2
2	Chemical Oxygen Demand, COD	mg/L	Titrimetric	10	<2
3	Chlorine, Cl <sub>2</sub>	mg/L	Colorimetric	0.03	<0.01
4	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	6	4.18
5	Oil & Grease	mg/L	Gravimetric	1	<1
6	Surfactants, MBAS	mg/L	Colorimetric	200	<0.01
7	Total Phenols	mg/L	Colorimetric	1	<0.001

Note: Regulation Limit based on PP No. 82 Tahun 1982

<sup>1)</sup> = Field Measurement

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :				EV120601-06	EV120601-07	EV120601-08
Customer Sample I.D :				NS - 07	NS - 08	NS - 09
Date Sampled :				29-Jul-12	29-Jul-12	29-Jul-12
Sample Matrix :				Sediment	Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results	Results
<b>Total Metals</b>						
1	Antimony, Sb	mg/dry Kg	HVAAS	0.22	0.87	0.34
2	Arsenic, As	mg/dry Kg	HVAAS	8.09	17.1	9.57
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	34	22	27
5	Copper, Cu	mg/dry Kg	FAAS	6.0	26.2	13.1
6	Lead, Pb	mg/dry Kg	FAAS	6	18	11
7	Mercury, Hg	mg/dry Kg	CVAAS	0.016	0.077	0.040
8	Nickel, Ni	mg/dry Kg	FAAS	46.4	23.9	27.2
9	Selenium, Se	mg/dry Kg	HVAAS	0.07	0.30	0.17
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	72.7	81.3	72.4
<b>Organic Tests</b>						
1	TPH	mg/dry Kg	GC-FID	<2	18	<2

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey  
 Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :				EV120864-06	EV120864-07	EV120864-08
Customer Sample I.D :				OS - 07	OS - 01	OS - 08
Date Sampled :				20-Oct-12	20-Oct-12	21-Oct-12
Sample Matrix :				Sediment	Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results	Results
<b>Total Metals</b>						
1	Antimony, Sb	mg/dry Kg	HVAAS	0.97	1.80	<0.01
2	Arsenic, As	mg/dry Kg	HVAAS	42.8	30.4	25.1
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	18	20	23
5	Copper, Cu	mg/dry Kg	FAAS	3.4	6.4	3.6
6	Lead, Pb	mg/dry Kg	FAAS	18	20	15
7	Mercury, Hg	mg/dry Kg	CVAAS	0.037	0.032	0.022
8	Nickel, Ni	mg/dry Kg	FAAS	19.1	21.2	21.9
9	Selenium, Se	mg/dry Kg	HVAAS	0.05	0.21	<0.01
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	42.1	53.5	44.8
<b>Organic Tests</b>						
1	TPH	mg/dry Kg	GC-FID	<2	<2	<2

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey  
 Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/VI/2012

Laboratory Sample I.D :				EV120864-09	EV120864-10	EV120864-11
Customer Sample I.D :				OS - 10	OS - 11	OS - 12
Date Sampled :				21-Oct-12	21-Oct-12	21-Oct-12
Sample Matrix :				Sediment	Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results	Results
<b>Total Metals</b>						
1	Antimony, Sb	mg/dry Kg	HVAAS	<0.01	0.98	0.84
2	Arsenic, As	mg/dry Kg	HVAAS	25.1	10.3	27.8
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	18	21	18
5	Copper, Cu	mg/dry Kg	FAAS	2.9	10.0	5.1
6	Lead, Pb	mg/dry Kg	FAAS	12	14	15
7	Mercury, Hg	mg/dry Kg	CVAAS	0.022	0.064	0.032
8	Nickel, Ni	mg/dry Kg	FAAS	21.4	27.3	20.2
9	Selenium, Se	mg/dry Kg	HVAAS	0.14	<0.01	<0.01
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	43.5	61.9	44.4
<b>Organic Tests</b>						
1	TPH	mg/dry Kg	GC-FID	<2	<2	<2



Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey  
 Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/MI/2012

Laboratory Sample ID :				EV120864-12	EV120864-13
Customer Sample ID :				OS - 03	OS - 04
Date Sampled :				27-Oct-12	27-Oct-12
Sample Matrix :				Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results
<b>Total Metals</b>					
1	Antimony, Sb	mg/dry Kg	HVAAS	<0.01	0.29
2	Arsenic, As	mg/dry Kg	HVAAS	4.24	49.6
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	22	20
5	Copper, Cu	mg/dry Kg	FAAS	3.7	2.1
6	Lead, Pb	mg/dry Kg	FAAS	11	15
7	Mercury, Hg	mg/dry Kg	CVAAS	0.032	0.023
8	Nickel, Ni	mg/dry Kg	FAAS	19.6	17.1
9	Selenium, Se	mg/dry Kg	HVAAS	1.09	<0.01
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	46.4	35.3
<b>Organic Tests</b>					
1	TPH	mg/dry Kg	GC-FID	<2	<2

**Job Number :** EV120884  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey  
 Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :				EV120884-14	EV120884-15
Customer Sample I.D :				OS - 08	NS - 05
Date Sampled :				27-Oct-12	27-Oct-12
Sample Matrix :				Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results
<b>Total Metals</b>					
1	Antimony, Sb	mg/dry Kg	HVAAS	0.84	<0.01
2	Arsenic, As	mg/dry Kg	HVAAS	86.9	8.25
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	13	17
5	Copper, Cu	mg/dry Kg	FAAS	1.6	6.0
6	Lead, Pb	mg/dry Kg	FAAS	24	12
7	Mercury, Hg	mg/dry Kg	CVAAS	0.015	0.038
8	Nickel, Ni	mg/dry Kg	FAAS	16.3	18.2
9	Selenium, Se	mg/dry Kg	HVAAS	<0.01	<0.01
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	37.0	45.6
<b>Organic Tests</b>					
1	TPH	mg/dry Kg	GC-FID	<2	<2

**Job Number :** EV120601rev.1  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season  
**AMDAL Tangguh Expansion Project BP Berau Ltd**  
**Customer Ref :** 1241.r1/IUS-EV/II/2012

Laboratory Sample I.D :				EV120601-06	EV120601-07	EV120601-08
Customer Sample I.D :				NS - 07	NS - 08	NS - 09
Date Sampled :				29-Jul-12	29-Jul-12	29-Jul-12
Sample Matrix :				Sediment	Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results	Results
<b>Total Metals</b>						
1	Antimony, Sb	mg/dry Kg	HVAAS	0.22	0.87	0.34
2	Arsenic, As	mg/dry Kg	HVAAS	8.09	17.1	9.57
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	34	22	27
5	Copper, Cu	mg/dry Kg	FAAS	8.0	28.2	13.1
6	Lead, Pb	mg/dry Kg	FAAS	6	18	11
7	Mercury, Hg	mg/dry Kg	CVAAS	0.016	0.077	0.040
8	Nickel, Ni	mg/dry Kg	FAAS	46.4	23.9	27.2
9	Selenium, Se	mg/dry Kg	HVAAS	0.07	0.30	0.17
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	72.7	81.3	72.4
<b>Organic Tests</b>						
1	TPH	mg/dry Kg	GC-FID	<2	16	<2

**Job Number :** EV120601-B  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/AUS-EV/VII/2012

Laboratory Sample I.D :				EV120601-28	EV120601-29	EV120601 30
Customer Sample I.D :				OS - 09	SW - 03	NS - 03
Date Sampled :				07-Aug-12	09-Aug-12	13-Aug-12
Sample Matrix :				Sediment	Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results	Results
<b>Total Metals</b>						
1	Antimony, Sb	mg/dry Kg	HVAAS	0.73	0.16	0.15
2	Arsenic, As	mg/dry Kg	HVAAS	61.0	5.10	7.81
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	13	4	19
5	Copper, Cu	mg/dry Kg	FAAS	1.7	0.9	4.6
6	Lead, Pb	mg/dry Kg	FAAS	11	2	7
7	Mercury, Hg	mg/dry Kg	CVAAS	0.004	0.004	0.024
8	Nickel, Ni	mg/dry Kg	FAAS	20.9	5.7	18.2
9	Selenium, Se	mg/dry Kg	HVAAS	0.07	0.06	0.14
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	38.9	12.5	36.1
<b>Organic Tests</b>						
1	TPH	mg/dry Kg	GC-FID	<2	<2	<2



**PT. Intertek Utama Services**  
Cilandak Commercial Estate 103E  
Jl. Cilandak KKO  
Jakarta 12560  
Indonesia  
Tel: +6221 7808011  
Fax: +6221 7807929  
Email: indo.office@intertek.com  
Website: www.intertek.com

Job Number : EV120601-C  
Customer : PT ERM Indonesia  
Project Name : Environmental Baseline Survey Dry Season AMDAL  
Tanggung Expansion Project BP Berau Ltd  
Customer Ref : 1241.r1/US-EV/III/2012

Laboratory Sample I.D :				EV120601-38
Customer Sample I.D :				SW - 01
Date Sampled :				09-Aug-12
Sample Matrix :				Sediment
No.	Test Description	Unit	Technique	Results
<b>Total Metals</b>				
1	Antimony, Sb	mg/dry Kg	HVAAS	0.12
2	Arsenic, As	mg/dry Kg	HVAAS	21.5
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	24
5	Copper, Cu	mg/dry Kg	FAAS	8.3
6	Lead, Pb	mg/dry Kg	FAAS	7
7	Mercury, Hg	mg/dry Kg	CVAAS	0.020
8	Nickel, Ni	mg/dry Kg	FAAS	34.7
9	Selenium, Se	mg/dry Kg	HVAAS	0.04
10	Silver, Ag	mg/dry Kg	FAAS	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	64.9
<b>Organic Tests</b>				
1	TPH	mg/dry Kg	GC-FID	3

Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/II/2012

Laboratory Sample I.D :				EV120601-19	EV120601-20
Customer Sample I.D :				OS - 14	NS - 01
Date Sampled :				04-Aug-12	05 Aug-12
Sample Matrix :				Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results
<b>Total Metals</b>					
1	Antimony, Sb	mg/dry Kg	HVAAS	0.48	0.17
2	Arsenic, As	mg/dry Kg	HVAAS	22.5	7.0
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	31	8
5	Copper, Cu	mg/dry Kg	FAAS	13.4	1.2
6	Lead, Pb	mg/dry Kg	FAAS	15	<1
7	Mercury, Hg	mg/dry Kg	CVAAS	0.027	0.007
8	Nickel, Ni	mg/dry Kg	FAAS	32.3	3.8
9	Selenium, Se	mg/dry Kg	HVAAS	0.36	0.23
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	76.1	6.2
<b>Organic Tests</b>					
1	TPH	mg/dry Kg	GC-FID	19	13

**Job Number :** EV120601-A  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :				EV120601-21	EV120601-22
Customer Sample I.D :				NS - 02	NS - 04
Date Sampled :				03-Aug-12	04-Aug 12
Sample Matrix :				Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results
	<b>Total Metals</b>				
1	Antimony, Sb	mg/dry Kg	HVAAS	0.29	0.22
2	Arsenic, As	mg/dry Kg	HVAAS	11.6	9.7
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	30	26
5	Copper, Cu	mg/dry Kg	FAAS	9.1	7.7
6	Lead, Pb	mg/dry Kg	FAAS	13	11
7	Mercury, Hg	mg/dry Kg	CVAAS	0.037	0.037
8	Nickel, Ni	mg/dry Kg	FAAS	28.9	25.0
9	Selenium, Se	mg/dry Kg	HVAAS	0.27	0.21
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	73.7	69.2
	<b>Organic Tests</b>				
1	TPH	mg/dry Kg	GC-FID	9	10

Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :				EV120601-23
Customer Sample I.D :				NS - 06
Date Sampled :				04-Aug-12
Sample Matrix :				Sediment
No.	Test Description	Unit	Technique	Results
<b>Total Metals</b>				
1	Antimony, Sb	mg/dry Kg	HVAAS	0.32
2	Arsenic, As	mg/dry Kg	HVAAS	17.7
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	34
5	Copper, Cu	mg/dry Kg	FAAS	14.0
6	Lead, Pb	mg/dry Kg	FAAS	16
7	Mercury, Hg	mg/dry Kg	CVAAS	0.026
8	Nickel, Ni	mg/dry Kg	FAAS	34.6
9	Selenium, Se	mg/dry Kg	HVAAS	0.35
10	Silver, Ag	mg/dry Kg	FAAS	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	89.3
<b>Organic Tests</b>				
1	TPH	mg/dry Kg	GC-FID	22



**QUALITY CONTROL - PRECISION**

**Job Number :** EV120601-A  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VII/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-18	EV120601-18 (Replicate)	
<b>Physical Tests</b>					
1	Brightness <sup>1)</sup>	m	<1	-	-
2	Floating Matter <sup>1)</sup>	-	None	-	-
3	Odor <sup>1)</sup>	-	Odorless	-	-
4	Oil Film <sup>1)</sup>	-	None	-	-
5	pH <sup>1)</sup>	-	7.22	-	-
6	Salinity <sup>1)</sup>	‰	24.4	-	-
7	Temperature <sup>1)</sup>	°C	28.5	-	-
8	Total Suspended Solids, TSS	mg/L	60	60	0.0%
9	Turbidity <sup>1)</sup>	NTU	49.4	-	-
<b>Anions</b>					
1	Sulphide as H <sub>2</sub> S	mg/L	<0.002	-	-
2	Total Cyanide, CN	mg/L	<0.005	<0.005	-
<b>Nutrients</b>					
1	Ammonia, NH <sub>3</sub> -N	mg/L	<0.02	<0.02	-
2	Nitrate, NO <sub>3</sub> -N	mg/L	0.288	0.293	1.7%
3	Total Phosphorus as P	mg/L	0.038	0.038	0.0%
<b>Microbiology Tests</b>					
1	Total Coliform	MPN/100ml	ND	-	-
<b>Dissolved Metals</b>					
1	Arsenic, As	mg/L	<0.0005	<0.0005	-
2	Cadmium, Cd	mg/L	0.0001	0.0001	-
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	<0.002	<0.002	-
4	Copper, Cu	mg/L	<0.001	<0.001	-
5	Lead, Pb	mg/L	<0.001	<0.001	-
6	Mercury, Hg	mg/L	<0.00005	<0.00005	-
7	Nickel, Ni	mg/L	<0.02	<0.02	-
8	Zinc, Zn	mg/L	0.014	0.013	7.4%

### QUALITY CONTROL - PRECISION

**Job Number :** EV120601-A  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VII/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-18	EV120601-18 (Replicate)	
	<b>Miscellaneous</b>				
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	<2	<2	
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	4.87	-	
3	Surfactants, MBAS	mg/L	<0.01	<0.01	
4	Oil & Grease	mg/L	<1	-	-
5	Total Phenols	mg/L	<0.001	<0.001	-
	<b>Organic Tests**</b>				
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	<0.0001	-	

Note: <sup>1)</sup> = Field Measurement

**QUALITY CONTROL - PRECISION**

Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-23	EV120801-23 (Replicate)	
	<b>Total Metals</b>				
1	Antimony, Sb	mg/dry Kg	0.32	0.34	8.3%
2	Arsenic, As	mg/dry Kg	17.7	18.1	8.0%
3	Cadmium, Cd	mg/dry Kg	<0.1	<0.1	
4	Chromium, Cr	mg/dry Kg	34	34	0.5%
5	Copper, Cu	mg/dry Kg	14.0	13.8	0.9%
6	Lead, Pb	mg/dry Kg	16	16	2.0%
7	Mercury, Hg	mg/dry Kg	0.026	0.027	4.4%
8	Nickel, Ni	mg/dry Kg	34.6	34.3	0.8%
9	Selenium, Se	mg/dry Kg	0.35	0.38	7.7%
10	Silver, Ag	mg/dry Kg	<0.4	<0.4	
11	Zinc, Zn	mg/dry Kg	89.3	91.9	2.8%
	<b>Organic Tests</b>				
1	TPH	mg/dry Kg	22	22	0.0%

**QUALITY CONTROL - ACCURACY**

Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/VII/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
<b>Physical Tests</b>							
1	Brightness <sup>1)</sup>	m	-	-	-	-	-
2	Floating Matter <sup>1)</sup>	-	-	-	-	-	-
3	Odor <sup>1)</sup>	-	-	-	-	-	-
4	Oil Film <sup>1)</sup>	-	-	-	-	-	-
5	pH <sup>1)</sup>	-	-	-	-	-	-
6	Salinity <sup>1)</sup>	ppt	-	-	-	-	-
7	Temperature <sup>1)</sup>	°C	-	-	-	-	-
8	Total Suspended Solids, TSS	mg/L	1	<1	39	40	102%
9	Turbidity <sup>1)</sup>	NTU	0.5	<0.5	-	-	-
<b>Anions</b>							
1	Sulphide as H <sub>2</sub> S	mg/L	0.002	<0.002	2.25	2.25	100%
2	Total Cyanide, CN	mg/L	0.005	<0.005	0.926	0.910	98%
<b>Nutrients</b>							
1	Ammonia, NH <sub>3</sub> -N	mg/L	0.02	<0.02	10.9	10.6	97%
2	Nitrate, NO <sub>3</sub> -N	mg/L	0.005	<0.005	4.35	4.49	103%
3	Total Phosphorus as P	mg/L	0.005	<0.005	8.88	8.55	96%
<b>Microbiology Tests</b>							
1	Total Coliform	MPN/100ml	1	-	-	-	-
<b>Dissolved Metals</b>							
1	Arsenic, As	mg/L	0.0005	<0.0005	0.347	0.349	101%
2	Cadmium, Cd	mg/L	0.0001	<0.0001	0.427	0.419	98%
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	0.002	<0.002	0.346	0.347	100%
4	Copper, Cu	mg/L	0.001	<0.001	0.217	0.224	103%
5	Lead, Pb	mg/L	0.001	<0.001	0.754	0.766	102%
6	Mercury, Hg	mg/L	0.00005	<0.00005	0.0173	0.0168	97%
7	Nickel, Ni	mg/L	0.02	<0.02	0.51	0.50	99%
8	Zinc, Zn	mg/L	0.005	<0.005	0.975	0.996	102%

**QUALITY CONTROL - ACCURACY**

Job Number : EV120601-A  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/II/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
	<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	2	<2	82	79	97%
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	-	-	-	-	-
3	Surfactants, MBAS	mg/L	0.01	<0.01	0.35	0.34	97%
4	Oil & Grease	mg/L	1	<1	202	182	90%
5	Total PhenolS	mg/L	0.001	<0.001	0.163	0.159	98%
	<b>Total Metals (Sediment)</b>						
1	Antimony, Sb	mg/dry Kg	0.01	< 0.01	113	104	92%
2	Arsenic, As	mg/dry Kg	0.01	< 0.01	237	232	98%
3	Cadmium, Cd	mg/dry Kg	0.1	< 0.1	191	181	95%
4	Chromium, Cr	mg/dry Kg	1	< 1.0	128	123	96%
5	Copper, Cu	mg/dry Kg	0.2	< 0.2	123	122	99%
6	Lead, Pb	mg/dry Kg	1	< 1	103	98	95%
7	Mercury, Hg	mg/dry Kg	0.001	< 0.001	12.4	12.0	97%
8	Nickel, Ni	mg/dry Kg	0.4	< 0.4	118	110	94%
9	Selenium, Se	mg/dry Kg	0.01	< 0.01	110	108	99%
10	Silver, Ag	mg/dry Kg	0.4	< 0.4	-	-	-
11	Zinc, Zn	mg/dry Kg	0.1	< 0.1	183	186	102%
	<b>Organic Tests**</b>						
1	TPH	mg/dry Kg	2	<2	2380	2160	91%
	<b>Organic Tests**</b>						
	<b>Polycyclic Aromatic Hydrocarbons, PAHs**</b>						
1	Acenaphthene	mg/L	0.0001	<0.0001	4.00	3.38	85%
2	Acenaphthylene	mg/L	0.0001	<0.0001	4.00	3.42	86%
3	Anthracene	mg/L	0.0001	<0.0001	4.00	3.84	96%
4	Benzo(a)anthracene	mg/L	0.0001	<0.0001	4.00	3.76	94%
5	Benzo(a)pyrene	mg/L	0.0001	<0.0001	4.00	4.12	103%
6	Benzo(g,h,i)perylene	mg/L	0.0001	<0.0001	4.00	4.34	109%
7	Benzo(k)fluoranthene	mg/L	0.0001	<0.0001	4.00	4.12	103%
8	Chrysene	mg/L	0.0001	<0.0001	4.00	4.22	106%

**QUALITY CONTROL - ACCURACY**

**Job Number :** EV120601-A  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VII/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
9	Dibenz(a,h)anthracene	mg/L	0.0001	<0.0001	4.00	4.32	108%
10	Fluoranthene	mg/L	0.0001	<0.0001	4.00	4.14	104%
11	Fluorene	mg/L	0.0001	<0.0001	4.00	3.36	84%
12	Indeno(1,2,3-cd)pyrene	mg/L	0.0001	<0.0001	4.00	4.34	109%
13	Naphthalene	mg/L	0.0001	<0.0001	4.00	3.84	96%
14	Phenanthrene	mg/L	0.0001	<0.0001	4.00	3.92	98%
15	Pyrene	mg/L	0.0001	<0.0001	4.00	4.32	108%

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey  
 Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/VI/2012

Laboratory Sample I.D :				EV120864-06	EV120864-07	EV120864-08
Customer Sample I.D :				OS - 07	OS - 01	OS - 08
Date Sampled :				20-Oct-12	20-Oct-12	21-Oct-12
Sample Matrix :				Sediment	Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results	Results
<b>Total Metals</b>						
1	Antimony, Sb	mg/dry Kg	HVAAS	0.97	1.80	<0.01
2	Arsenic, As	mg/dry Kg	HVAAS	42.8	30.4	25.1
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	18	20	23
5	Copper, Cu	mg/dry Kg	FAAS	3.4	6.4	3.6
6	Lead, Pb	mg/dry Kg	FAAS	18	20	15
7	Mercury, Hg	mg/dry Kg	CVAAS	0.037	0.032	0.022
8	Nickel, Ni	mg/dry Kg	FAAS	19.1	21.2	21.9
9	Selenium, Se	mg/dry Kg	HVAAS	0.05	0.21	<0.01
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	42.1	53.5	44.8
<b>Organic Tests</b>						
1	TPH	mg/dry Kg	GC-FID	<2	<2	<2

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey  
 Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VI/2012

Laboratory Sample I.D :				EV120864-09	EV120864-10	EV120864-11
Customer Sample I.D :				OS - 10	OS - 11	OS - 12
Date Sampled :				21-Oct-12	21-Oct-12	21-Oct-12
Sample Matrix :				Sediment	Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results	Results
<b>Total Metals</b>						
1	Antimony, Sb	mg/dry Kg	HVAAS	<0.01	0.96	0.84
2	Arsenic, As	mg/dry Kg	HVAAS	25.1	10.3	27.8
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	18	21	18
5	Copper, Cu	mg/dry Kg	FAAS	2.9	10.0	5.1
6	Lead, Pb	mg/dry Kg	FAAS	12	14	15
7	Mercury, Hg	mg/dry Kg	CVAAS	0.022	0.054	0.032
8	Nickel, Ni	mg/dry Kg	FAAS	21.4	27.3	20.2
9	Selenium, Se	mg/dry Kg	HVAAS	0.14	<0.01	<0.01
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	43.5	61.9	44.4
<b>Organic Tests</b>						
1	TPH	mg/dry Kg	GC-FID	<2	<2	<2



Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey  
 Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/11/2012

Laboratory Sample ID :				EV120864-12	EV120864-13
Customer Sample ID :				OS - 03	OS - 04
Date Sampled :				27-Oct-12	27-Oct-12
Sample Matrix :				Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results
<b>Total Metals</b>					
1	Antimony, Sb	mg/dry Kg	HVAAS	<0.01	0.29
2	Arsenic, As	mg/dry Kg	HVAAS	4.24	49.6
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	22	20
5	Copper, Cu	mg/dry Kg	FAAS	3.7	2.1
6	Lead, Pb	mg/dry Kg	FAAS	11	15
7	Mercury, Hg	mg/dry Kg	CVAAS	0.032	0.023
8	Nickel, Ni	mg/dry Kg	FAAS	19.6	17.1
9	Selenium, Se	mg/dry Kg	HVAAS	1.09	<0.01
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	46.4	35.3
<b>Organic Tests</b>					
1	TPH	mg/dry Kg	GC-FID	<2	<2

Job Number : EV120884  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey  
 Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/11/2012

Laboratory Sample I.D :				EV120884-14	EV120884-15
Customer Sample I.D :				OS - 08	NS - 05
Date Sampled :				27-Oct-12	27-Oct-12
Sample Matrix :				Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results
<b>Total Metals</b>					
1	Antimony, Sb	mg/dry Kg	HVAAS	0.64	<0.01
2	Arsenic, As	mg/dry Kg	HVAAS	86.9	8.25
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	13	17
5	Copper, Cu	mg/dry Kg	FAAS	1.6	6.0
6	Lead, Pb	mg/dry Kg	FAAS	24	12
7	Mercury, Hg	mg/dry Kg	CVAAS	0.016	0.038
8	Nickel, Ni	mg/dry Kg	FAAS	16.3	16.2
9	Selenium, Se	mg/dry Kg	HVAAS	<0.01	<0.01
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	37.0	45.5
<b>Organic Tests</b>					
1	TPH	mg/dry Kg	GC-FID	<2	<2

150

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Barau Ltd  
 Customer Ref : 1241.r1/US-EV/VI/2012

Laboratory Sample I.D :						EV120864-16	EV120864-17
Customer Sample I.D :						AQN - 08	AQN - 10
Date Sampled :						27-Oct-12	27-Oct-12
Sample Matrix :						Ambient Air	Ambient Air
No.	Test Description	Unit	Technique	Sampling Duration	Regulatory Limit	Results	Results
	Ambient Air Quality						
1	Sulfur Dioxide, SO <sub>2</sub>	µg/Nm <sup>3</sup>	Parasarsiline	1 hour	900	60	65
2	Carbon Monoxide, CO*	µg/Nm <sup>3</sup>	CO Analyzer	1 hour	30000	<1140	<1140
3	Nitrogen Oxide, NO <sub>2</sub>	µg/Nm <sup>3</sup>	Setzman	1 hour	400	<5	<5
4	Oxidant, O <sub>3</sub>	µg/Nm <sup>3</sup>	Chemiluminescent	1 hour	235	14	25
5	Hydrocarbon, HC*	µg/Nm <sup>3</sup>	GC-FID	3 hours	160	<5	<5
6	Particulate <10mm (PM <sub>10</sub> )	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	150	15	11
7	Particulate <2.5mm (PM <sub>2.5</sub> )	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	65	9	2
8	Total Suspended Particulate (TSP)	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	230	19	13
9	Lead, Pb	µg/Nm <sup>3</sup>	GFAAS	Grab	2	<0.1	<0.1
10	Noise, L <sub>avg</sub> *	dB	Noise Dosimeter	Grab	-	55.3	55.3

Note: \* = Non accredited parameter

Laboratory Sample I.D :						EV120864-18	EV120864-19
Customer Sample I.D :						AQN - 11	AQN - 12
Date Sampled :						28-Oct-12	28-Oct-12
Sample Matrix :						Ambient Air	Ambient Air
No.	Test Description	Unit	Technique	Sampling Duration	Regulatory Limit	Results	Results
	Ambient Air Quality						
1	Sulfur Dioxide, SO <sub>2</sub>	µg/Nm <sup>3</sup>	Parasarsiline	1 hour	900	67	77
2	Carbon Monoxide, CO*	µg/Nm <sup>3</sup>	CO Analyzer	1 hour	30000	<1140	<1140
3	Nitrogen Oxide, NO <sub>2</sub>	µg/Nm <sup>3</sup>	Setzman	1 hour	400	11	4
4	Oxidant, O <sub>3</sub>	µg/Nm <sup>3</sup>	Chemiluminescent	1 hour	235	10	20
5	Hydrocarbon, HC*	µg/Nm <sup>3</sup>	GC-FID	3 hours	160	<5	<5
6	Particulate <10mm (PM <sub>10</sub> )	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	150	17	17
7	Particulate <2.5mm (PM <sub>2.5</sub> )	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	65	3	11
8	Total Suspended Particulate (TSP)	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	230	19	26
9	Lead, Pb	µg/Nm <sup>3</sup>	GFAAS	Grab	2	<0.1	<0.1
10	Noise, L <sub>avg</sub> *	dB	Noise Dosimeter	Grab	-	57.0	62.8

Note: \* = Non accredited parameter

Job Number : EV120601-C  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :						EV120601-39	EV120601-40
Customer Sample I.D :						AQ 1	AQ 2
Date Sampled :						07-Aug-12	06 Aug 12
Sample Matrix :						Ambient Air	Ambient Air
No.	Test Description	Unit	Technique	Sampling Duration	Regulatory Limit	Results	Results
<b>Ambient Air Quality</b>							
1	Sulfur Dioxide, SO <sub>2</sub>	µg/Nm <sup>3</sup>	Pararosaniline	1 hour	900	255	154
2	Carbon Monoxide, CO*	µg/Nm <sup>3</sup>	CO Analyzer	1 hour	30000	1030	5/3
3	Nitrogen Oxide, NO <sub>2</sub>	µg/Nm <sup>3</sup>	Satzman	1 hour	400	<5	<5
4	Oxidant, O <sub>3</sub>	µg/Nm <sup>3</sup>	Chemiluminescent	1 hour	235	<1	<1
5	Hydrocarbon, HC*	µg/Nm <sup>3</sup>	GC-FID	3 hours	180	<5	<5
6	Particulate <10µm (PM <sub>10</sub> )	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	150	8	8
7	Particulate <2.5µm (PM <sub>2.5</sub> )	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	65	10	9
8	Total Suspended Particulate (TSP)	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	230	19	20
9	Lead, Pb	µg/Nm <sup>3</sup>	GFAAS	Grab	2	<2	<2
10	Noise, L <sub>avg</sub> *	dB	Noise Dosimeter	Grab	-	42.7	41.1

Note: \* = Non accredited parameter

Job Number : EV120601-C  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

Laboratory Sample I.D :						EV120601-41	LV120601 42
Customer Sample I.D :						AQ 4	AQ 6
Date Sampled :						09-Aug-12	14-Aug 12
Sample Matrix :						Ambient Air	Ambient Air
No.	Test Description	Unit	Technique	Sampling Duration	Regulatory Limit	Results	Results
<b>Ambient Air Quality</b>							
1	Sulfur Dioxide, SO <sub>2</sub>	µg/Nm <sup>3</sup>	Pararosaniline	1 hour	900	130	86
2	Carbon Monoxide, CO*	µg/Nm <sup>3</sup>	CO Analyzer	1 hour	30000	687	916
3	Nitrogen Oxide, NO <sub>2</sub>	µg/Nm <sup>3</sup>	Satzman	1 hour	400	6	<5
4	Oxidant, O <sub>3</sub>	µg/Nm <sup>3</sup>	Chemiluminescent	1 hour	235	<1	<1
5	Hydrocarbon, HC*	µg/Nm <sup>3</sup>	GC-FID	3 hours	160	<5	<5
6	Particulate <10µm (PM <sub>10</sub> )	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	150	9	12
7	Particulate <2.5µm (PM <sub>2.5</sub> )	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	65	11	16
8	Total Suspended Particulate (TSP)	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	230	22	32
9	Lead, Pb	µg/Nm <sup>3</sup>	GFAAS	Grab	2	<2	<2
10	Noise, L <sub>avg</sub> *	dB	Noise Dosimeter	Grab	-	54.2	40.8

Note: \* = Non accredited parameter

Job Number : EV120601-C  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VI/2012

Laboratory Sample I.D :						EV120601-43	EV120601-44
Customer Sample I.D :						AQ 7	AQ 8
Date Sampled :						16-Aug-12	05-Aug 17
Sample Matrix :						Ambient Air	Ambient Air
No.	Test Description	Unit	Technique	Sampling Duration	Regulatory Limit	Results	Results
<b>Ambient Air Quality</b>							
1	Sulfur Dioxide, SO <sub>2</sub>	µg/Nm <sup>3</sup>	Pararosaniline	1 hour	900	<20	355
2	Carbon Monoxide, CO*	µg/Nm <sup>3</sup>	CO Analyzer	1 hour	30000	1150	1150
3	Nitrogen Oxide, NO <sub>2</sub>	µg/Nm <sup>3</sup>	Satzman	1 hour	400	6	<5
4	Oxidant, O <sub>3</sub>	µg/Nm <sup>3</sup>	Chemiluminescent	1 hour	235	<1	<1
5	Hydrocarbon, HC*	µg/Nm <sup>3</sup>	GC-FID	3 hours	160	<5	<5
6	Particulate <10µm (PM <sub>10</sub> )	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	150	9	13
7	Particulate <2.5µm (PM <sub>2.5</sub> )	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	65	13	5
8	Total Suspended Particulate (TSP)	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	230	24	19
9	Lead, Pb	µg/Nm <sup>3</sup>	GFAAS	Grab	2	<2	<2
10	Noise, L <sub>avg</sub> *	dB	Noise Dosimeter	Grab	-	49.5	53.2

Note: \* = Non accredited parameter

**QUALITY CONTROL - PRECISION**

Job Number : EV120601-C  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-36	EV120601-36 (Replicate)	
<b>Physical Tests</b>					
1	Colour	P/Co	<5	<5	-
2	Conductivity <sup>1)</sup>	µS/Cm	45	-	-
3	Odor <sup>1)</sup>	-	Odorless	-	-
4	pH <sup>1)</sup>	-	5.79	-	-
5	Taste <sup>1)</sup>	-	N.A	-	-
6	Temperature <sup>1)</sup>	°C	24.7	-	-
7	Total Dissolved Solids, TDS	mg/L	15	15	0.0%
8	Total Hardness as CaCO <sub>3</sub>	mg/L	8.8	8.9	1.3%
9	Turbidity	NTU	0.8	0.8	0.0%
<b>Anions</b>					
1	Chloride, Cl <sup>-</sup>	mg/L	2.6	3.2	20.7%
2	Fluoride, F <sup>-</sup>	mg/L	<0.02	<0.02	-
3	Sulphate, SO <sub>4</sub>	mg/L	<2	<2	-
4	Sulphide as H <sub>2</sub> S	mg/L	<0.002	-	-
5	Total Cyanide, CN <sup>-</sup>	mg/L	<0.005	-	-
<b>Nutrients</b>					
1	Nitrate, NO <sub>3</sub> -N	mg/L	1.45	1.60	10.0%
2	Nitrite, NO <sub>2</sub> -N	mg/L	<0.001	<0.001	-
<b>Microbiology Tests</b>					
1	E.Coli	MPN/100ml	1	-	-
2	Total Coliform	MPN/100mi	1410	-	-
<b>Dissolved Metals</b>					
1	Arsenic, As	mg/L	<0.0005	<0.0005	-
2	Cadmium, Cd	mg/L	<0.0001	<0.0001	-
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	<0.002	<0.002	-
4	Copper, Cu	mg/L	<0.01	<0.01	-
5	Iron, Fe	mg/L	0.08	0.08	-
6	Lead, Pb	mg/L	<0.001	<0.001	-
7	Manganese, Mn	mg/L	<0.01	<0.01	-

**QUALITY CONTROL - PRECISION**

**Job Number :** EV120601-C  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/US-EV/VII/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-36	EV120601-36 (Replicate)	
8	Mercury, Hg	mg/L	<0.00005	<0.00005	
9	Selenium, Se	mg/L	<0.0005	<0.0005	-
10	Zinc, Zn	mg/L	0.013	0.013	-
	<b>Miscellaneous</b>				
1	Surfactants, MBAS	mg/L	<0.01	<0.01	-
2	Total Organic Matter, KMnO4	mg/L	<2	<2	-



**QUALITY CONTROL - PRECISION**

**Job Number :** EV120601-C  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/VII/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120601-38	EV120601-38 (Replicate)	
	<b>Total Metals</b>				
1	Antimony, Sb	mg/dry Kg	0.12	0.12	0.2%
2	Arsenic, As	mg/dry Kg	21.5	21.3	1.0%
3	Cadmium, Cd	mg/dry Kg	<0.1	<0.1	-
4	Chromium, Cr	mg/dry Kg	24	24	0.3%
5	Copper, Cu	mg/dry Kg	8.3	8.3	0.0%
6	Lead, Pb	mg/dry Kg	7	7	9.9%
7	Mercury, Hg	mg/dry Kg	0.020	0.022	11.9%
8	Nickel, Ni	mg/dry Kg	34.7	31.8	8.7%
9	Selenium, Se	mg/dry Kg	0.04	0.05	5.6%
10	Silver, Ag	mg/dry Kg	<0.4	<0.4	
11	Zinc, Zn	mg/dry Kg	64.9	72.6	11.2%
	<b>Organic Tests</b>				
1	TPH	mg/dry Kg	3	-	-

**QUALITY CONTROL - ACCURACY**

Job Number : EV120601-C  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VII/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
<b>Physical Tests</b>							
1	Colour	Pt/Co	5	<5	40	38.3/	96%
2	Conductivity <sup>1)</sup>	µS/Cm		-	-	-	
3	Odor <sup>1)</sup>	-	-	-	-	-	
4	pH <sup>1)</sup>	-	-	-	-	-	
5	Taste <sup>1)</sup>	-	-	-	-	-	
6	Temperature <sup>1)</sup>	°C	-	-	-	-	
7	Total Dissolved Solids, TDS	mg/L	1	<1			
8	Total Hardness as CaCO <sub>3</sub>	mg/L	0.5	<0.5	290	299	103%
9	Total Suspended Solids, TSS	mg/L	1	<1	39	40	102%
10	Turbidity (in lab)	NTU	0.5	<0.5	4.7	4.6	98%
<b>Anions</b>							
1	Chloride, Cl <sup>-</sup>	mg/L	0.5	<0.5	9.14	8.77	96%
2	Fluoride, F <sup>-</sup>	mg/L	0.02	<0.02	4.00	3.87	97%
3	Sulphate, SO <sub>4</sub>	mg/L	2	<2	18.5	17.8	96%
4	Sulphide, S <sup>2-</sup>	mg/L	0.002	<0.002	2.25	2.11	94%
5	Total Cyanide, CN	mg/L	0.005	<0.005	0.926	0.893	96%
<b>Nutrients</b>							
1	Free Ammonia, NH <sub>3</sub> -N	mg/L	0.02	<0.02	10.9	11.7	107%
2	Nitrate, NO <sub>3</sub> -N	mg/L	0.005	<0.005	4.35	4.74	109%
3	Nitrite, NO <sub>2</sub> -N	mg/L	0.001	<0.001	1.64	1.58	96%
4	Total Phosphorus as P	mg/L	0.005	<0.005	8.88	9.02	102%
<b>Microbiology Tests</b>							
1	E.Coli	MPN/100ml	1	-	-	-	
2	Total Coliform	MPN/100ml	1	-	-	-	
<b>Dissolved Metals</b>							
1	Arsenic, As	mg/L	0.0005	<0.0005	0.347	0.336	97%
2	Barium, Ba	mg/L	0.1	<0.1	2.4	2.3	98%
3	Boron, B	mg/L	0.1	<0.1	1.7	1.8	108%

**QUALITY CONTROL - ACCURACY**

Job Number : EV120601-C  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/VII/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
4	Cadmium, Cd	mg/L	0.0001	<0.0001	0.427	0.406	95%
5	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	0.002	<0.002	0.345	0.350	101%
6	Cobalt, Co	mg/L	0.02	<0.02	0.36	0.37	101%
7	Copper, Cu	mg/L	0.01	<0.01	0.217	0.216	100%
8	Iron, Fe	mg/L	0.05	<0.05	1.07	1.03	96%
9	Lead, Pb	mg/L	0.001	<0.001	0.75	0.74	98%
10	Manganese, Mn	mg/L	0.01	<0.01	1.86	1.86	100%
11	Mercury, Hg	mg/L	0.00005	<0.00005	0.0173	0.0158	91%
12	Selenium, Se	mg/L	0.0005	<0.0005	1.62	1.60	99%
13	Zinc, Zn	mg/L	0.005	<0.005	0.975	0.954	98%
<b>Miscellaneous</b>							
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	2	<2	82	76	94%
2	Chemical Oxygen Demand, COD	mg/L	2	<2	132	130	98%
3	Chlorine, Cl <sub>2</sub>	mg/L	0.01	<0.01	-	-	
4	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	-	-	-	-	
5	Oil & Grease	mg/L	1	<1	264	257	95%
6	Surfactants, MBAS	mg/L	0.01	<0.01	0.35	0.34	97%
7	Total Organic Matter, KMnO <sub>4</sub>	mg/L	2	<2	-	-	
8	Total Phenols	mg/L	0.001	<0.001	0.163	0.155	95%
<b>Total Metals (Sediment)</b>							
1	Antimony, Sb	mg/dry Kg	0.01	<0.01	113	107	95%
2	Arsenic, As	mg/dry Kg	0.01	<0.01	237	239	101%
3	Cadmium, Cd	mg/dry Kg	0.1	<0.1	191	188	99%
4	Chromium, Cr	mg/dry Kg	1	<1	128	125	98%
5	Copper, Cu	mg/dry Kg	0.2	<0.2	123	123	100%
6	Lead, Pb	mg/dry Kg	1	<1	103	102	99%
7	Mercury, Hg	mg/dry Kg	0.001	<0.001	12.4	12.2	98%
8	Nickel, Ni	mg/dry Kg	0.4	<0.4	118	125	106%
9	Selenium, Se	mg/dry Kg	0.01	<0.01	110	110	100%
10	Silver, Ag	mg/dry Kg	0.4	<0.4	-	-	
11	Zinc, Zn	mg/dry Kg	0.1	<0.1	183	172	94%



**PT. Intertek Utama Services**  
Cilandak Commercial Estate 103E  
Jl. Cilandak KKO  
Jakarta 12560  
Indonesia  
Tel: +6221 7808011  
Fax: +6221 7807929  
Email: [indo.office@intertek.com](mailto:indo.office@intertek.com)  
Website: [www.intertek.com](http://www.intertek.com)

### QUALITY CONTROL - ACCURACY

Job Number : EV120601-C  
Customer : PT ERM Indonesia  
Project Name : Environmental Baseline Survey Dry Season AMDAL  
Tanggung Expansion Project BP Berau Ltd  
Customer Ref : 1241.r1/IUS-EV/VII/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
	<b>Organic Tests</b>						
1	TPH	mg/dry Kg		<2	2380	2160	91%

Note: <sup>1)</sup> = Field Measurement



Job Number : EV120884  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/VI/2012

Laboratory Sample I.D :						EV120884-16	EV120884-17
Customer Sample I.D :						AQN - 09	AQN - 10
Date Sampled :						27-Oct-12	27-Oct-12
Sample Matrix :						Ambient Air	Ambient Air
No.	Test Description	Unit	Technique	Sampling Duration	Regulatory Limit	Results	Results
<b>Ambient Air Quality</b>							
1	Sulfur Dioxide, SO <sub>2</sub>	µg/Nm <sup>3</sup>	Pararosaniline	1 hour	800	60	65
2	Carbon Monoxide, CO*	µg/Nm <sup>3</sup>	CO Analyzer	1 hour	30000	<1140	<1140
3	Nitrogen Oxide, NO <sub>2</sub>	µg/Nm <sup>3</sup>	Satzman	1 hour	400	<5	<5
4	Oxidant, O <sub>3</sub>	µg/Nm <sup>3</sup>	Chemiluminescent	1 hour	235	14	25
5	Hydrocarbon, HC*	µg/Nm <sup>3</sup>	GC-FID	3 hours	160	<5	<5
6	Particulate <10mm (PM <sub>10</sub> )	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	150	15	11
7	Particulate <2.5mm (PM <sub>2.5</sub> )	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	85	9	2
8	Total Suspended Particulate (TSP)	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	230	19	13
9	Lead, Pb	µg/Nm <sup>3</sup>	GFAAS	Grab	2	<0.1	<0.1
10	Noise, L <sub>avg</sub> *	dB	Noise Dosimeter	Grab	-	55.3	55.3

Note: \* = Non accredited parameter

Laboratory Sample I.D :						EV120884-18	EV120884-19
Customer Sample I.D :						AQN - 11	AQN - 12
Date Sampled :						28-Oct-12	28-Oct-12
Sample Matrix :						Ambient Air	Ambient Air
No.	Test Description	Unit	Technique	Sampling Duration	Regulatory Limit	Results	Results
<b>Ambient Air Quality</b>							
1	Sulfur Dioxide, SO <sub>2</sub>	µg/Nm <sup>3</sup>	Pararosaniline	1 hour	800	67	77
2	Carbon Monoxide, CO*	µg/Nm <sup>3</sup>	CO Analyzer	1 hour	30000	<1140	<1140
3	Nitrogen Oxide, NO <sub>2</sub>	µg/Nm <sup>3</sup>	Satzman	1 hour	400	11	4
4	Oxidant, O <sub>3</sub>	µg/Nm <sup>3</sup>	Chemiluminescent	1 hour	235	10	20
5	Hydrocarbon, HC*	µg/Nm <sup>3</sup>	GC-FID	3 hours	160	<5	<5
6	Particulate <10mm (PM <sub>10</sub> )	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	150	17	17
7	Particulate <2.5mm (PM <sub>2.5</sub> )	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	85	3	11
8	Total Suspended Particulate (TSP)	µg/Nm <sup>3</sup>	Dust Analyzer	Grab	230	19	26
9	Lead, Pb	µg/Nm <sup>3</sup>	GFAAS	Grab	2	<0.1	<0.1
10	Noise, L <sub>avg</sub> *	dB	Noise Dosimeter	Grab	-	57.0	62.8

Note: \* = Non accredited parameter

### QUALITY CONTROL - PRECISION

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/U8-EV/VII/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120864-05	EV120864-05 (Replicate)	
<b>Physical Tests</b>					
1	Brightness <sup>1)</sup>	m	70	-	-
2	Floating Matter <sup>1)</sup>	-	None	-	-
3	Odor <sup>1)</sup>	-	Odorless	-	-
4	Oil Film <sup>1)</sup>	-	None	-	-
5	pH <sup>1)</sup>	-	8.54	-	-
6	Salinity <sup>1)</sup>	‰	30.5	-	-
7	Temperature <sup>1)</sup>	°C	31.1	-	-
8	Total Suspended Solids, TSS	mg/L	86	88	2.3%
9	Turbidity <sup>1)</sup>	NTU	80.0	-	-
<b>Anions</b>					
1	Sulphide as H <sub>2</sub> S	mg/L	<0.002	-	-
2	Total Cyanide, CN	mg/L	<0.005	<0.005	-
<b>Nutrients</b>					
1	Ammonia, NH <sub>3</sub> -N	mg/L	<0.02	<0.02	-
2	Nitrate, NO <sub>3</sub> -N	mg/L	0.078	0.079	1.3%
3	Total Phosphorus as P	mg/L			-
<b>Microbiology Tests</b>					
1	Total Coliform	MPN/100ml	ND	-	-
<b>Dissolved Metals</b>					
1	Arsenic, As	mg/L	0.0021	0.0019	10.0%
2	Cadmium, Cd	mg/L	<0.0001	<0.0001	-
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	<0.002	<0.002	-
4	Copper, Cu	mg/L	<0.001	<0.001	-
5	Lead, Pb	mg/L	<0.001	<0.001	-
6	Mercury, Hg	mg/L	<0.00005	<0.00005	-
7	Nickel, Ni	mg/L	<0.001	<0.001	-
8	Zinc, Zn	mg/L	<0.005	<0.005	-

### QUALITY CONTROL - PRECISION

Job Number : EV120884  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/VII/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120884-05	EV120884-06 (Replicate)	
	<b>Miscellaneous</b>				
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	2	3	40.0%
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	5.16	-	-
3	Surfactanta, MBAS	mg/L	<0.01	<0.01	-
4	Oil & Grease	mg/L	<1	-	-
5	Total Phenols	mg/L	<0.001	<0.001	-
	<b>Organic Tests**</b>				
	<b>Polycyclic Aromatic Hydrocarbons, PAHs**</b>				
1	Naphthalene	mg/L	<0.0001	-	-
2	2-Methylnaphthalene	mg/L	<0.0001	-	-
3	Acenaphthylene	mg/L	<0.0001	-	-
4	Acenaphthene	mg/L	<0.0001	-	-
5	Fluorene	mg/L	<0.0001	-	-
6	Phenanthrene	mg/L	<0.0001	-	-
7	Anthracene	mg/L	<0.0001	-	-
8	Fluoranthene	mg/L	<0.0001	-	-
9	Pyrene	mg/L	<0.0001	-	-
10	Benz(a)anthracene	mg/L	<0.0001	-	-
11	Chrysene	mg/L	<0.0001	-	-
12	Benzo(b)fluoranthene	mg/L	<0.0001	-	-
13	Benzo(k)fluoranthene	mg/L	<0.0001	-	-
14	Benzo(a)pyrene	mg/L	<0.0001	-	-
15	Indeno(1,2,3-c,d)pyrene	mg/L	<0.0001	-	-
16	Dibenz(a,h)anthracene	mg/L	<0.0001	-	-
17	Benzo(ghi)perylene	mg/L	<0.0001	-	-

**QUALITY CONTROL - PRECISION**

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL Tangguh  
 Expansion Project BP Berau Ltd  
 Customer Ref : 1241.1/US-EV/VI/2012

No	Description	Units	Laboratory Replicate		% RPD
			EV120864-15	EV120864-16 (Replicate)	
	<b>Total Metals</b>				
1	Antimony, Sb	mg/dry Kg	<0.01	<0.01	-
2	Arsenic, As	mg/dry Kg	8.25	7.25	12.9%
3	Cadmium, Cd	mg/dry Kg	<0.1	<0.1	-
4	Chromium, Cr	mg/dry Kg	17	17	0.0%
5	Copper, Cu	mg/dry Kg	6.0	6.1	2.1%
6	Lead, Pb	mg/dry Kg	12	11	7.8%
7	Mercury, Hg	mg/dry Kg	0.036	0.045	20.8%
8	Nickel, Ni	mg/dry Kg	18.2	18.7	2.8%
9	Selenium, Se	mg/dry Kg	<0.01	<0.01	-
10	Silver, Ag	mg/dry Kg	<0.4	<0.4	-
11	Zinc, Zn	mg/dry Kg	45.5	45.7	0.6%
	<b>Organic Tests</b>				
1	TPH	mg/dry Kg	<2	<2	-



### QUALITY CONTROL - ACCURACY

Job Number : EV120894  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/MI/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
<b>Physical Tests</b>							
1	Brightness <sup>1)</sup>	m	-	-	-	-	-
2	Floating Matter <sup>1)</sup>	-	-	-	-	-	-
3	Odor <sup>1)</sup>	-	-	-	-	-	-
4	Oil Film <sup>9)</sup>	-	-	-	-	-	-
5	pH <sup>1)</sup>	-	-	-	-	-	-
6	Salinity <sup>1)</sup>	ppt	-	-	-	-	-
7	Temperature <sup>1)</sup>	°C	-	-	-	-	-
8	Total Suspended Solids, TSS	mg/L	1	<1	68	68	99%
9	Turbidity <sup>1)</sup>	NTU	0.5	<0.5	-	-	-
<b>Anions</b>							
1	Sulphide, S <sup>2-</sup>	mg/L	0.002	<0.002	2.25	2.19	97%
2	Total Cyanide, CN	mg/L	0.005	<0.005	0.380	0.407	104%
<b>Nutrients</b>							
1	Ammonia, NH <sub>3</sub> -N	mg/L	0.02	<0.02	10.9	10.4	95%
2	Nitrate, NO <sub>3</sub> -N	mg/L	0.005	<0.005	4.48	4.48	100%
3	Total Phosphorus as P	mg/L	0.005	<0.005	8.88	8.89	100%
<b>Microbiology Tests</b>							
1	Total Coliform	MPN/100ml	1	ND	-	-	-
<b>Dissolved Metals</b>							
1	Arsenic, As	mg/L	0.0005	<0.0005	0.347	0.365	105%
2	Cadmium, Cd	mg/L	0.0001	<0.0001	0.427	0.412	96%
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	0.002	<0.002	0.348	0.338	98%
4	Copper, Cu	mg/L	0.001	<0.001	0.217	0.221	102%
5	Lead, Pb	mg/L	0.001	<0.001	0.754	0.773	103%
6	Mercury, Hg	mg/L	0.00005	<0.00005	0.00398	0.00410	103%
7	Nickel, Ni	mg/L	0.001	<0.001	0.507	0.502	99%
8	Zinc, Zn	mg/L	0.005	<0.005	0.975	0.980	101%

**QUALITY CONTROL - ACCURACY**

Job Number : EV120864  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/II/2012

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
<b>Miscellaneous</b>							
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	2	<2	82	79	97%
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	-	-	-	-	-
3	Surfactants, MBAS	mg/L	0.01	<0.01	0.35	0.35	99%
4	Oil & Grease	mg/L	1	<1	40	39	97%
5	Total Phenols	mg/L	0.001	<0.001	0.488	0.472	97%
<b>Total Metals (Sediment)</b>							
1	Antimony, Sb	mg/dry Kg	0.01	<0.01	0.75	0.73	97%
2	Arsenic, As	mg/dry Kg	0.01	<0.01	237	220	93%
3	Cadmium, Cd	mg/dry Kg	0.1	<0.1	181	173	96%
4	Chromium, Cr	mg/dry Kg	1	<1	128	118	92%
5	Copper, Cu	mg/dry Kg	0.2	<0.2	123	111	90%
6	Lead, Pb	mg/dry Kg	1	<1	103	93	90%
7	Mercury, Hg	mg/dry Kg	0.001	<0.001	12.4	12.8	103%
8	Nickel, Ni	mg/dry Kg	0.4	<0.4	118	109	92%
9	Selenium, Se	mg/dry Kg	0.01	<0.01	110	98	89%
10	Silver, Ag	mg/dry Kg	0.4	<0.4	-	-	-
11	Zinc, Zn	mg/dry Kg	0.1	<0.1	183	169	92%
<b>Organic Tests**</b>							
1	TPH	mg/dry Kg	2	<2	2050	1980	96%
<b>Organic Tests**</b>							
<b>Polycyclic Aromatic Hydrocarbons, PAHs**</b>							
1	Naphthalene	mg/L	0.0001	<0.0001			72%
2	Acenaphthene	mg/L	0.0001	<0.0001			98%
3	Phenanthrene	mg/L	0.0001	<0.0001			113%
4	Pyrene	mg/L	0.0001	<0.0001			120%
5	Chrysene	mg/L	0.0001	<0.0001			110%
6	Benzo(a)pyrene	mg/L	0.0001	<0.0001			120%

Note: <sup>1)</sup> = Field Measurement

## ENVIRONMENTAL TEST REPORT

**Mr. Yahya Husin**  
PT ERM Indonesia  
Wisma Aldiron Dirgantara, 2nd Floor, Suite # 238-239  
Jl. Gatot Subroto Kav. 72  
Jakarta 12780  
Indonesia

**Job Number :** EV120601-C **Date received :** 23-Aug-2012  
**Client Ref :** 1241.r1/IUS-EV/VII/2012 **Date reported :** 26-Sep-2012

**Number of samples :** 13

**Report Comprising :** Cover Sheet, Sample Information, Results, QC

**Total Pages :** 20

**Notes :**  
N.A = Not Analyzed  
I.S = Insufficient Sample  
\* = Non Accredited Test  
\*\* = Sub Contracted Test  
1) = Field Measurement  
I.P = In Progress

**Project Name :** Environmental Baseline Survey Dry Season AMDAL Tangguh  
Expansion Project BP Berau Ltd

**Approved Signature for:**

  
**Reginald C. de Wit**  
Technical Advisor - Environmental

All work is performed in accordance with Intertek Standard Terms and Conditions of work  
<http://www.intertek.com/terms/>

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as received.

This report was prepared solely for the use of the client named in this report. PT Intertek Utama Services accepts no responsibility for any loss, damage or liability suffered by any third party as a result of any reliance upon or use of this report.

**DO NOT PHOTOCOPY**

### SAMPLE INFORMATION

**Job Number :** EV120601-C  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Dry Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1241.r1/IUS-EV/II/2012

No	Laboratory Sample I.D	Customer Sample I.D	Sample Matrix	Date Sampled	Time Sampled	Date Received	Sampled By <sup>*)</sup>	Coordinates	
								South	East
1	EV120601-32	DGW (Depth Ground Water)	Ground Water	7-Aug-12	8:40	23-Aug-12	Ali & Ajiraga	02° 27' 59.8"	133° 06' 16.7"
2	EV120601-33	SGW - 01	Ground Water	7-Aug-12	9:37	23-Aug-12	Ali & Ajiraga	02° 28' 18.1"	133° 06' 14.8"
3	EV120601-34	SGW - 02	Ground Water	7-Aug-12	10:00	23-Aug-12	Ali & Ajiraga	02° 28' 09.9"	133° 06' 23.7"
4	EV120601-35	GW - 01 (TMB)	Ground Water	9-Aug-12	11:40	23-Aug-12	Ali & Ajiraga	02° 27' 25.0"	133° 06' 44.3"
5	EV120601-36	GW - 02 (TMB)	Ground Water	7-Aug-12	9:40	23-Aug-12	Ali & Ajiraga	02° 27' 29.4"	133° 06' 53.1"
6	EV120601-37	SW - 01	Surface Water	8-Aug-12	10:00	23-Aug-12	Ali & Ajiraga	02° 27' 59.8"	133° 06' 16.2"
7	EV120601-38	SW - 01	Sediment	9-Aug-12	10:00	23-Aug-12	Ali & Ajiraga	02° 27' 59.8"	133° 06' 16.2"
8	EV120601-39	AQ 1	Ambient Air	7-Aug-12	8:30	23-Aug-12	Ali & Ajiraga	02° 27' 18.8"	133° 06' 52.0"
9	EV120601-40	AQ 2	Ambient Air	6-Aug-12	8:30	23-Aug-12	Ali & Ajiraga	02° 27' 06.1"	133° 09' 02.1"
10	EV120601-41	AQ 4	Ambient Air	9-Aug-12	8:25	23-Aug-12	Ali & Ajiraga	02° 26' 46.7"	133° 08' 03.8"
11	EV120601-42	AQ 6	Ambient Air	14-Aug-12	9:40	23-Aug-12	Ali & Ajiraga	02° 26' 56.3"	133° 06' 56.1"
12	EV120601-43	AQ 7	Ambient Air	16-Aug-12	10:40	23-Aug-12	Ali & Ajiraga	02° 27' 40.1"	133° 06' 16.2"
13	EV120601-44	AQ 8	Ambient Air	5-Aug-12	10:20	23-Aug-12	Ali & Ajiraga	02° 39' 22.2"	133° 32' 53.4"

Note <sup>\*)</sup> = Sampled by IUS

Job Number : EV120601-C  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/II/2012

Laboratory Sample I.D :				EV120601-32	EV120601 33
Customer Sample I.D :				DGW (Depth Ground Water)	SGW 01
Date Sampled :				07-Aug-12	07 Aug 12
Sample Matrix :				Ground Water	Ground Water
No.	Test Description	Unit	Technique	Results	Results
<b>Physical Tests</b>					
1	Colour	Pt/Co	Colorimetric	47	46
2	Conductivity <sup>1)</sup>	µS/Cm	Conductivity meter	544	48
3	Odor <sup>1)</sup>	-	Normal	Odorless	Odorless
4	pH <sup>1)</sup>	-	Probe	7.93	5.51
5	Taste <sup>1)</sup>	-	Normal	N.A	N.A
6	Temperature <sup>1)</sup>	°C	Thermometer	25.0	26.1
7	Total Dissolved Solids, TDS	mg/L	Gravimetric	344	25
8	Total Hardness as CaCO <sub>3</sub>	mg/L	Titrimetric	40.7	2.3
9	Turbidity	NTU	Turbidimetric	<0.5	16.0
<b>Anions</b>					
1	Chloride, Cl <sup>-</sup>	mg/L	Ion Chromatography	3.4	3.8
2	Fluoride, F <sup>-</sup>	mg/L	Ion Chromatography	0.02	<0.02
3	Sulphate, SO <sub>4</sub>	mg/L	Ion Chromatography	<2	3
4	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	<0.002	<0.002
5	Total Cyanide, CN	mg/L	Colorimetric	<0.005	<0.005
<b>Nutrients</b>					
1	Nitrate, NO <sub>3</sub> -N	mg/L	Ion Chromatography	0.463	<0.005
2	Nitrite, NO <sub>2</sub> -N	mg/L	Ion Chromatography	1.37	<0.001
<b>Microbiology Tests</b>					
1	E.Coli	MPN/100ml	Incubation	ND	1
2	Total Coliform	MPN/100ml	Incubation	179	99

Job Number : EV120601-C  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/II/2012

Laboratory Sample I.D :				EV120601-32	FV120601 33
Customer Sample I.D :				DGW (Depth Ground Water)	SGW 01
Date Sampled :				07-Aug-12	07-Aug-12
Sample Matrix :				Ground Water	Ground Water
No.	Test Description	Unit	Technique	Results	Results
	Dissolved Metals				
1	Arsenic, As	mg/L	HVAAS	<0.0005	0.0006
2	Cadmium, Cd	mg/L	GFAAS	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	<0.002	<0.002
4	Copper, Cu	mg/L	FAAS	<0.01	<0.01
5	Iron, Fe	mg/L	FAAS	<0.05	0.170
6	Lead, Pb	mg/L	GFAAS	<0.001	<0.001
7	Manganese, Mn	mg/L	FAAS	0.03	<0.01
8	Mercury, Hg	mg/L	CVAAS	<0.00005	<0.00005
9	Selenium, Se	mg/L	HVAAS	<0.0005	<0.0005
10	Zinc, Zn	mg/L	FAAS	0.016	0.012
	Miscellaneous				
1	Surfactants, MBAS	mg/L	Colorimetric	<0.01	<0.01
2	Total Organic Matter, KMnO4	mg/L	Titrimetric	3	3

Note: <sup>1)</sup> = Field Measurement

Job Number : EV120601-C  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/II/2012

Laboratory Sample I.D :				EV120601-34	EV120601-35
Customer Sample I.D :				SGW - 02	GW - 01 (1M3)
Date Sampled :				07-Aug-12	08-Aug-12
Sample Matrix :				Ground Water	Ground Water
No.	Test Description	Unit	Technique	Results	Results
<b>Physical Tests</b>					
1	Colour	Pt/Co	Colorimetric	23	11
2	Conductivity <sup>1)</sup>	µS/Cm	Conductivity meter	39	145
3	Odor <sup>1)</sup>	-	Normal	Odorless	Odorless
4	pH <sup>1)</sup>	-	Probe	5.24	5.75
5	Taste <sup>1)</sup>	-	Normal	N.A	N.A
6	Temperature <sup>1)</sup>	°C	Thermometer	25.8	24.6
7	Total Dissolved Solids, TDS	mg/L	Gravimetric	20	89
8	Total Hardness as CaCO <sub>3</sub>	mg/L	Titrimetric	14.8	62.1
9	Turbidity	NTU	Turbidimetric	9.6	0.9
<b>Anions</b>					
1	Chloride, Cl <sup>-</sup>	mg/L	Ion Chromatography	2.6	6.9
2	Fluoride, F <sup>-</sup>	mg/L	Ion Chromatography	<0.02	0.04
3	Sulphate, SO <sub>4</sub>	mg/L	Ion Chromatography	3	<2
4	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	<0.002	<0.002
5	Total Cyanide, CN	mg/L	Colorimetric	<0.005	<0.005
<b>Nutrients</b>					
1	Nitrate, NO <sub>3</sub> -N	mg/L	Ion Chromatography	0.010	8.63
2	Nitrite, NO <sub>2</sub> -N	mg/L	Ion Chromatography	<0.001	<0.001
<b>Microbiology Tests</b>					
1	E.Coli	MPN/100ml	Incubation	13	ND
2	Total Coliform	MPN/100ml	Incubation	225	4

Job Number : EV120601-C  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/II/2012

Laboratory Sample I.D :				EV120601-34	EV120601 35
Customer Sample I.D :				SGW - 02	GW - 01 (IMB)
Date Sampled :				07-Aug-12	09-Aug-12
Sample Matrix :				Ground Water	Ground Water
No.	Test Description	Unit	Technique	Results	Results
	Dissolved Metals				
1	Arsenic, As	mg/L	HVAAS	0.0007	<0.0005
2	Cadmium, Cd	mg/L	GFAAS	0.0001	0.0002
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	<0.002	<0.002
4	Copper, Cu	mg/L	FAAS	<0.01	<0.01
5	Iron, Fe	mg/L	FAAS	0.060	<0.05
6	Lead, Pb	mg/L	GFAAS	<0.001	0.002
7	Manganese, Mn	mg/L	FAAS	0.03	0.03
8	Mercury, Hg	mg/L	CVAAS	<0.00005	<0.00005
9	Selenium, Se	mg/L	HVAAS	<0.0005	<0.0005
10	Zinc, Zn	mg/L	FAAS	0.015	0.017
	Miscellaneous				
1	Surfactants, MBAS	mg/L	Colorimetric	<0.01	<0.01
2	Total Organic Matter, KMnO4	mg/L	Titrimetric	3	<2

Note: <sup>1)</sup> = Field Measurement



Job Number : EV120601-C  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/US-EV/II/2012

Laboratory Sample I.D :				EV120601-36
Customer Sample I.D :				GW - 02 (TMB)
Date Sampled :				07-Aug-12
Sample Matrix :				Ground Water
No.	Test Description	Unit	Technique	Results
<b>Physical Tests</b>				
1	Colour	Pt/Co	Colorimetric	<5
2	Conductivity <sup>1)</sup>	µS/Cm	Conductivity meter	45
3	Odor <sup>1)</sup>	-	Normal	Odorless
4	pH <sup>1)</sup>	-	Probe	5.79
5	Taste <sup>1)</sup>	-	Normal	N.A
6	Temperature <sup>1)</sup>	°C	Thermometer	24.7
7	Total Dissolved Solids, TDS	mg/L	Gravimetric	15
8	Total Hardness as CaCO <sub>3</sub>	mg/L	Titrimetric	8.8
9	Turbidity	NTU	Turbidimetric	0.8
<b>Anions</b>				
1	Chloride, Cl <sup>-</sup>	mg/L	Ion Chromatography	2.6
2	Fluoride, F <sup>-</sup>	mg/L	Ion Chromatography	<0.02
3	Sulphate, SO <sub>4</sub>	mg/L	Ion Chromatography	<2
4	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	<0.002
5	Total Cyanide, CN	mg/L	Colorimetric	<0.005
<b>Nutrients</b>				
1	Nitrate, NO <sub>3</sub> -N	mg/L	Ion Chromatography	1.45
2	Nitrite, NO <sub>2</sub> -N	mg/L	Ion Chromatography	<0.001
<b>Microbiology Tests</b>				
1	E.Coli	MPN/100ml	Incubation	1
2	Total Coliform	MPN/100ml	Incubation	1410

Job Number : EV120601-C  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Dry Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1241.r1/IUS-EV/II/2012

Laboratory Sample I.D :				EV120601-36
Customer Sample I.D :				GW - 02 (TMB)
Date Sampled :				07-Aug-12
Sample Matrix :				Ground Water
No.	Test Description	Unit	Technique	Results
	Dissolved Metals			
1	Arsenic, As	mg/L	HVAAS	<0.0005
2	Cadmium, Cd	mg/L	GFAAS	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	<0.002
4	Copper, Cu	mg/L	FAAS	<0.01
5	Iron, Fe	mg/L	FAAS	0.08
6	Lead, Pb	mg/L	GFAAS	<0.001
7	Manganese, Mn	mg/L	FAAS	<0.01
8	Mercury, Hg	mg/L	CVAAS	<0.00005
9	Selenium, Se	mg/L	HVAAS	<0.0005
10	Zinc, Zn	mg/L	FAAS	0.013
	Miscellaneous			
1	Surfactants, MBAS	mg/L	Colorimetric	<0.01
2	Total Organic Matter, KMnO4	mg/L	Titrimetric	<2

Note: <sup>1)</sup> = Field Measurement



## Lampiran II.2

### **Data Rona Lingkungan :**

**Kualitas Air Laut (*Sea Water*), Sedimen (*Sediment*), Kualitas Air Sungai (*River Water*), Kualitas Air Tanah (*Groundwater*), dan Kualitas Udara (*Air Ambient*)  
(*Wet Season 2013*)**

## ENVIRONMENTAL TEST REPORT

**Mr. Teguh Yekti**  
PT ERM Indonesia  
Wisma Aldiron Dirgantara, 2nd Floor, Suite # 238-239  
Jl. Gatot Subroto Kav. 72  
Jakarta 12780  
Indonesia

**Job Number :** EV130302 **Date received :** 21-Mar-2013  
**Client Ref :** 1529.r2/IUS-EV/II/2013 **Date reported :** 23-Apr-2013

**Number of samples :** 37

**Report Comprising :** Cover Sheet, Sample Information, Results, QC

**Total Pages :** 38

**Notes :**  
N.A = Not Analyzed  
I.S = insufficient Sample  
^ = Non Accredited Test  
\*\* = Sub Contracted Test  
1) = Field Measurement  
I.P = In Progress

**Project Name :** Environmental Baseline Survey Wet Season AMDAL Tangguh  
Expansion Project BP Berau Ltd

Approved Signature for:



Reginald C. de Wit

Technical Advisor - Environmental

All work is performed in accordance with Intertek Standard Terms and Conditions of work  
<http://www.intertek.com/terms/>

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as received.

This report was prepared solely for the use of the client named in this report. PT Intertek Utama Services accepts no responsibility for any loss, damage or liability suffered by any third party as a result of any reliance upon or use of this report.

**DO NOT PHOTOCOPY**

### SAMPLE INFORMATION

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

No	Laboratory Sample I.D.	Customer Sample I.D.	Sample Matrix	Date Sampled	Time Sampled	Date Analyzed	Sampled By	Coordinates	
								South	East
1	EV130302-01	FNS 02	Seawater	16-Mar-13	9:00	21-Mar-13	Winamo & Hilman	02° 46' 27.0"	132° 46' 44.0"
2	EV130302-02	FNS 06	Seawater	17-Mar-13	10:20	21-Mar-13	Winamo & Hilman	02° 28' 42.0"	133° 23' 48.0"
3	EV130302-03	FNS 08	Seawater	17-Mar-13	12:35	21-Mar-13	Winamo & Hilman	02° 28' 03.8"	133° 38' 38.2"
4	EV130302-04	NS 01	Seawater	16-Mar-13	12:40	21-Mar-13	Winamo & Hilman	02° 38' 32.3"	132° 33' 18.9"
5	EV130302-05	NS 02	Seawater	17-Mar-13	14:55	21-Mar-13	Winamo & Hilman	02° 27' 01.3"	133° 05' 35.1"
6	EV130302-06	NS 03	Seawater	15-Mar-13	15:00	21-Mar-13	Winamo & Hilman	02° 25' 49.6"	133° 07' 18.0"
7	EV130302-07	NS 04	Seawater	17-Mar-13	14:15	21-Mar-13	Winamo & Hilman	02° 25' 13.1"	133° 10' 52.0"
8	EV130302-08	NS 05	Seawater	17-Mar-13	8:35	21-Mar-13	Winamo & Hilman	02° 27' 53.3"	133° 19' 55.5"
9	EV130302-09	NS 06	Seawater	17-Mar-13	11:30	21-Mar-13	Winamo & Hilman	02° 22' 19.9"	133° 49' 15.8"
10	EV130302-10	OS 03	Seawater	16-Mar-13	9:20	21-Mar-13	Winamo & Hilman	02° 41' 50.3"	132° 44' 40.4"
11	EV130302-11	OS 06	Seawater	18-Mar-13	16:10	21-Mar-13	Winamo & Hilman	02° 30' 42.2"	132° 58' 32.2"
12	EV130302-12	OS 14	Seawater	17-Mar-13	12:05	21-Mar-13	Winamo & Hilman	02° 21' 15.5"	133° 40' 57.4"
13	EV130302-13	SW 01	River Water	12-Mar-13	13:10	21-Mar-13	Winamo & Hilman	02° 27' 59.8"	133° 08' 16.2"
14	EV130302-14	SW 03	River Water	17-Mar-13	9:10	21-Mar-13	Winamo & Hilman	02° 31' 54.8"	133° 16' 29.3"
15	EV130302-15	DGW 01	Ground Water	12-Mar-13	10:40	21-Mar-13	Winamo & Hilman	02° 28' 16.2"	133° 06' 24.2"
16	EV130302-16	SGW 01	Ground Water	12-Mar-13	10:10	21-Mar-13	Winamo & Hilman	02° 28' 18.1"	133° 06' 14.9"
17	EV130302-17	SGW 02	Ground Water	12-Mar-13	11:35	21-Mar-13	Winamo & Hilman	02° 28' 09.9"	133° 06' 23.7"
18	EV130302-18	GW 01	Ground Water	12-Mar-13	14:22	21-Mar-13	Winamo & Hilman	-	-
19	EV130302-19	GW 02	Ground Water	12-Mar-13	14:00	21-Mar-13	Winamo & Hilman	-	-
20	EV130302-20	FNS 02	Sediment	16-Mar-13	9:00	21-Mar-13	Winamo & Hilman	02° 46' 27.0"	132° 46' 44.0"

### SAMPLE INFORMATION

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

No.	Laboratory Sample I.D.	Customer Sample I.D.	Sample Matrix	Date Sampled	Time Sampled	Date Received	Sampled By	Coordinates	
								South	East
21	EV130302-21	FNS 06	Sediment	17-Mar-13	10:20	21-Mar-13	Winamo & Hilman	02° 28' 42.0"	133° 23' 48.0"
22	EV130302-22	FNS 08	Sediment	16-Mar-13	12:40	21-Mar-13	Winamo & Hilman	02° 28' 03.8"	133° 38' 38.2"
23	EV130302-23	NS 02	Sediment	17-Mar-13	14:55	21-Mar-13	Winamo & Hilman	02° 27' 01.3"	133° 05' 35.1"
24	EV130302-24	NS 03	Sediment	15-Mar-13	15:00	21-Mar-13	Winamo & Hilman	02° 25' 49.6"	133° 07' 18.0"
25	EV130302-25	NS 04	Sediment	17-Mar-13	14:15	21-Mar-13	Winamo & Hilman	02° 25' 13.1"	133° 10' 52.0"
26	EV130302-26	NS 05	Sediment	17-Mar-13	8:35	21-Mar-13	Winamo & Hilman	02° 27' 53.3"	133° 19' 55.5"
27	EV130302-27	NS 06	Sediment	17-Mar-13	11:30	21-Mar-13	Winamo & Hilman	02° 22' 19.9"	133° 49' 15.8"
28	EV130302-28	OS 03	Sediment	16-Mar-13	9:20	21-Mar-13	Winamo & Hilman	02° 41' 50.3"	132° 44' 40.4"
29	EV130302-29	OS 06	Sediment	16-Mar-13	16:10	21-Mar-13	Winamo & Hilman	02° 30' 42.2"	132° 58' 32.2"
30	EV130302-30	OS 14	Sediment	17-Mar-13	12:05	21-Mar-13	Winamo & Hilman	02° 21' 15.5"	133° 40' 57.4"
31	EV130302-31	SW 01	Sediment	12-Mar-13	13:10	21-Mar-13	Winamo & Hilman	02° 27' 59.8"	133° 06' 16.2"
32	EV130302-32	SW 03	Sediment	17-Mar-13	9:10	21-Mar-13	Winamo & Hilman	02° 31' 54.8"	133° 18' 29.3"
33	EV130302-33	AQN 01	Ambient Air	10-Mar-13	7:45	21-Mar-13	Winamo & Hilman	02° 27' 19.0"	133° 08' 51.5"
34	EV130302-34	AQN 04	Ambient Air	11-Mar-13	7:45	21-Mar-13	Winamo & Hilman	02° 26' 45.9"	133° 08' 05.2"
35	EV130302-35	AQN 06	Ambient Air	11-Mar-13	14:55	21-Mar-13	Winamo & Hilman	02° 26' 52.9"	133° 07' 03.4"
36	EV130302-36	AQN 07	Ambient Air	12-Mar-13	13:15	21-Mar-13	Winamo & Hilman	02° 27' 40.1"	133° 06' 16.2"
37	EV130302-37	AQN 08	Ambient Air	16-Mar-13	10:30	21-Mar-13	Winamo & Hilman	-	-

Note \*) = Sampled by IUS



**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/AUS-EV/II/2013

Laboratory Sample I.D :					EV130302-01	EV130302-02
Customer Sample I.D :					FNS 02	FNS 06
Date Sampled :					16-Mar-13	17-Mar-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	1.5	0.8
2	Floating Matter <sup>1)</sup>	-	Visual	none	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	None	None
5	pH <sup>1)</sup>	-	Probe	7 -8,5	8.01	7.79
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	24.8	26.6
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	29.6	30.4
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	20	29
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	293	21.9
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.010	0.103
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.021	0.024
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0014	0.0015
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0005	<0.0005
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	0.002	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005





**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**Customer Ref :** AMDAL Tangguh Expansion Project BP Berau Ltd  
 1529.r2/US-EV/II/2013

<b>Laboratory Sample I.D :</b>					EV130302-01	EV130302-02
<b>Customer Sample I.D :</b>					FNS 02	FNS 06
<b>Data Sampled :</b>					16-Mar-13	17-Mar-13
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.82	4.86
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	4
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs***	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III



**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130302-03	EV130302-04
Customer Sample I.D :					FNS 08	NS 01
Date Sampled :					17-Mar-13	18-Mar-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sacht disc	natural	1.1	2.0
2	Floating Matter <sup>1)</sup>	-	Visual	none	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	None	None
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.67	8.06
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	25.5	27.2
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	31.1	30.2
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	27	11
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	8.8	171
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.097	0.073
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.022	0.015
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0009	0.0018
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0005	<0.0005
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

<b>Laboratory Sample I.D :</b>					EV130302-03	EV130302-04
<b>Customer Sample I.D :</b>					FNS 08	NS 01
<b>Date Sampled :</b>					17-Mar-13	18-Mar-13
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	4.82	5.85
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	2
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**Customer Ref :** AMDAL Tangguh Expansion Project BP Berau Ltd  
 1529.r2/US-EV/1/2013

Laboratory Sample I.D :					EV130302-05	EV130302-06
Customer Sample I.D :					NS 02	NS 03
Date Sampled :					17-Mar-13	15-Mar-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	0.5	0.7
2	Floating Matter <sup>1)</sup>	-	Visual	none	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	None	None
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.88	7.88
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	25.9	26.2
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	31.5	30.4
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	61	47
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	46.3	40.1
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.081	0.119
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.040	0.036
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0012	0.0015
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0005	<0.0005
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	0.002	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	0.008	<0.005

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**AMDAL Tangguh Expansion Project BP Berau Ltd**  
**Customer Ref :** 1529.r2/US-EV/II/2013

<b>Laboratory Sample I.D :</b>					EV130302-05	EV130302-06
<b>Customer Sample I.D :</b>					NS 02	NS 03
<b>Date Sampled :</b>					17-Mar-13	15-Mar-13
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.30	5.60
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	11
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1629.r2/US-EV/II/2013

Laboratory Sample I.D :					EV130302-07	EV130302-08
Customer Sample I.D :					NS 04	NS 05
Date Sampled :					17-Mar-13	17-Mar-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	0.5	0.8
2	Floating Matter <sup>1)</sup>	-	Visual	none	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	None	None
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.87	7.78
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	26.1	26.4
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	31.1	30.2
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	44	46
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	28.7	26.8
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.090	0.112
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.027	0.030
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0009	0.0015
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0005	<0.0005
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1629.r2/IUS-EV/II/2013

<b>Laboratory Sample I.D :</b>					EV130302-07	EV130302-08
<b>Customer Sample I.D :</b>					NS 04	NS 05
<b>Date Sampled :</b>					17-Mar-13	17-Mar-13
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.49	5.03
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III

**Job Number :** EV130302  
**Customer :** PT ERH Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**Customer Ref :** AMDAL Tangguh Expansion Project BP Berau Ltd  
 1529.r2/US-EV/II/2013

Laboratory Sample i.D :					EV130302-09	EV130302-10
Customer Sample i.D :					NS 06	OS 03
Date Sampled :					17-Mar-13	16-Mar-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	0.8	2.0
2	Floating Matter <sup>1)</sup>	-	Visual	none	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	None	None
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.37	8.04
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	21.5	25.4
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.4	29.9
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	19	25
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	12.2	187
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.045	0.051
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.017	0.016
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0006	0.0011
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0005	<0.0005
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005



**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/1/2013

<b>Laboratory Sample I.D :</b>					EV130302-09	EV130302-10
<b>Customer Sample I.D :</b>					NS 06	OS 03
<b>Date Sampled :</b>					17-Mar-13	16-Mar-13
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	4.58	5.95
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**Customer Ref :** AMDAL Tangguh Expansion Project BP Berau Ltd  
 1526.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130302-11	EV130302-12
Customer Sample I.D :					OS 06	OS 14
Date Sampled :					16-Mar-13	17-Mar-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	1.5	0.8
2	Floating Matter <sup>1)</sup>	-	Visual	none	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	None	None
5	pH <sup>1)</sup>	-	Probe	7 -8,5	8.04	7.58
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	27.1	21.9
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.2	31.3
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	20	30
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	379	16.3
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.072	0.110
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.025	0.024
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0011	0.0012
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0005	<0.0005
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.02	<0.02
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/US-EV/IV/2013

Laboratory Sample I.D :					EV130302-11	EV130302-12
Customer Sample I.D :					OS 06	OS 14
Date Sampled :					16-Mar-13	17-Mar-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.97	4.85
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III

**Job Number :** EV130335  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau  
 Ltd  
**Customer Ref :** 1525.72/IUS-EV/II/2013

Laboratory Sample I.D :					EV130335-03	EV130335-04
Customer Sample I.D :					FNS 07	NS 07
Date Sampled :					23-Mar-13	23-Mar-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	2.5	2.5
2	Floating Matter <sup>1)</sup>	-	Visual	none	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	None	None
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.71	7.92
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	24.1	24.0
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.9	31.4
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	14	17
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	2.8	1.8
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.066	0.109
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.021	0.018
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0021	0.0012
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	0.002	0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

**Job Number :** EV130335  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau  
 Ltd  
**Customer Ref :** 1529.r2/IUS-EV/1/2013

Laboratory Sample I.D :					EV130335-03	EV130335-04
Customer Sample I.D :					FNS 07	NS 07
Date Sampled :					23-Mar-13	23-Mar-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.19	6.08
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.00001	<0.00001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III  
 ND = Not Detected

**Job Number :** EV130335  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau  
 Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130335-05	EV130335-06
Customer Sample I.D :					NS 08	NS 09
Date Sampled :					23-Mar-13	24-Mar-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	2.0	1.1
2	Floating Matter <sup>1)</sup>	-	Visual	none	None	None
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	None	None
5	pH <sup>1)</sup>	-	Probe	7 -8,5	8.07	8.15
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	26.2	28.5
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	31.6	30.5
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	11	15
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	3.9	7.7
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.121	0.085
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.014	0.017
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0006	0.0015
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

**Job Number :** EV130335  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau  
 Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130335-05	EV130335-06
Customer Sample I.D :					NS 08	NS 09
Date Sampled :					23-Mar-13	24-Mar-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.99	6.47
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	incubation	1000	ND	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs <sup>***</sup>	mg/L	Solvent Extraction GC/ ECD/ MS	0.003	<0.00001	<0.00001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on Kepmen LH 51/2004 Appendix III  
 ND = Not Detected

## ENVIRONMENTAL TEST REPORT

**Mr. Teguh Yekti**  
PT ERM Indonesia  
Wisma Aldiron Dirgantara, 2nd Floor, Suite # 238-239  
Jl. Gatot Subroto Kav. 72  
Jakarta 12780  
Indonesia

**Job Number :** EV130464 **Date received :** 30-Apr-2013  
**Client Ref :** 1529.r2/IUS-EV/II/2013 **Date reported :** 07-Jun-2013

**Number of samples :** 45

**Report Comprising :** Cover Sheet, Sample Information, Results, QC

**Total Pages :** 45

**Notes :**  
N.A = Not Analyzed  
I.S = Insufficient Sample  
\* = Non Accredited Test  
\*\* = Sub Contracted Test  
1) = Field Measurement  
I.P = In Progress

**Project Name :** Environmental Baseline Survey Wet Season AMDAL Tangguh  
Expansion Project BP Berau Ltd

Approved Signature for:



**Reginald C. de Wit**  
Technical Advisor - Environmental

All work is performed in accordance with Intertek Standard Terms and Conditions of work  
<http://www.intertek.com/terms/>

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as received.

This report was prepared solely for the use of the client named in this report. PT Intertek Utama Services accepts no responsibility for any loss, damage or liability suffered by any third party as a result of any reliance upon or use of this report.

**DO NOT PHOTOCOPY**



### SAMPLE INFORMATION

**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

No	Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Sampled By:	Coordinates	
								North	East
1	EV130464-01	OS 02 T	Seawater	23-Apr-13	8:03	30-Apr-13	Winarno & Arman	02° 24' 43.4"	132° 32' 42.4"
2	EV130464-02	OS 02 M	Seawater	23-Apr-13	7:49	30-Apr-13	Winarno & Arman	02° 24' 43.4"	132° 32' 42.4"
3	EV130464-03	OS 02 B	Seawater	23-Apr-13	7:26	30-Apr-13	Winarno & Arman	02° 24' 43.4"	132° 32' 42.4"
4	EV130464-04	OS 02 Comp	Seawater	23-Apr-13	8:10	30-Apr-13	Winarno & Arman	02° 24' 43.4"	132° 32' 42.4"
5	EV130464-05	OS 04 T	Seawater	23-Apr-13	11:13	30-Apr-13	Winarno & Arman	02° 34' 28.5"	132° 39' 05.2"
6	EV130464-06	OS 04 B	Seawater	23-Apr-13	11:03	30-Apr-13	Winarno & Arman	02° 34' 28.5"	132° 39' 05.2"
7	EV130464-07	OS 04 Comp	Seawater	23-Apr-13	11:29	30-Apr-13	Winarno & Arman	02° 34' 28.5"	132° 39' 05.2"
8	EV130464-08	FOS 04 T	Seawater	23-Apr-13	14:55	30-Apr-13	Winarno & Arman	02° 26' 46.4"	132° 52' 06.6"
9	EV130464-09	FOS 04 M	Seawater	23-Apr-13	15:36	30-Apr-13	Winarno & Arman	02° 26' 46.4"	132° 52' 06.6"
10	EV130464-10	FOS 04 B	Seawater	23-Apr-13	15:20	30-Apr-13	Winarno & Arman	02° 26' 46.4"	132° 52' 06.6"
11	EV130464-11	OS 05	Seawater	23-Apr-13	17:18	30-Apr-13	Winarno & Arman	02° 20' 43.7"	132° 48' 38.5"
12	EV130464-12	OS 13 T	Seawater	24-Apr-13	7:08	30-Apr-13	Winarno & Arman	02° 20' 06.5"	133° 26' 19.4"
13	EV130464-13	OS 13 M	Seawater	24-Apr-13	7:40	30-Apr-13	Winarno & Arman	02° 20' 06.5"	133° 26' 19.4"
14	EV130464-14	OS 13 B	Seawater	24-Apr-13	7:25	30-Apr-13	Winarno & Arman	02° 20' 06.5"	133° 26' 19.4"
15	EV130464-15	OS 13 Comp	Seawater	24-Apr-13	7:50	30-Apr-13	Winarno & Arman	02° 20' 06.5"	133° 26' 19.4"
16	EV130464-16	OS 11	Seawater	24-Apr-13	9:57	30-Apr-13	Winarno & Arman	02° 15' 54.2"	133° 11' 07.4"
17	EV130464-17	OS 08 T	Seawater	24-Apr-13	11:50	30-Apr-13	Winarno & Arman	02° 15' 54.0"	133° 11' 07.0"
18	EV130464-18	OS 08 M	Seawater	24-Apr-13	12:24	30-Apr-13	Winarno & Arman	02° 15' 54.0"	133° 11' 07.0"
19	EV130464-19	OS 08 B	Seawater	24-Apr-13	12:10	30-Apr-13	Winarno & Arman	02° 15' 54.0"	133° 11' 07.0"
20	EV130464-20	OS 08 Comp	Seawater	24-Apr-13	12:33	30-Apr-13	Winarno & Arman	02° 15' 54.0"	133° 11' 07.0"

### SAMPLE INFORMATION

**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/US-EV/III/2013

No.	Laboratory Sample I.D.	Customer Sample I.D.	Sample Matrix	Date Sampled	Time Sampled	Date Received	Sampled By*	Coordinates	
								Coord	East
21	EV130464-21	OS 09	Seawater	24-Apr-13	15:54	30-Apr-13	Winarno & Arman	02° 22' 38"	133° 06' 40.6"
22	EV130464-22	FOS 05 T	Seawater	24-Apr-13	17:30	30-Apr-13	Winarno & Arman	02° 22' 05.9"	133° 01' 56.1"
23	EV130464-23	FOS 05 M	Seawater	24-Apr-13	18:10	30-Apr-13	Winarno & Arman	02° 22' 05.9"	133° 01' 56.1"
24	EV130464-24	FOS 05 B	Seawater	24-Apr-13	17:50	30-Apr-13	Winarno & Arman	02° 22' 05.9"	133° 01' 56.1"
25	EV130464-25	OS 01	Seawater	25-Apr-13	7:32	30-Apr-13	Winarno & Arman	02° 20' 31.9"	132° 57' 30.0"
26	EV130464-26	OS 07	Seawater	25-Apr-13	11:34	30-Apr-13	Winarno & Arman	02° 26' 01.4"	133° 01' 22.9"
27	EV130464-27	OS 12	Seawater	25-Apr-13	17:05	30-Apr-13	Winarno & Arman	02° 19' 22.7"	133° 17' 15.7"
28	EV130464-28	OS 10	Seawater	26-Apr-13	8:03	30-Apr-13	Winarno & Arman	02° 22' 53.5"	133° 12' 20.9"
29	EV130464-29	AQN 09	Ambient Air	25-Apr-13	11:05	30-Apr-13	Winarno & Arman	02° 26' 01.4"	133° 01' 22.9"
30	EV130464-30	AQN 10	Ambient Air	25-Apr-13	6:35	30-Apr-13	Winarno & Arman	02° 20' 31.9"	133° 57' 30.0"
31	EV130464-31	AQN 11	Ambient Air	24-Apr-13	11:45	30-Apr-13	Winarno & Arman	02° 15' 54.0"	133° 11' 07.0"
32	EV130464-32	AQN 12	Ambient Air	26-Apr-13	7:33	30-Apr-13	Winarno & Arman	-	-
33	EV130464-33	OS 02 B	Sediment	23-Apr-13	7:26	30-Apr-13	Winarno & Arman	02° 24' 43.4"	132° 32' 42.4"
34	EV130464-34	OS 04 B	Sediment	23-Apr-13	11:03	30-Apr-13	Winarno & Arman	02° 34' 28.5"	132° 39' 05.2"
35	EV130464-35	FOS 04 B	Sediment	23-Apr-13	15:20	30-Apr-13	Winarno & Arman	02° 26' 46.4"	132° 52' 06.6"
36	EV130464-36	OS 05	Sediment	23-Apr-13	17:18	30-Apr-13	Winarno & Arman	02° 20' 43.7"	132° 48' 38.5"
37	EV130464-37	OS 13 B	Sediment	24-Apr-13	7:25	30-Apr-13	Winarno & Arman	02° 20' 06.5"	133° 26' 19.4"
38	EV130464-38	OS 11	Sediment	24-Apr-13	9:57	30-Apr-13	Winarno & Arman	02° 15' 54.2"	133° 11' 07.4"
39	EV130464-39	OS 08 B	Sediment	24-Apr-13	12:10	30-Apr-13	Winarno & Arman	02° 15' 54.0"	133° 11' 07.0"
40	EV130464-40	OS 09	Sediment	24-Apr-13	15:54	30-Apr-13	Winarno & Arman	02° 22' 38"	133° 06' 40.6"
41	EV130464-41	FOS 05 B	Sediment	24-Apr-13	17:50	30-Apr-13	Winarno & Arman	02° 22' 05.9"	133° 01' 56.1"

### SAMPLE INFORMATION

**Job Number :** EV130484  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

No.	Laboratory Sample I.D.	Customer Sample I.D.	Sample Media	Date Sampled	Time Sampled	Date Analysis	Sampled By <sup>a)</sup>	Coordinates	
								South	East
42	EV130464-42	OS 01	Sediment	25-Apr-13	7:32	30-Apr-13	Winarno & Arman	02° 20' 31.9"	132° 57' 30.0"
43	EV130464-43	OS 07	Sediment	25-Apr-13	11:34	30-Apr-13	Winarno & Arman	02° 26' 01.4"	133° 01' 22.9"
44	EV130464-44	OS 12	Sediment	25-Apr-13	17:05	30-Apr-13	Winarno & Arman	02° 19' 22.7"	133° 17' 15.7"
45	EV130464-45	OS 10	Sediment	26-Apr-13	8:03	30-Apr-13	Winarno & Arman	02° 22' 53.5"	133° 12' 20.9"

Note <sup>a)</sup> = Sampled by IUS

**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130464-01	EV130464-02
Customer Sample I.D :					OS 02 T	OS 02 M
Date Sampled :					23-Apr-13	23-Apr-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	6.0	-
2	Floating Matter <sup>1)</sup>	-	Visual	none	none	none
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	none	none
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.87	7.90
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	28.2	32.2
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	29.7	29.6
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	7	11
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	0.7	<0.5
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.008	0.020
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.018	0.019
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0023	0.0017
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

**Job Number :** EV130464  
**Customer :** PT ERMI Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

<b>Laboratory Sample I.D :</b>					EV130464-01	EV130464-02
<b>Customer Sample I.D :</b>					OS 02 T	OS 02 M
<b>Date Sampled :</b>					23-Apr-13	23-Apr-13
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
	<b>Miscellaneous</b>					
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.70	5.52
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
	<b>Microbiology Tests</b>					
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
	<b>Organic Tests**</b>					
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III  
 ND = Not Detected

Job Number : EV130464  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130464-03	EV130464-04
Customer Sample I.D :					OS 02 B	OS 02 Comp
Date Sampled :					23-Apr-13	23-Apr-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	none	none	none
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	none	none
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.87	7.99
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	32.2	31.0
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	29.5	29.8
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	4	4
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	0.6	0.6
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.021	0.019
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.018	0.017
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0012	0.0011
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/III/2013

<b>Laboratory Sample I.D :</b>					EV130464-03	EV130464-04
<b>Customer Sample I.D :</b>					OS 02 B	OS 02 Comp
<b>Date Sampled :</b>					23-Apr-13	23-Apr-13
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.40	5.76
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III  
 ND = Not Detected

**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**Customer Ref :** ARDAL Tangguh Expansion Project BP Berau Ltd  
 1529.r2/US-EV/IV/2013

Laboratory Sample I.D :					EV130464-05	EV130464-06
Customer Sample I.D :					OS 04 T	OS 04 B
Date Sampled :					23-Apr-13	23-Apr-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	10.0	-
2	Floating Matter <sup>1)</sup>	-	Visual	none	none	none
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	none	none
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.92	7.86
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	28.0	30.7
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.8	30.6
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	6	3
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	0.6	<0.5
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.036	0.021
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.013	0.020
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0016	0.0012
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005



**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**AMDAL Tangguh Expansion Project BP Berau Ltd**  
**Customer Ref :** 1529.r2/US-EV/II/2013

<b>Laboratory Sample I.D :</b>					EV130464-05	EV130464-06
<b>Customer Sample I.D :</b>					OS 04 T	OS 04 B
<b>Date Sampled :</b>					23-Apr-13	23-Apr-13
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.86	5.51
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ ECD/ MS	0.003	<0.0001	0.0007

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III  
 ND = Not Detected

**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/US-EV/II/2013

Laboratory Sample I.D :					EV130464-07	EV130464-08
Customer Sample I.D :					OS 04 Comp	FOS 04 T
Date Sampled :					23-Apr-13	23-Apr-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	-	7.0
2	Floating Matter <sup>1)</sup>	-	Visual	none	none	none
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	none	none
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.92	7.87
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.5	28.1
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	31.6	30.7
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	6	4
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	<0.5	<0.5
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.015	0.009
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.020	0.018
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0010	0.0025
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

<b>Laboratory Sample I.D :</b>					EV130464-07	EV130464-08
<b>Customer Sample I.D :</b>					OS 04 Comp	FOS 04 T
<b>Date Sampled :</b>					23-Apr-13	23-Apr-13
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.11	6.52
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III  
 ND = Not Detected

**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130464-09	EV130464-10
Customer Sample I.D :					FOS 04 M	FOS 04 B
Date Sampled :					23-Apr-13	23-Apr-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	none	none	none
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	none	none
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.91	7.93
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	32.3	32.6
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.7	29.9
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	7	5
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	<0.5	<0.5
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.006	0.010
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.015	0.018
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0020	0.0009
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**Customer Ref :** AMDAL Tangguh Expansion Project BP Berau Ltd  
 1529.r2/IUS-EV/III/2013

<b>Laboratory Sample I.D :</b>					EV130464-09	EV130464-10
<b>Customer Sample I.D :</b>					FOS 04 M	FOS 04 B
<b>Date Sampled :</b>					23-Apr-13	23-Apr-13
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.85	5.55
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

**Note:** <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III  
 ND = Not Detected

**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**Customer Ref :** AMDAL Tangguh Expansion Project BP Berau Ltd  
 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130464-11	EV130464-12
Customer Sample I.D :					OS 05	OS 13 T
Date Sampled :					23-Apr-13	24-Apr-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	3.5	5.0
2	Floating Matter <sup>1)</sup>	-	Visual	none	none	none
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	none	none
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.86	7.80
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	27.6	27.0
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.5	30.1
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	3	4
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	1.5	<0.5
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.030	0.025
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.018	0.014
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0010	0.0010
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	0.00026
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

<b>Laboratory Sample I.D :</b>					EV130464-11	EV130464-12
<b>Customer Sample I.D :</b>					OS 05	OS 13 T
<b>Date Sampled :</b>					23-Apr-13	24-Apr-13
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.17	6.36
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III  
 ND = Not Detected



**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**ANDAL Tangguh Expansion Project BP Berau Ltd**  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130464-13	EV130464-14
Customer Sample I.D :					OS 13 M	OS 13 B
Date Sampled :					24-Apr-13	24-Apr-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	none	none	none
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	none	none
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.84	7.85
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	29.5	29.8
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	29.9	29.8
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	3	5
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	1.6	6.1
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.024	0.036
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.023	0.031
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0011	0.0016
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	0.00017	0.00014
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005



**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**Customer Ref :** ANIDAL Tangguh Expansion Project BP Berau Ltd  
 1529.r2/IUS-EV/III/2013

<b>Laboratory Sample I.D :</b>					EV130464-13	EV130464-14
<b>Customer Sample I.D :</b>					OS 13 M	OS 13 B
<b>Date Sampled :</b>					24-Apr-13	24-Apr-13
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.18	4.95
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III  
 ND = Not Detected

**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**Customer Ref :** AMDAL Tangguh Expansion Project BP Berau Ltd  
 1529.r2/IUS-EV/1/2013

Laboratory Sample I.D :					EV130464-15	EV130464-16
Customer Sample I.D :					OS 13 Comp	OS 11
Date Sampled :					24-Apr-13	24-Apr-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	-	5.0
2	Floating Matter <sup>1)</sup>	-	Visual	none	none	none
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	none	none
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.89	7.89
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	28.9	27.4
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	29.8	30.5
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	5	6
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	1.9	0.6
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.029	0.035
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.023	0.021
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0013	0.0018
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	0.00014	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

**Job Number :** EV130484  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**AMDAL Tangguh Expansion Project BP Berau Ltd**  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130484-15	EV130484-16
Customer Sample I.D :					OS 13 Comp	OS 11
Date Sampled :					24-Apr-13	24-Apr-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.71	6.12
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III  
 ND = Not Detected

**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130464-17	EV130464-18
Customer Sample I.D :					OS 08 T	OS 08 M
Date Sampled :					24-Apr-13	24-Apr-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	5.0	-
2	Floating Matter <sup>2)</sup>	-	Visual	none	none	none
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	none	none
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.90	7.86
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	27.1	30.0
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.9	30.3
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	7	5
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	<0.5	1.0
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.035	0.046
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.016	0.017
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0011	0.0015
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

Job Number :  
 Customer :  
 Project Name :  
 Customer Ref :

EV130464  
 PT ERM Indonesia  
 Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 1529.r2/US-EV/IV2013

Laboratory Sample I.D :		EV130464-17		EV130464-18		
Customer Sample I.D :		OS 08 T		OS 08 M		
Date Sampled :		24-Apr-13		24-Apr-13		
Sample Matrix :		Seawater		Seawater		
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.53	5.25
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III  
 ND = Not Detected





Job Number : EV130464  
 Customer : PT ERM Indonesia  
 Project Name : Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
 Customer Ref : 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130464-19	EV130464-20
Customer Sample I.D :					OS 08 B	OS 08 Comp
Date Sampled :					24-Apr-13	24-Apr-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	none	none	none
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	none	none
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.91	7.88
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	31.2	29.2
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	30.1	30.8
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	4	11
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	2.8	1.2
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.051	0.018
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.021	0.018
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0008	0.0013
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

<b>Laboratory Sample I.D :</b>					EV130464-19	EV130464-20
<b>Customer Sample I.D :</b>					OS 08 B	OS 08 Comp
<b>Date Sampled :</b>					24-Apr-13	24-Apr-13
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.28	6.25
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III  
 ND = Not Detected

**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130464-21	EV130464-22
Customer Sample I.D :					OS 09	FOS 05 T
Date Sampled :					24-Apr-13	24-Apr-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	3.0	4.0
2	Floating Matter <sup>1)</sup>	-	Visual	none	none	none
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	none	none
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.93	7.91
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	26.7	27.8
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	31.0	30.7
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	6	8
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	1.4	<0.5
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.030	0.028
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.019	0.015
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0010	0.0018
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005



**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

<b>Laboratory Sample I.D :</b>					EV130464-21	EV130464-22
<b>Customer Sample I.D :</b>					OS 09	FOS 05 T
<b>Date Sampled :</b>					24-Apr-13	24-Apr-13
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.58	6.71
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III  
 ND = Not Detected



**Job Number :** EV130484  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130464-23	EV130464-24
Customer Sample I.D :					FOS 05 M	FOS 05 B
Date Sampled :					24-Apr-13	24-Apr-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	-	-
2	Floating Matter <sup>1)</sup>	-	Visual	none	none	none
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	none	none
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.90	7.90
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	28.3	30.7
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	29.8	29.4
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	5	5
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	<0.5	1.4
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.030	0.031
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.016	0.017
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0009	0.0012
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005



**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

<b>Laboratory Sample I.D :</b>					EV130464-23	EV130464-24
<b>Customer Sample I.D :</b>					FOS 05 M	FOS 05 B
<b>Date Sampled :</b>					24-Apr-13	24-Apr-13
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.89	5.10
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III  
 ND = Not Detected



**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130464-25	EV130464-26
Customer Sample I.D :					0S 01	0S 07
Date Sampled :					25-Apr-13	25-Apr-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachl disc	natural	4.0	4.0
2	Floating Matter <sup>1)</sup>	-	Visual	none	none	none
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	none	none
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.86	7.94
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	27.7	26.1
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	29.5	31.1
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	6	9
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	1.8	1.5
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.031	0.030
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.018	0.021
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0011	0.0008
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005



**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

<b>Laboratory Sample I.D :</b>					EV130464-25	EV130464-26
<b>Customer Sample I.D :</b>					OS 01	OS 07
<b>Date Sampled :</b>					25-Apr-13	25-Apr-13
<b>Sample Matrix :</b>					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	5.33	6.22
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	2	ND
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs**	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III  
 ND = Not Detected



**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130454-27	EV130464-28
Customer Sample I.D :					0S 12	0S 10
Date Sampled :					25-Apr-13	26-Apr-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Physical Tests</b>						
1	Brightness <sup>1)</sup>	m	Sachi disc	natural	5.0	3.0
2	Floating Matter <sup>1)</sup>	-	Visual	none	none	none
3	Odor <sup>1)</sup>	-	Organoleptic	natural	Odorless	Odorless
4	Oil Film <sup>1)</sup>	-	Visual	none	none	none
5	pH <sup>1)</sup>	-	Probe	7 -8,5	7.92	7.90
6	Salinity <sup>1)</sup>	‰	Salinometer	natural	27.7	28.7
7	Temperature <sup>1)</sup>	°C	Thermometer	natural	31.3	29.9
8	Total Suspended Solids, TSS	mg/L	Gravimetric	natural	9	3
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	< 5	0.5	2.6
<b>Anions</b>						
1	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.01	<0.002	<0.002
2	Total Cyanide, CN	mg/L	Colorimetric	0.5	<0.005	<0.005
<b>Nutrients</b>						
1	Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.3	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	0.008	0.029	0.034
3	Total Phosphorus as P	mg/L	Colorimetric	0.015	0.021	0.028
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.012	0.0018	0.0018
2	Cadmium, Cd	mg/L	GFAAS	0.001	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.005	<0.002	<0.002
4	Copper, Cu	mg/L	GFAAS	0.008	<0.001	<0.001
5	Lead, Pb	mg/L	GFAAS	0.008	<0.001	<0.001
6	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
7	Nickel, Ni	mg/L	FAAS	0.05	<0.001	<0.001
8	Zinc, Zn	mg/L	FAAS	0.05	<0.005	<0.005

**Job Number :** EV130464  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**Customer Ref :** AMDAL Tangguh Expansion Project BP Berau Ltd  
 1529.r2/IUS-EV/III/2013

Laboratory Sample I.D :					EV130464-27	EV130464-28
Customer Sample I.D :					OS 12	OS 10
Date Sampled :					25-Apr-13	26-Apr-13
Sample Matrix :					Seawater	Seawater
No.	Test Description	Unit	Technique	Regulatory Limit	Results	Results
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	20	<2	<2
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	>5	6.71	5.57
3	Surfactants, MBAS	mg/L	Colorimetric	1	<0.01	<0.01
4	Oil & Grease	mg/L	Gravimetric	1	<1	<1
5	Total Phenols	mg/L	Colorimetric	0.002	<0.001	<0.001
<b>Microbiology Tests</b>						
1	Total Coliform	MPN/100ml	Incubation	1000	ND	23
<b>Organic Tests**</b>						
1	Polycyclic Aromatic Hydrocarbons, PAHs <sup>***</sup>	mg/L	Solvent Extraction GC/ECD/ MS	0.003	<0.0001	<0.0001

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on KepmenLH 51/2004 Appendix III  
 ND = Not Detected

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/US-EV/II/2013

Laboratory Sample I.D :					EV130302-13	EV130302-14
Customer Sample I.D :					SW 01	SW 03
Date Sampled :					12-Mar-13	17-Mar-13
Sample Matrix :					River Water	River Water
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	pH <sup>1)</sup>	-	Probe	6 - 9	6.45	7.18
2	Temperature <sup>1)</sup>	°C	Thermometer	3 deviation	26.3	29.7
3	Total Dissolved Solids, TDS	mg/L	Gravimetric	1000	70	23400
4	Total Suspended Solids, TSS	mg/L	Gravimetric	50	129	45
<b>Anions</b>						
1	Chloride, Cl <sup>-</sup>	mg/L	Ion Chromatography	600	33.0	11700
2	Fluoride, F <sup>-</sup>	mg/L	Ion Chromatography	0.5	<0.02	0.30
3	Sulphate, SO <sub>4</sub>	mg/L	Ion Chromatography	400	7	1790
4	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.002	<0.002	<0.002
5	Total Cyanide, CN	mg/L	Colorimetric	0.02	<0.005	<0.005
<b>Nutrients</b>						
1	Free Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.5	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Ion Chromatography	10	0.019	0.344
3	Nitrite, NO <sub>2</sub> -N	mg/L	Ion Chromatography	0.06	<0.001	0.022
4	Total Phosphorus as P	mg/L	Colorimetric	0.2	0.101	0.021
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.05	0.0013	0.0022
2	Barium, Ba	mg/L	FAAS	1	<0.1	<0.1
3	Boron, B	mg/L	ICP -AES	1	<0.1	3.4
4	Cadmium, Cd	mg/L	FAAS	0.01	<0.005	<0.005
5	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.05	<0.002	<0.002
6	Cobalt, Co	mg/L	FAAS	0.2	<0.02	<0.02
7	Copper, Cu	mg/L	FAAS	0.02	<0.01	<0.01
8	Iron, Fe	mg/L	FAAS	0.3	0.29	<0.05
9	Lead, Pb	mg/L	GFAAS	0.03	0.002	<0.001
10	Manganese, Mn	mg/L	FAAS	0.1	0.05	0.01
11	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
12	Selenium, Se	mg/L	HVAAS	0.01	<0.0005	<0.0005
13	Zinc, Zn	mg/L	FAAS	0.05	0.020	0.007



**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**Customer Ref :** AMDAL Tangguh Expansion Project BP Berau Ltd  
 1529.r2/IUS-EV/II/2013

<b>Laboratory Sample I.D :</b>					EV130302-13	EV130302-14
<b>Customer Sample I.D :</b>					SW 01	SW 03
<b>Date Sampled :</b>					12-Mar-13	17-Mar-13
<b>Sample Matrix :</b>					River Water	River Water
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Microbiology Tests</b>						
1	E.Coil	MPN/100ml	Incubation	100	40	23
2	Total Coliform	MPN/100ml	Incubation	1000	328	345
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	2	6	<2
2	Chemical Oxygen Demand, COD	mg/L	Titrimetric	10	28	5
3	Chlorine, Cl <sub>2</sub> <sup>1)</sup>	mg/L	Colorimetric	0.03	<0.01	<0.01
4	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	6	5.23	3.97
5	Oil & Grease	mg/L	Gravimetric	1	<1	<1
6	Surfactants, MBAS	mg/L	Colorimetric	200	<0.01	<0.01
7	Total Phenols	mg/L	Colorimetric	1	<0.001	<0.001

Note: Regulation Limit based on PP No. 82 Tahun 1982

<sup>1)</sup> = Field Measurement

## ENVIRONMENTAL TEST REPORT

**Mr. Teguh Yekti**  
PT ERM Indonesia  
Wisma Aldiron Dirgantara, 2nd Floor, Suite # 238-239  
Jl. Gatot Subroto Kav. 72  
Jakarta 12780  
Indonesia

**Job Number :** EV130335 **Date received :** 28-Mar-2013  
**Client Ref :** 1529.r2/IUS-EV/II/2013 **Date reported :** 06-May-2013

**Number of samples :** 12

**Report Comprising :** Cover Sheet, Sample Information, Results, QC

**Total Pages :** 16

**Notes :**  
N.A = Not Analyzed  
I.S = Insufficient Sample  
\* = Non Accredited Test  
\*\* = Sub Contracted Test  
1) = Field Measurement  
I.P = In Progress

**Project Name :** Environmental Baseline Survey Wet Season AMDAL Tangguh  
Expansion Project BP Berau Ltd

Approved Signature for:



Regina C. de Wit  
Technical Advisor - Environmental

All work is performed in accordance with Intertek Standard Terms and Conditions of work  
<http://www.intertek.com/terms/>

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as received.

This report was prepared solely for the use of the client named in this report. PT Intertek Utama Services accepts no responsibility for any loss, damage or liability suffered by any third party as a result of any reliance upon or use of this report.

**DO NOT PHOTOCOPY**

### SAMPLE INFORMATION

**Job Number :** EV130335  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/1/2013

No.	Laboratory Sample I.D.	Customer Sample I.D.	Sample Media	Date Sampled	Time Sampled	Date Received	Sampled By <sup>a)</sup>	Coordinates	
								South	East
1	EV130335-01	SWS 03	River Water	19-Mar-13	13:00	28-Mar-13	Winamo & Hilman	02° 34' 54.0"	132° 27' 25.0"
2	EV130335-02	SWS 01	River Water	21-Mar-13	11:50	28-Mar-13	Winamo & Hilman	02° 38' 21.0"	133° 56' 30.0"
3	EV130335-03	FNS 07	Seawater	23-Mar-13	9:45	28-Mar-13	Winamo & Hilman	02° 15' 08.9"	133° 33' 47.3"
4	EV130335-04	NS 07	Seawater	23-Mar-13	14:55	28-Mar-13	Winamo & Hilman	02° 13' 43.3"	133° 15' 00.9"
5	EV130335-05	NS 08	Seawater	23-Mar-13	16:20	28-Mar-13	Winamo & Hilman	02° 17' 19.0"	132° 54' 49.0"
6	EV130335-06	NS 09	Seawater	24-Mar-13	13:20	28-Mar-13	Winamo & Hilman	02° 18' 25.0"	132° 39' 43.0"
7	EV130335-07	SWS 03	Sediment	19-Mar-13	13:00	28-Mar-13	Winamo & Hilman	02° 34' 54.0"	132° 27' 25.0"
8	EV130335-08	SWS 01	Sediment	21-Mar-13	11:50	28-Mar-13	Winamo & Hilman	02° 38' 21.0"	133° 56' 30.0"
9	EV130335-09	FNS 07	Sediment	23-Mar-13	9:45	28-Mar-13	Winamo & Hilman	02° 15' 08.9"	133° 33' 47.3"
10	EV130335-10	NS 07	Sediment	23-Mar-13	14:55	28-Mar-13	Winamo & Hilman	02° 13' 43.3"	133° 15' 00.9"
11	EV130335-11	NS 08	Sediment	23-Mar-13	16:20	28-Mar-13	Winamo & Hilman	02° 17' 19.0"	132° 54' 49.0"
12	EV130335-12	NS 09	Sediment	24-Mar-13	13:20	28-Mar-13	Winamo & Hilman	02° 18' 25.0"	132° 39' 43.0"

Note <sup>a)</sup> = Sampled by IUS

**Job Number :** EV130335  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau  
 Ltd  
**Customer Ref :** 1629.r2/IUS-EV/IV2013

Laboratory Sample I.D :					EV130335-01	EV130335-02
Customer Sample I.D :					SWS 03	SWS 01
Date Sampled :					18-Mar-13	21-Mar-13
Sample Matrix :					River Water	River Water
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	pH <sup>(1)</sup>	-	Probe	6 - 9	7.76	8.02
2	Temperature <sup>(1)</sup>	°C	Thermometer	3 deviation	30.5	31.1
3	Total Dissolved Solids, TDS	mg/L	Gravimetric	1000	28500	25100
4	Total Suspended Solids, TSS	mg/L	Gravimetric	50	63	380
<b>Anions</b>						
1	Chloride, Cl <sup>-</sup>	mg/L	Titrimetric	600	15500	14800
2	Fluoride, F <sup>-</sup>	mg/L	Ion Selective Electrode	0.5	0.36	0.32
3	Sulphate, SO <sub>4</sub>	mg/L	Turbidimetric	400	2310	2080
4	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	0.002	<0.002	<0.002
5	Total Cyanide, CN	mg/L	Colorimetric	0.02	<0.005	<0.005
<b>Nutrients</b>						
1	Free Ammonia, NH <sub>3</sub> -N	mg/L	Ion Selective Electrode	0.5	<0.02	<0.02
2	Nitrate, NO <sub>3</sub> -N	mg/L	Colorimetric	10	0.066	0.051
3	Nitrite, NO <sub>2</sub> -N	mg/L	Colorimetric	0.06	0.006	0.013
4	Total Phosphorus as P	mg/L	Colorimetric	0.2	0.027	0.187
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.05	0.0025	0.0023
2	Barium, Ba	mg/L	FAAS	1	<0.1	<0.1
3	Boron, B	mg/L	ICP -AES	1	4.0	3.9
4	Cadmium, Cd	mg/L	FAAS	0.01	<0.005	<0.005
5	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.05	<0.002	<0.002
6	Cobalt, Co	mg/L	FAAS	0.2	<0.02	<0.02
7	Copper, Cu	mg/L	FAAS	0.02	<0.01	<0.01
8	Iron, Fe	mg/L	FAAS	0.3	0.06	0.10
9	Lead, Pb	mg/L	GFAAS	0.03	0.013	0.037
10	Manganese, Mn	mg/L	FAAS	0.1	<0.01	<0.01
11	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
12	Selenium, Se	mg/L	HVAAS	0.01	<0.0005	<0.0005
13	Zinc, Zn	mg/L	FAAS	0.05	0.033	0.015

**Job Number :** EV130335  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau  
 Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130335-01	EV130335-02
Customer Sample I.D :					SWS 03	SWS 01
Date Sampled :					19-Mar-13	21-Mar-13
Sample Matrix :					River Water	River Water
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Microbiology Tests</b>						
1	E.Coli	MPN/100ml	Incubation	100	12	ND
2	Total Coliform	MPN/100ml	Incubation	1000	29	308
<b>Miscellaneous</b>						
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	Probe	2	11	17
2	Chemical Oxygen Demand, COD	mg/L	Titrimetric	10	35	55
3	Chlorine, Cl <sub>2</sub> <sup>1)</sup>	mg/L	Probe	0.03	<0.01	<0.01
4	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	Probe	6	5.73	6.03
5	Oil & Grease	mg/L	Gravimetric	1	<1	<1
6	Surfactants, MBAS	mg/L	Colorimetric	200	<0.01	<0.01
7	Total Phenols	mg/L	Colorimetric	1	<0.001	<0.001

Note: Regulation Limit based on PP No. 82 Tahun 1982  
<sup>1)</sup> = Field Measurement

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**AMBDAL Tangguh Expansion Project BP Berau Ltd**  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :					EV130302-15	EV130302-16
Customer Sample I.D :					DGW 01	SGW 01
Date Sampled :					12-Mar-13	12-Mar-13
Sample Matrix :					Ground Water	Ground Water
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Colour	Pt/Co	Colorimetric	50	8	41
2	Conductivity <sup>1)</sup>	µS/Cm	Conductivity meter	-	503	62
3	Odor <sup>1)</sup>	-	Normal	-	Odorless	Odorless
4	pH <sup>1)</sup>	-	Probe	6.5-9	8.32	5.39
5	Taste <sup>1)</sup>	-	Normal	-	N.A	N.A
6	Temperature <sup>1)</sup>	°C	Thermometer	± 3	26.9	27.3
7	Total Dissolved Solids, TDS	mg/L	Gravimetric	1500	381	23
8	Total Hardness as CaCO <sub>3</sub>	mg/L	Titrimetric	500	41.8	3.1
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	25	<0.5	27.7
<b>Anions</b>						
1	Chloride, Cl <sup>-</sup>	mg/L	Ion Chromatography	600	1.0	4.7
2	Fluoride, F <sup>-</sup>	mg/L	Ion Chromatography	1.5	<0.02	<0.02
3	Sulphate, SO <sub>4</sub>	mg/L	Ion Chromatography	400	<2	4
4	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	-	<0.002	<0.002
5	Total Cyanide, CN	mg/L	Colorimetric	0.1	<0.005	<0.005
<b>Nutrients</b>						
1	Nitrate, NO <sub>3</sub> -N	mg/L	Ion Chromatography	10	0.045	0.170
2	Nitrite, NO <sub>2</sub> -N	mg/L	Ion Chromatography	1	0.765	<0.001
<b>Microbiology Tests</b>						
1	E.Coli	MPN/100ml	Incubation	-	2	7
2	Total Coliform	MPN/100ml	Incubation	50	187	548
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.05	0.0010	0.0014
2	Cadmium, Cd	mg/L	GFAAS	0.005	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.05	<0.002	<0.002
4	Copper, Cu	mg/L	FAAS	-	0.02	<0.01
5	Iron, Fe	mg/L	FAAS	1	0.10	0.26
6	Lead, Pb	mg/L	GFAAS	0.05	0.004	0.001

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1520.r2/IUS-EV/II/2013

<b>Laboratory Sample I.D :</b>					EV130302-15	EV130302-16
<b>Customer Sample I.D :</b>					DGW 01	SGW 01
<b>Date Sampled :</b>					12-Mar-13	12-Mar-13
<b>Sample Matrix :</b>					Ground Water	Ground Water
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
7	Manganese, Mn	mg/L	FAAS	0.5	0.05	0.01
8	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
9	Selenium, Se	mg/L	HVAAS	0.01	<0.0005	<0.0005
10	Zinc, Zn	mg/L	FAAS	15	0.036	0.009
<b>Miscellaneous</b>						
1	Surfactants, MBAS	mg/L	Colorimetric	0.5	<0.01	<0.01
2	Total Organic Matter, KMnO4	mg/L	Titrimetric	10	<2	<2

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on Permenkes 416/1990 Appendix II

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
**AMDAL Tangguh Expansion Project BP Berau Ltd**  
**Customer Ref :** 1629.r2/US-EV/1/2013

Laboratory Sample I.D :					EV130302-17	EV130302-18
Customer Sample I.D :					SGW 02	GW 01
Date Sampled :					12-Mar-13	12-Mar-13
Sample Matrix :					Ground Water	Ground Water
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
<b>Physical Tests</b>						
1	Colour	PCo	Colorimetric	50	13	26
2	Conductivity <sup>1)</sup>	µS/Cm	Conductivity meter	-	38	299
3	Odor <sup>1)</sup>	-	Normal	-	Odorless	Odorless
4	pH <sup>1)</sup>	-	Probe	6.5-9	5.95	7.14
5	Taste <sup>1)</sup>	-	Normal	-	N.A	N.A
6	Temperature <sup>1)</sup>	°C	Thermometer	± 3	26.9	26.4
7	Total Dissolved Solids, TDS	mg/L	Gravimetric	1500	17	179
8	Total Hardness as CaCO <sub>3</sub>	mg/L	Titrimetric	500	10.5	92.5
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	25	21.5	1.6
<b>Anions</b>						
1	Chloride, Cl <sup>-</sup>	mg/L	Ion Chromatography	600	2.7	23.8
2	Fluoride, F <sup>-</sup>	mg/L	Ion Chromatography	1.5	<0.02	<0.02
3	Sulphate, SO <sub>4</sub>	mg/L	Ion Chromatography	400	3	<2
4	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	-	<0.002	<0.002
5	Total Cyanide, CN	mg/L	Colorimetric	0.1	<0.005	<0.005
<b>Nutrients</b>						
1	Nitrate, NO <sub>3</sub> -N	mg/L	Ion Chromatography	10	<0.005	0.223
2	Nitrite, NO <sub>2</sub> -N	mg/L	Ion Chromatography	1	<0.001	<0.001
<b>Microbiology Tests</b>						
1	E.Coli	MPN/100ml	Incubation	-	128	ND
2	Total Coliform	MPN/100ml	Incubation	50	>2420	14
<b>Dissolved Metals</b>						
1	Arsenic, As	mg/L	HVAAS	0.05	0.0005	0.0010
2	Cadmium, Cd	mg/L	GFAAS	0.005	<0.0001	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.05	<0.002	<0.002
4	Copper, Cu	mg/L	FAAS	-	<0.01	<0.01
5	Iron, Fe	mg/L	FAAS	1	0.16	<0.05
6	Lead, Pb	mg/L	GFAAS	0.05	<0.001	<0.001





**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

<b>Laboratory Sample I.D :</b>					EV130302-17	EV130302-18
<b>Customer Sample I.D :</b>					SGW 02	GW 01
<b>Date Sampled :</b>					12-Mar-13	12-Mar-13
<b>Sample Matrix :</b>					Ground Water	Ground Water
No.	Test Description	Unit	Technique	Regulation Limit	Results	Results
7	Manganese, Mn	mg/L	FAAS	0.5	0.03	<0.01
8	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005	<0.00005
9	Selenium, Se	mg/L	HVAAS	0.01	<0.0005	<0.0005
10	Zinc, Zn	mg/L	FAAS	15	0.010	0.008
<b>Miscellaneous</b>						
1	Surfactants, MBAS	mg/L	Colorimetric	0.5	<0.01	<0.01
2	Total Organic Matter, KMnO4	mg/L	Titrimetric	10	<2	<2

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on Permenkes 418/1990 Appendix II



81

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

<b>Laboratory Sample I.D :</b>					EV130302-19
<b>Customer Sample I.D :</b>					GW 02
<b>Date Sampled :</b>					12-Mar-13
<b>Sample Matrix :</b>					Ground Water
No.	Test Description	Unit	Technique	Regulation Limit	Results
<b>Physical Tests</b>					
1	Colour	Pt/Co	Colorimetric	50	<5
2	Conductivity <sup>1)</sup>	µS/cm	Conductivity meter	-	33
3	Odor <sup>1)</sup>	-	Normal	-	Odorless
4	pH <sup>1)</sup>	-	Probe	6.5-9	5.08
5	Taste <sup>1)</sup>	-	Normal	-	N.A
6	Temperature <sup>1)</sup>	°C	Thermometer	± 3	27.2
7	Total Dissolved Solids, TDS	mg/L	Gravimetric	1500	13
8	Total Hardness as CaCO <sub>3</sub>	mg/L	Titrimetric	500	5.7
9	Turbidity <sup>1)</sup>	NTU	Turbidimetric	25	1.1
<b>Anions</b>					
1	Chloride, Cl <sup>-</sup>	mg/L	Ion Chromatography	600	3.7
2	Fluoride, F <sup>-</sup>	mg/L	Ion Chromatography	1.5	<0.02
3	Sulphate, SO <sub>4</sub>	mg/L	Ion Chromatography	400	<2
4	Sulphide as H <sub>2</sub> S	mg/L	Ion Selective Electrode	-	<0.002
5	Total Cyanide, CN	mg/L	Colorimetric	0.1	<0.005
<b>Nutrients</b>					
1	Nitrate, NO <sub>3</sub> -N	mg/L	Ion Chromatography	10	0.953
2	Nitrite, NO <sub>2</sub> -N	mg/L	Ion Chromatography	1	<0.001
<b>Microbiology Tests</b>					
1	E.Coli	MPN/100ml	Incubation	-	ND
2	Total Coliform	MPN/100ml	Incubation	50	13
<b>Dissolved Metals</b>					
1	Arsenic, As	mg/L	HVAAS	0.05	<0.0005
2	Cadmium, Cd	mg/L	GFAAS	0.005	<0.0001
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	Colorimetric	0.05	<0.002
4	Copper, Cu	mg/L	FAAS	-	<0.01
5	Iron, Fe	mg/L	FAAS	1	0.10
6	Lead, Pb	mg/L	GFAAS	0.05	<0.001

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season  
 AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/1/2013

<b>Laboratory Sample I.D :</b>					EV130302-19
<b>Customer Sample I.D :</b>					GW 02
<b>Date Sampled :</b>					12-Mar-13
<b>Sample Matrix :</b>					Ground Water
No.	Test Description	Unit	Technique	Regulation Limit	Results
7	Manganese, Mn	mg/L	FAAS	0.5	0.008
8	Mercury, Hg	mg/L	CVAAS	0.001	<0.00005
9	Selenium, Se	mg/L	HVAAS	0.01	<0.0005
10	Zinc, Zn	mg/L	FAAS	15	<0.005
<b>Miscellaneous</b>					
1	Surfactants, MBAS	mg/L	Colorimetric	0.5	<0.01
2	Total Organic Matter, KMnO4	mg/L	Titrimetric	10	<2

Note: <sup>1)</sup> = Field Measurement  
 Regulation Limit based on Permenkes 416/1990 Appendix II

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :				EV130302-20	EV130302-21	EV130302-22
Customer Sample I.D :				FNS 02	FNS 06	FNS 06
Date Sampled :				16-Mar-13	17-Mar-13	16-Mar-13
Sample Matrix :				Sediment	Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results	Results
<b>Total Metals</b>						
1	Antimony, Sb	mg/dry Kg	HVAAS	0.44	0.44	0.39
2	Arsenic, As	mg/dry Kg	HVAAS	4.46	11.7	7.45
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	13	18	18
5	Copper, Cu	mg/dry Kg	FAAS	2.6	6.5	5.8
6	Lead, Pb	mg/dry Kg	FAAS	4	10	8
7	Mercury, Hg	mg/dry Kg	CVAAS	0.021	0.021	0.020
8	Nickel, Ni	mg/dry Kg	FAAS	9.0	16.3	17.0
9	Selenium, Se	mg/dry Kg	HVAAS	0.06	0.07	0.07
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	27.6	53.1	45.9
<b>Organic Tests</b>						
1	TPH	mg/dry Kg	GC-FID	<2	<2	<2

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :				EV130302-23	EV130302-24	EV130302-25
Customer Sample I.D :				NS 02	NS 03	NS 04
Date Sampled :				17-Mar-13	15-Mar-13	17-Mar-13
Sample Matrix :				Sediment	Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results	Results
<b>Total Metals</b>						
1	Antimony, Sb	mg/dry Kg	HVAAS	0.38	0.81	0.70
2	Arsenic, As	mg/dry Kg	HVAAS	4.55	60.0	14.4
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	15	28	25
5	Copper, Cu	mg/dry Kg	FAAS	3.9	7.7	6.7
6	Lead, Pb	mg/dry Kg	FAAS	7	12	12
7	Mercury, Hg	mg/dry Kg	CVAAS	0.019	0.026	0.024
8	Nickel, Ni	mg/dry Kg	FAAS	12.5	29.7	21.5
9	Selenium, Se	mg/dry Kg	HVAAS	0.06	0.08	0.47
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	34.1	71.2	73.9
<b>Organic Tests</b>						
1	TPH	mg/dry Kg	GC-FID	<2	<2	<2

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/US-EV/II/2013

Laboratory Sample I.D :				EV130302-26	EV130302-27	EV130302-28
Customer Sample I.D :				NS 05	NS 06	OS 03
Date Sampled :				17-Mar-13	17-Mar-13	16-Mar-13
Sample Matrix :				Sediment	Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results	Results
<b>Total Metals</b>						
1	Antimony, Sb	mg/dry Kg	HVAAS	0.55	0.44	0.34
2	Arsenic, As	mg/dry Kg	HVAAS	6.22	6.77	3.79
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	20	14	24
5	Copper, Cu	mg/dry Kg	FAAS	7.3	5.2	3.9
6	Lead, Pb	mg/dry Kg	FAAS	9	7	8
7	Mercury, Hg	mg/dry Kg	CVAAS	0.019	0.012	0.018
8	Nickel, Ni	mg/dry Kg	FAAS	17.9	13.2	18.8
9	Selenium, Se	mg/dry Kg	HVAAS	0.09	0.07	0.06
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	47.9	34.7	48.7
<b>Organic Tests</b>						
1	TPH	mg/dry Kg	GC-FID	<2	<2	<2

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/US-EV/IV/2013

<b>Laboratory Sample I.D :</b>				EV130302-29	EV130302-30
<b>Customer Sample I.D :</b>				OS 06	OS 14
<b>Date Sampled :</b>				16-Mar-13	17-Mar-13
<b>Sample Matrix :</b>				Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results
<b>Total Metals</b>					
1	Antimony, Sb	mg/dry Kg	HVAAS	1.74	0.48
2	Arsenic, As	mg/dry Kg	HVAAS	89.4	5.73
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	24	13
5	Copper, Cu	mg/dry Kg	FAAS	3.3	4.9
6	Lead, Pb	mg/dry Kg	FAAS	19	6
7	Mercury, Hg	mg/dry Kg	CVAAS	0.008	0.016
8	Nickel, Ni	mg/dry Kg	FAAS	19.4	11.7
9	Selenium, Se	mg/dry Kg	HVAAS	0.02	0.06
10	Silver, Ag	mg/dry Kg	FAAS	0.6	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	56.1	31.3
<b>Organic Tests</b>					
1	TPH	mg/dry Kg	GC-FID	<2	<2

**Job Number :** EV130302  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :				EV130302-31	EV130302-32
Customer Sample I.D :				SW 01	SW 03
Date Sampled :				12-Mar-13	17-Mar-13
Sample Matrix :				Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results
	<b>Total Metals</b>				
1	Antimony, Sb	mg/dry Kg	HVAAS	0.43	0.41
2	Arsenic, As	mg/dry Kg	HVAAS	13.7	13.8
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	30	31
5	Copper, Cu	mg/dry Kg	FAAS	11.1	12.4
6	Lead, Pb	mg/dry Kg	FAAS	12	17
7	Mercury, Hg	mg/dry Kg	CVAAS	0.029	0.035
8	Nickel, Ni	mg/dry Kg	FAAS	30.7	36.3
9	Selenium, Se	mg/dry Kg	HVAAS	0.07	0.10
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	75.7	91.1
	<b>Organic Tests</b>				
1	TPH	mg/dry Kg	GC-FID	<2	<2



**Job Number :** EV130335  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/US-EV/1/2013

Laboratory Sample I.D :				EV130335-07	EV130335-06	EV130335-09
Customer Sample I.D :				SWS 03	SWS 01	FNS 07
Date Sampled :				19-Mar-13	21-Mar-13	23-Mar-13
Sample Matrix :				Sediment	Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results	Results
	<b>Total Metals</b>					
1	Antimony, Sb	mg/dry Kg	HVAAS	0.15	0.06	0.27
2	Arsenic, As	mg/dry Kg	HVAAS	12.9	4.66	17.8
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	26	19	41
5	Copper, Cu	mg/dry Kg	FAAS	11.0	3.6	9.9
6	Lead, Pb	mg/dry Kg	FAAS	11	5	11
7	Mercury, Hg	mg/dry Kg	CVAAS	0.033	0.019	0.026
8	Nickel, Ni	mg/dry Kg	FAAS	25.2	13.6	43.7
9	Selenium, Se	mg/dry Kg	HVAAS	0.03	0.02	0.15
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	75.6	40.3	90.1
	<b>Organic Tests</b>					
1	TPH	mg/dry Kg	GC-FID	<2	<2	<2



**Job Number :** EV130335  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

Laboratory Sample I.D :				EV130335-10	EV130335-11	EV130335-12
Customer Sample I.D :				NS 07	NS 08	NS 09
Date Sampled :				23-Mar-13	23-Mar-13	24-Mar-13
Sample Matrix :				Sediment	Sediment	Sediment
No.	Test Description	Unit	Technique	Results	Results	Results
<b>Total Metals</b>						
1	Antimony, Sb	mg/dry Kg	HVAAS	0.17	0.39	0.46
2	Arsenic, As	mg/dry Kg	HVAAS	9.19	9.06	9.73
3	Cadmium, Cd	mg/dry Kg	FAAS	<0.1	<0.1	<0.1
4	Chromium, Cr	mg/dry Kg	FAAS	37	15	29
5	Copper, Cu	mg/dry Kg	FAAS	7.6	10.4	19.7
6	Lead, Pb	mg/dry Kg	FAAS	6	11	15
7	Mercury, Hg	mg/dry Kg	CVAAS	0.020	0.025	0.049
8	Nickel, Ni	mg/dry Kg	FAAS	44.8	16.3	27.4
9	Selenium, Se	mg/dry Kg	HVAAS	0.01	<0.01	0.03
10	Silver, Ag	mg/dry Kg	FAAS	<0.4	<0.4	<0.4
11	Zinc, Zn	mg/dry Kg	FAAS	84.3	61.5	87.2
<b>Organic Tests</b>						
1	TPH	mg/dry Kg	GC-FID	<2	<2	<2



### QUALITY CONTROL - PRECISION

**Job Number :** EV130335  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

No	Description	Units	Laboratory Replicate		% RPD
			EV130335-06	EV130335-06 (Replicate)	
<b>Physical Tests</b>					
1	Brightness <sup>1)</sup>	m	1.1	-	-
2	Floating Matter <sup>1)</sup>	-	None	-	-
3	Odor <sup>1)</sup>	-	Odorless	-	-
4	Oil Film <sup>1)</sup>	-	None	-	-
5	pH <sup>1)</sup>	-	8.15	-	-
6	Salinity <sup>1)</sup>	‰	28.5	-	-
7	Temperature <sup>1)</sup>	°C	30.5	-	-
8	Total Suspended Solids, TSS	mg/L	15	13	14.3%
9	Turbidity	NTU	7.7	-	-
<b>Anions</b>					
1	Sulphide as H <sub>2</sub> S	mg/L	<0.002	-	-
2	Total Cyanide, CN	mg/L	<0.005	<0.005	-
<b>Nutrients</b>					
1	Ammonia, NH <sub>3</sub> -N	mg/L	<0.02	-	-
2	Nitrate, NO <sub>3</sub> -N	mg/L	0.065	0.067	3.0%
3	Total Phosphorus as P	mg/L	0.017	0.017	0.0%
<b>Dissolved Metals</b>					
1	Arsenic, As	mg/L	0.0015	0.0018	6.5%
2	Cadmium, Cd	mg/L	<0.0001	<0.0001	-
3	Chromium Hexavalent, Cr <sup>6+</sup>	mg/L	<0.002	<0.002	-
4	Copper, Cu	mg/L	<0.001	<0.001	-
5	Lead, Pb	mg/L	<0.001	<0.001	-
6	Mercury, Hg	mg/L	<0.00005	<0.00005	-
7	Nickel, Ni	mg/L	<0.001	<0.001	-
8	Zinc, Zn	mg/L	<0.005	<0.005	-

### QUALITY CONTROL - PRECISION

**Job Number :** EV130335  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season ANIDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/II/2013

No	Description	Units	Laboratory Replicate		% RPD
			EV130335-06	EV130335-06 (Replicate)	
	<b>Miscellaneous</b>				
1	Biochemical Oxygen Demand, BOD <sub>5</sub>	mg/L	<2	<2	-
2	Dissolved Oxygen, DO <sup>1)</sup>	mg/L	6.47	-	-
3	Surfactants, MBAS	mg/L	<0.01	<0.01	-
4	Oil & Grease	mg/L	<1	-	-
5	Total Phenols	mg/L	<0.001	<0.001	-
	<b>Microbiology Tests</b>				
1	Total Coliform	MPN/100ml	ND	-	-

### QUALITY CONTROL - PRECISION

**Job Number :** EV130335  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season AMDAL Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/US-EV/IV/2013

No	Description	Units	Laboratory Replicate		% RPD
			EV130302-12	EV130302-12 (Replicate)	
	<b>Total Metals</b>				
1	Antimony, Sb	mg/dry Kg	0.46	0.46	0.6%
2	Arsenic, As	mg/dry Kg	9.7	9.94	2.1%
3	Cadmium, Cd	mg/dry Kg	<0.1	<0.1	-
4	Chromium, Cr	mg/dry Kg	29	29	0.3%
5	Copper, Cu	mg/dry Kg	19.7	20.0	1.7%
6	Lead, Pb	mg/dry Kg	15	15	3.9%
7	Mercury, Hg	mg/dry Kg	0.049	0.050	2.9%
8	Nickel, Ni	mg/dry Kg	27.4	28.2	2.8%
9	Selenium, Se	mg/dry Kg	0.03	0.03	4.3%
10	Silver, Ag	mg/dry Kg	<0.4	<0.4	-
11	Zinc, Zn	mg/dry Kg	87.2	86.7	0.6%
	<b>Organic Tests</b>				
1	TPH	mg/dry Kg	<2	<2	-

### QUALITY CONTROL - ACCURACY

**Job Number :** EV130335  
**Customer :** PT ERM Indonesia  
**Project Name :** Environmental Baseline Survey Wet Season AMDAL  
 Tangguh Expansion Project BP Berau Ltd  
**Customer Ref :** 1529.r2/IUS-EV/IV/2013

No	Description	Units	Detection Limit	Blank	Reference Material		% Recovery
					Expected Value	Result	
<b>Physical Tests</b>							
1	Brightness <sup>1)</sup>	m	-	-	-	-	-
2	Floating Matter <sup>1)</sup>	-	-	-	-	-	-
3	Odor <sup>1)</sup>	-	-	-	-	-	-
4	Oil Film <sup>1)</sup>	-	-	-	-	-	-
5	pH <sup>1)</sup>	-	-	-	-	-	-
6	Salinity <sup>1)</sup>	%	-	-	-	-	-
7	Temperature <sup>1)</sup>	°C	-	-	-	-	-
8	Total Dissolved Solids, TDS	mg/L	1	<1	343	350	102%
9	Total Suspended Solids, TSS	mg/L	1	<1	73	76	104%
10	Turbidity <sup>1)</sup>	NTU	0.5	<0.5	-	-	-
<b>Anions</b>							
1	Chloride, Cl <sup>-</sup>	mg/L	0.5	<0.5	85.3	90.3	106%
2	Fluoride, F <sup>-</sup>	mg/L	0.02	<0.02	1.30	1.25	96%
3	Sulphate, SO <sub>4</sub>	mg/L	2	<2	30	29	97%
4	Sulphide, S <sup>2-</sup>	mg/L	0.002	<0.002	7.76	7.70	99%
5	Total Cyanide, CN	mg/L	0.005	<0.005	0.471	0.479	102%
<b>Nutrients</b>							
1	Ammonia, NH <sub>3</sub> -N	mg/L	0.02	<0.02	10.9	10.9	100%
2	Free Ammonia, NH <sub>3</sub> -N	mg/L	0.02	<0.02	-	-	-
3	Nitrate, NO <sub>3</sub> -N	mg/L	0.005	<0.005	4.35	4.50	103%
4	Nitrite, NO <sub>2</sub> -N	mg/L	0.001	<0.001	2.58	2.53	98%
5	Total Phosphorus as P	mg/L	0.005	<0.005	8.88	8.65	97%
<b>Microbiology Tests</b>							
1	E.Coli	MPN/100ml	1	ND	-	-	-
2	Total Coliform	MPN/100ml	1	ND	-	-	-