

To: Refinería La Pampilla S.A.A.
From: Gregory S. Douglas, Ph.D. (NewFields)
Date: August 23, 2023
Subject: Chemical Fingerprinting of samples collected in Ventanilla, Peru

This memorandum summarizes the results of forensic chemical analysis conducted on one (1) sample that was collected by Repsol contractors on August 1, 2023 (Table 1). The sample was shipped to NewFields alliance laboratory, Alpha Analytical Laboratory, Inc. (Mansfield MA) for forensic chemical analysis. The objective of the analysis was to the degree possible, identify the product type (s) present in the sample and determine if the chemical composition match that of the source oil (Table 1).

Sample and Analysis

A sample of suspected petroleum was collected by Repsol contractors in an amber glass bottle consisting of petroleum residues. Sample “GE DEL 01AGO2023” was shipped to Alpha Analytical Labs in Mansfield, MA under chain of custody (Attachment 1) and arrived at ambient temperature (21.7°C) on August 7, 2023 with a DHL Tracking # 3425612050 (Seal number 201650).

Samples were extracted using methylene chloride and diluted to volume. A portion of the extract was removed for gravimetric weight determination. A portion of the extract was removed (based on the gravimetric weight), spiked with surrogates and internal standards, and analyzed following laboratory methods that were specifically developed for forensic characterization of petroleum, as described by Douglas et.al. (2015).¹

- The samples were analyzed using a modified EPA Method 8015 gas chromatography/flame ionization detection (GC/FID) technique to generate a high resolution chromatographic “fingerprint” of hydrocarbons present in the sample. The chromatographic “fingerprint” identifies the general nature of the hydrocarbons (e.g., petroleum product type) and relative weathering state of the sample. A suite of normal and branched-chain alkanes as well as total petroleum hydrocarbons (TPH) were also measured to aid in product identification (**Table 2**). Sample results were reported on a mg/kg (oils) basis.
- The samples were also analyzed by a modified EPA Method 8270 gas chromatography/mass spectrometry (GC/MS) method operated in the selected ion monitoring (SIM) mode to quantify concentrations of 62 oil source diagnostic parent and C1-C4 alkylated PAHs (**Table 3**), and 55 sterane and triterpane petroleum biomarkers compounds (**Table 4**). These compounds provide highly specific information pertinent to the identification of petroleum or pyrogenic PAHs and their potential origin. Sample results were reported on a mg/kg (oils) basis.

¹ Douglas, G.D., Emsbo-Mattingly, S.D., Stout, S.A., Uhler, A.D., and McCarthy, K.J. (2015). Hydrocarbon fingerprinting methods. In: Introduction to Environmental Forensics, 3rd Ed., B. Murphy and R. Morrison, Eds., Academic Press, New York, pp. 201-310.



All chemical analyses were conducted following standard EPA methods for laboratory documentation, sample handling, instrument calibration, and method quality control. Quantified sample results are included in Attachment 2.

Findings

The gas chromatographic “fingerprints” of the source oil, and GE DEL 01AGO2023 (GE DEL1) are shown in Figures 1A and 1B respectively.

GC/FID Analysis

The GC/FID chromatogram for the GE DEL1 sample (Figure 1B), shows the sample contains a broad C₁₅ – C₄₄ range material consisting of resolved n-alkanes and an unresolved complex mixture (UCM) which appears as a “hump” in the chromatogram. This sample is slightly/moderately weathered due to evaporation and biodegradation as indicated by the absence of the more volatile alkanes (C₈ -C₁₄) compared to the source oil (Figure 1A). There is a noticeable difference in the pristane/phytane source ratio in GE DEL1 versus the source oil. The petroleum GC/FID signature is consistent with a slightly/moderately weathered crude or heavy fuel oil.

GC/MS Alkylated PAH and Biomarker Analysis

The PAH and biomarker molecular chemistry was evaluated to determine if there was evidence for a chemical linkage between the source oil and the GE DEL1 sample. GC/MS analysis of PAH and biomarker compounds is approximately 10 times more sensitive than the GC/FID analysis and provides source diagnostic weathering resistant chromatographic “fingerprints” of the samples.

Qualitative comparison of the PAH histograms for the source oil, and the GE DEL1 sample are provided in Figures 2A and 2B respectively. The PAH histogram for the GE DEL1 sample (Figure 2B) shows this sample slightly/moderately weathered as indicated by the absence of decalins and the lower abundance of naphthalenes compared to the source oil. The proportion of alkylated dibenzothiophenes and naphthobenzothiophenes to phenanthrenes (Figure 2B) indicates the presence of a higher sulfur fuel in GE DEL1 than the source oil which is evidence that this sample was derived from a different source of petroleum.

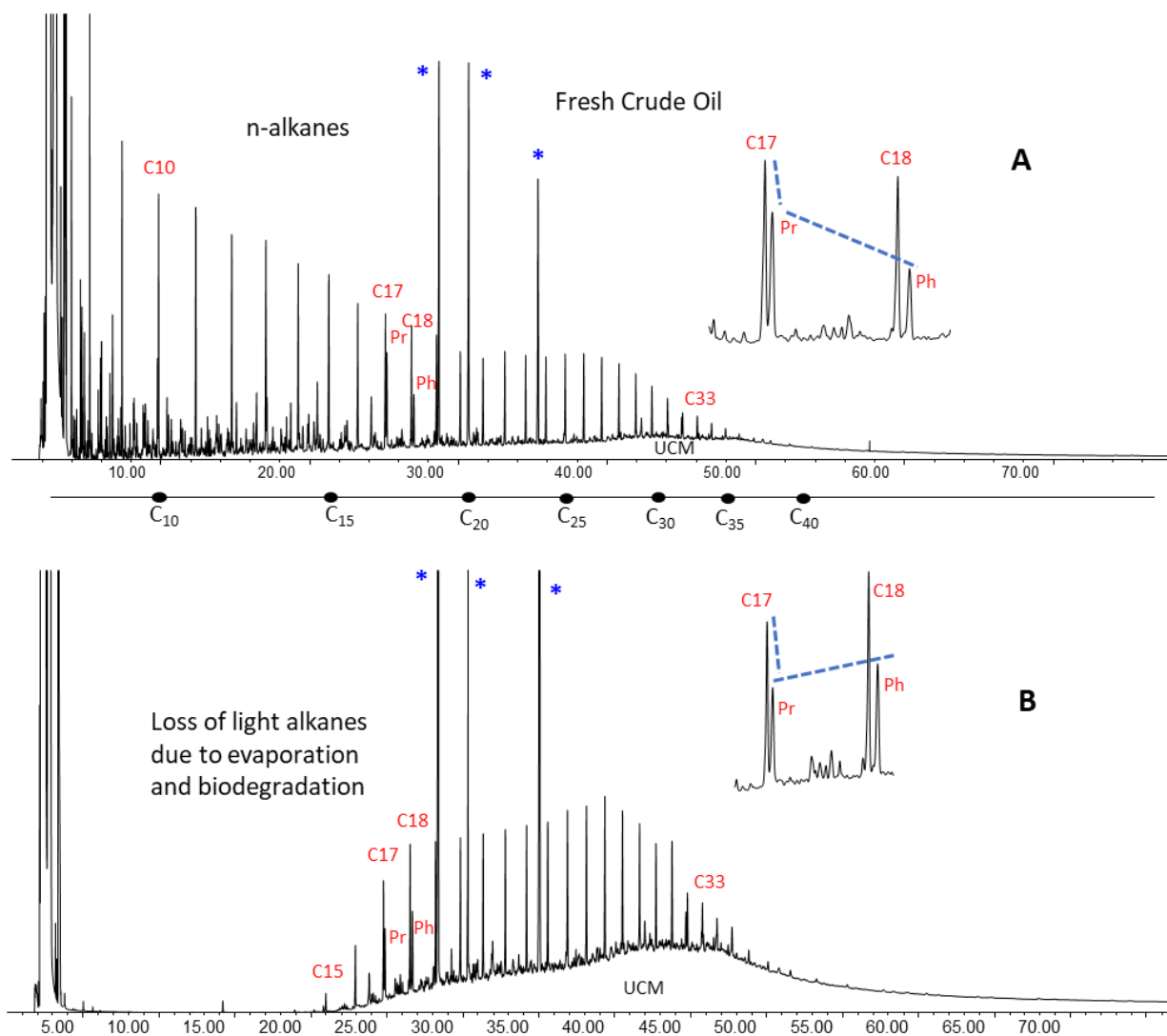
Figure 3 is a double source ratio plot of sulfur containing alkyl-dibenzothiophenes to alkyl-phenanthrenes (C2-dibenzothiophenes/C2-phenanthrenes [D2/P2] versus C3-dibenzothiophenes/C3-phenanthrenes [D3/P3]). Differences in this ratio are a function of crude oil source and refinery processing.² The source oil, and the GE DEL1 sample plot away from each other indicating a different source of petroleum.

The biomarker triterpene m/z 191 ion traces for the source oil and the GE DEL1 sample are presented in Figures 4A and 4B respectively. The biomarker traces for GE DEL1 show similarities, however the presence of oleanane (T18) in GE DEL1, a compound not observed in the source oil, is evidence that this sample is derived from a different source of petroleum. In addition, there are differences in the relative amount of gammacerane (T22A) and the triaromatic steroids presented in the m/z 231 ion biomarker traces for the source oil and GE DEL1 (Figures 5A and 5B) further indicating the two samples are derived from a different source.

² Douglas, G.S. et al. (1996) Environmental stability of selected petroleum hydrocarbon source and weathering ratios. Environ. Sci. Technol. 30: 2332-2339.

**Conclusion**

The GE DEL 01AGO2023 sample consists of a slightly/moderately weathered crude or heavy oil. Although there are some similarities, the GC/FID, PAH and biomarker analysis indicate the petroleum detected in the GE DEL 01AGO2023 sample is chemically different and was derived from a different source of petroleum.



**Figure 1. GC/FID “fingerprints” for the field samples.
Carbon ranges annotated below the x-axis analysis time scale.**

A) Ship’s Tanks Composite Sample

B) GE DEL 01AGO2023

“*”: Laboratory-added Internal Standard

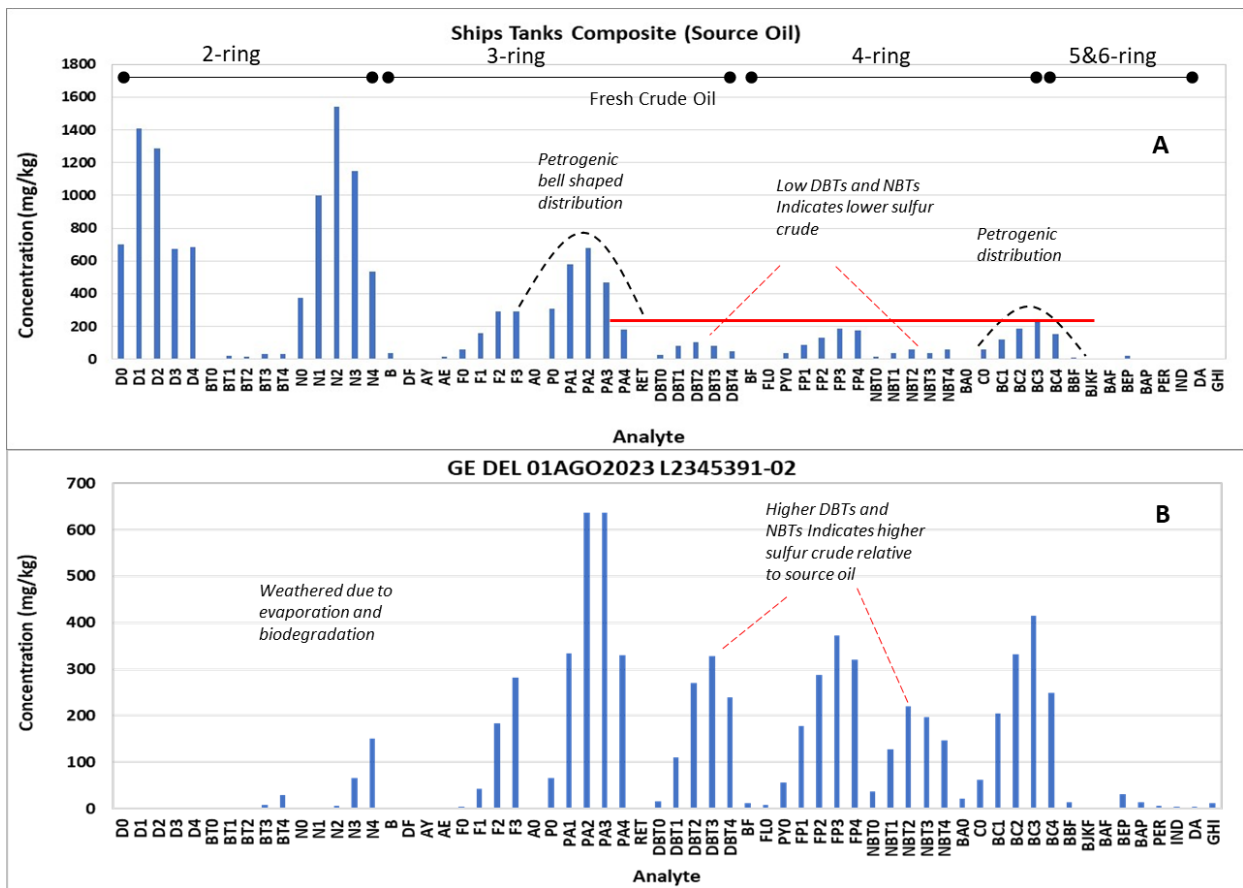


Figure 2. PAH Histograms
A) Ship's Tanks Composite Sample
B) GE DEL 01AGO2023

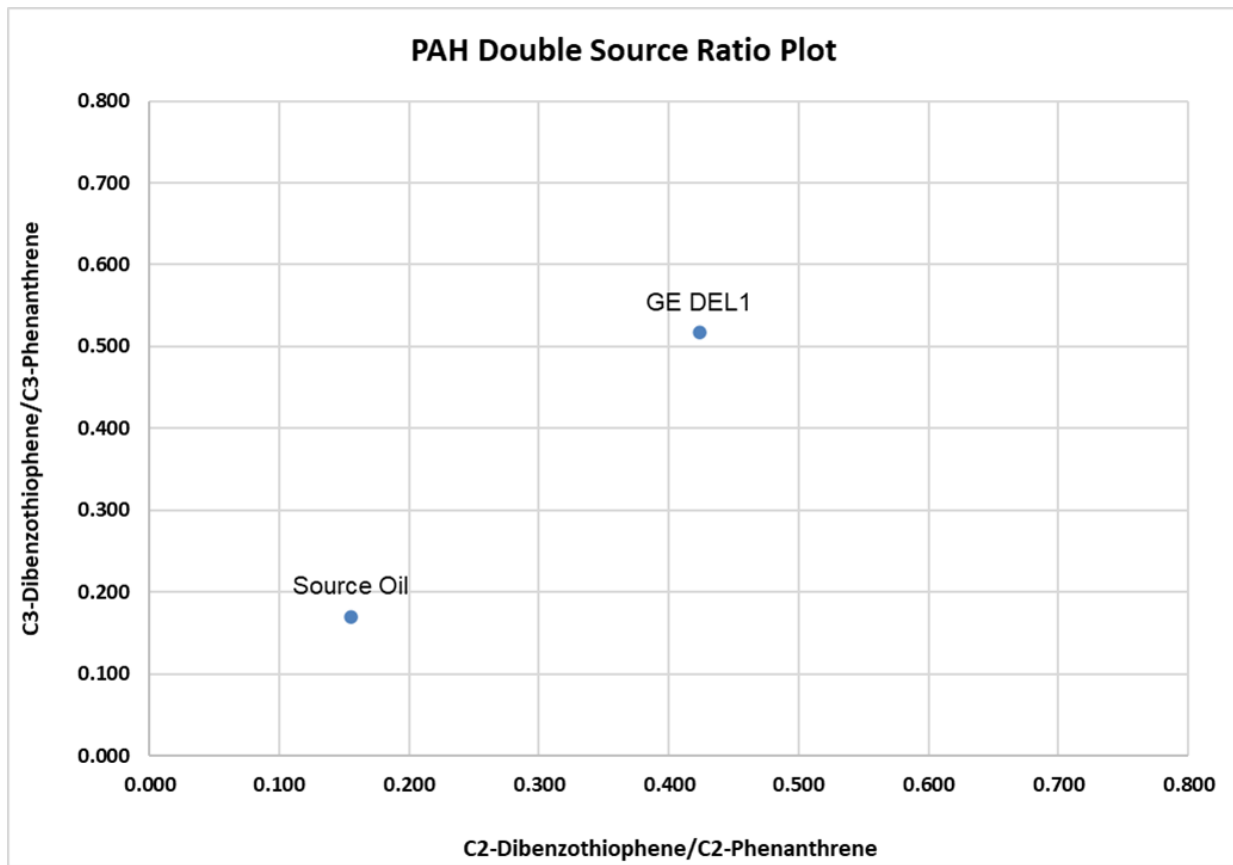


Figure 3. PAH Double Source Ratio Plot

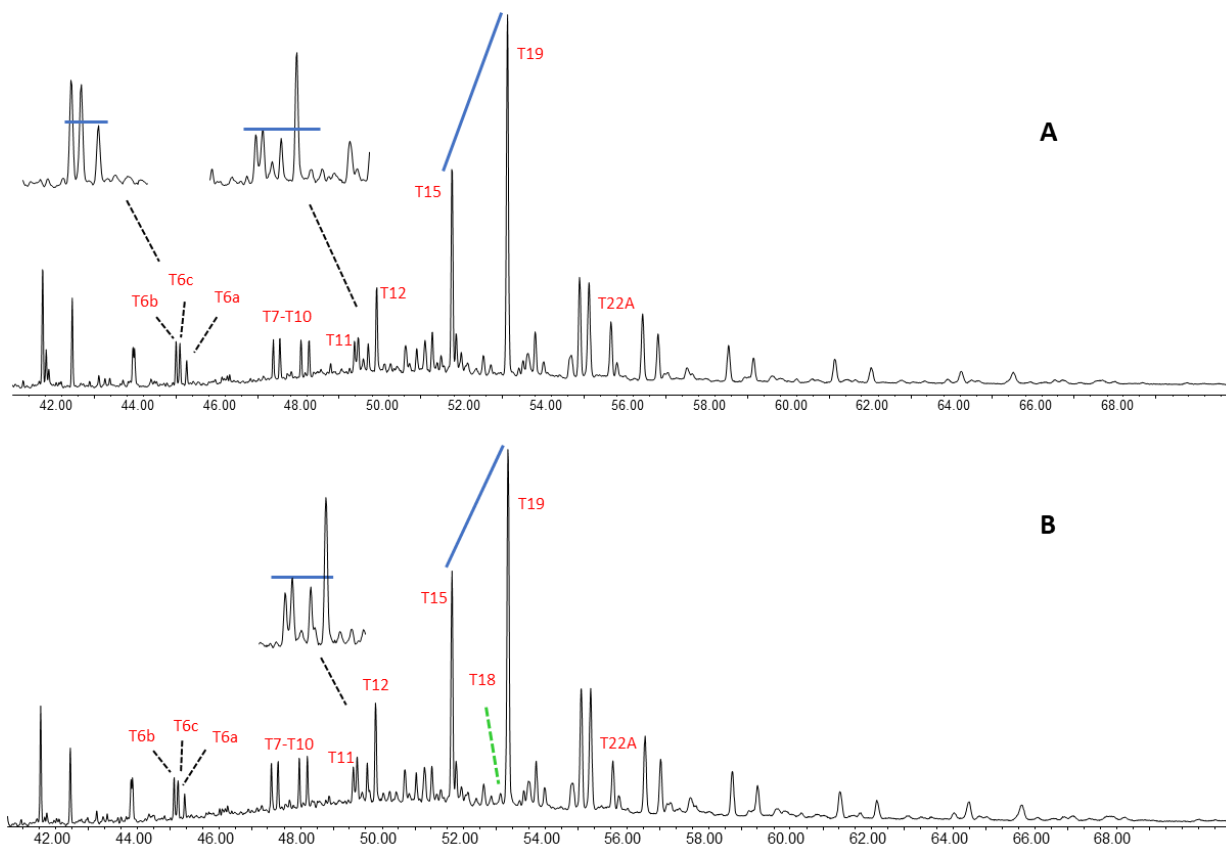


Figure 4. Biomarker m/z 191 Triterpane Fingerprint Traces

A) Ship's Tanks Composite Sample

B) GE DEL 01AGO2023

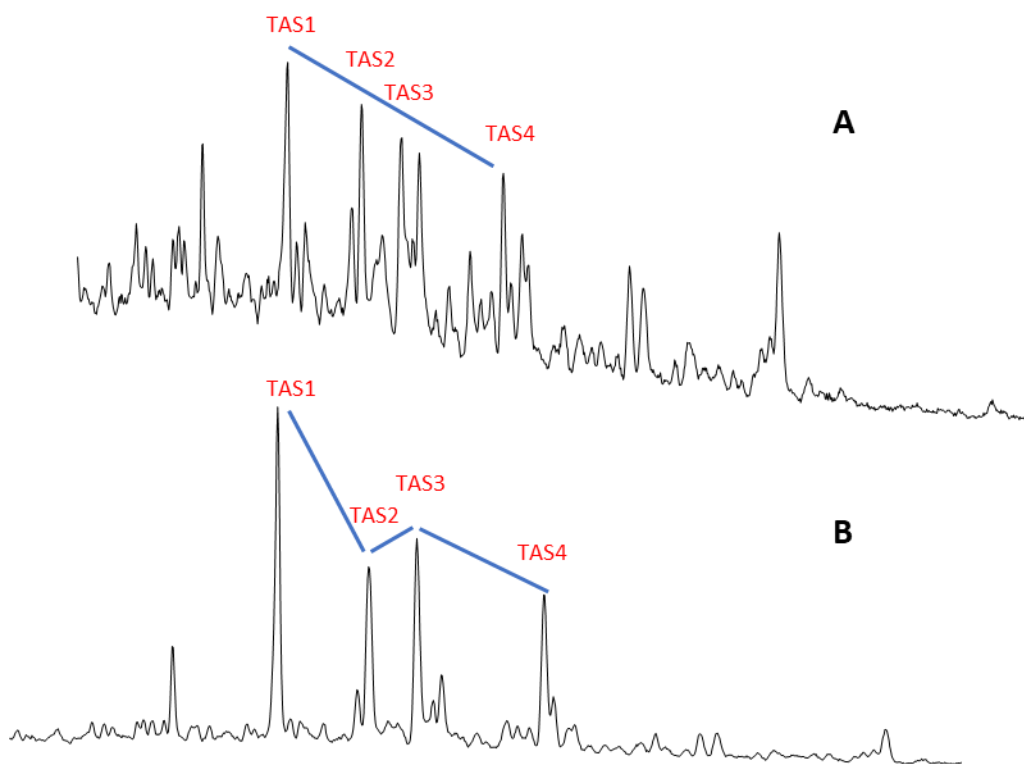


Figure 5. Biomarker m/z 231 Triaromatic Steroid Fingerprint Traces
A) Ship's Tanks Composite Sample
B) GE DEL 01AGO2023



Table 1. Sample List.

Field ID	Lab ID	Collection Date	Matrix	Collected by
Ship's Tanks Composite Sample	L2223310-01	01/14/2022	Source Oil	Repsol Contractor
GE DEL 01AGO2023	L2345391-02	8/1/2023	Glob	Repsol Contractor



Table 2. n-Alkane and branched chain alkane target compounds.

Abbrev	Analytes
C9	n-Nonane (C ₉)
C10	n-Decane (C ₁₀)
C11	n-Undecane (C ₁₁)
C12	n-Dodecane (C ₁₂)
C13	n-Tridecane (C ₁₃)
1380	2,6,10 Trimethyldodecane (1380)
C14	n-Tetradecane (C ₁₄)
1470	2,6,10 Trimethyltridecane (1470)
C15	n-Pentadecane (C ₁₅)
C16	n-Hexadecane (C ₁₆)
1650	Norpristane (1650)
C17	n-Heptadecane (C ₁₇)
Pr	Pristane
C18	n-Octadecane (C ₁₈)
Ph	Phytane
C19	n-Nonadecane (C ₁₉)
C20	n-Eicosane (C ₂₀)
C21	n-Heneicosane (C ₂₁)
C22	n-Docosane (C ₂₂)
C23	n-Tricosane (C ₂₃)
C24	n-Tetracosane (C ₂₄)
C25	n-Pentacosane (C ₂₅)
C26	n-Hexacosane (C ₂₆)
C27	n-Heptacosane (C ₂₇)
C28	n-Octacosane (C ₂₈)
C29	n-Nonacosane (C ₂₉)
C30	n-Triacontane (C ₃₀)
C31	n-Hentriacontane (C ₃₁)
C32	n-Dotriacontane (C ₃₂)
C33	n-Tritriacontane (C ₃₃)
C34	n-Tetratriacontane (C ₃₄)
C35	n-Pentatriacontane (C ₃₅)
C36	n-Hexatriacontane (C ₃₆)
C37	n-Heptatriacontane (C ₃₇)
C38	n-Octatriacontane (C ₃₈)
C39	n-Nonatriacontane (C ₃₉)
C40	n-Tetracontane (C ₄₀)
TPH	Total Petroleum Hydrocarbons (C9-C44)
TSH	Total Saturated Hydrocarbons



Table 3. PAH and alkyl-PAH Target Compound List

Abbrev	Analytes	Abbrev	Analytes
D0	cis/trans-Decalin	FP1	C1-Fluoranthenes/Pyrenes
D0	cis/trans-Decalin	FP2	C2-Fluoranthenes/Pyrenes
D1	C1-Decalins	FP3	C3-Fluoranthenes/Pyrenes
D2	C2-Decalins	FP4	C4-Fluoranthenes/Pyrenes
D3	C3-Decalins	NBT0	Naphthobenzothiophenes
D4	C4-Decalins	NBT1	C1-Naphthobenzothiophenes
BT0	Benzo(b)thiophene	NBT2	C2-Naphthobenzothiophenes
BT1	C1-Benzo(b)thiophenes	NBT3	C3-Naphthobenzothiophenes
BT2	C2-Benzo(b)thiophenes	NBT4	C4-Naphthobenzothiophenes
BT3	C3-Benzo(b)thiophenes	BA0	Benz[a]anthracene
BT4	C4-Benzo(b)thiophenes	C0	Chrysene/Triphenylene
N0	Naphthalene	BC1	C1-Chrysenes
N1	C1-Naphthalenes	BC2	C2-Chrysenes
N2	C2-Naphthalenes	BC3	C3-Chrysenes
N3	C3-Naphthalenes	BC4	C4-Chrysenes
N4	C4-Naphthalenes	BBF	Benzo[b]fluoranthene
B	Biphenyl	BJKF	Benzo[k]fluoranthene
DF	Dibenzofuran	BAF	Benzo[a]fluoranthene
AY	Acenaphthylene	BEP	Benzo[e]pyrene
AE	Acenaphthene	BAP	Benzo[a]pyrene
F0	Fluorene	PER	Perylene
F1	C1-Fluorenes	IND	Indeno[1,2,3-cd]pyrene
F2	C2-Fluorenes	DA	Dibenz[a,h]anthracene
F3	C3-Fluorenes	GHI	Benzo[g,h,i]perylene
A0	Anthracene	CAR	Carbazole
P0	Phenanthrene	4MDT	4-Methyldibenzthiophene
PA1	C1-Phenanthrenes/Anthracenes	2DMT	2/3-Methyldibenzothiophene
PA2	C2-Phenanthrenes/Anthracenes	1DMT	1-Methyldibenzothiophene
PA3	C3-Phenanthrenes/Anthracenes	3MP	3-Methylphenanthrene
PA4	C4-Phenanthrenes/Anthracenes	2MP	2-Methylphenanthrene
RET	Retene	2MA	2-Methylanthracene
DBT0	Dibenzothiophene	9MP	9/4-Methylphenanthrene
DBT1	C1-Dibenzothiophenes	1MP	1-Methylphenanthrene
DBT2	C2-Dibenzothiophenes	1MN	1-Methylnaphthalene
DBT3	C3-Dibenzothiophenes	2MN	2-Methylnaphthalene
DBT4	C4-Dibenzothiophenes	26DMN	2,6-Dimethylnaphthalene
BF	Benzo(b)fluorene	235TMN	2,3,5-Trimethylnaphthalene
FLO	Fluoranthene		
PY0	Pyrene		



Table 4. Triterpane and Sterane Biomarker Target Compound List.

Abbrev	Analytes	Abbrev	Analytes
T4	C23 Tricyclic Terpane	S4	13b(H),17a(H)-20S-Diacholestane
T5	C24 Tricyclic Terpane	S5	13b(H),17a(H)-20R-Diacholestane
T6	C25 Tricyclic Terpane	S8	13b,17a-20S-Methylcholestane
T6a	C24 Tetracyclic Terpane	S12	14a(H),17a(H)-20S-Cholestane
T6b	C26 Tricyclic Terpane-22S	S17	14a(H),17a(H)-20R-Cholestane
T6c	C26 Tricyclic Terpane-22R	S18	13b,17a-20R-Ethylcholestane
T7	C28 Tricyclic Terpane-22S	S19	13a,17b-20S-Ethylcholestane
T8	C28 Tricyclic Terpane-22R	S20	14a,17a-20S-Methylcholestane
T9	C29 Tricyclic Terpane-22S	S24	14a,17a-20R-Methylcholestane
T10	C29 Tricyclic Terpane-22R	S25	14a(H),17a(H)-20S-Ethylcholestane
T11	18a-22,29,30-Trisnorneohopane-TS	S28	14a(H),17a(H)-20R-Ethylcholestane
T11a	C30 Tricyclic Terpane-22S	S14	14b(H),17b(H)-20R-Cholestane
T11b	C30 Tricyclic Terpane-22R	S15	14b(H),17b(H)-20S-Cholestane
T12	17a(H)-22,29,30-Trisnorhopane-TM	S22	14b,17b-20R-Methylcholestane
T14a	17a/b,21b/a 28,30-Bisnorhopane	S23	14b,17b-20S-Methylcholestane
T14b	17a(H),21b(H)-25-Norhopane	S26	14b(H),17b(H)-20R-Ethylcholestane
T15	30-Norhopane	S27	14b(H),17b(H)-20S-Ethylcholestane
T16	18a(H)-30-Norneohopane-C29Ts	RC26/SC27TA	C26,20R- +C27,20S- triaromatic steroid
X	17a(H)-Diahopane	SC28TA	C28,20S-triaromatic steroid
T17	30-Normoretane	RC27TA	C27,20R-triaromatic steroid
T18	18a(H)&18b(H)-Oleananes	RC28TA	C28,20R-triaromatic steroid
T19	Hopane		
T20	Moretane		
T21	30-Homohopane-22S		
T22	30-Homohopane-22S		
T22A	Gammarcerane/C32-Diahopane		
T26	30,31-Bishomohopane-22S		
T27	30,31-Bishomohopane-22R		
T30	30,31-Trishomohopane-22S		
T31	30,31-Trishomohopane-22R		
T32	Tetrakishomohopane-22S		
T33	Tetrakishomohopane-22R		
T34	Pentakishomohopane-22S		
T35	Pentakishomohopane-22R		

Attachment 1
Chain of Custody

8/7/23

L2345391
Nº 007206



CADENA DE CUSTODIA
(Registro de Campo -Toma de muestra de aguas, suelos, lodos y sedimentos)

SOLICITANTE: **REFINERIA LA PAMPILLA S.A.A**

LUGAR: **PIÑA DELFINES**

Distrito: **Ventanilla**

Provincia: **CALLAO**

Departamento:

PERSONA DE CONTACTO:

José Arturo Puzajc

Página 1 de 1

EXPEDIENTE: **EXMA-10434-2023**

HS: **23006012**

JOB NUMBER:

- 1. SMO-205 - APM - APM - REV. 2016 Ed. 2017. Collection and preservation of samples Part
- 2. Instrucción 0061 Toma de muestras de sedimentos ()
- 3. NTP 214.005 - 1987 (Revisada el 2019) Agua Potable. Toma de muestra (CSMA.4)
- 4. NMF 271-2020-PRODUCE. Protocolo para el monitoreo de afluentes de los establecimientos industriales propuestos de contacto hídrico directo a ríos.
- 5. NTP 010-2016-AMA. Protocolo nacional para el monitoreo de la calidad de los recursos hídricos superficiales
- 6. NTP 60-0807-12-2012 (Revisada el 2016) Calidad de agua. Muestreo. Parte 01 - Guía para el muestreo de aguas residuales
- 7. NTP 214.005.2016 AGUAS RESIDUALES. Protocolo de muestreo de aguas residuales no domésticas que se descargan en la red de alcantarillado
- 8. NMF 273-2013-PRODUCE. Protocolo de muestreo de la calidad de los afluentes de las plantas de tratamiento de aguas residuales domésticas e industriales. PPAE
- 9. NMF 006-2014-ANAM. Guía para el muestreo de aguas
- 10. Protocolo de muestreo de calidad de agua en sector hidrocarburífero DGAEE-ES
- 11. Otros:

PARÁMETROS DE ANÁLISIS EN EL LABORATORIO

PARÁMETROS DE ANÁLISIS EN EL LABORATORIO		PARÁMETROS DE CAMPO	
PH (Unidades de pH)	Temperatura Ambiental (°C)	Temperatura (°C)	Conductividad (µS/cm) ()
Conductividad (µS/cm)	Salinidad (PSU)	Cloro residual mg Cl ₂ /L Libre () Total ()	Turbiedad (UNT)
		Caudal (m ³ /s)	

FINGERPRINT

DESCRIPCIÓN DE LA MUESTRA

PUNTO DE LA TOMA DE MUESTRA	MUESTREO		MATRIZ (1)	GEOREFERENCIA (UTM WGS84)		ALTITUD (M.S.N.M)	CANTIDAD DE ENVASES
	FECHA	HORA		ESTE (m)	NORTE (m)		
GE DEL 01AG02023	01.08.23	10:50	*	0263299	8689223	18L	01
Total de Envases							01

45391
-02

- (1) Matriz (s)
- AC = Agua para uso y consumo humano
- AN = Agua Natural
- AP = Agua de proceso
- ASAL = Agua Salina
- AR = Agua Residual
- SM = Sedimento
- SU = Suelo
- Otro **X**

Condiciones de las muestras:		Equipos Utilizados	
Temperatura ambiente () Refrigerada <input checked="" type="checkbox"/> Congelada () Caja conservadora <input checked="" type="checkbox"/>	Hermeticamente cerrada <input checked="" type="checkbox"/> Ice pack <input checked="" type="checkbox"/> Hielo de calidad potable ()	Equipo	Código
		GPS	SIN 6SE 051691

Observaciones: **Se procedió a llegar al punto de muestreo indicado y denominado por el representante del cliente, quien estuvo presente durante el muestreo. Se realizó el procedimiento de caracterización de la muestra, la cual presenta una coloración oscura (negra) y olor a hidrocarburos. La muestra fue prelevada en campo en presencia del representante del cliente N. Puzajc, 201650. Se tomaron coordenadas en situ.**

Responsable de la toma de muestra:
 Firma: *[Signature]*
 Inspector Cooper: **José Antonio**
 Inspectores de apoyo: **Goberto Anarques**
 Hora de término: **11:30**

Representante del cliente
 Rec: *[Signature]* **8/7/23 0954**
 Recepción de muestras
 Firma: *[Signature]*
 Nombre: **Arturo Puzajc Aguilera**
 DNI: **47498855**
 Cargo: **Coordinador (P.Y.S)**

Nombre: **Lenar Vidal #**
 Fecha: **02-08-2023**
 Hora: **12:57 PM**



Attachment 2

Analytical Data

Project Name: PAMPILLA 2
 Project Number:

Client ID GE DEL 01AGO2023
 Lab ID L2345391-02
 Matrix SOLID
 Matrix Description
 Reference Method 8015D(M)
 Batch ID WG1816944
 Date Collected 8/1/2023
 Date Received 8/7/2023
 Date Prepped 8/17/2023
 Date Analyzed 8/19/2023
 Sample Size(wet) 0.00441 g
 % Solid 100
 File ID F18081823029
 Units mg/kg
 Final Volume 1
 Dilution 1
 Reporting Limit 227

Class	Abbrev	Analytes	Result	SSRL
SHC	C9	NONANE (C9)	U	227
SHC	C10	DECANE (C10)	3.63 J	227
SHC	C11	UNDECANE	6.58 J	227
SHC	C12	DODECANE (C12)	10.4 J	227
SHC	C13	TRIDECANE	11.6 J	227
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	6.58 J	227
SHC	C14	TETRADECANE (C14)	44.9 J	227
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	69.6 J	227
SHC	C15	PENTADECANE (C15)	334	227
SHC	C16	HEXADECANE (C16)	1170	227
SHC	1650	NORPRISTANE (1650)	734	227
SHC	C17	HEPTADECANE (C17)	2040	227
SHC	Pr	PRISTANE	1630	227
SHC	C18	OCTADECANE (C18)	2460	227
SHC	Ph	PHYTANE	1920	227
SHC	C19	NONADECANE (C19)	2400	227
SHC	C20	EICOSANE (C20)	2490	227
SHC	C21	HENEICOSANE (C21)	2500	227
SHC	C22	DOCOSANE (C22)	2400	227
SHC	C23	TRICOSANE (C23)	2340	227
SHC	C24	TETRACOSANE (C24)	2440	227
SHC	C25	PENTACOSANE (C25)	2770	227
SHC	C26	HEXACOSANE (C26)	2790	227
SHC	C27	HEPTACOSANE (C27)	2670	227
SHC	C28	OCTACOSANE (C28)	2330	227
SHC	C29	NONACOSANE (C29)	2470	227
SHC	C30	TRIACONTANE (C30)	1760	227
SHC	C31	HENTATRIACONTANE (C31)	1820	227
SHC	C32	DOTRIACONTANE (C32)	988	227
SHC	C33	TRITRIACONTANE (C33)	771	227
SHC	C34	TETRATRIACONTANE (C34)	702	227
SHC	C35	PENTATRIACONTANE (C35)	793	227
SHC	C36	HEXATRIACONTANE (C36)	334	227
SHC	C37	HEPTATRIACONTANE (C37)	279	227
SHC	C38	OCTATRIACONTANE (C38)	288	227
SHC	C39	NONATRIACONTANE (C39)	142 J	227
SHC	C40	TETRACONTANE (C40)	146 J	227
		TOTAL PETROLEUM HYDROCARBONS		
SHC	TPH	(C9-C44)	626000	7480
SHC	TSH	TOTAL SATURATED HYDROCARBONS	46100 J	227

Surrogates (% Recovery)
 O-TERPHENYL 108
 D50-TETRACOSANE 105

Project Name: PAMPILLA 2
 Project Number:

Client ID	Laboratory Method BI
Lab ID	WG1816944-1
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1816944
Date Collected	NA
Date Received	8/17/2023
Date Prepped	8/17/2023
Date Analyzed	8/18/2023
Sample Size(wet)	0.00424 g
% Solid	100
File ID	F18081823011
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	236

Class	Abbrev	Analytes	Result	SSRL
SHC	C9	NONANE (C9)	U	236
SHC	C10	DECANE (C10)	U	236
SHC	C11	UNDECANE	U	236
SHC	C12	DODECANE (C12)	U	236
SHC	C13	TRIDECANE	U	236
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	U	236
SHC	C14	TETRADECANE (C14)	U	236
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	U	236
SHC	C15	PENTADECANE (C15)	U	236
SHC	C16	HEXADECANE (C16)	U	236
SHC	1650	NORPRISTANE (1650)	U	236
SHC	C17	HEPTADECANE (C17)	U	236
SHC	Pr	PRISTANE	U	236
SHC	C18	OCTADECANE (C18)	U	236
SHC	Ph	PHYTANE	U	236
SHC	C19	NONADECANE (C19)	U	236
SHC	C20	EICOSANE (C20)	U	236
SHC	C21	HENEICOSANE (C21)	U	236
SHC	C22	DOCOSANE (C22)	U	236
SHC	C23	TRICOSANE (C23)	U	236
SHC	C24	TETRACOSANE (C24)	U	236
SHC	C25	PENTACOSANE (C25)	U	236
SHC	C26	HEXACOSANE (C26)	U	236
SHC	C27	HEPTACOSANE (C27)	U	236
SHC	C28	OCTACOSANE (C28)	U	236
SHC	C29	NONACOSANE (C29)	214 J	236
SHC	C30	TRIACONTANE (C30)	U	236
SHC	C31	HENTATRIACONTANE (C31)	U	236
SHC	C32	DOTRIACONTANE (C32)	U	236
SHC	C33	TRITRIACONTANE (C33)	U	236
SHC	C34	TETRATRIACONTANE (C34)	U	236
SHC	C35	PENTATRIACONTANE (C35)	U	236
SHC	C36	HEXATRIACONTANE (C36)	U	236
SHC	C37	HEPTATRIACONTANE (C37)	U	236
SHC	C38	OCTATRIACONTANE (C38)	U	236
SHC	C39	NONATRIACONTANE (C39)	U	236
SHC	C40	TETRACONTANE (C40)	U	236
		TOTAL PETROLEUM HYDROCARBONS		
SHC	TPH	(C9-C44)	U	7780
SHC	TSH	TOTAL SATURATED HYDROCARBONS	214 J	236

Surrogates (% Recovery)	
O-TERPHENYL	108
D50-TETRACOSANE	104

Project Name: PAMPILLA 2
Project Number:

Client ID Laboratory Control S
Lab ID WG1816944-2
Matrix SOLID
Matrix Description
Reference Method 8015D(M)
Batch ID WG1816944
Date Collected NA
Date Received 8/17/2023
Date Prepped 8/17/2023
Date Analyzed 8/18/2023
Sample Size(wet) 0.00424 g
% Solid 100
File ID f18081823015
Units %
Final Volume 1
Dilution 1
Reporting Limit 236

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	NONANE (C9)	4880	236	103	4720	50	130
SHC	C10	DECANE (C10)	4910	236	104	4720	50	130
SHC	C12	DODECANE (C12)	5010	236	106	4720	50	130
SHC	C14	TETRADECANE (C14)	4880	236	103	4720	50	130
SHC	C16	HEXADECANE (C16)	5320	236	113	4720	50	130
SHC	C18	OCTADECANE (C18)	5220	236	111	4720	50	130
SHC	C19	NONADECANE (C19)	4860	236	103	4720	50	130
SHC	C20	EICOSANE (C20)	4810	236	102	4720	50	130
SHC	C22	DOCOSANE (C22)	4750	236	101	4720	50	130
SHC	C24	TETRACOSANE (C24)	4980	236	106	4720	50	130
SHC	C26	HEXACOSANE (C26)	4790	236	102	4720	50	130
SHC	C28	OCTACOSANE (C28)	4630	236	98	4720	50	130
SHC	C30	TRIACONTANE (C30)	4650	236	98	4720	50	130
SHC	C36	HEXATRIACONTANE (C36)	4120	236	87	4720	50	130

Surrogates (% Recovery)
O-TERPHENYL 110
D50-TETRACOSANE 106

Project Name: PAMPILLA 2
 Project Number:

Client ID LCS Duplicate
 Lab ID WG1816944-3
 Matrix SOLID
 Matrix Description
 Reference Method 8015D(M)
 Batch ID WG1816944
 Date Collected NA
 Date Received 8/17/2023
 Date Prepped 8/17/2023
 Date Analyzed 8/18/2023
 Sample Size(wet) 0.00424 g
 % Solid 100
 File ID f18081823017
 Units %
 Final Volume 1
 Dilution 1
 Reporting Limit 236

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
SHC	C9	NONANE (C9)	4900	236	104	4720	50	130	1	30
SHC	C10	DECANE (C10)	4750	236	101	4720	50	130	3	30
SHC	C12	DODECANE (C12)	4990	236	106	4720	50	130	0	30
SHC	C14	TETRADECANE (C14)	4860	236	103	4720	50	130	0	30
SHC	C16	HEXADECANE (C16)	5310	236	112	4720	50	130	1	30
SHC	C18	OCTADECANE (C18)	5220	236	111	4720	50	130	0	30
SHC	C19	NONADECANE (C19)	4860	236	103	4720	50	130	0	30
SHC	C20	EICOSANE (C20)	4810	236	102	4720	50	130	0	30
SHC	C22	DOCOSANE (C22)	4760	236	101	4720	50	130	0	30
SHC	C24	TETRACOSANE (C24)	4980	236	106	4720	50	130	0	30
SHC	C26	HEXACOSANE (C26)	4810	236	102	4720	50	130	0	30
SHC	C28	OCTACOSANE (C28)	4640	236	98	4720	50	130	0	30
SHC	C30	TRIACONTANE (C30)	4650	236	99	4720	50	130	1	30
SHC	C36	HEXATRIACONTANE (C36)	4120	236	87	4720	50	130	0	30

Surrogates (% Recovery)
 O-TERPHENYL 109
 D50-TETRACOSANE 106

Project Name: PAMPILLA 2
 Project Number:

Client ID Alaska North Slope Crude
 Lab ID WG1762020-1
 Matrix OIL
 Matrix Description Crude Oil
 Reference Method 1,8015D(M)-A2-NFSHC
 Batch ID WG1762020-1
 Date Collected N/A
 Date Received N/A
 Date Prepped N/A
 Date Analyzed 3/29/2023
 Sample Size(wet) 0.10176 g
 % Solid 100
 File ID F18032823029
 Units mg/kg
 Final Volume 10
 Dilution 1
 Reporting Limit 0.983

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	NONANE (C9)	6880	0.983	109	6286	65	135
SHC	C10	DECANE (C10)	5560	0.983	110	5047	65	135
SHC	C11	UNDECANE	5120	0.983	109	4703	65	135
SHC	C12	DODECANE (C12)	4740	0.983	114	4155	65	135
SHC	C13	TRIDECANE	4380	0.983	108	4058	65	135
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	1000	0.983	118	845	65	135
SHC	C14	TETRADECANE (C14)	3960	0.983	108	3670	65	135
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	1480	0.983	108	1367	65	135
SHC	C15	PENTADECANE (C15)	3910	0.983	107	3660	65	135
SHC	C16	HEXADECANE (C16)	3500	0.983	105	3330	65	135
SHC	1650	NORPRISTANE (1650)	1190	0.983	109	1093	65	135
SHC	C17	HEPTADECANE (C17)	3040	0.983	101	3012	65	135
SHC	Pr	PRISTANE	2400	0.983	112	2145	65	135
SHC	C18	OCTADECANE (C18)	2700	0.983	100	2700	65	135
SHC	Ph	PHYTANE	1450	0.983	119	1215	65	135
SHC	C19	NONADECANE (C19)	2580	0.983	112	2305	65	135
SHC	C20	EICOSANE (C20)	2540	0.983	109	2337	65	135
SHC	C21	HENEICOSANE (C21)	2240	0.983	110	2044	65	135
SHC	C22	DOCOSANE (C22)	2120	0.983	108	1972	65	135
SHC	C23	TRICOSANE (C23)	1920	0.983	110	1745	65	135
SHC	C24	TETRACOSANE (C24)	1820	0.983	111	1641	65	135
SHC	C25	PENTACOSANE (C25)	1750	0.983	112	1562	65	135
SHC	C26	HEXACOSANE (C26)	1520	0.983	110	1378	65	135
SHC	C27	HEPTACOSANE (C27)	1180	0.983	109	1083	65	135
SHC	C28	OCTACOSANE (C28)	840	0.983	108	776	65	135
SHC	C29	NONACOSANE (C29)	817	0.983	111	734	65	135
SHC	C30	TRIACONTANE (C30)	652	0.983	104	627	65	135
SHC	C31	HENTATRIACONTANE (C31)	549	0.983	107	514	65	135
SHC	C32	DOTRIACONTANE (C32)	565	0.983	123	458	65	135
SHC	C33	TRITRIACONTANE (C33)	330	0.983	85	388	65	135
SHC	C34	TETRATRIACONTANE (C34)	313	0.983	90	347	65	135
SHC	C35	PENTATRIACONTANE (C35)	282	0.983	101	278	65	135
SHC	C36	HEXATRIACONTANE (C36)	157	0.983	84	186	65	135
SHC	C37	HEPTATRIACONTANE (C37)	150	0.983	99	152	65	135
SHC	C38	OCTATRIACONTANE (C38)	130	0.983	99	131	65	135
SHC	C39	NONATRIACONTANE (C39)	85.2	0.983	96	89	65	135
SHC	C40	TETRACONTANE (C40)	81.4	0.983	88	92	65	135
		TOTAL PETROLEUM HYDROCARBONS						
SHC	TPH	(C9-C44)	586000	0.983	106	554993	65	135
SHC	TSH	TOTAL SATURATED HYDROCARBONS	83312	0.983	122	68122	65	135

Project Name: PAMPILLA 2
 Project Number:

Client ID GE DEL 01AGO2023
 Lab ID L2345391-02
 Matrix SOLID
 Matrix Description
 Reference Method 8270E-SIM(M)
 Batch ID WG1816944
 Date Collected 8/1/2023
 Date Received 8/7/2023
 Date Prepped 8/17/2023
 Date Analyzed 8/21/2023
 Sample Size(wet) 0.00441 g
 % Solid 100
 File ID F908202323
 Units mg/kg
 Final Volume 1
 Dilution 1
 Reporting Limit 1.13

Class	Abbrev	Analytes	Result	SSRL
2	D0	CIS/TRANS-DECALIN	0.440 J	1.13
2	D1	C1-DECALINS	2.26 J	2.27
2	D2	C2-DECALINS	U	2.27
2	D3	C3-DECALINS	U	2.27
2	D4	C4-DECALINS	U	2.27
S	BT0	BENZOTHIOPHENE	U	2.27
2	BT1	C1-BENZO(B)THIOPHENES	U	2.27
2	BT2	C2-BENZO(B)THIOPHENES	1.51 J	2.27
2	BT3	C3-BENZO(B)THIOPHENES	8.13	2.27
2	BT4	C4-BENZO(B)THIOPHENES	29.9	2.27
A	N0	NAPHTHALENE	0.430 JB	2.27
2	N1	C1-NAPHTHALENES	0.889 J	2.27
2	N2	C2-NAPHTHALENES	5.78	2.27
2	N3	C3-NAPHTHALENES	65.3	2.27
2	N4	C4-NAPHTHALENES	151	2.27
2	B	BIPHENYL	0.574 JB	2.27
3	DF	DIBENZOFURAN	0.496 J	2.27
3	AY	ACENAPHTHYLENE	0.299 J	2.27
3	AE	ACENAPHTHENE	U	2.27
3	F0	FLUORENE	3.36	2.27
3	F1	C1-FLUORENES	43.6	2.27
3	F2	C2-FLUORENES	184	2.27
3	F3	C3-FLUORENES	282	2.27
3	A0	ANTHRACENE	U	2.27
3	P0	PHENANTHRENE	66.9	2.27
3	PA1	C1-PHENANTHRENES/ANTHRACENES	334	2.27
3	PA2	C2-PHENANTHRENES/ANTHRACENES	637	2.27
3	PA3	C3-PHENANTHRENES/ANTHRACENES	636	2.27
3	PA4	C4-PHENANTHRENES/ANTHRACENES	330	2.27
3	RET	RETENE	U	2.27
3	DBT0	DIBENZOTHIOPHENE	16.6	2.27
3	DBT1	C1-DIBENZOTHIOPHENES	110	2.27
3	DBT2	C2-DIBENZOTHIOPHENES	270	2.27
3	DBT3	C3-DIBENZOTHIOPHENES	329	2.27
3	DBT4	C4-DIBENZOTHIOPHENES	240	2.27
4	BF	BENZO(B)FLUORENE	12.6	2.27
4	FL0	FLUORANTHENE	7.79	2.27
4	PY0	PYRENE	56.6	2.27
4	FP1	C1-FLUORANTHENES/PYRENES	178	2.27
4	FP2	C2-FLUORANTHENES/PYRENES	288	2.27
4	FP3	C3-FLUORANTHENES/PYRENES	373	2.27
4	FP4	C4-FLUORANTHENES/PYRENES	320	2.27
4	NBT0	NAPHTHOBENZOTHIOPHENE	36.1	2.27
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	127	2.27
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	220	2.27
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	197	2.27
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	146	2.27
4	BA0	BENZ(A)ANTHRACENE	22.1	2.27
4	C0	CHRYSENE/TRIPHENYLENE	61.6	2.27
4	BC1	C1-CHRYSENES	205	2.27
4	BC2	C2-CHRYSENES	332	2.27
4	BC3	C3-CHRYSENES	414	2.27
4	BC4	C4-CHRYSENES	249	2.27
5	BBF	BENZO(B)FLUORANTHENE	13.2	2.27

Project Name: PAMPILLA 2
 Project Number:

Client ID GE DEL 01AGO2023
 Lab ID L2345391-02
 Matrix SOLID
 Matrix Description
 Reference Method 8270E-SIM(M)
 Batch ID WG1816944
 Date Collected 8/1/2023
 Date Received 8/7/2023
 Date Prepped 8/17/2023
 Date Analyzed 8/21/2023
 Sample Size(wet) 0.00441 g
 % Solid 100
 File ID F908202323
 Units mg/kg
 Final Volume 1
 Dilution 1
 Reporting Limit 1.13

Class	Abbrev	Analytes	Result	SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE	2.55	2.27
5	BAF	BENZO(A)FLUORANTHENE	U	2.27
5	BEP	BENZO(E)PYRENE	31.4	2.27
5	BAP	BENZO(A)PYRENE	14.5	2.27
5	PER	PERYLENE	5.82	2.27
6	IND	INDENO(1,2,3-CD)PYRENE	4.56	2.27
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	4.28	2.27
6	GHI	BENZO(GHI)PERYLENE	12.5	2.27
O	CAR	CARBAZOLE	2.44	2.27
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	44.2	2.27
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	36.0	2.27
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	24.1	2.27
3	3MP	3-METHYLPHENANTHRENE (3MP)	74.0	2.27
3	2MP	2-METHYLPHENANTHRENE (2MP)	89.2	2.27
3	2MA	2-METHYLANTHRACENE (2MA)	9.52	2.27
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	84.0	2.27
3	1MP	1-METHYLPHENANTHRENE (1MP)	70.6	2.27
A	1MN	1-METHYLNAPHTHALENE	0.527 J	2.27
A	2MN	2-METHYLNAPHTHALENE	0.681 J	2.27
2	26DMN	2,6-DIMETHYLNAPHTHALENE	1.64 J	2.27
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	13.3	2.27
H30	T19	HOPANE (T19)	655	2.27
t23	T4	C23 TRICYCLIC TERPANE (T4)	129	2.27
t24	T5	C24 TRICYCLIC TERPANE (T5)	84.8	2.27
t25	T6	C25 TRICYCLIC TERPANE (T6)	88.6	2.27
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	30.3	2.27
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	49.2	2.27
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	46.4	2.27
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	67.3	2.27
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	58.2	2.27
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	59.5	2.27
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	56.8	2.27
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	53.2	2.27
t30S	T11a	C30 TRICYCLIC TERPANE-22S	70.2	2.27
t30R	T11b	C30 TRICYCLIC TERPANE-22R	51.7	2.27
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	146	2.27
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	73.7	2.27
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	42.1	2.27
H29	T15	30-NORHOPANE (T15)	364	2.27
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	60.9	2.27
X	X	17A(H)-DIAHOPANE (X)	30.0	2.27
M29	T17	30-NORMORETANE (T17)	43.2	2.27
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	20.2	2.27
M30	T20	MORETANE (T20)	89.2	2.27
H31S	T21	30-HOMOHOPANE-22S (T21)	248	2.27
H31R	T22	30-HOMOHOPANE-22R (T22)	261	2.27
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	95.7	2.27
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	176	2.27
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	121	2.27
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	114	2.27
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	81.3	2.27
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	87.3	2.27
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	56.0	2.27
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	66.9	2.27

Project Name: PAMPILLA 2
 Project Number:

Client ID GE DEL 01AGO2023
 Lab ID L2345391-02
 Matrix SOLID
 Matrix Description
 Reference Method 8270E-SIM(M)
 Batch ID WG1816944
 Date Collected 8/1/2023
 Date Received 8/7/2023
 Date Prepped 8/17/2023
 Date Analyzed 8/21/2023
 Sample Size(wet) 0.00441 g
 % Solid 100
 File ID F908202323
 Units mg/kg
 Final Volume 1
 Dilution 1
 Reporting Limit 1.13

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	80.4	2.27
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	86.4	2.27
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	38.0	2.27
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	24.5	2.27
aa27S	S12	17A(H)20SC27/C29DIA	121	2.27
aa27R	S17	17A(H)20RC27/C29DIA	184	2.27
d29R	S18	UNKNOWN STERANE (S18)	12.0	2.27
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	13.0	2.27
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	86.7	2.27
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	91.9	2.27
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	99.3	2.27
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	97.2	2.27
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	110	2.27
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	106	2.27
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	103	2.27
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	107	2.27
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	114	2.27
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	80.2	2.27
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	490	2.27
SC28TAS	TAS02	C28,20S TAS	288	2.27
RC27TAS	TAS03	C27,20R TAS	344	2.27
RC28TAS	TAS04	C28,20R TAS	247	2.27

Surrogates (% Recovery)
 NAPHTHALENE-D8
 PHENANTHRENE-D10
 BENZO(A)PYRENE-D12
 5B(H)CHOLANE

83
 115
 116
 120

Project Name: PAMPILLA 2
 Project Number:

Client ID	Laboratory Method BI
Lab ID	WG1816944-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1816944
Date Collected	NA
Date Received	8/17/2023
Date Prepped	8/17/2023
Date Analyzed	8/21/2023
Sample Size(wet)	0.00424 g
% Solid	100
File ID	F908202318
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.18

Class	Abbrev	Analytes	Result	SSRL
2	D0	CIS/TRANS-DECALIN	U	1.18
2	D1	C1-DECALINS	U	2.36
2	D2	C2-DECALINS	U	2.36
2	D3	C3-DECALINS	U	2.36
2	D4	C4-DECALINS	U	2.36
S	BT0	BENZOTHIOPHENE	U	2.36
2	BT1	C1-BENZO(B)THIOPHENES	U	2.36
2	BT2	C2-BENZO(B)THIOPHENES	U	2.36
2	BT3	C3-BENZO(B)THIOPHENES	U	2.36
2	BT4	C4-BENZO(B)THIOPHENES	U	2.36
A	N0	NAPHTHALENE	0.184 J	2.36
2	N1	C1-NAPHTHALENES	U	2.36
2	N2	C2-NAPHTHALENES	U	2.36
2	N3	C3-NAPHTHALENES	U	2.36
2	N4	C4-NAPHTHALENES	U	2.36
2	B	BIPHENYL	0.247 J	2.36
3	DF	DIBENZOFURAN	U	2.36
3	AY	ACENAPHTHYLENE	U	2.36
3	AE	ACENAPHTHENE	U	2.36
3	F0	FLUORENE	U	2.36
3	F1	C1-FLUORENES	U	2.36
3	F2	C2-FLUORENES	U	2.36
3	F3	C3-FLUORENES	U	2.36
3	A0	ANTHRACENE	U	2.36
3	P0	PHENANTHRENE	0.221 J	2.36
3	PA1	C1-PHENANTHRENES/ANTHRACENES	U	2.36
3	PA2	C2-PHENANTHRENES/ANTHRACENES	U	2.36
3	PA3	C3-PHENANTHRENES/ANTHRACENES	U	2.36
3	PA4	C4-PHENANTHRENES/ANTHRACENES	U	2.36
3	RET	RETENE	U	2.36
3	DBT0	DIBENZOTHIOPHENE	0.123 J	2.36
3	DBT1	C1-DIBENZOTHIOPHENES	0.611 J	2.36
3	DBT2	C2-DIBENZOTHIOPHENES	U	2.36
3	DBT3	C3-DIBENZOTHIOPHENES	U	2.36
3	DBT4	C4-DIBENZOTHIOPHENES	U	2.36
4	BF	BENZO(B)FLUORENE	0.148 J	2.36
4	FL0	FLUORANTHENE	0.231 J	2.36
4	PY0	PYRENE	0.320 J	2.36
4	FP1	C1-FLUORANTHENES/PYRENES	U	2.36
4	FP2	C2-FLUORANTHENES/PYRENES	U	2.36
4	FP3	C3-FLUORANTHENES/PYRENES	U	2.36
4	FP4	C4-FLUORANTHENES/PYRENES	U	2.36
4	NBT0	NAPHTHOBENZOTHIOPHENE	0.244 J	2.36
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	U	2.36
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	U	2.36
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	U	2.36
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	U	2.36
4	BA0	BENZ(A)ANTHRACENE	0.188 J	2.36
4	C0	CHRYSENE/TRIPHENYLENE	0.230 J	2.36
4	BC1	C1-CHRYSENES	U	2.36
4	BC2	C2-CHRYSENES	U	2.36
4	BC3	C3-CHRYSENES	U	2.36
4	BC4	C4-CHRYSENES	U	2.36
5	BBF	BENZO(B)FLUORANTHENE	0.146 J	2.36

Project Name: PAMPILLA 2
 Project Number:

Client ID
 Lab ID
 Matrix
 Matrix Description
 Reference Method
 Batch ID
 Date Collected
 Date Received
 Date Prepped
 Date Analyzed
 Sample Size(wet)
 % Solid
 File ID
 Units
 Final Volume
 Dilution
 Reporting Limit

Laboratory Method BI
 WG1816944-1
 SOLID
 8270E-SIM(M)
 WG1816944
 NA
 8/17/2023
 8/17/2023
 8/21/2023
 0.00424 g
 100
 F908202318
 mg/kg
 1
 1
 1.18

Class	Abbrev	Analytes	Result	SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE	0.170 J	2.36
5	BAF	BENZO(A)FLUORANTHENE	U	2.36
5	BEP	BENZO(E)PYRENE	0.186 J	2.36
5	BAP	BENZO(A)PYRENE	U	2.36
5	PER	PERYLENE	U	2.36
6	IND	INDENO(1,2,3-CD)PYRENE	U	2.36
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	U	2.36
6	GHI	BENZO(GHI)PERYLENE	U	2.36
O	CAR	CARBAZOLE	U	2.36
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	0.0854 J	2.36
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	U	2.36
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	0.192 J	2.36
3	3MP	3-METHYLPHENANTHRENE (3MP)	U	2.36
3	2MP	2-METHYLPHENANTHRENE (2MP)	U	2.36
3	2MA	2-METHYLANTHRACENE (2MA)	U	2.36
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	U	2.36
3	1MP	1-METHYLPHENANTHRENE (1MP)	U	2.36
A	1MN	1-METHYLNAPHTHALENE	U	2.36
A	2MN	2-METHYLNAPHTHALENE	U	2.36
2	26DMN	2,6-DIMETHYLNAPHTHALENE	U	2.36
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	U	2.36
H30	T19	HOPANE (T19)	U	2.36
t23	T4	C23 TRICYCLIC TERPANE (T4)	U	2.36
t24	T5	C24 TRICYCLIC TERPANE (T5)	U	2.36
t25	T6	C25 TRICYCLIC TERPANE (T6)	U	2.36
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	U	2.36
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	U	2.36
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	U	2.36
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	U	2.36
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	U	2.36
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	U	2.36
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	U	2.36
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	U	2.36
t30S	T11a	C30 TRICYCLIC TERPANE-22S	U	2.36
t30R	T11b	C30 TRICYCLIC TERPANE-22R	U	2.36
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	U	2.36
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	U	2.36
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	U	2.36
H29	T15	30-NORHOPANE (T15)	U	2.36
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	U	2.36
X	X	17A(H)-DIAHOPANE (X)	U	2.36
M29	T17	30-NORMORETANE (T17)	U	2.36
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	U	2.36
M30	T20	MORETANE (T20)	U	2.36
H31S	T21	30-HOMOHOPANE-22S (T21)	U	2.36
H31R	T22	30-HOMOHOPANE-22R (T22)	U	2.36
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	U	2.36
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	U	2.36
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	U	2.36
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	U	2.36
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	U	2.36
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	U	2.36
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	U	2.36
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	U	2.36

Project Name: PAMPILLA 2

Project Number:

Client ID	Laboratory Method BI
Lab ID	WG1816944-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1816944
Date Collected	NA
Date Received	8/17/2023
Date Prepped	8/17/2023
Date Analyzed	8/21/2023
Sample Size(wet)	0.00424 g
% Solid	100
File ID	F908202318
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.18

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	U	2.36
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	U	2.36
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	U	2.36
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	U	2.36
aa27S	S12	17A(H)20SC27/C29DIA	U	2.36
aa27R	S17	17A(H)20RC27/C29DIA	U	2.36
d29R	S18	UNKNOWN STERANE (S18)	U	2.36
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	U	2.36
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	U	2.36
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	U	2.36
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	U	2.36
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	U	2.36
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	U	2.36
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	U	2.36
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	U	2.36
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	U	2.36
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	U	2.36
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	U	2.36
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	U	2.36
SC28TAS	TAS02	C28,20S TAS	U	2.36
RC27TAS	TAS03	C27,20R TAS	U	2.36
RC28TAS	TAS04	C28,20R TAS	U	2.36

Surrogates (% Recovery)

NAPHTHALENE-D8	86
PHENANTHRENE-D10	120
BENZO(A)PYRENE-D12	111
5B(H)CHOLANE	116

Project Name: PAMPILLA 2
 Project Number:

Client ID Laboratory Control S
 Lab ID WG1816944-2
 Matrix SOLID
 Matrix Description
 Reference Method 8270E-SIM(M)
 Batch ID WG1816944
 Date Collected NA
 Date Received 8/17/2023
 Date Prepped 8/17/2023
 Date Analyzed 8/21/2023
 Sample Size(wet) 0.00424 g
 % Solid 100
 File ID F908202319
 Units %
 Final Volume 1
 Dilution 1
 Reporting Limit 2.36

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
A	NO	NAPHTHALENE	171	2.36	72	236	50	130
3	AY	ACENAPHTHYLENE	190	2.36	81	236	50	130
3	AE	ACENAPHTHENE	201	2.36	85	236	50	130
3	F0	FLUORENE	231	2.36	98	236	50	130
3	A0	ANTHRACENE	239	2.36	101	236	50	130
3	P0	PHENANTHRENE	244	2.36	104	236	50	130
4	FL0	FLUORANTHENE	245	2.36	104	236	50	130
4	PY0	PYRENE	255	2.36	108	236	50	130
4	BA0	BENZ(A)ANTHRACENE	229	2.36	97	236	50	130
4	C0	CHRYSENE/TRIPHENYLENE	205	2.36	87	236	50	130
5	BBF	BENZO(B)FLUORANTHENE	227	2.36	96	236	50	130
5	BJKF	BENZO(J)+(K)FLUORANTHENE	222	2.36	94	236	50	130
5	BAP	BENZO(A)PYRENE	211	2.36	90	236	50	130
6	IND	INDENO(1,2,3-CD)PYRENE	238	2.36	101	236	50	130
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	238	2.36	101	236	50	130
6	GHI	BENZO(GHI)PERYLENE	213	2.36	90	236	50	130
A	2MN	2-METHYLNAPHTHALENE	190	2.36	80	236	50	130

Surrogates (% Recovery)
 NAPHTHALENE-D8 88
 PHENANTHRENE-D10 121
 BENZO(A)PYRENE-D12 110
 5B(H)CHOLANE 112

Project Name: PAMPILLA 2
 Project Number:

Client ID LCS Duplicate
 Lab ID WG1816944-3
 Matrix SOLID
 Matrix Description
 Reference Method 8270E-SIM(M)
 Batch ID WG1816944
 Date Collected NA
 Date Received 8/17/2023
 Date Prepped 8/17/2023
 Date Analyzed 8/21/2023
 Sample Size(wet) 0.00424 g
 % Solid 100
 File ID F908202320
 Units %
 Final Volume 1
 Dilution 1
 Reporting Limit 2.36

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
A	NO	NAPHTHALENE	173	2.36	73	236	50	130	1	30
3	AY	ACENAPHTHYLENE	194	2.36	82	236	50	130	1	30
3	AE	ACENAPHTHENE	205	2.36	87	236	50	130	2	30
3	F0	FLUORENE	234	2.36	99	236	50	130	1	30
3	A0	ANTHRACENE	242	2.36	102	236	50	130	1	30
3	P0	PHENANTHRENE	249	2.36	105	236	50	130	1	30
4	FL0	FLUORANTHENE	248	2.36	105	236	50	130	1	30
4	PY0	PYRENE	256	2.36	109	236	50	130	1	30
4	BA0	BENZ(A)ANTHRACENE	233	2.36	99	236	50	130	2	30
4	C0	CHRYSENE/TRIPHENYLENE	208	2.36	88	236	50	130	1	30
5	BBF	BENZO(B)FLUORANTHENE	231	2.36	98	236	50	130	2	30
5	BJKF	BENZO(J)+(K)FLUORANTHENE	225	2.36	95	236	50	130	1	30
5	BAP	BENZO(A)PYRENE	215	2.36	91	236	50	130	1	30
6	IND	INDENO(1,2,3-CD)PYRENE	245	2.36	104	236	50	130	3	30
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	243	2.36	103	236	50	130	2	30
6	GHI	BENZO(GHI)PERYLENE	217	2.36	92	236	50	130	2	30
A	2MN	2-METHYLNAPHTHALENE	192	2.36	81	236	50	130	1	30

Surrogates (% Recovery)
 NAPHTHALENE-D8 86
 PHENANTHRENE-D10 121
 BENZO(A)PYRENE-D12 111
 5B(H)CHOLANE 111

Project Name: PAMPILLA 2
 Project Number:

Client ID Alaska North Slope Crude
 Lab ID WG1802945-1
 Matrix OIL
 Matrix Description Crude Oil
 1,8270E-SIM(M)-A2-
 NFALKPAHBIOMARKER
 Reference Method
 Batch ID WG1802945-1
 Date Collected N/A
 Date Received N/A
 Date Prepped N/A
 Date Analyzed 7/13/2023
 Sample Size(wet) 0.0514 g
 % Solid 100
 File ID F907112318
 Units mg/kg
 Final Volume 10
 Dilution 1
 Reporting Limit 1.94

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
2	D0	CIS/TRANS-DECALIN	436	1.94	91	477.66	65	135
2	D1	C1-DECALINS	683	1.94	90	760.39	65	135
2	D2	C2-DECALINS	569	1.94	84	675.98	65	135
2	D3	C3-DECALINS	308	1.94	84	366.46	65	135
2	D4	C4-DECALINS	285	1.94	79	362.78	65	135
S	BT0	BENZOTHIOPHENE	4.51	1.94	78	5.75	65	135
2	BT1	C1-BENZO(B)THIOPHENES	21.9	1.94	73	29.96	65	135
2	BT2	C2-BENZO(B)THIOPHENES	42.2	1.94	83	50.93	65	135
2	BT3	C3-BENZO(B)THIOPHENES	85.7	1.94	83	103.18	65	135
2	BT4	C4-BENZO(B)THIOPHENES	77.5	1.94	85	90.8	65	135
A	N0	NAPHTHALENE	465	1.94	82	565.56	65	135
2	N1	C1-NAPHTHALENES	1050	1.94	87	1208.32	65	135
2	N2	C2-NAPHTHALENES	1220	1.94	84	1450.37	65	135
2	N3	C3-NAPHTHALENES	891	1.94	85	1052.74	65	135
2	N4	C4-NAPHTHALENES	501	1.94	86	583.65	65	135
2	B	BIPHENYL	134	1.94	92	145.7	65	135
3	DF	DIBENZOFURAN	52.9	1.94	106	49.63	65	135
3	AY	ACENAPHTHYLENE	5.18	1.94	75	6.91	65	135
3	AE	ACENAPHTHENE	17.6	1.94	96	18.35	65	135
3	F0	FLUORENE	73.7	1.94	104	70.69	65	135
3	F1	C1-FLUORENES	172	1.94	106	162.7	65	135
3	F2	C2-FLUORENES	255	1.94	101	251.87	65	135
3	F3	C3-FLUORENES	244	1.94	101	242.29	65	135
3	P0	PHENANTHRENE	215	1.94	114	188.41	65	135
3	PA1	C1-PHENANTHRENES/ANTHRACENES	471	1.94	121	388.12	65	135
3	PA2	C2-PHENANTHRENES/ANTHRACENES	488	1.94	112	434.38	65	135
3	PA3	C3-PHENANTHRENES/ANTHRACENES	348	1.94	113	308.67	65	135
3	PA4	C4-PHENANTHRENES/ANTHRACENES	151	1.94	116	129.94	65	135
3	DBT0	DIBENZOTHIOPHENE	136	1.94	104	130.56	65	135
3	DBT1	C1-DIBENZOTHIOPHENES	267	1.94	97	275.34	65	135
3	DBT2	C2-DIBENZOTHIOPHENES	396	1.94	107	369.42	65	135
3	DBT3	C3-DIBENZOTHIOPHENES	368	1.94	106	345.39	65	135
3	DBT4	C4-DIBENZOTHIOPHENES	205	1.94	106	193.51	65	135
4	FL0	FLUORANTHENE	4.33	1.94	115	3.77	65	135
4	PY0	PYRENE	13.6	1.94	117	11.65	65	135
4	FP1	C1-FLUORANTHENES/PYRENES	56.3	1.94	103	54.43	65	135
4	FP2	C2-FLUORANTHENES/PYRENES	102	1.94	114	89.07	65	135
4	FP3	C3-FLUORANTHENES/PYRENES	124	1.94	113	109.78	65	135
4	FP4	C4-FLUORANTHENES/PYRENES	104	1.94	107	97.22	65	135
4	NBT0	NAPHTHOBENZOTHIOPHENE	43.0	1.94	110	39.13	65	135
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	113	1.94	106	106.13	65	135
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	162	1.94	108	150.09	65	135
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	130	1.94	108	120.77	65	135
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	86.9	1.94	102	85.38	65	135
4	BA0	BENZ(A)ANTHRACENE	2.34	1.94	103	2.28	65	135
4	C0	CHRYSENE/TRIPHENYLENE	35.4	1.94	97	36.66	65	135
4	BC1	C1-CHRYSENES	64.4	1.94	100	64.59	65	135
4	BC2	C2-CHRYSENES	84.1	1.94	96	87.41	65	135
4	BC3	C3-CHRYSENES	101	1.94	100	101.29	65	135
4	BC4	C4-CHRYSENES	64.2	1.94	101	63.42	65	135
5	BBF	BENZO(B)FLUORANTHENE	4.76	1.94	88	5.4	65	135
5	BEP	BENZO(E)PYRENE	9.18	1.94	93	9.88	65	135
5	BAP	BENZO(A)PYRENE	1.77	1.94	87	2.03	65	135
5	PER	PERYLENE	2.77	1.94	83	3.34	65	135
6	GHI	BENZO(GHI)PERYLENE	3.1	1.94	86	3.59	65	135
O	CAR	CARBAZOLE	6.38	1.94	105	6.09	65	135
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	128	1.94	97	131.38	65	135
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2DMT)	93.6	1.94	96	98.05	65	135

Project Name: PAMPILLA 2
 Project Number:

Client ID Alaska North Slope Crude
 Lab ID WG1802945-1
 Matrix OIL
 Matrix Description Crude Oil
 Reference Method 1,8270E-SIM(M)-A2-
 NFALKPAHBIOMARKER
 Batch ID WG1802945-1
 Date Collected N/A
 Date Received N/A
 Date Prepped N/A
 Date Analyzed 7/13/2023
 Sample Size(wet) 0.0514 g
 % Solid 100
 File ID F907112318
 Units mg/kg
 Final Volume 10
 Dilution 1
 Reporting Limit 1.94

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	43.8	1.94	108	40.36	65	135
3	3MP	3-METHYLPHENANTHRENE (3MP)	96.4	1.94	122	79.32	65	135
3	2MA	2-METHYLANTHRACENE (2MA)	3.76	1.94	125	3	65	135
3	1MP	1-METHYLPHENANTHRENE (1MP)	108	1.94	123	87.93	65	135
A	1MN	1-METHYLNAPHTHALENE	748	1.94	94	793.54	65	135
A	2MN	2-METHYLNAPHTHALENE	943	1.94	87	1087.89	65	135
2	26DMN	2,6-DIMETHYLNAPHTHALENE	606	1.94	95	635.33	65	135
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	153	1.94	104	147.12	65	135
H30	T19	HOPANE (T19)	154	1.94	96	161.24	65	135
t23	T4	C23 TRICYCLIC TERPANE (T4)	59.3	1.94	85	69.8	65	135
t24	T5	C24 TRICYCLIC TERPANE (T5)	42.8	1.94	102	42.1	65	135
t25	T6	C25 TRICYCLIC TERPANE (T6)	37.2	1.94	92	40.4	65	135
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	13.4	1.94	94	14.2	65	135
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	16.1	1.94	99	16.3	65	135
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	12.8	1.94	88	14.6	65	135
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	17.5	1.94	108	16.2	65	135
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	17.4	1.94	99	17.6	65	135
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	17.5	1.94	91	19.2	65	135
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	20.0	1.94	95	21	65	135
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	26.2	1.94	93	28.3	65	135
t30S	T11a	C30 TRICYCLIC TERPANE-22S	14.7	1.94	96	15.3	65	135
t30R	T11b	C30 TRICYCLIC TERPANE-22R	13.7	1.94	90	15.2	65	135
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	32.6	1.94	95	34.4	65	135
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	6.03	1.94	86	7	65	135
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	7.5	1.94	93	8.1	65	135
H29	T15	30-NORHOPANE (T15)	86.9	1.94	96	90.7	65	135
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	21.3	1.94	91	23.3	65	135
X	X	17A(H)-DIAHOPANE (X)	12.5	1.94	96	13	65	135
M29	T17	30-NORMORETANE (T17)	11.4	1.94	102	11.2	65	135
M30	T20	MORETANE (T20)	15.5	1.94	95	16.3	65	135
H31S	T21	30-HOMOHOPANE-22S (T21)	64.4	1.94	95	67.6	65	135
H31R	T22	30-HOMOHOPANE-22R (T22)	54.8	1.94	94	58.3	65	135
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	45.0	1.94	92	48.9	65	135
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	31.9	1.94	90	35.6	65	135
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	35.3	1.94	91	38.8	65	135
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	21.7	1.94	85	25.6	65	135
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	24.3	1.94	87	27.9	65	135
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	16.5	1.94	83	19.8	65	135
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	23.7	1.94	82	28.8	65	135
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	18.2	1.94	82	22.3	65	135
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	53.2	1.94	111	48.1	65	135
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	27.4	1.94	109	25.1	65	135
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	25.6	1.94	103	24.8	65	135
aa27S	S12	17A(H)20SC27/C29DIA	62.2	1.94	104	59.74	65	135
aa27R	S17	17A(H)20RC27/C29DIA	77.4	1.94	108	71.55	65	135
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	3.73	1.94	98	3.8	65	135
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	33.7	1.94	102	33	65	135
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	34.4	1.94	107	32.2	65	135
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	47.8	1.94	92	51.7	65	135
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	34.9	1.94	97	36.1	65	135
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	36.6	1.94	95	38.4	65	135
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	38.0	1.94	96	39.7	65	135
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	41.1	1.94	100	41	65	135
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	49.1	1.94	95	51.7	65	135
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	52.9	1.94	97	54.6	65	135
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	37.9	1.94	99	38.2	65	135
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	324	1.94	112	289.3	65	135
SC28TAS	TAS02	C28,20S TAS	211	1.94	116	182.5	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID Alaska North Slope Crude
Lab ID WG1802945-1
Matrix OIL
Matrix Description Crude Oil
Reference Method 1,8270E-SIM(M)-A2-
NFALKPAHBIOMARKER
Batch ID WG1802945-1
Date Collected N/A
Date Received N/A
Date Prepped N/A
Date Analyzed 7/13/2023
Sample Size(wet) 0.0514 g
% Solid 100
File ID F907112318
Units mg/kg
Final Volume 10
Dilution 1
Reporting Limit 1.94

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
RC27TAS	TAS03	C27,20R TAS	195	1.94	110	177.1	65	135
RC28TAS	TAS04	C28,20R TAS	165	1.94	111	148.1	65	135

List of Potential Qualifiers

- A: Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B: The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C: Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D: Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E: Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F: The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum.
- G: The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H: The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I: The lower value for the two columns has been reported due to obvious interference.
- J: Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.
- J: Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- J: Estimated value. The Target analyte concentration is below the Limit of Quantitation (LOQ), but above the Detection Limit (DL). This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.
- M: Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND: Not detected at the Limit of Quantitation (LOQ) for the sample.
- ND: Not detected at the Limit of Detection (LOD) for the sample.
- ND: Not detected at the reporting limit (RL) for the sample.
- ND: Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ: Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P: The RPD between the results for the two columns exceeds the method-specified criteria.
- Q: The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R: Analytical results are from sample re-analysis.
- RE: Analytical results are from sample re-extraction.
- S: Analytical results are from modified screening analysis.
- U: Not detected at the reported detection limit for the sample.
- V: The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z: The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)