To: Refinería La Pampilla S.A.A.

From: Gregory S. Douglas, Ph.D. (NewFields)

Date: August 24, 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 CAV 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 201649).

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 CAV 01AGO2023 (GE CAV1) are shown in Figures 1A and1B respectively.

GC/FID Analysis

The GC/FID chromatogram for the GE CAV1 sample (Figure 1B), shows the sample contains a broad C_{15} – C_{44} 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 (C_8 -C_{14}) compared to the source oil (Figure 1A). There is a noticeable difference in the pristane/phytane source ratio in GE CAV1 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 CAV1 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 CAV1 sample are provided in Figures 2A and 2B respectively. The PAH histogram for the GE CAV1 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 napthobenzothiophenes to phenanthrenes (Figure 2B) indicates the presence of a higher sulfur fuel in GE CAV1 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 CAV1 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 CAV1 sample are presented in Figures 4A and 4B respectively. The biomarker traces for GE CAV1 show similarities, however the presence of oleanane (T18) in GE CAV1, 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 CAV1 (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 CAV 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 CAV 01AGO2023 sample is chemically different and was derived from a different source of petroleum.

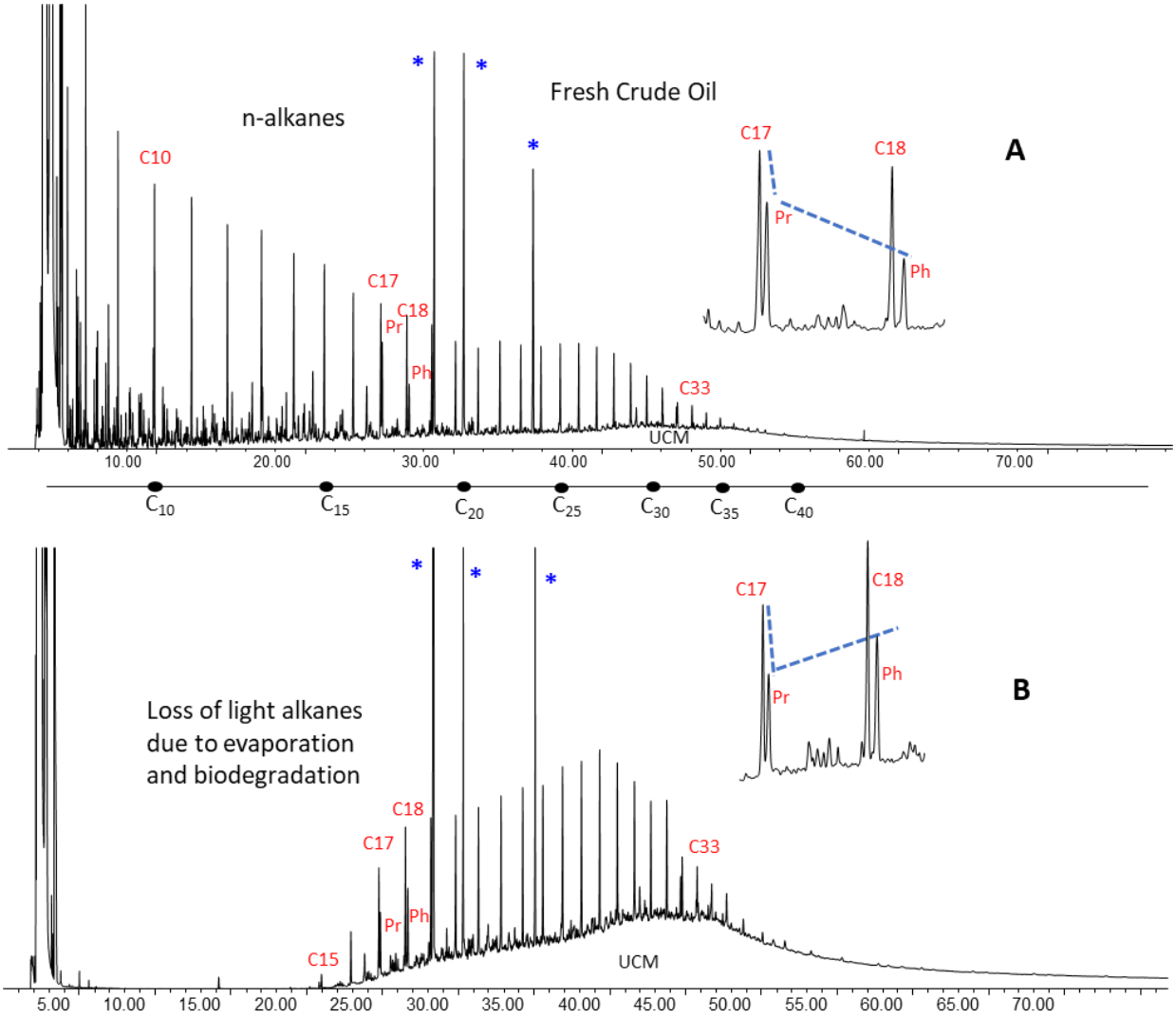

Figure 1. GC/FID "fingerprints" for the field samples.
Carbon ranges annotated below the x-axis analysis time scale.

A) Ship's Tanks Composite Sample
B) GE CAV 01AGO2023
'*': Laboratory-added Internal Standard

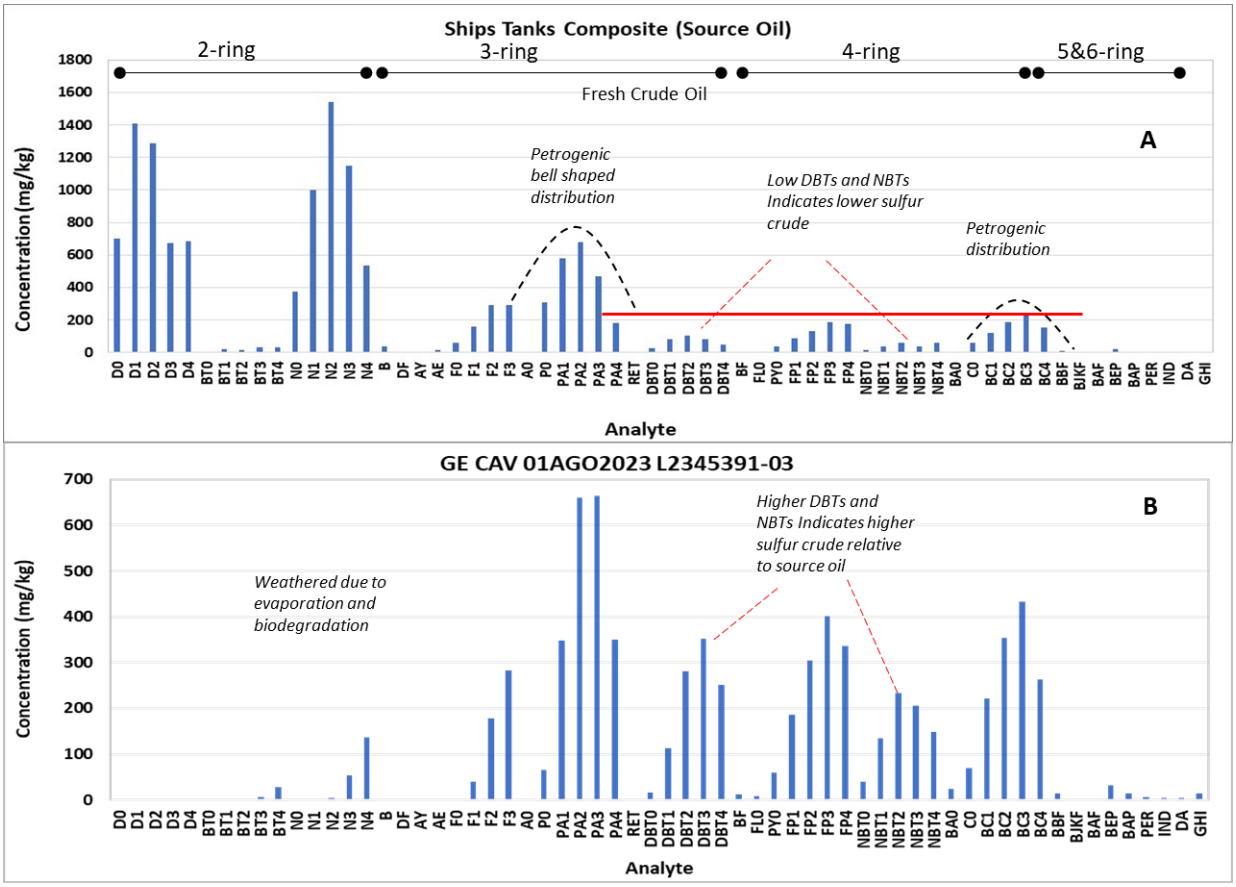

Figure 2. PAH Histograms

A) Ship's Tanks Composite Sample
B) GE CAV 01AGO2023

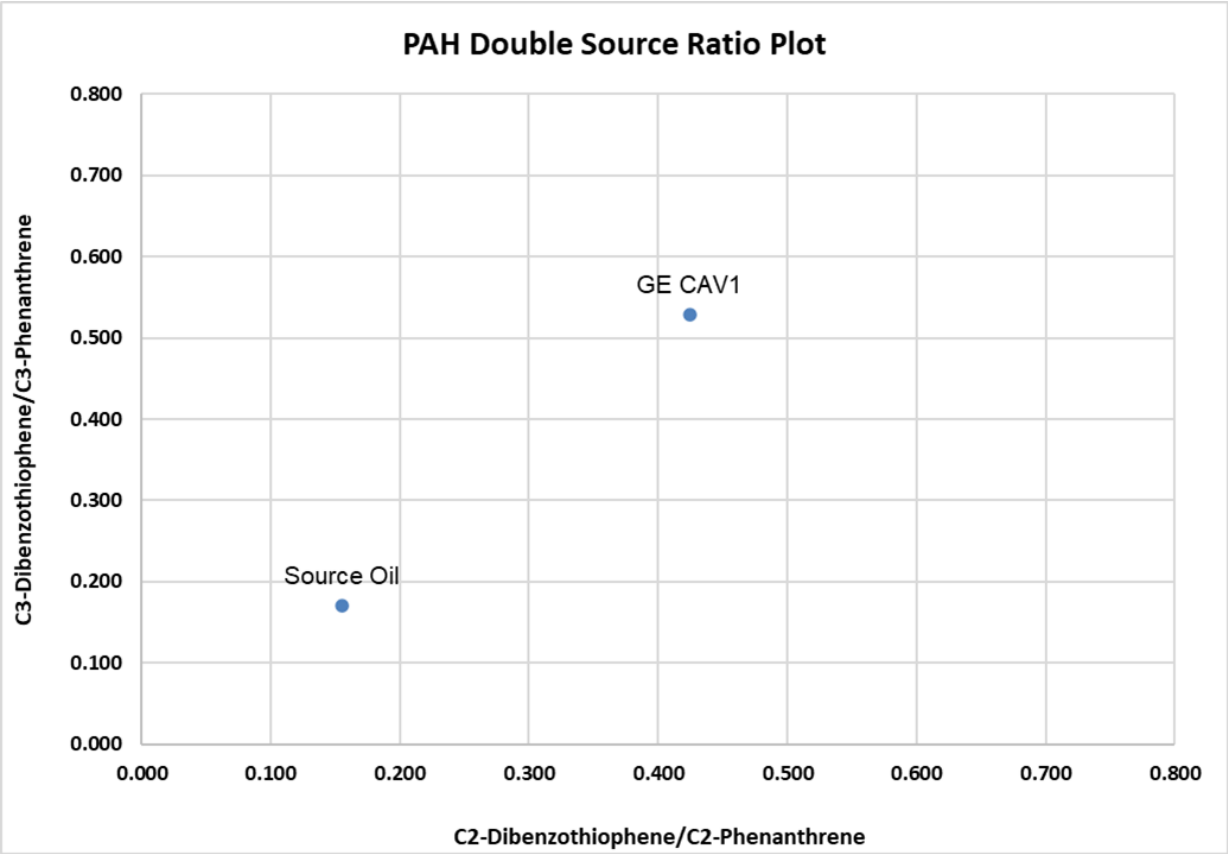

Figure 3. PAH Double Source Ratio Plot

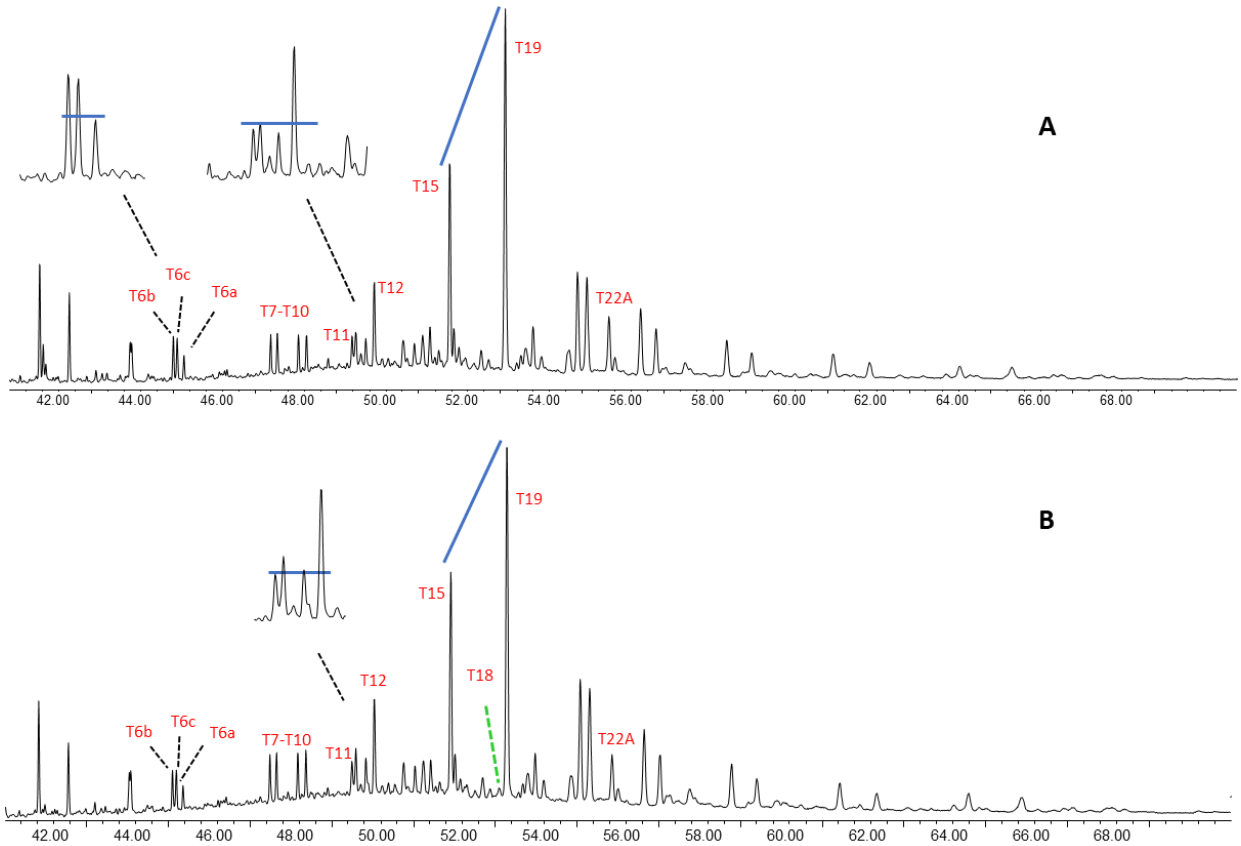

Figure 4. Biomarker m/z 191 Triterpane Fingerprint Traces

A) Ship's Tanks Composite Sample
B) GE CAV 01AGO2023

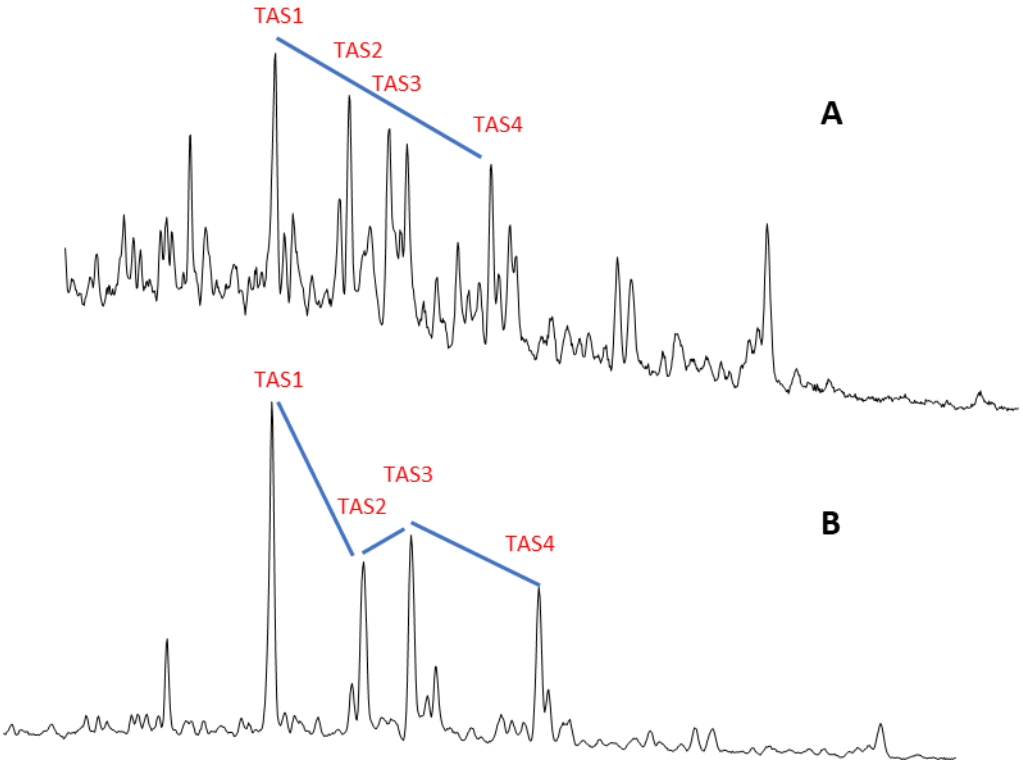

Figure 5. Biomarker m/z 231 Triaromatic Steroid Fingerprint Traces
A) Ship's Tanks Composite Sample
B) GE CAV 01AGO2023

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 CAV 01AGO2023	L2345391-03	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_2$9)
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
D0	cis/trans-Decalin
D0	cis/trans-Decalin
D1	C1-Decalins
D2	C2-Decalins
D3	C3-Decalins
D4	C4-Decalins
BT0	Benzothiophene
BT1	C1-Benzo(b)thiophenes
BT2	C2-Benzo(b)thiophenes
BT3	C3-Benzo(b)thiophenes
BT4	C4-Benzo(b)thiophenes
N0	Naphthalene
N1	C1-Naphthalenes
N2	C2-Naphthalenes
N3	C3-Naphthalenes
N4	C4-Naphthalenes
B	Biphenyl
DF	Dibenzofuran
AY	Acenaphthylene
AE	Acenaphthene
F0	Fluorene
F1	C1-Fluorenes
F2	C2-Fluorenes
F3	C3-Fluorenes
A0	Anthracene
P0	Phenanthrene
PA1	C1-Phenanthrenes/Anthracenes
PA2	C2-Phenanthrenes/Anthracenes
PA3	C3-Phenanthrenes/Anthracenes
PA4	C4-Phenanthrenes/Anthracenes
RET	Retene
DBT0	Dibenzothiophene
DBT1	C1-Dibenzothiophenes
DBT2	C2-Dibenzothiophenes
DBT3	C3-Dibenzothiophenes
DBT4	C4-Dibenzothiophenes
BF	Benzo(b)fluorene
FL0	Fluoranthene
PY0	Pyrene

Abbrev	Analytes
FP1	C1-Fluoranthenes/Pyrenes
FP2	C2-Fluoranthenes/Pyrenes
FP3	C3-Fluoranthenes/Pyrenes
FP4	C4-Fluoranthenes/Pyrenes
NBT0	Naphthobenzothiophenes
NBT1	C1-Naphthobenzothiophenes
NBT2	C2-Naphthobenzothiophenes
NBT3	C3-Naphthobenzothiophenes
NBT4	C4-Naphthobenzothiophenes
BA0	Benz[a]anthracene
C0	Chrysene/Triphenylene
BC1	C1-Chrysenes
BC2	C2-Chrysenes
BC3	C3-Chrysenes
BC4	C4-Chrysenes
BBF	Benzo[b]fluoranthene
BJKF	Benzo[k]fluoranthene
BAF	Benzo[a]fluoranthene
BEP	Benzo[e]pyrene
BAP	Benzo[a]pyrene
PER	Perylene
IND	Indeno[1,2,3-cd]pyrene
DA	Dibenz[a,h]anthracene
GHI	Benzo[g,h,i]perylene
CAR	Carbazole
4MDT	4-Methyldibenzthiophene
2DMT	2/3-Methyldibenzothiophene
1DMT	1-Methyldibenzothiophene
3MP	3-Methylphenanthrene
2MP	2-Methylphenanthrene
2MA	2-Methylanthracene
9MP	9/4-Methylphenanthrene
1MP	1-Methylphenanthrene
1MN	1-Methylnaphthalene
2MN	2-Methylnaphthalenene
26DMN	2,6-Dimethylnaphthalene
235TMN	2,3,5-Trimethylnaphthalene

Table 4. Triterpane and Sterane Biomarker Target Compound List.

Abbrev	Analytes
T4	C23 Tricyclic Terpane
T5	C24 Tricyclic Terpane
T6	C25 Tricyclic Terpane
T6a	C24 Tetracyclic Terpane
T6b	C26 Tricyclic Terpane-22S
T6c	C26 Tricyclic Terpane-22R
T7	C28 Tricyclic Terpane-22S
T8	C28 Tricyclic Terpane-22R
T9	C29 Tricyclic Terpane-22S
T10	C29 Tricyclic Terpane-22R
T11	18a-22,29,30-Trisnorneohopane-TS
T11a	C30 Tricyclic Terpane-22S
T11b	C30 Tricyclic Terpane-22R
T12	17a(H)-22,29,30-Trisnorhopane-TM
T14a	17a/b,21b/a 28,30-Bisnorhopane
T14b	17a(H),21b(H)-25-Norhopane
T15	30-Norhopane
T16	18a(H)-30-Norneohopane-C29Ts
X	17a(H)-Diahopane
T17	30-Normoretane
T18	18a(H)&18b(H)-Oleananes
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

Abbrev	Analytes
S4	13b(H),17a(H)-20S-Diacholestane
S5	13b(H),17a(H)-20R-Diacholestane
S8	13b,17a-20S-Methyldiacholestane
S12	14a(H),17a(H)-20S-Cholestane
S17	14a(H),17a(H)-20R-Cholestane
S18	13b,17a-20R-Ethyldiacholestane
S19	13a,17b-20S-Ethyldiacholestane
S20	14a,17a-20S-Methylcholestane
S24	14a,17a-20R-Methylcholestane
S25	14a(H),17a(H)-20S-Ethylcholestane
S28	14a(H),17a(H)-20R-Ethylcholestane
S14	14b(H),17b(H)-20R-Cholestane
S15	14b(H),17b(H)-20S-Cholestane
S22	14b,17b-20R-Methylcholestane
S23	14b,17b-20S-Methylcholestane
S26	14b(H),17b(H)-20R-Ethylcholestane
S27	14b(H),17b(H)-20S-Ethylcholestane
RC26/SC27TA	C26,20R- +C27,20S- triaromatic steroid
SC28TA	C28,20S-triaromatic steroid
RC27TA	C27,20R-triaromatic steroid
RC28TA	C28,20R-triaromatic steroid

Attachment 1

Chain of Custody

8/7/23

L2345391

Nº 007182

CERPER CERTIFICACIONES DEL PERÚ S.A.

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

Página 1 de 1

SOLICITANTE: REFINERIA LA PAMPILLA S.A.A

EXPEDIENTE: EXMA-10434-2023

LUGAR: PLAYA CAVERO | Distrito: Ventanilla | Provincia: CALLAO | Departamento:

PERSONA DE CONTACTO: Ing. Arturo Purizaga

HS: 23006017

JOB NUMBER:

NORMA:

- SMEWW - APHA - AWWA - WEF 23rd Ed. 2017 Collection and preservation of samples. Part 9060 A (B) ( ) 9060 B-C ( ) 10200 B ( ) 10300 B ( ) 10500 B ( ) 5175 B ( )
- Instrucción 8059 (Toma de muestras de sedimentos) ( )
- NTP 214.005 - 1987 (Revisada el 2016) Agua Potable. Toma de muestra ITEM 4.4 ( ) ITEM 4.5 ( )
- RM N° 271-2020-PRODUCE. Protocolo para el Muestreo de efluentes de los establecimientos industriales pesqueros de conserva hechas directo a mitilidos ( )
- RJ N° 010-2016-ANA. Protocolo nacional para el monitoreo de la calidad de los recursos hídricos superficiales ( )
- NTP ISO 5667-10:2012 (Revisada el 2016) Calidad de agua. Muestreo. Parte 10 - Guía para el muestreo de aguas residuales ( )
- NTP 214.048:2016 AGUAS RESIDUALES. Protocolo de muestreo de aguas residuales no domésticas que se descargan en la red de alcantarillado ( )
- RM N° 273-2013-VIVIENDA. Protocolo de monitoreo de la calidad de los efluentes de los plantas de tratamiento de aguas residuales domésticas o municipales PTAR ( )
- RM N° 085-2014-MINAM. Guía para el muestreo de suelos ( )
- Protocolo de muestreo de calidad de agua sub sector hidrocarburos DGAAE-EM ( )
- Otros _____ ( )

PARÁMETROS DE ANÁLISIS EN EL LABORATORIO: FINGER PRINT

PARÁMETROS DE CAM

DESCRIPCIÓN DE LA MUESTRA

PUNTO DE LA TOMA DE MUESTRA	MUESTREO FECHA	MUESTREO HORA	MATRIZ (1)	GEOREFERENCIA (UTM WGS84) ESTE (m)	GEOREFERENCIA (UTM WGS84) NORTE (m)	ALTITUD (m.s.n.m) ZONA (17,18,19) (K,L,M)	CANTIDAD DE ENVASES
45391-03 GE CAV 01AG02023	01.08.23	10:00	*	0263045	8689596	18L	01
						Total de Envases	01

pH (Unidades de pH) | Temperatura Ambiental (°C) | Temperatura (°C) | Oxígeno Disuelto (mg/L) | Conductividad µS/cm ( ) mS/cm ( ) | Salinidad (UPS) | Cloro residual mg Cl2/L Libre ( ) Total ( ) | Turbiedad (UNT) | Caudal (m³/s) | Transparencia cm ( ) m ( )

(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 * Globulos Anomalos

Condiciones de las muestras:

Temperatura ambiente ( ) Refrigerada (X) Congelada ( ) Caja conservadora (X)

Herméticamente cerrada (X) Ice pack (X) Hielo de calidad potable ( )

Equipos: Utilizados

Equipo	Código	Equipo	Código
1 GPS	S/N GSE051691	4	
2		5	
3		6	

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 fué presentada en campo en presencia del representante del cliente nº Precinto: 201649. Se tomaron las coordenadas en sitio.

Responsable de la toma de muestra:

Firma:

Inspector Cerper: Ing. Joe Gutierrez F.

Inspectores de apoyo:

Hora de inicio: 09:08 Hora de término: 10:40

Representante del cliente

Firma:

Nombre: Arturo Purizaga Ayala

DNI: 47448853

Cargo: Coordinador (Ayu)

Rec: 8/7/23 0954

Recepción de muestras

Nombre: Eron Vidal A.

Fecha: 02-08-2023 Hora: 12:57 PM

intertek

02 AGO 2023

LAB. CALEB BRETT

RECEIVED

Attachment 2

Analytical Data

Project Name: PAMPILLA 2
Project Number:

Client ID	GE CAV 01AGO2023
Lab ID	L2345391-03
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)	0.00428 g
% Solid	100
File ID	F18081823031
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	234

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)		U	234
SHC	C10	DECANE (C10)		U	234
SHC	C11	UNDECANE	3.50	J	234
SHC	C12	DODECANE (C12)		U	234
SHC	C13	TRIDECANE	6.54	J	234
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)		U	234
SHC	C14	TETRADECANE (C14)	29.2	J	234
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	51.9	J	234
SHC	C15	PENTADECANE (C15)	247		234
SHC	C16	HEXADECANE (C16)	963		234
SHC	1650	NORPRISTANE (1650)	651		234
SHC	C17	HEPTADECANE (C17)	1820		234
SHC	Pr	PRISTANE	1440		234
SHC	C18	OCTADECANE (C18)	2320		234
SHC	Ph	PHYTANE	1860		234
SHC	C19	NONADECANE (C19)	2310		234
SHC	C20	EICOSANE (C20)	2500		234
SHC	C21	HENEICOSANE (C21)	2480		234
SHC	C22	DOCOSANE (C22)	2400		234
SHC	C23	TRICOSANE (C23)	2370		234
SHC	C24	TETRACOSANE (C24)	2500		234
SHC	C25	PENTACOSANE (C25)	2850		234
SHC	C26	HEXACOSANE (C26)	2910		234
SHC	C27	HEPTACOSANE (C27)	2870		234
SHC	C28	OCTACOSANE (C28)	2480		234
SHC	C29	NONACOSANE (C29)	2640		234
SHC	C30	TRIACONTANE (C30)	1870		234
SHC	C31	HENTATRIACONTANE (C31)	1930		234
SHC	C32	DOTRIACONTANE (C32)	1090		234
SHC	C33	TRITRIACONTANE (C33)	833		234
SHC	C34	TETRATRIACONTANE (C34)	660		234
SHC	C35	PENTATRIACONTANE (C35)	804		234
SHC	C36	HEXATRIACONTANE (C36)	405		234
SHC	C37	HEPTATRIACONTANE (C37)	323		234
SHC	C38	OCTATRIACONTANE (C38)	236		234
SHC	C39	NONATRIACONTANE (C39)	154	J	234
SHC	C40	TETRACONTANE (C40)	167	J	234
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	661000		7710
SHC	TSH	TOTAL SATURATED HYDROCARBONS	46200	J	234

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

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
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
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (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
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (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 CAV 01AGO2023
Lab ID	L2345391-03
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)	0.00428 g
% Solid	100
File ID	F908202324
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.17

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN		U	1.17
2	D1	C1-DECALINS		U	2.34
2	D2	C2-DECALINS		U	2.34
2	D3	C3-DECALINS		U	2.34
2	D4	C4-DECALINS		U	2.34
S	BT0	BENZOTHIOPHENE		U	2.34
2	BT1	C1-BENZO(B)THIOPHENES		U	2.34
2	BT2	C2-BENZO(B)THIOPHENES	1.43	J	2.34
2	BT3	C3-BENZO(B)THIOPHENES	7.03		2.34
2	BT4	C4-BENZO(B)THIOPHENES	27.5		2.34
A	N0	NAPHTHALENE	0.484	JB	2.34
2	N1	C1-NAPHTHALENES	0.597	J	2.34
2	N2	C2-NAPHTHALENES	4.52		2.34
2	N3	C3-NAPHTHALENES	54.6		2.34
2	N4	C4-NAPHTHALENES	137		2.34
2	B	BIPHENYL	0.496	JB	2.34
3	DF	DIBENZOFURAN	0.449	J	2.34
3	AY	ACENAPHTHYLENE	0.412	J	2.34
3	AE	ACENAPHTHENE		U	2.34
3	F0	FLUORENE	2.70		2.34
3	F1	C1-FLUORENES	39.8		2.34
3	F2	C2-FLUORENES	178		2.34
3	F3	C3-FLUORENES	282		2.34
3	A0	ANTHRACENE		U	2.34
3	P0	PHENANTHRENE	66.5		2.34
3	PA1	C1-PHENANTHRENES/ANTHRACENES	348		2.34
3	PA2	C2-PHENANTHRENES/ANTHRACENES	660		2.34
3	PA3	C3-PHENANTHRENES/ANTHRACENES	664		2.34
3	PA4	C4-PHENANTHRENES/ANTHRACENES	350		2.34
3	RET	RETENE		U	2.34
3	DBT0	DIBENZOTHIOPHENE	15.8		2.34
3	DBT1	C1-DIBENZOTHIOPHENES	113		2.34
3	DBT2	C2-DIBENZOTHIOPHENES	280		2.34
3	DBT3	C3-DIBENZOTHIOPHENES	351		2.34
3	DBT4	C4-DIBENZOTHIOPHENES	252		2.34
4	BF	BENZO(B)FLUORENE	12.6		2.34
4	FL0	FLUORANTHENE	7.59		2.34
4	PY0	PYRENE	58.9		2.34
4	FP1	C1-FLUORANTHENES/PYRENES	187		2.34
4	FP2	C2-FLUORANTHENES/PYRENES	304		2.34
4	FP3	C3-FLUORANTHENES/PYRENES	401		2.34
4	FP4	C4-FLUORANTHENES/PYRENES	337		2.34
4	NBT0	NAPHTHOBENZOTHIOPHENE	39.1		2.34
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	134		2.34
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	233		2.34
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	205		2.34
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	149		2.34
4	BA0	BENZ(A)ANTHRACENE	23.7		2.34
4	C0	CHRYSENE/TRIPHENYLENE	68.6		2.34
4	BC1	C1-CHRYSENES	221		2.34
4	BC2	C2-CHRYSENES	354		2.34
4	BC3	C3-CHRYSENES	433		2.34
4	BC4	C4-CHRYSENES	263		2.34
5	BBF	BENZO(B)FLUORANTHENE	13.6		2.34

Project Name: PAMPILLA 2
Project Number:

Client ID	GE CAV 01AGO2023
Lab ID	L2345391-03
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)	0.00428 g
% Solid	100
File ID	F908202324
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.17

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE	2.33	J	2.34
5	BAF	BENZO(A)FLUORANTHENE		U	2.34
5	BEP	BENZO(E)PYRENE	32.6		2.34
5	BAP	BENZO(A)PYRENE	14.9		2.34
5	PER	PERYLENE	6.44		2.34
6	IND	INDENO(1,2,3-CD)PYRENE	4.11		2.34
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	4.01		2.34
6	GHI	BENZO(GHI)PERYLENE	13.3		2.34
O	CAR	CARBAZOLE	2.28	J	2.34
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	44.7		2.34
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	36.3		2.34
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	24.8		2.34
3	3MP	3-METHYLPHENANTHRENE (3MP)	77.5		2.34
3	2MP	2-METHYLPHENANTHRENE (2MP)	94.3		2.34
3	2MA	2-METHYLANTHRACENE (2MA)	9.22		2.34
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	88.2		2.34
3	1MP	1-METHYLPHENANTHRENE (1MP)	71.6		2.34
A	1MN	1-METHYLNAPHTHALENE	0.417	J	2.34
A	2MN	2-METHYLNAPHTHALENE	0.395	J	2.34
2	26DMN	2,6-DIMETHYLNAPHTHALENE	1.14	J	2.34
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	11.0		2.34
H30	T19	HOPANE (T19)	709		2.34
t23	T4	C23 TRICYCLIC TERPANE (T4)	135		2.34
t24	T5	C24 TRICYCLIC TERPANE (T5)	99.2		2.34
t25	T6	C25 TRICYCLIC TERPANE (T6)	99.4		2.34
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	31.4		2.34
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	51.1		2.34
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	52.5		2.34
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	70.9		2.34
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	64.4		2.34
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	61.7		2.34
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	60.6		2.34
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	60.0		2.34
t30S	T11a	C30 TRICYCLIC TERPANE-22S	74.3		2.34
t30R	T11b	C30 TRICYCLIC TERPANE-22R	56.6		2.34
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	152		2.34
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	76.2		2.34
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	43.4		2.34
H29	T15	30-NORHOPANE (T15)	391		2.34
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	65.0		2.34
X	X	17A(H)-DIAHOPANE (X)	29.4		2.34
M29	T17	30-NORMORETANE (T17)	46.8		2.34
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	20.5		2.34
M30	T20	MORETANE (T20)	91.6		2.34
H31S	T21	30-HOMOHOPANE-22S (T21)	266		2.34
H31R	T22	30-HOMOHOPANE-22R (T22)	276		2.34
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	105		2.34
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	191		2.34
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	128		2.34
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	125		2.34
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	82.1		2.34
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	91.8		2.34
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	59.8		2.34
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	67.5		2.34

Project Name: PAMPILLA 2
Project Number:

Client ID	GE CAV 01AGO2023	
Lab ID	L2345391-03	
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)	0.00428	g
% Solid	100	
File ID	F908202324	
Units	mg/kg	
Final Volume	1	
Dilution	1	
Reporting Limit	1.17	

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	79.3	2.34
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	91.9	2.34
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	41.0	2.34
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	25.4	2.34
aa27S	S12	17A(H)20SC27/C29DIA	138	2.34
aa27R	S17	17A(H)20RC27/C29DIA	203	2.34
d29R	S18	UNKNOWN STERANE (S18)	13.8	2.34
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	15.1	2.34
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	94.4	2.34
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	102	2.34
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	113	2.34
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	101	2.34
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	120	2.34
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	117	2.34
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	102	2.34
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	109	2.34
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	118	2.34
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	89.9	2.34
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	523	2.34
SC28TAS	TAS02	C28,20S TAS	307	2.34
RC27TAS	TAS03	C27,20R TAS	379	2.34
RC28TAS	TAS04	C28,20R TAS	263	2.34

Surrogates (% Recovery)	
NAPHTHALENE-D8	83
PHENANTHRENE-D10	114
BENZO(A)PYRENE-D12	114
5B(H)CHOLANE	122

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
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	Laboratory Method Bl
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
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 Bl	
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	N0	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	N0	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	
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
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(2MDT)	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.)