Muestreo y Caracterización de Hidrocarburos ajenos a la Terminal 2 de RELAPASAA en la Costa de Ventanilla y Chancay

Memorando Técnico Complementario No. 12

PREPARADO PARA
RELAPASAA

FECHA
28 de noviembre 2023

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CONTENIDO

1. INTRODUCCIÓN

Con fecha 02 de diciembre de 2022, Refinería La Pampilla SAA (RELAPASAA), remitió al Organismo de Evaluación y Fiscalización Ambiental (OEFA) con Cargo de recepción 2022-E01-123337, el informe *"Muestreo y Caracterización de Hidrocarburos ajenos a la Terminal 2 de RELAPASAA en la costa de Ventanilla y Chancay"* (en adelante, **Informe de Resultados de Fingerprint**), en el que se reportaron los resultados de análisis Fingerprint de las muestras tomadas entre el 20 de mayo y 26 de setiembre del 2022 en diferentes playas y en mar y, cuyo origen no se relaciona con la composición del crudo Buzios.

Con fecha del 19 de enero de 2023, RELAPASAA remitió a OEFA con cargo recepción 2023-E01-040474, el informe titulado "*Muestreo y Caracterización de Hidrocarburos Ajenos a la Terminal 2 de RELAPASAA en la costa de Ventanilla y Chancay - Memorando Técnico Complementario No.1"*, (en adelante *Memorando Técnico Complementario No.1*) en el que se reportaron los resultados de análisis Fingerprint de las muestras tomadas entre el 3 de noviembre y 6 de diciembre del 2022, cuyo origen no se relaciona con la composición del crudo Buzios.

Con fecha del 9 de marzo de 2023, RELAPASAA remitió a OEFA con cargo recepción 2023-E01-327609, el informe titulado "*Muestreo y Caracterización de Hidrocarburos Ajenos a la Terminal 2 de RELAPASAA en la costa de Ventanilla y Chancay - Memorando Técnico Complementario No.2"*, (en adelante *Memorando Técnico Complementario No.2*) en el que se reportaron los resultados de análisis Fingerprint de las muestras tomadas los días 01 y 22 de noviembre, y el 13, 15, 16, 19 y 27 de diciembre del 2022 y el 10, 13, 14, 15, 16, 23 y 24 de enero del 2023 cuyo origen no se relaciona con la composición del crudo Buzios.

Con fecha del 15 de mayo de 2023, RELAPASAA remitió a OEFA con cargo recepción 2023-E01-466870, el informe titulado *"Muestreo y Caracterización de Hidrocarburos Ajenos a la Terminal 2 de RELAPASAA en la costa de Ventanilla y Chancay - Memorando Técnico Complementario No.3"*, (en adelante *Memorando Técnico Complementario No.3*) en el que se reportaron los resultados de análisis Fingerprint de las muestras tomadas los días 01, 02, 09 y 21 de febrero y 23 de marzo del 2023 cuyo origen no se relaciona con la composición del crudo Buzios.

Con fecha del 2 de junio de 2023, RELAPASAA remitió a OEFA con cargo recepción 2023-E01-473068, el informe titulado *"Muestreo y Caracterización de Hidrocarburos Ajenos a la Terminal 2 de RELAPASAA en la costa de Ventanilla y Chancay - Memorando Técnico Complementario No.4"*, (en adelante *Memorando Técnico Complementario No.4*) en el que se reportaron los resultados de análisis Fingerprint de la muestra tomada el día 11 de abril del 2023 cuyo origen no se relaciona con la composición del crudo Buzios.

Con fecha del 26 de julio de 2023, RELAPASAA remitió a OEFA con cargo recepción 2023-E01-518019, el informe titulado *"Muestreo y Caracterización de Hidrocarburos Ajenos a la Terminal 2 de RELAPASAA en la costa de Ventanilla y Chancay - Memorando Técnico Complementario No.5"*, (en adelante *Memorando Técnico Complementario No.5*) en el que se reportaron los resultados de análisis Fingerprint de la muestras tomadas los días 08, 09 y 10 de junio del 2023 cuyo origen no se relaciona con la composición del crudo Buzios.

Con fecha del 16 de agosto de 2023, RELAPASAA remitió a OEFA con cargo recepción 2023-E01-526330, el informe titulado *"Muestreo y Caracterización de Hidrocarburos Ajenos a la Terminal 2 de RELAPASAA en la costa de Ventanilla y Chancay- Memorando Técnico Complementario No.6"*, (en adelante *Memorando Técnico Complementario No. 6*) en el que se reportaron los resultados de análisis Fingerprint de las muestras tomadas los días 20 de junio y 08 de julio del 2023 cuyo origen no se relaciona con la composición del crudo Buzios.

Con fecha del 23 de agosto de 2023, RELAPASAA remitió a OEFA con cargo recepción 2023-E01-528477, el informe titulado *"Muestreo y Caracterización de Hidrocarburos Ajenos a la Terminal 2 de RELAPASAA en la costa*

de Ventanilla y Chancay - Memorando Técnico Complementario No.7", (en adelante *Memorando Técnico Complementario No. 7*) en el que se reportaron los resultados de análisis Fingerprint de las muestras tomadas los días 21, 23 y 28 de junio y 18 de julio del 2023 cuyo origen no se relaciona con la composición del crudo Buzios.

Con fecha del 29 de agosto de 2023, RELAPASAA remitió a OEFA con cargo recepción 2023-E01-530147, el informe titulado *"Muestreo y Caracterización de Hidrocarburos Ajenos a la Terminal 2 de RELAPASAA en la costa de Ventanilla y Chancay - Memorando Técnico Complementario No.8"*, (en adelante *Memorando Técnico Complementario No. 8*) en el que se reportaron los resultados de análisis Fingerprint de las muestras tomadas el día 01 de agosto del 2023 cuyo origen no se relaciona con la composición del crudo Buzios.

Con fecha del 29 de setiembre de 2023, RELAPASAA remitió a OEFA con cargo recepción 2023-E01-540914, el informe titulado *"Muestreo y Caracterización de Hidrocarburos Ajenos a la Terminal 2 de RELAPASAA en la costa de Ventanilla y Chancay - Memorando Técnico Complementario No.9"*, (en adelante *Memorando Técnico Complementario No. 9*) en el que se reportaron los resultados de análisis Fingerprint de las muestras tomadas los días del 04 al 08, 11, 21, 24, 25, 27, 29 y 31 de julio del 2023 cuyo origen no se relaciona con la composición del crudo Buzios.

Con fecha del 19 de octubre de 2023, RELAPASAA remitió a OEFA con cargo recepción 2023-E01-548962, el informe titulado *"Muestreo y Caracterización de Hidrocarburos Ajenos a la Terminal 2 de RELAPASAA en la costa de Ventanilla y Chancay - Memorando Técnico Complementario No.10"*, (en adelante *Memorando Técnico Complementario No. 10*) en el que se reportaron los resultados de análisis Fingerprint de las muestras tomadas los días 02, 03, 06, 11 y 27 de agosto del 2023 cuyo origen no se relaciona con la composición del crudo Buzios.

Con fecha del 8 de noviembre de 2023, RELAPASAA remitió a OEFA con cargo recepción 2023-E01-558221, el informe titulado *"Muestreo y Caracterización de Hidrocarburos Ajenos a la Terminal 2 de RELAPASAA en la costa de Ventanilla y Chancay - Memorando Técnico Complementario No.11"*, (en adelante *Memorando Técnico Complementario No. 11*) en el que se reportaron los resultados de análisis Fingerprint de las muestras tomadas los días 26, 28 y 29 de agosto del 2023 cuyo origen no se relaciona con la composición del crudo Buzios.

El presente documento tiene como objetivo presentar los resultados de los análisis Fingerprint de dos muestras tomadas los días 28 de setiembre y 16 de octubre del 2023, adicional a las reportadas en el Informe de Resultados de Fingerprint remitido al OEFA el 02 de diciembre de 2022, al Memorando Técnico Complementario No.1 remitido el 19 de enero del 2023, al Memorando Técnico Complementario No.2 remitido el 9 de marzo del 2023, al Memorando Técnico Complementario No.3 remitido el 15 de mayo del 2023, al Memorando Técnico Complementario No.4 remitido el 2 de junio del 2023, al Memorando Técnico Complementario No.5 remitido el 26 de julio del 2023, al Memorando Técnico Complementario No.6 remitido el 16 de agosto del 2023, al Memorando Técnico Complementario No.7 remitido el 23 de agosto del 2023, al Memorando Técnico Complementario No.8 remitido el 29 de agosto del 2023, al Memorando Técnico Complementario No.9 remitido el 29 de setiembre del 2023, al Memorando Técnico Complementario No.10 remitido el 19 de octubre del 2023 y al Memorando Técnico Complementario No.11 remitido el 8 de noviembre del 2023.

2. MUESTREO Y ANÁLISIS DE LABORATORIO

Los días 28 de setiembre y 16 de octubre del 2023, se recolectaron 02 muestras adicionales, cuyo resultado de *Fingerprint* concluye que sus orígenes no corresponden al crudo Buzios derramado el 15 de enero en el T2 (i.e. químicamente no compatibles). Las muestras fueron tomadas por personal del laboratorio independiente CERPER, colectadas en frascos de vidrio, rotuladas, precintados, siendo finalmente ITS quien las envió vía aérea al laboratorio New Fields con su respectiva cadena de custodia. Los análisis de *Fingerprint* de todas las muestras reportadas hasta el momento fueron realizados por New Fields. El laboratorio Alpha Laboratories (Alpha) a través de New Fields, está certificado por el Programa Nacional de Acreditación de Laboratorios Ambientales (NELAP) en 22 estados de Estados Unidos, y está certificado recíprocamente por NELAP para ejercer en 14 estados adicionales. Además de la certificación NELAP, los sistemas, procesos y procedimientos operativos de Alpha son consistentes con los protocolos ISO 17000 aplicables.

En la Figura 4-1, se presentan las ubicaciones de todas las muestras con resultados de Fingerprint tomadas al momento, y en el **Anexo B** se presentan los resultados analíticos de Fingerprint de la presente actualización.

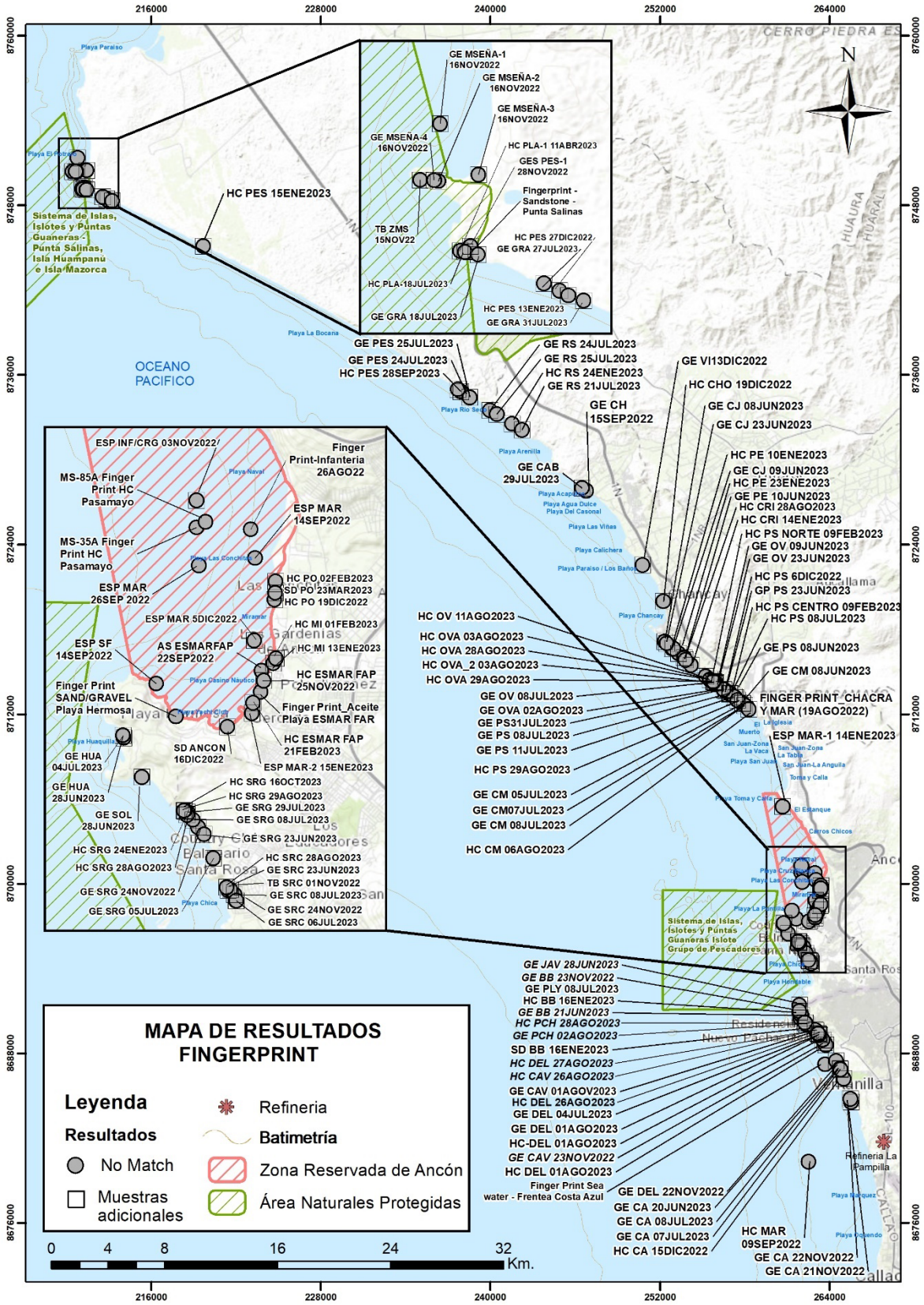

FIGURA 4-1. UBICACIÓN DE LAS MUESTRAS TOMADAS PARA ANÁLISIS DE FINGERPRINT.

Notas:
No Match = Químicamente no compatible con el crudo Buzios
Fuente: ERM - noviembre, 2023

Los aportes de hidrocarburo de diferentes fuentes, con características químicas que permiten asegurar que son distintas al del crudo Buzios son recurrentes y se han identificado en diferentes periodos de tiempo y locaciones, como se detalla en la línea de tiempo de la Figura 4-2 donde se presentan a las muestras tomadas para determinación analítica de Fingerprint cuyo origen no corresponde al crudo Buzios.

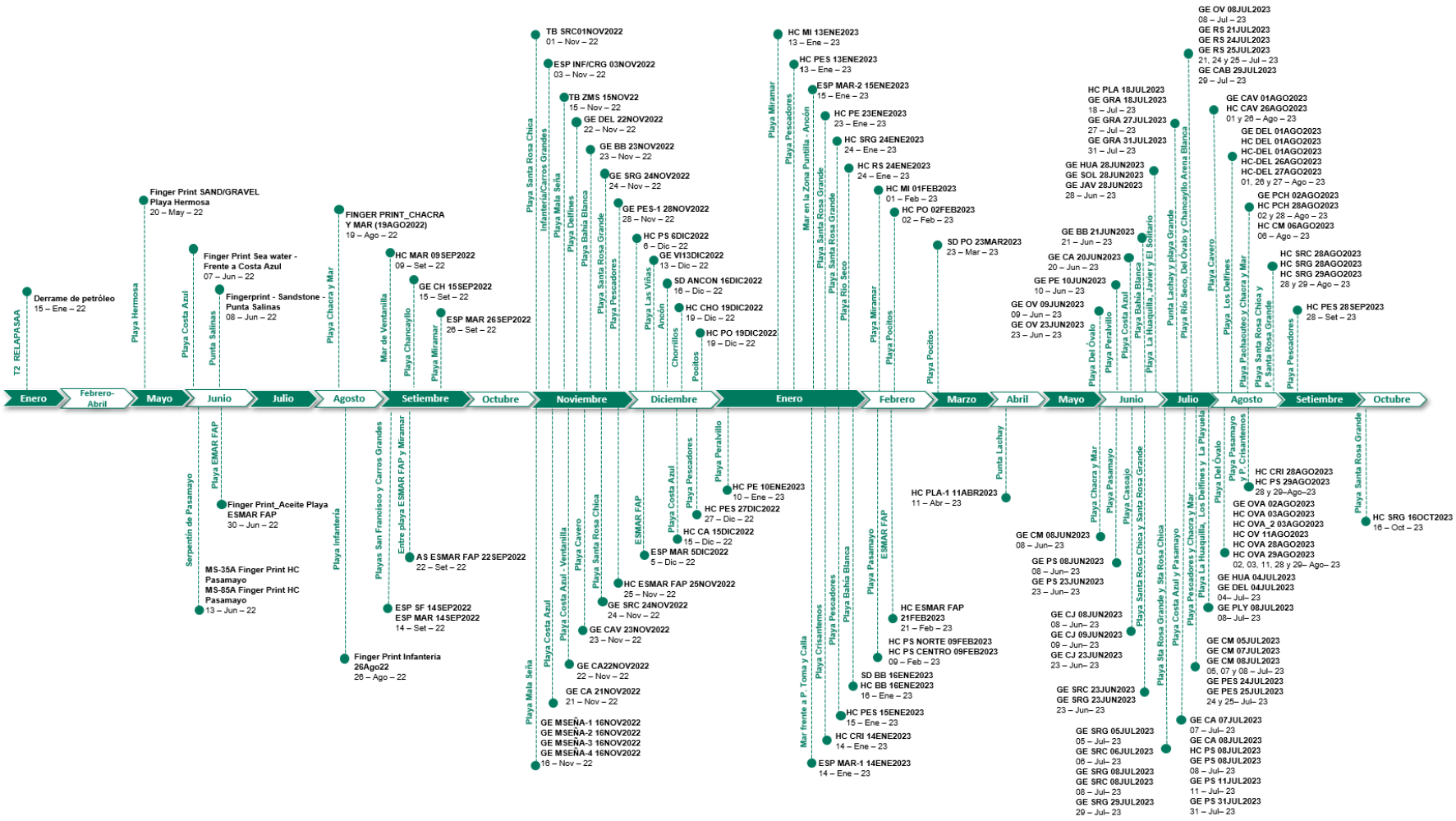

FIGURA 4-2. LÍNEA DE TIEMPO DE MUESTRAS DE FINGERPRINT CUYO ORIGEN ES DIFERENTE AL DEL CRUDO BUZIOS.

Fuente: Elaboración propia. ERM – noviembre, 2023

3. RESULTADOS

3.1 RESULTADO DE LAS MUESTRAS AJENAS AL CRUDO BUZIOS

En la presente actualización, se detallan los resultados de 02 muestras adicionales químicamente no compatibles con el crudo Buzios y, por lo tanto, no relacionado al caso de T2 de enero 2022.

En la Tabla 5-1 y Tabla 5-2, se incluye el resumen de los resultados de los análisis de *Fingerprint*, en el Anexo A, el registro fotográfico de las actividades de muestreo para las muestras adicionales reportadas en este informe y en el Anexo B, el informe del laboratorio (*NewFields*).

TABLA 5-1. RESUMEN DE RESULTADOS DE ANÁLISIS DE FINGERPRINT AJENAS AL CRUDO BUZIOS.

Ubicación: Playa Pescadores	**Fecha de muestreo:** 28 de setiembre de 2023
	**Nombre de la muestra:** *HC PES 28SEP2023* **Precintado por:** CERPER **Precinto N°:** 203931 **Enviado a NewFields por:** Intertek Testing Services Perú S.A Coordenadas UTM WGS84 18L 0237693 E, 8734972 N
	Descripción: Restos sólidos de hidrocarburo, con olor a hidrocarburo, encontrados en playa Pescadores. **Resultado:** La muestra *HC PES 28SEP2023* consiste en un material de la gama de diésel moderadamente intemperizado que se ha mezclado con un producto más pesado para incrementar su movilidad o, alternativamente, representa dos emisiones separadas. Los resultados de los análisis de FID, HAP y biomarcadores indican que **el petróleo detectado en la muestra *HC PES 28SEP2023* y el petróleo del crudo de origen (Buzios) son químicamente diferentes, y se derivan de una fuente de petróleo distinta.**

Ubicación: Playa Santa Rosa Grande	**Fecha de muestreo:** 16 de octubre de 2023
	**Nombre de la muestra:** *HC SRG 16OCT2023* **Precintado por:** CERPER **Precinto N°:** 203980 **Enviado a NewFields por:** Intertek Testing Services Perú S.A Coordenadas UTM WGS84 18L 0261797 E, 8695906 N
	Descripción: Restos sólidos de hidrocarburo, con olor a hidrocarburo, encontrados en playa Santa Rosa Grande. **Resultado:** La muestra *HC SRG 16OCT2023* consiste en un petróleo pesado moderadamente intemperizado. Los resultados de los análisis de FID, HAP y biomarcadores indican que **el petróleo detectado en la muestra *HC SRG 16OCT2023* y el petróleo del crudo de origen (Buzios) son químicamente diferentes, y se derivan de una fuente de petróleo distinta.**

TABLA 5-2. RESUMEN DE RESULTADOS DE FINGERPRINT QUÍMICAMENTE NO COMPATIBLES CON EL CRUDO BUZIOS (MUESTRAS ADICIONALES)

N°	Nombre de la muestra	Matriz	Fecha de muestreo	Ubicación	Resultado(*)
1	HC PES 28SEP2023	Restos sólidos de hidrocarburo	28-sep-23	Pescadores	La muestra *HC PES 28SEP2023* consiste en un material de la gama de diésel moderadamente intemperizado que se ha mezclado con un producto más pesado para incrementar su movilidad o, alternativamente, representa dos emisiones separadas. Los resultados de los análisis de FID, HAP y biomarcadores indican que **el petróleo detectado en la muestra *HC PES 28SEP2023* y el petróleo del crudo de origen (Buzios) son químicamente diferentes, y se derivan de una fuente de petróleo distinta.**
2	HC SRG 16OCT2023	Restos sólidos de hidrocarburo	16-oct-23	Santa Rosa Grande	La muestra *HC SRG 16OCT2023* consiste en un petróleo pesado moderadamente intemperizado. Los resultados de los análisis de FID, HAP y biomarcadores indican que **el petróleo detectado en la muestra *HC SRG 16OCT2023* y el petróleo del crudo de origen (Buzios) son químicamente diferentes, y se derivan de una fuente de petróleo distinta.**

(*) Traducido de las conclusiones de los informes de Fingerprint emitidos por NewFields

Fuente: Elaboración propia. ERM 2023

4. CONCLUSIONES

Los resultados de *Fingerprint*, permiten concluir lo siguiente:

- En el presente informe, mediante el análisis de *Fingerprint*, como técnica de análisis químico forense, se han identificado dos muestras adicionales colectadas de hidrocarburo que no son químicamente compatibles con el crudo Buzios y que provienen de distintas fuentes de hidrocarburo. Estas muestras fueron colectadas en la zona intermareal de las playas Pescadores y Santa Rosa Grande.
- Hasta el momento, mediante el análisis de *Fingerprint*, como técnica de análisis químico forense, se han identificado un total de 124 muestras de diferentes matrices (arena, agua, espuma, bolas de alquitrán, y aceite) colectadas en playas y mar que no son químicamente compatibles con el crudo Buzios y que provienen de distintas fuentes de hidrocarburo.
- Hasta el momento, el análisis de *Fingerprint* ha permitido confirmar la existencia de hidrocarburos no asociados al crudo Buzios desde Ventanilla (Playa Delfines) hasta Huacho (Punta Salinas), siendo en la zona intermareal diferentes playas como Chacra y Mar, Hermosa, Del Óvalo, Punta Salinas, ESMAR FAP, Bahía Blanca, Mala Seña, Chancayllo, Los Delfines, Cavero, Costa Azul, Santa Rosa Grande, Santa Rosa Chica; Pescadores, Miramar, Ancón, Peralvillo, Pocitos, Pasamayo, Punta Lachay, Las Viñas, La Huaquilla, El Solitario, Javier, Grande, Río Seco, Pachacútec, Crisantemos y Cascajo así como en la zona submareal y en el mar frente a Playa Costa Azul, Pasamayo, playa Infantería, playa San Francisco, en el mar de Ventanilla, frente ESMARFAP/Miramar, frente a playa Miramar, frente a playa Infantería/Carros Grandes y en el mar frente a Playa Toma y Calla.
- Los resultados de análisis *Fingerprint* demuestran que existen una variedad de fuentes de petróleo en el medio marino a lo largo de la costa distintas al derrame del 15 de enero de 2022 en la Terminal T2 de RELAPASAA.

ANEXO A – REGISTRO FOTOGRÁFICO

Toma de muestra *HC PES 28SEP2023* – 28 de setiembre 2023

Muestra *HC PES 28SEP2023* precintada – 28 de setiembre 2023

Toma de muestra *HC SRG 16OCT2023* – 16 de octubre 2023

Muestra *HC SRG 16OCT2023* precintada – 16 de octubre 2023

ANEXO B – RESULTADOS ANALÍTICOS DE FINGERPRINT

HC PES 28SEP2023

To: Refinería La Pampilla S.A.A.

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

Date: November 10, 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 September 28, 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 "HC PES 28SEP2023" was shipped to Alpha Analytical Labs in Mansfield, MA under chain of custody (COC) and arrived at 10.4°C on October 5, 2023 with a DHL Tracking # 5079742286 (Seal number 0203931).

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 HC PES 28SEP2023 (PES 28) are shown in Figures 1A and1B respectively.

GC/FID Analysis

The GC/FID chromatogram for the PES 28 sample (Figure 1B), consists predominately of a moderately weathered C_{10} – C_{26} diesel range material as indicated by the lack of *n*-alkanes and relative increase in the more recalcitrant isoprenoids (pristane and phytane). In addition, there is evidence of minor levels of a heavier (C_{26} - C_{40+}) range material. The petroleum GC/FID signature is consistent with a moderately weathered diesel range material that has been blended with a heavier product to increase mobility or alternatively represents two separate releases.

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 PES 28 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 PES 28 sample are provided in Figures 2A and 2B respectively. The PAH histogram for the PES 28 sample (Figure 2B) shows this sample is weathered as indicated by the lower proportion of naphthalenes compared to the source oil (Figure 2A). There are higher amounts of decalins and differences in the proportion of dibenzothiophenes and phenanthrenes compared to the source oil.

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 PES 28 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 PES 28 sample are presented in Figures 4A and 4B respectively. The biomarker traces show many differences including tri and tetracyclic terpane triplet (T6a, T6a, and T6c),[3] the proportion of TS and TM (T11 and T12)[2], norhopane and hopane (T15 and T19)[2], and an decrease in gammacerane (T22A) and T7-T10 relative to the source oil. In addition, sample PES 28 contains oleanane (T18) which is absent in the source oil. These differences indicate the PES 28 sample and source oil are derived from a different source of petroleum.

Figure 5 is a double source ratio plot for the biomarkers norhopane/hopane versus TS/TM. Differences in these ratio plots are a function of crude oil source and refinery processing.[2] The source oil and PES 28 sample plot away from each other indicating a different source of petroleum.

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

[3] Hostettler, F. D. and Kvenvolden, K. A. Kvenvolden. Geochemical changes in crude oil spilled from the Exxon Valdez supertanker into Prince William Sound, Alaska Org. Geochem. Vol. 21, No. 8/9, pp. 927-936, 1994.

Conclusion

The HC PES 28SEP2023 sample consists of a moderately weathered diesel range material that has been blended with a heavier product to increase mobility or alternatively represents two separate releases. The FID, PAH and biomarker analysis indicate the petroleum detected in the source oil and the HC PES 28SEP2023 sample are chemically different and was derived from a different source of petroleum.

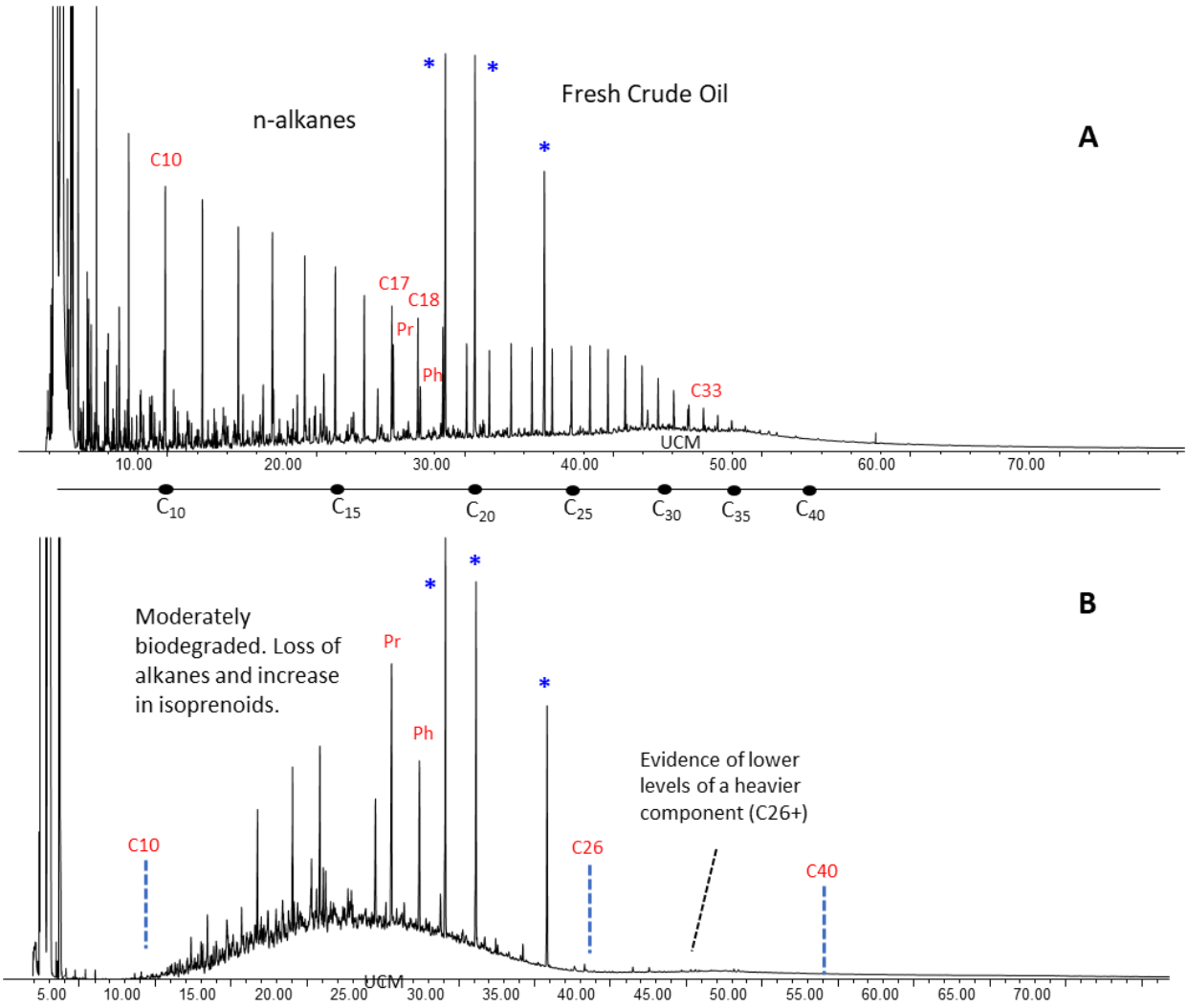

Figure 1. GC/FID "fingerprints" for the field samples.
Carbon ranges annotated below the x-axis analysis time scale.

A) Ship's Tanks Composite Sample
B) HC PES 28SEP2023
'*': Laboratory-added Internal Standard

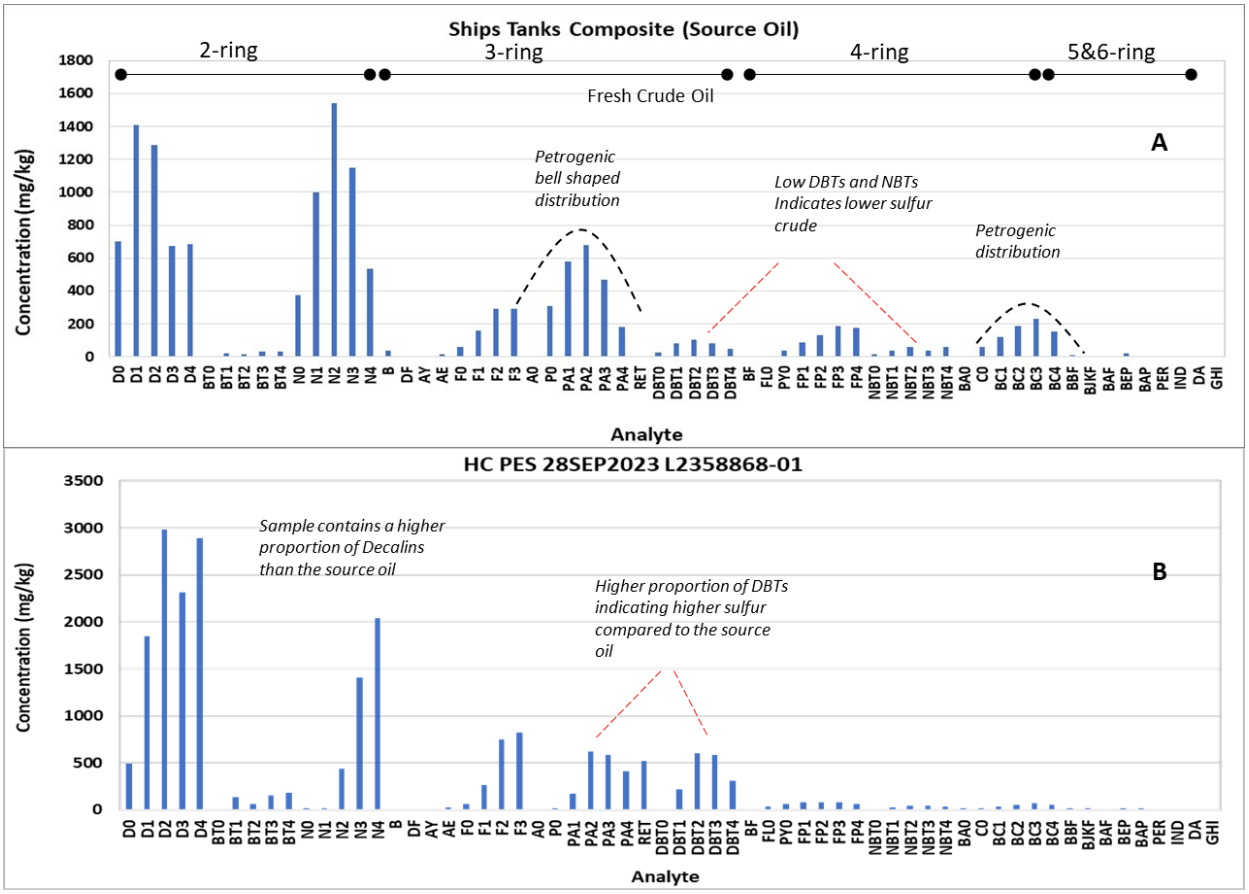

Figure 2. PAH Histograms

A) Ship's Tanks Composite Sample
B) HC PES 28SEP2023

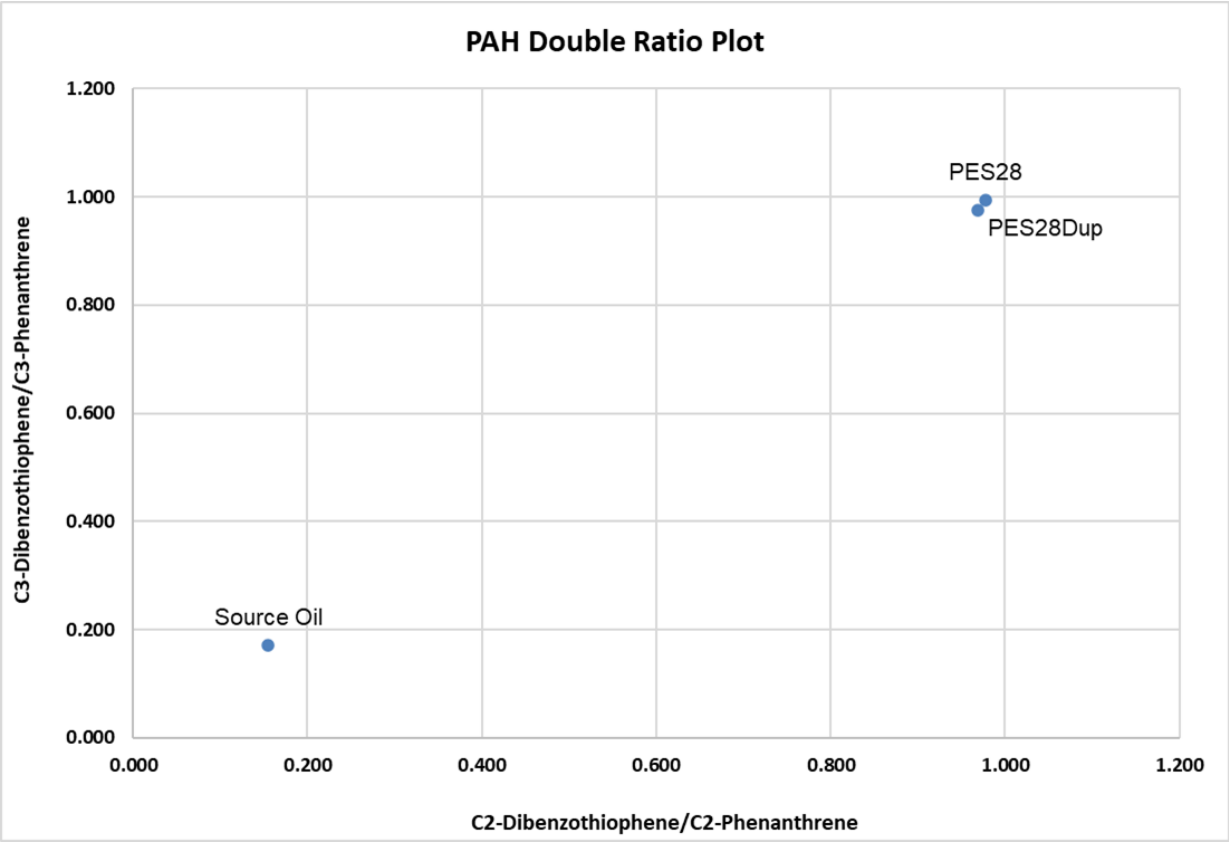

Figure 3. PAH Double Source Ratio Plots

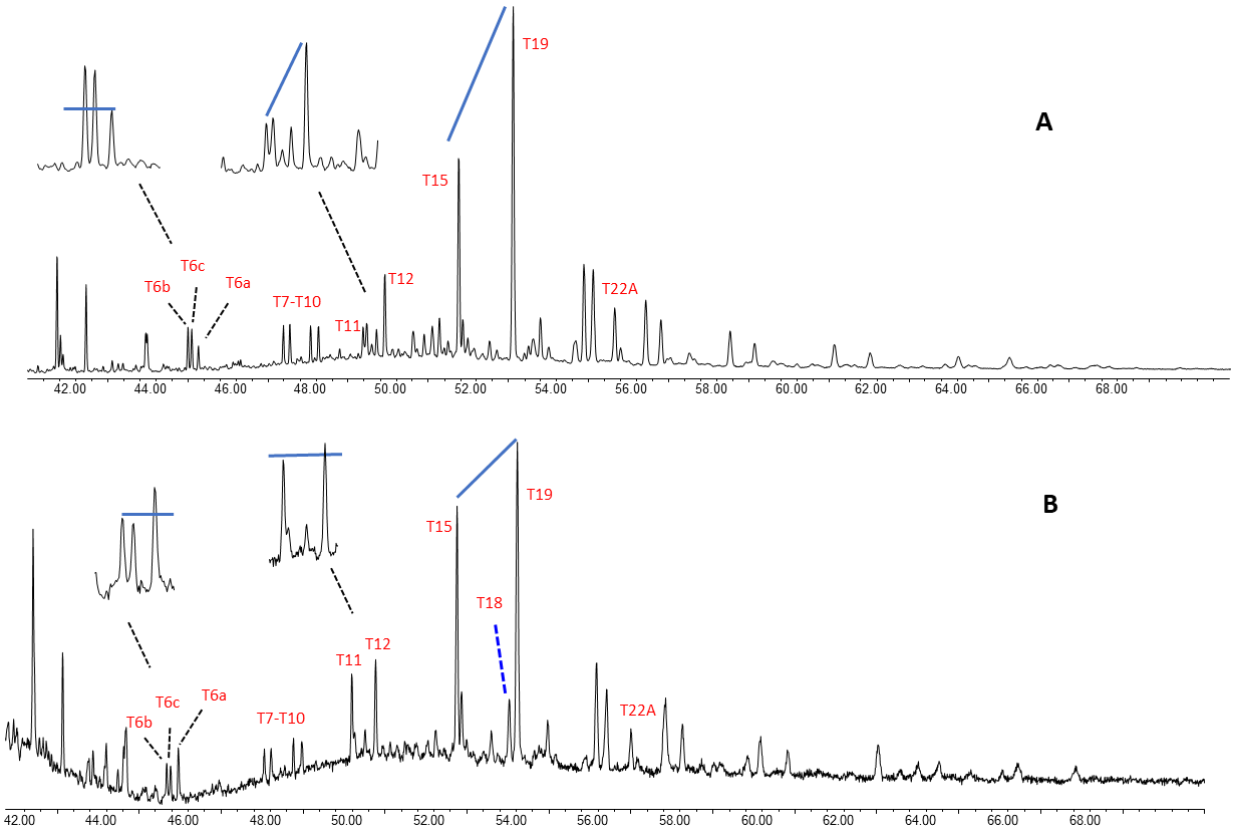

Figure 4. Biomarker m/z 191 Triterpane Fingerprint Traces

A) Ship's Tanks Composite Sample

B) HC PES 28SEP2023

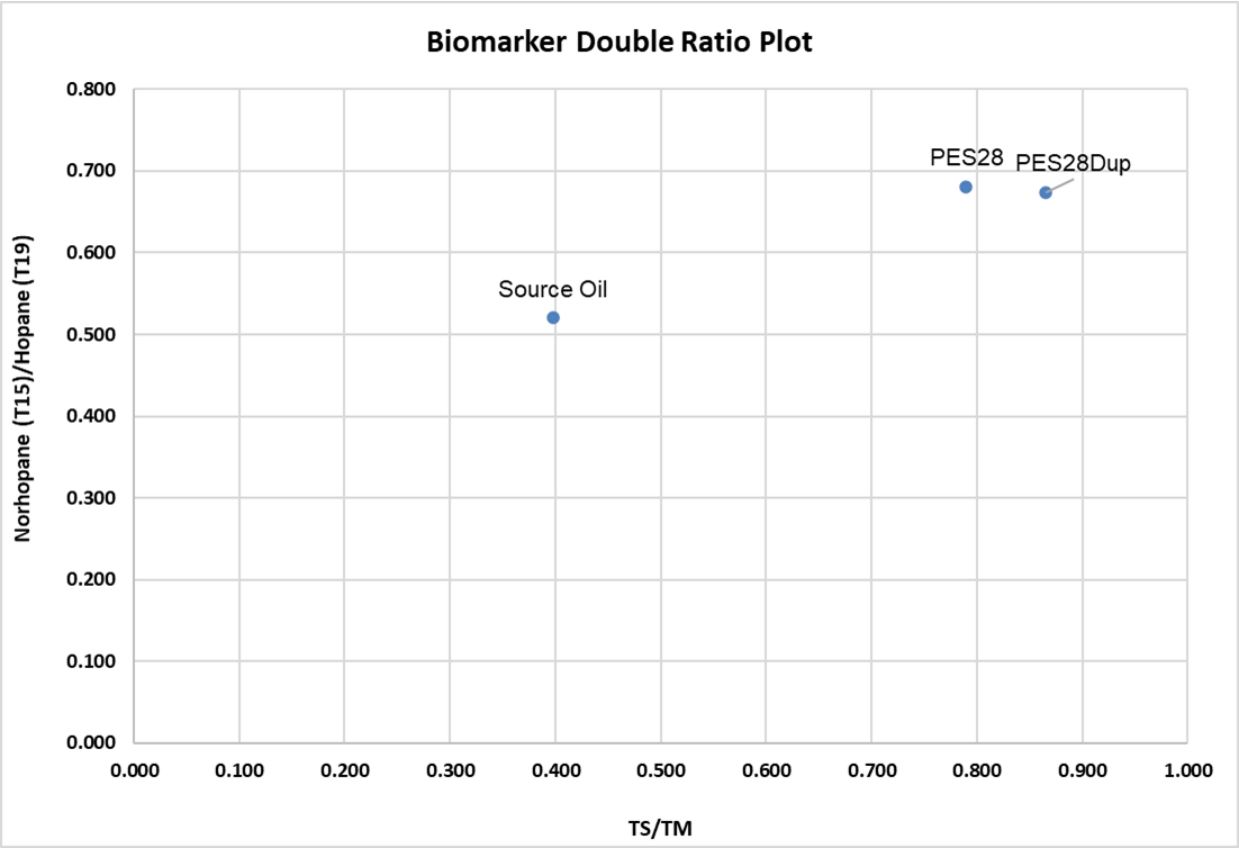

Figure 5. Biomarker Double Source Ratio Plots

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
HC PES 28SEP2023	L2358868-01	09/28/2023	Oily Solid	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
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

10/5/23

CARGO 10/5/23

L2358868

Nº 010502

CERPER
CERTIFICACIONES DEL PERU 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

LUGAR: PLAYA PESCADORES | Distrito: Huacho | Provincia: HUAURA | Departamento: LIMA

PERSONA DE CONTACTO: Ing. Caleb Torres

EXPEDIENTE: LEXIM-13217-2023

HS: 23007304

JOB NUMBER: 23LM0029894656O

NORMA:

1 SMEWW-APHA-AWWA-WEF. 24 th Ed. 2023. Collection and preservation of samples. Part 9060 A-B ( ) 9060 B-C ( ) 10200 B ( ) 10300 B ( ) 11000 B ( ) 11050 B ( )
2 Instructivo 3056-I Toma de muestras de sedimentos ( )
3 NTP 214.005 - 1987 (Revisada el 2016) Agua Potable. Toma de muestra. ITEM 4.4 ( ) ITEM 4.5 ( )
4 RM Nº 371-2020-PRODUCE. Protocolo para el Monitoreo de efluentes de los establecimientos industriales pesqueros de consumo humano directo e indirecto ( )
5 RJ Nº 010-2016-ANA. Protocolo nacional para el monitoreo de la calidad de los recursos hídricos superficiales ( )
6 NTP-ISO 5667-10:2012 (Revisada el 2018) Calidad de agua. Muestreo. Parte 10 - Guía para el muestreo de aguas residuales ( )
7 NTP 214.060.2016 AGUAS RESIDUALES. Protocolo de muestreo de aguas residuales no domésticas que se descargan en la red de alcantarillado ( )
8 RM Nº 273-2013-VIVIENDA. Protocolo de monitoreo de la calidad de los efluentes de las plantas de tratamiento de aguas residuales domésticas o municipales - PTAR ( )
9 RM Nº 085-2014-MINAM. Guía para el muestreo de suelos ( )
10 Protocolo de muestreo de calidad de agua sub sector hidrocarburos DGAAE-EM ( )
11 Otros: ( )

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
HC PES 28SEP2023	28.09.23	14:25	*	0237693	8734972	18L	01
						Total de Envases	01

-01

FINGER PRINT ✓

PARÁMETROS DE ANÁLISIS EN EL LABORATORIO

PARÁMETROS DE CAM

pH (Unidades de pH) | Temperatura Ambiental (°C) | Temperatura (°C) | Oxigeno Disuelto (mg/L) | Conductividad µS/cm ( ) mS/cm ( ) | Salinidad (UPS) | Cloro residual mg Cl2 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:
LDO = Lodo:
Otro: Restos Solidos de Hidrocarburos

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	033	4		
2			5		
3			6		

Observaciones: Se Acudio 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 preservación de la Muestra, la cual presenta una coloración oscura y olor a Hidrocarburos. La Muestra fue remitida en Tiempo Nº Precinto 0203931. Se tomaron las coordenadas UTM S: 1...

Responsable de la toma de muestra:
Firma:
Inspector Cerper: Joel Gutierrez Abarca
Inspectores de apoyo:
Hora de inicio: 14:20 Hora de término: 16:15

Representante del cliente
Rec: 10/5/23 12:31
Firma:
Nombre: CARLOS TORRES YACHACHIN
DNI: 48001656
Cargo: SUPERVISOR PLAYA

Recepción de muestras
Nombre: Oscar Vidal A.
Fecha: 02-10-2023 Hora: 2:50 PM

intertek
02 OCT. 2023
LAB. CALEB BRETT
RECEIVED

OI-R-C
Versió

Attachment 2

Analytical Data

Project Name: PAMPILLA 2
Project Number:

Client ID	HC PES 28SEP2023
Lab ID	L2358868-01
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1846978
Date Collected	9/28/2023
Date Received	10/5/2023
Date Prepped	11/1/2023
Date Analyzed	11/2/2023
Sample Size(wet)	0.00423 g
% Solid	100
File ID	F611012326
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	236

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)	6.86	J	236
SHC	C10	DECANE (C10)	63.6	J	236
SHC	C11	UNDECANE	830		236
SHC	C12	DODECANE (C12)	556		236
SHC	C13	TRIDECANE		U	236
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	6160		236
SHC	C14	TETRADECANE (C14)	1280		236
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	7520		236
SHC	C15	PENTADECANE (C15)	1110		236
SHC	C16	HEXADECANE (C16)	519		236
SHC	1650	NORPRISTANE (1650)	5920		236
SHC	C17	HEPTADECANE (C17)		U	236
SHC	Pr	PRISTANE	12300		236
SHC	C18	OCTADECANE (C18)		U	236
SHC	Ph	PHYTANE	7980		236
SHC	C19	NONADECANE (C19)		U	236
SHC	C20	EICOSANE (C20)		U	236
SHC	C21	HENEICOSANE (C21)		U	236
SHC	C22	DOCOSANE (C22)	108	J	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)	46.1	J	236
SHC	C28	OCTACOSANE (C28)		U	236
SHC	C29	NONACOSANE (C29)		U	236
SHC	C30	TRIACONTANE (C30)		U	236
SHC	C31	HENTATRIACONTANE (C31)		U	236
SHC	C32	DOTRIACONTANE (C32)		U	236
SHC	C33	TRITRIACONTANE (C33)	47.0	J	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)	949000		7800
SHC	TSH	TOTAL SATURATED HYDROCARBONS	44400	J	236

Surrogates (% Recovery)	
O-TERPHENYL	99
D50-TETRACOSANE	92

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1846978-1
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1846978
Date Collected	NA
Date Received	11/1/2023
Date Prepped	11/1/2023
Date Analyzed	11/1/2023
Sample Size(wet)	0.00418 g
% Solid	100
File ID	F611012314
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	239

Class	Abbrev	Analytes	Result	SSRL
SHC	C9	NONANE (C9)	U	239
SHC	C10	DECANE (C10)	U	239
SHC	C11	UNDECANE	U	239
SHC	C12	DODECANE (C12)	U	239
SHC	C13	TRIDECANE	U	239
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	U	239
SHC	C14	TETRADECANE (C14)	U	239
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	U	239
SHC	C15	PENTADECANE (C15)	U	239
SHC	C16	HEXADECANE (C16)	U	239
SHC	1650	NORPRISTANE (1650)	U	239
SHC	C17	HEPTADECANE (C17)	U	239
SHC	Pr	PRISTANE	U	239
SHC	C18	OCTADECANE (C18)	U	239
SHC	Ph	PHYTANE	U	239
SHC	C19	NONADECANE (C19)	U	239
SHC	C20	EICOSANE (C20)	U	239
SHC	C21	HENEICOSANE (C21)	U	239
SHC	C22	DOCOSANE (C22)	U	239
SHC	C23	TRICOSANE (C23)	U	239
SHC	C24	TETRACOSANE (C24)	U	239
SHC	C25	PENTACOSANE (C25)	U	239
SHC	C26	HEXACOSANE (C26)	U	239
SHC	C27	HEPTACOSANE (C27)	U	239
SHC	C28	OCTACOSANE (C28)	U	239
SHC	C29	NONACOSANE (C29)	U	239
SHC	C30	TRIACONTANE (C30)	U	239
SHC	C31	HENTATRIACONTANE (C31)	U	239
SHC	C32	DOTRIACONTANE (C32)	U	239
SHC	C33	TRITRIACONTANE (C33)	U	239
SHC	C34	TETRATRIACONTANE (C34)	U	239
SHC	C35	PENTATRIACONTANE (C35)	U	239
SHC	C36	HEXATRIACONTANE (C36)	U	239
SHC	C37	HEPTATRIACONTANE (C37)	U	239
SHC	C38	OCTATRIACONTANE (C38)	U	239
SHC	C39	NONATRIACONTANE (C39)	U	239
SHC	C40	TETRACONTANE (C40)	U	239
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	U	7890
SHC	TSH	TOTAL SATURATED HYDROCARBONS	U	239

Surrogates (% Recovery)	
O-TERPHENYL	97
D50-TETRACOSANE	96

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S	
Lab ID	WG1846978-2	
Matrix	SOLID	
Matrix Description		
Reference Method	8015D(M)	
Batch ID	WG1846978	
Date Collected	NA	
Date Received	11/1/2023	
Date Prepped	11/1/2023	
Date Analyzed	11/1/2023	
Sample Size(wet)	0.00418	g
% Solid	100	
File ID	F611012316	
Units	%	
Final Volume	1	
Dilution	1	
Reporting Limit	239	

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	NONANE (C9)	4780	239	100	4780	50	130
SHC	C10	DECANE (C10)	4640	239	97	4780	50	130
SHC	C12	DODECANE (C12)	4770	239	100	4780	50	130
SHC	C14	TETRADECANE (C14)	4810	239	100	4780	50	130
SHC	C16	HEXADECANE (C16)	5100	239	107	4780	50	130
SHC	C18	OCTADECANE (C18)	5370	239	112	4780	50	130
SHC	C19	NONADECANE (C19)	4840	239	101	4780	50	130
SHC	C20	EICOSANE (C20)	4900	239	102	4780	50	130
SHC	C22	DOCOSANE (C22)	4750	239	99	4780	50	130
SHC	C24	TETRACOSANE (C24)	5050	239	106	4780	50	130
SHC	C26	HEXACOSANE (C26)	4740	239	99	4780	50	130
SHC	C28	OCTACOSANE (C28)	4750	239	99	4780	50	130
SHC	C30	TRIACONTANE (C30)	4810	239	100	4780	50	130
SHC	C36	HEXATRIACONTANE (C36)	4410	239	92	4780	50	130

Surrogates (% Recovery)	
O-TERPHENYL	97
D50-TETRACOSANE	96

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate	
Lab ID	WG1846978-3	
Matrix	SOLID	
Matrix Description		
Reference Method	8015D(M)	
Batch ID	WG1846978	
Date Collected	NA	
Date Received	11/1/2023	
Date Prepped	11/1/2023	
Date Analyzed	11/1/2023	
Sample Size(wet)	0.00418	g
% Solid	100	
File ID	F611012318	
Units	%	
Final Volume	1	
Dilution	1	
Reporting Limit	239	

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
SHC	C9	NONANE (C9)	4790	239	100	4780	50	130	0	30
SHC	C10	DECANE (C10)	4680	239	98	4780	50	130	1	30
SHC	C12	DODECANE (C12)	4800	239	100	4780	50	130	0	30
SHC	C14	TETRADECANE (C14)	4860	239	102	4780	50	130	2	30
SHC	C16	HEXADECANE (C16)	5140	239	107	4780	50	130	0	30
SHC	C18	OCTADECANE (C18)	5370	239	112	4780	50	130	0	30
SHC	C19	NONADECANE (C19)	4840	239	101	4780	50	130	0	30
SHC	C20	EICOSANE (C20)	4880	239	102	4780	50	130	0	30
SHC	C22	DOCOSANE (C22)	4720	239	99	4780	50	130	0	30
SHC	C24	TETRACOSANE (C24)	5020	239	105	4780	50	130	1	30
SHC	C26	HEXACOSANE (C26)	4710	239	98	4780	50	130	1	30
SHC	C28	OCTACOSANE (C28)	4710	239	98	4780	50	130	1	30
SHC	C30	TRIACONTANE (C30)	4780	239	100	4780	50	130	0	30
SHC	C36	HEXATRIACONTANE (C36)	4400	239	92	4780	50	130	0	30

Surrogates (% Recovery)	
O-TERPHENYL	98
D50-TETRACOSANE	96

Project Name: PAMPILLA 2
Project Number:

Client ID		HC PES 28SEP2023		Duplicate Sample	
Lab ID		L2358868-01		WG1846978-4	
Matrix		SOLID		SOLID	
Matrix Description					
Reference Method		8015D(M)		8015D(M)	
Batch ID		WG1846978		WG1846978	
Date Collected		9/28/2023		NA	
Date Received		10/5/2023		11/1/2023	
Date Prepped		11/1/2023		11/1/2023	
Date Analyzed		11/2/2023		11/2/2023	
Sample Size(wet)		0.00423 g		0.00385 g	
% Solid		100		100	
File ID		F611012326		F611012328	
Units		mg/kg		mg/kg	
Final Volume		1		1	
Dilution		1		1	
Reporting Limit		236		260	

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
SHC	C9	NONANE (C9)	6.86	J	236	3.90	J	260		30	NC
SHC	C10	DECANE (C10)	63.6	J	236	43.9	J	260		30	NC
SHC	C11	UNDECANE	830		236	697		260	17	30	
SHC	C12	DODECANE (C12)	556		236	476		260	16	30	
SHC	C13	TRIDECANE		U	236		U	260		30	NC
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	6160		236	5310		260	15	30	
SHC	C14	TETRADECANE (C14)	1280		236	1110		260	14	30	
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	7520		236	6480		260	15	30	
SHC	C15	PENTADECANE (C15)	1110		236	897		260	21	30	
SHC	C16	HEXADECANE (C16)	519		236	414		260	23	30	
SHC	1650	NORPRISTANE (1650)	5920		236	5170		260	14	30	
SHC	C17	HEPTADECANE (C17)		U	236		U	260		30	NC
SHC	Pr	PRISTANE	12300		236	10600		260	15	30	
SHC	C18	OCTADECANE (C18)		U	236		U	260		30	NC
SHC	Ph	PHYTANE	7980		236	6840		260	15	30	
SHC	C19	NONADECANE (C19)		U	236		U	260		30	NC
SHC	C20	EICOSANE (C20)		U	236		U	260		30	NC
SHC	C21	HENEICOSANE (C21)		U	236		U	260		30	NC
SHC	C22	DOCOSANE (C22)	108	J	236	67.0	J	260		30	NC
SHC	C23	TRICOSANE (C23)		U	236		U	260		30	NC
SHC	C24	TETRACOSANE (C24)		U	236		U	260		30	NC
SHC	C25	PENTACOSANE (C25)		U	236		U	260		30	NC
SHC	C26	HEXACOSANE (C26)		U	236		U	260		30	NC
SHC	C27	HEPTACOSANE (C27)	46.1	J	236	33.2	J	260		30	NC
SHC	C28	OCTACOSANE (C28)		U	236		U	260		30	NC
SHC	C29	NONACOSANE (C29)		U	236		U	260		30	NC
SHC	C30	TRIACONTANE (C30)		U	236		U	260		30	NC
SHC	C31	HENTATRIACONTANE (C31)		U	236		U	260		30	NC
SHC	C32	DOTRIACONTANE (C32)		U	236		U	260		30	NC
SHC	C33	TRITRIACONTANE (C33)	47.0	J	236	46.8	J	260		30	NC
SHC	C34	TETRATRIACONTANE (C34)		U	236		U	260		30	NC
SHC	C35	PENTATRIACONTANE (C35)		U	236		U	260		30	NC
SHC	C36	HEXATRIACONTANE (C36)		U	236		U	260		30	NC
SHC	C37	HEPTATRIACONTANE (C37)		U	236		U	260		30	NC
SHC	C38	OCTATRIACONTANE (C38)		U	236		U	260		30	NC
SHC	C39	NONATRIACONTANE (C39)		U	236		U	260		30	NC
SHC	C40	TETRACONTANE (C40)		U	236		U	260		30	NC
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	949000		7800	798000		8570	17	30	
SHC	TSH	TOTAL SATURATED HYDROCARBONS	44400	J	236	38200	J	260		30	NC

Surrogates (% Recovery)		
O-TERPHENYL	99	98
D50-TETRACOSANE	92	93

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1836137-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8015D(M)-A2-NFSHC
Batch ID	WG1836137-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	9/9/2023
Sample Size(wet)	0.1008 g
% Solid	100
File ID	F609082330
Units	mg/kg
Final Volume	10
Dilution	1
Reporting Limit	0.992

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	NONANE (C9)	6480	0.992	103	6286	65	135
SHC	C10	DECANE (C10)	5280	0.992	105	5047	65	135
SHC	C11	UNDECANE	4780	0.992	102	4703	65	135
SHC	C12	DODECANE (C12)	4470	0.992	108	4155	65	135
SHC	C13	TRIDECANE	4110	0.992	101	4058	65	135
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	939	0.992	111	845	65	135
SHC	C14	TETRADECANE (C14)	3770	0.992	103	3670	65	135
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	1480	0.992	108	1367	65	135
SHC	C15	PENTADECANE (C15)	4320	0.992	118	3660	65	135
SHC	C16	HEXADECANE (C16)	3410	0.992	102	3330	65	135
SHC	1650	NORPRISTANE (1650)	1230	0.992	112	1093	65	135
SHC	C17	HEPTADECANE (C17)	2930	0.992	97	3012	65	135
SHC	Pr	PRISTANE	2250	0.992	105	2145	65	135
SHC	C18	OCTADECANE (C18)	2580	0.992	96	2700	65	135
SHC	Ph	PHYTANE	1420	0.992	117	1215	65	135
SHC	C19	NONADECANE (C19)	2490	0.992	108	2305	65	135
SHC	C20	EICOSANE (C20)	2630	0.992	112	2337	65	135
SHC	C21	HENEICOSANE (C21)	2180	0.992	107	2044	65	135
SHC	C22	DOCOSANE (C22)	2050	0.992	104	1972	65	135
SHC	C23	TRICOSANE (C23)	1800	0.992	103	1745	65	135
SHC	C24	TETRACOSANE (C24)	1730	0.992	105	1641	65	135
SHC	C25	PENTACOSANE (C25)	1830	0.992	117	1562	65	135
SHC	C26	HEXACOSANE (C26)	1390	0.992	101	1378	65	135
SHC	C27	HEPTACOSANE (C27)	1120	0.992	103	1083	65	135
SHC	C28	OCTACOSANE (C28)	778	0.992	100	776	65	135
SHC	C29	NONACOSANE (C29)	778	0.992	106	734	65	135
SHC	C30	TRIACONTANE (C30)	612	0.992	98	627	65	135
SHC	C31	HENTATRIACONTANE (C31)	502	0.992	98	514	65	135
SHC	C32	DOTRIACONTANE (C32)	539	0.992	118	458	65	135
SHC	C33	TRITRIACONTANE (C33)	402	0.992	104	388	65	135
SHC	C34	TETRATRIACONTANE (C34)	337	0.992	97	347	65	135
SHC	C35	PENTATRIACONTANE (C35)	254	0.992	91	278	65	135
SHC	C36	HEXATRIACONTANE (C36)	181	0.992	97	186	65	135
SHC	C37	HEPTATRIACONTANE (C37)	163	0.992	107	152	65	135
SHC	C38	OCTATRIACONTANE (C38)	125	0.992	95	131	65	135
SHC	C39	NONATRIACONTANE (C39)	87.9	0.992	99	89	65	135
SHC	C40	TETRACONTANE (C40)	74.8	0.992	81	92	65	135
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	569000	0.992	102	554993	65	135
SHC	TSH	TOTAL SATURATED HYDROCARBONS	80263	0.992	118	68122	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	SHIP'S TANKS COMPOSITE SAMPLE
Lab ID	L2358868-02
Matrix	OIL
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1847594
Date Collected	1/14/2022
Date Received	5/4/2022
Date Prepped	12/22/2022
Date Analyzed	11/2/2023
Sample Size(wet)	0.0584 g
% Solid	100
File ID	F611012344
Units	mg/kg
Final Volume	10
Dilution	1
Reporting Limit	171

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)	5060		171
SHC	C10	DECANE (C10)	4750		171
SHC	C11	UNDECANE	4680		171
SHC	C12	DODECANE (C12)	4460		171
SHC	C13	TRIDECANE	4420		171
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	1080		171
SHC	C14	TETRADECANE (C14)	4100		171
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	2000		171
SHC	C15	PENTADECANE (C15)	4420		171
SHC	C16	HEXADECANE (C16)	3390		171
SHC	1650	NORPRISTANE (1650)	1640		171
SHC	C17	HEPTADECANE (C17)	3020		171
SHC	Pr	PRISTANE	2740		171
SHC	C18	OCTADECANE (C18)	2840		171
SHC	Ph	PHYTANE	1690		171
SHC	C19	NONADECANE (C19)	2240		171
SHC	C20	EICOSANE (C20)	2080		171
SHC	C21	HENEICOSANE (C21)	1770		171
SHC	C22	DOCOSANE (C22)	1850		171
SHC	C23	TRICOSANE (C23)	1710		171
SHC	C24	TETRACOSANE (C24)	1820		171
SHC	C25	PENTACOSANE (C25)	2180		171
SHC	C26	HEXACOSANE (C26)	1780		171
SHC	C27	HEPTACOSANE (C27)	1760		171
SHC	C28	OCTACOSANE (C28)	1480		171
SHC	C29	NONACOSANE (C29)	1340		171
SHC	C30	TRIACONTANE (C30)	979		171
SHC	C31	HENTATRIACONTANE (C31)	803		171
SHC	C32	DOTRIACONTANE (C32)	958		171
SHC	C33	TRITRIACONTANE (C33)	570		171
SHC	C34	TETRATRIACONTANE (C34)	406		171
SHC	C35	PENTATRIACONTANE (C35)	249		171
SHC	C36	HEXATRIACONTANE (C36)	157	J	171
SHC	C37	HEPTATRIACONTANE (C37)	119	J	171
SHC	C38	OCTATRIACONTANE (C38)	97.1	J	171
SHC	C39	NONATRIACONTANE (C39)	66.8	J	171
SHC	C40	TETRACONTANE (C40)	63.9	J	171
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	486000		5650
SHC	TSH	TOTAL SATURATED HYDROCARBONS	74800	J	171

	92
	84

Project Name: PAMPILLA 2
Project Number:

Client ID	HC PES 28SEP2023
Lab ID	L2358868-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1846978
Date Collected	9/28/2023
Date Received	10/5/2023
Date Prepped	11/1/2023
Date Analyzed	11/7/2023
Sample Size(wet)	0.00423 g
% Solid	100
File ID	F911062325
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.18

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN	492		1.18
2	D1	C1-DECALINS	1850		2.36
2	D2	C2-DECALINS	2980		2.36
2	D3	C3-DECALINS	2310		2.36
2	D4	C4-DECALINS	2890		2.36
S	BT0	BENZOTHIOPHENE		U	2.36
2	BT1	C1-BENZO(B)THIOPHENES	140		2.36
2	BT2	C2-BENZO(B)THIOPHENES	60.6		2.36
2	BT3	C3-BENZO(B)THIOPHENES	151		2.36
2	BT4	C4-BENZO(B)THIOPHENES	183		2.36
A	N0	NAPHTHALENE	19.2		2.36
2	N1	C1-NAPHTHALENES	14.5	G	2.36
2	N2	C2-NAPHTHALENES	441		2.36
2	N3	C3-NAPHTHALENES	1410		2.36
2	N4	C4-NAPHTHALENES	2040		2.36
2	B	BIPHENYL	3.17	B	2.36
3	DF	DIBENZOFURAN	2.26	J	2.36
3	AY	ACENAPHTHYLENE	10.5		2.36
3	AE	ACENAPHTHENE	28.7		2.36
3	F0	FLUORENE	60.4		2.36
3	F1	C1-FLUORENES	260		2.36
3	F2	C2-FLUORENES	750		2.36
3	F3	C3-FLUORENES	824		2.36
3	A0	ANTHRACENE		U	2.36
3	P0	PHENANTHRENE	20.2		2.36
3	PA1	C1-PHENANTHRENES/ANTHRACENES	170		2.36
3	PA2	C2-PHENANTHRENES/ANTHRACENES	618		2.36
3	PA3	C3-PHENANTHRENES/ANTHRACENES	585		2.36
3	PA4	C4-PHENANTHRENES/ANTHRACENES	412		2.36
3	RET	RETENE	520		2.36
3	DBT0	DIBENZOTHIOPHENE	11.9		2.36
3	DBT1	C1-DIBENZOTHIOPHENES	218		2.36
3	DBT2	C2-DIBENZOTHIOPHENES	604		2.36
3	DBT3	C3-DIBENZOTHIOPHENES	581		2.36
3	DBT4	C4-DIBENZOTHIOPHENES	312		2.36
4	BF	BENZO(B)FLUORENE	9.44		2.36
4	FL0	FLUORANTHENE	32.8		2.36
4	PY0	PYRENE	59.2		2.36
4	FP1	C1-FLUORANTHENES/PYRENES	81.8		2.36
4	FP2	C2-FLUORANTHENES/PYRENES	81.0		2.36
4	FP3	C3-FLUORANTHENES/PYRENES	78.3		2.36
4	FP4	C4-FLUORANTHENES/PYRENES	65.7		2.36
4	NBT0	NAPHTHOBENZOTHIOPHENE	8.86		2.36
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	26.6		2.36
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	46.4		2.36
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	43.9		2.36
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	32.4		2.36
4	BA0	BENZ(A)ANTHRACENE	18.6		2.36
4	C0	CHRYSENE/TRIPHENYLENE	20.4		2.36
4	BC1	C1-CHRYSENES	38.3		2.36
4	BC2	C2-CHRYSENES	56.4		2.36
4	BC3	C3-CHRYSENES	69.3		2.36
4	BC4	C4-CHRYSENES	49.9		2.36
5	BBF	BENZO(B)FLUORANTHENE	14.0		2.36

Project Name: PAMPILLA 2
Project Number:

Client ID	HC PES 28SEP2023
Lab ID	L2358868-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1846978
Date Collected	9/28/2023
Date Received	10/5/2023
Date Prepped	11/1/2023
Date Analyzed	11/7/2023
Sample Size(wet)	0.00423 g
% Solid	100
File ID	F911062325
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.18

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE	13.0		2.36
5	BAF	BENZO(A)FLUORANTHENE	2.58		2.36
5	BEP	BENZO(E)PYRENE	12.8		2.36
5	BAP	BENZO(A)PYRENE	15.0		2.36
5	PER	PERYLENE	7.92		2.36
6	IND	INDENO(1,2,3-CD)PYRENE	9.54		2.36
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	3.84		2.36
6	GHI	BENZO(GHI)PERYLENE	9.39		2.36
O	CAR	CARBAZOLE	11.0		2.36
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	98.5		2.36
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	81.5		2.36
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	32.9		2.36
3	3MP	3-METHYLPHENANTHRENE (3MP)	14.0		2.36
3	2MP	2-METHYLPHENANTHRENE (2MP)	38.2		2.36
3	2MA	2-METHYLANTHRACENE (2MA)	15.4		2.36
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	45.9		2.36
3	1MP	1-METHYLPHENANTHRENE (1MP)	42.9		2.36
A	1MN	1-METHYLNAPHTHALENE	4.53		2.36
A	2MN	2-METHYLNAPHTHALENE	1.43	JB	2.36
2	26DMN	2,6-DIMETHYLNAPHTHALENE	125		2.36
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	96.6		2.36
H30	T19	HOPANE (T19)	71.4		2.36
t23	T4	C23 TRICYCLIC TERPANE (T4)	30.9		2.36
t24	T5	C24 TRICYCLIC TERPANE (T5)	17.3		2.36
t25	T6	C25 TRICYCLIC TERPANE (T6)	20.0		2.36
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	7.58		2.36
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	5.41		2.36
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	4.79		2.36
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	5.85		2.36
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	7.12		2.36
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	6.28		2.36
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	5.86		2.36
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	13.9		2.36
t30S	T11a	C30 TRICYCLIC TERPANE-22S	4.71		2.36
t30R	T11b	C30 TRICYCLIC TERPANE-22R	5.25		2.36
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	17.6		2.36
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	3.59		2.36
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	6.31		2.36
H29	T15	30-NORHOPANE (T15)	48.6		2.36
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	14.6		2.36
X	X	17A(H)-DIAHOPANE (X)	3.98		2.36
M29	T17	30-NORMORETANE (T17)	7.50		2.36
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	17.6		2.36
M30	T20	MORETANE (T20)	9.90		2.36
H31S	T21	30-HOMOHOPANE-22S (T21)	26.7		2.36
H31R	T22	30-HOMOHOPANE-22R (T22)	23.4		2.36
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	9.30		2.36
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	28.8		2.36
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	11.9		2.36
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	12.4		2.36
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	8.23		2.36
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	13.5		2.36
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	6.44		2.36
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	8.24		2.36

Project Name: PAMPILLA 2
Project Number:

Client ID	HC PES 28SEP2023
Lab ID	L2358868-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1846978
Date Collected	9/28/2023
Date Received	10/5/2023
Date Prepped	11/1/2023
Date Analyzed	11/7/2023
Sample Size(wet)	0.00423 g
% Solid	100
File ID	F911062325
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.18

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	6.48	2.36
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	16.2	2.36
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	9.37	2.36
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	6.83	2.36
aa27S	S12	17A(H)20SC27/C29DIA	18.3	2.36
aa27R	S17	17A(H)20RC27/C29DIA	22.9	2.36
d29R	S18	UNKNOWN STERANE (S18)	4.43	2.36
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	1.42 J	2.36
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	10.1	2.36
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	13.1	2.36
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	12.9	2.36
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	11.8	2.36
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	13.6	2.36
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	13.9	2.36
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	14.4	2.36
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	16.8	2.36
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	18.2	2.36
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	12.7	2.36
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	75.2	2.36
SC28TAS	TAS02	C28,20S TAS	47.3	2.36
RC27TAS	TAS03	C27,20R TAS	51.1	2.36
RC28TAS	TAS04	C28,20R TAS	38.2	2.36

Surrogates (% Recovery)	
NAPHTHALENE-D8	89
PHENANTHRENE-D10	98
BENZO(A)PYRENE-D12	98
5B(H)CHOLANE	110

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1846978-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1846978
Date Collected	NA
Date Received	11/1/2023
Date Prepped	11/1/2023
Date Analyzed	11/7/2023
Sample Size(wet)	0.00418 g
% Solid	100
File ID	F911062322
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.2

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN		U	1.20
2	D1	C1-DECALINS		U	2.39
2	D2	C2-DECALINS		U	2.39
2	D3	C3-DECALINS		U	2.39
2	D4	C4-DECALINS		U	2.39
S	BT0	BENZOTHIOPHENE		U	2.39
2	BT1	C1-BENZO(B)THIOPHENES		U	2.39
2	BT2	C2-BENZO(B)THIOPHENES		U	2.39
2	BT3	C3-BENZO(B)THIOPHENES		U	2.39
2	BT4	C4-BENZO(B)THIOPHENES		U	2.39
A	N0	NAPHTHALENE	0.475	J	2.39
2	N1	C1-NAPHTHALENES	0.783	J	2.39
2	N2	C2-NAPHTHALENES		U	2.39
2	N3	C3-NAPHTHALENES		U	2.39
2	N4	C4-NAPHTHALENES		U	2.39
2	B	BIPHENYL	0.338	J	2.39
3	DF	DIBENZOFURAN		U	2.39
3	AY	ACENAPHTHYLENE	0.230	J	2.39
3	AE	ACENAPHTHENE		U	2.39
3	F0	FLUORENE	0.219	J	2.39
3	F1	C1-FLUORENES		U	2.39
3	F2	C2-FLUORENES		U	2.39
3	F3	C3-FLUORENES		U	2.39
3	A0	ANTHRACENE	0.117	J	2.39
3	P0	PHENANTHRENE	0.403	J	2.39
3	PA1	C1-PHENANTHRENES/ANTHRACENES	1.01	J	2.39
3	PA2	C2-PHENANTHRENES/ANTHRACENES		U	2.39
3	PA3	C3-PHENANTHRENES/ANTHRACENES		U	2.39
3	PA4	C4-PHENANTHRENES/ANTHRACENES	2.23	J	2.39
3	RET	RETENE	1.73	J	2.39
3	DBT0	DIBENZOTHIOPHENE	0.233	J	2.39
3	DBT1	C1-DIBENZOTHIOPHENES	1.12	J	2.39
3	DBT2	C2-DIBENZOTHIOPHENES	2.29	J	2.39
3	DBT3	C3-DIBENZOTHIOPHENES		U	2.39
3	DBT4	C4-DIBENZOTHIOPHENES		U	2.39
4	BF	BENZO(B)FLUORENE	0.368	J	2.39
4	FL0	FLUORANTHENE	0.360	J	2.39
4	PY0	PYRENE	0.441	J	2.39
4	FP1	C1-FLUORANTHENES/PYRENES		U	2.39
4	FP2	C2-FLUORANTHENES/PYRENES		U	2.39
4	FP3	C3-FLUORANTHENES/PYRENES		U	2.39
4	FP4	C4-FLUORANTHENES/PYRENES		U	2.39
4	NBT0	NAPHTHOBENZOTHIOPHENE	0.634	J	2.39
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES		U	2.39
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES		U	2.39
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES		U	2.39
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES		U	2.39
4	BA0	BENZ(A)ANTHRACENE	0.388	J	2.39
4	C0	CHRYSENE/TRIPHENYLENE	0.522	J	2.39
4	BC1	C1-CHRYSENES		U	2.39
4	BC2	C2-CHRYSENES		U	2.39
4	BC3	C3-CHRYSENES		U	2.39
4	BC4	C4-CHRYSENES		U	2.39
5	BBF	BENZO(B)FLUORANTHENE	0.396	J	2.39

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1846978-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1846978
Date Collected	NA
Date Received	11/1/2023
Date Prepped	11/1/2023
Date Analyzed	11/7/2023
Sample Size(wet)	0.00418 g
% Solid	100
File ID	F911062322
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.2

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE	0.406	J	2.39
5	BAF	BENZO(A)FLUORANTHENE		U	2.39
5	BEP	BENZO(E)PYRENE	0.454	J	2.39
5	BAP	BENZO(A)PYRENE	0.339	J	2.39
5	PER	PERYLENE	0.254	J	2.39
6	IND	INDENO(1,2,3-CD)PYRENE	0.347	J	2.39
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	0.280	J	2.39
6	GHI	BENZO(GHI)PERYLENE	0.290	J	2.39
O	CAR	CARBAZOLE	0.170	J	2.39
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	0.230	J	2.39
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)		U	2.39
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	0.520	J	2.39
3	3MP	3-METHYLPHENANTHRENE (3MP)	0.0976	J	2.39
3	2MP	2-METHYLPHENANTHRENE (2MP)	0.175	J	2.39
3	2MA	2-METHYLANTHRACENE (2MA)		U	2.39
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	0.176	J	2.39
3	1MP	1-METHYLPHENANTHRENE (1MP)	0.320	J	2.39
A	1MN	1-METHYLNAPHTHALENE	0.328	J	2.39
A	2MN	2-METHYLNAPHTHALENE	0.529	J	2.39
2	26DMN	2,6-DIMETHYLNAPHTHALENE		U	2.39
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE		U	2.39
H30	T19	HOPANE (T19)		U	2.39
t23	T4	C23 TRICYCLIC TERPANE (T4)		U	2.39
t24	T5	C24 TRICYCLIC TERPANE (T5)		U	2.39
t25	T6	C25 TRICYCLIC TERPANE (T6)		U	2.39
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)		U	2.39
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)		U	2.39
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)		U	2.39
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)		U	2.39
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)		U	2.39
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)		U	2.39
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)		U	2.39
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)		U	2.39
t30S	T11a	C30 TRICYCLIC TERPANE-22S		U	2.39
t30R	T11b	C30 TRICYCLIC TERPANE-22R		U	2.39
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)		U	2.39
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)		U	2.39
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)		U	2.39
H29	T15	30-NORHOPANE (T15)		U	2.39
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)		U	2.39
X	X	17A(H)-DIAHOPANE (X)		U	2.39
M29	T17	30-NORMORETANE (T17)		U	2.39
OL	T18	18A(H)&18B(H)-OLEANANES (T18)		U	2.39
M30	T20	MORETANE (T20)		U	2.39
H31S	T21	30-HOMOHOPANE-22S (T21)		U	2.39
H31R	T22	30-HOMOHOPANE-22R (T22)		U	2.39
T22A	T22A	GAMMACERANE/C32-DIAHOPANE		U	2.39
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)		U	2.39
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)		U	2.39
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)		U	2.39
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)		U	2.39
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)		U	2.39
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)		U	2.39
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)		U	2.39

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1846978-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1846978
Date Collected	NA
Date Received	11/1/2023
Date Prepped	11/1/2023
Date Analyzed	11/7/2023
Sample Size(wet)	0.00418 g
% Solid	100
File ID	F911062322
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.2

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	U	2.39
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	U	2.39
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	U	2.39
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	U	2.39
aa27S	S12	17A(H)20SC27/C29DIA	U	2.39
aa27R	S17	17A(H)20RC27/C29DIA	U	2.39
d29R	S18	UNKNOWN STERANE (S18)	U	2.39
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	U	2.39
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	U	2.39
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	U	2.39
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	U	2.39
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	U	2.39
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	U	2.39
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	U	2.39
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	U	2.39
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	U	2.39
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	U	2.39
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	U	2.39
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	U	2.39
SC28TAS	TAS02	C28,20S TAS	U	2.39
RC27TAS	TAS03	C27,20R TAS	U	2.39
RC28TAS	TAS04	C28,20R TAS	U	2.39

Surrogates (% Recovery)	
NAPHTHALENE-D8	94
PHENANTHRENE-D10	104
BENZO(A)PYRENE-D12	93
5B(H)CHOLANE	110

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1846978-2
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1846978
Date Collected	NA
Date Received	11/1/2023
Date Prepped	11/1/2023
Date Analyzed	11/7/2023
Sample Size(wet)	0.00418 g
% Solid	100
File ID	F911062323
Units	%
Final Volume	1
Dilution	1
Reporting Limit	2.39

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
A	N0	NAPHTHALENE	222	2.39	93	239	50	130
3	AY	ACENAPHTHYLENE	247	2.39	103	239	50	130
3	AE	ACENAPHTHENE	221	2.39	92	239	50	130
3	F0	FLUORENE	237	2.39	99	239	50	130
3	A0	ANTHRACENE	248	2.39	104	239	50	130
3	P0	PHENANTHRENE	225	2.39	94	239	50	130
4	FL0	FLUORANTHENE	214	2.39	89	239	50	130
4	PY0	PYRENE	220	2.39	92	239	50	130
4	BA0	BENZ(A)ANTHRACENE	261	2.39	109	239	50	130
4	C0	CHRYSENE/TRIPHENYLENE	237	2.39	99	239	50	130
5	BBF	BENZO(B)FLUORANTHENE	221	2.39	92	239	50	130
5	BJKF	BENZO(J)+(K)FLUORANTHENE	220	2.39	92	239	50	130
5	BAP	BENZO(A)PYRENE	231	2.39	96	239	50	130
6	IND	INDENO(1,2,3-CD)PYRENE	242	2.39	101	239	50	130
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	242	2.39	101	239	50	130
6	GHI	BENZO(GHI)PERYLENE	212	2.39	88	239	50	130
A	2MN	2-METHYLNAPHTHALENE	219	2.39	92	239	50	130

Surrogates (% Recovery)	
NAPHTHALENE-D8	93
PHENANTHRENE-D10	102
BENZO(A)PYRENE-D12	97
5B(H)CHOLANE	109

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1846978-3
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1846978
Date Collected	NA
Date Received	11/1/2023
Date Prepped	11/1/2023
Date Analyzed	11/7/2023
Sample Size(wet)	0.00418 g
% Solid	100
File ID	F911062324
Units	%
Final Volume	1
Dilution	1
Reporting Limit	2.39

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
A	N0	NAPHTHALENE	224	2.39	94	239	50	130	1	30
3	AY	ACENAPHTHYLENE	248	2.39	104	239	50	130	1	30
3	AE	ACENAPHTHENE	220	2.39	92	239	50	130	0	30
3	F0	FLUORENE	236	2.39	98	239	50	130	1	30
3	A0	ANTHRACENE	250	2.39	104	239	50	130	0	30
3	P0	PHENANTHRENE	224	2.39	94	239	50	130	0	30
4	FL0	FLUORANTHENE	216	2.39	90	239	50	130	1	30
4	PY0	PYRENE	222	2.39	93	239	50	130	1	30
4	BA0	BENZ(A)ANTHRACENE	262	2.39	109	239	50	130	0	30
4	C0	CHRYSENE/TRIPHENYLENE	235	2.39	98	239	50	130	1	30
5	BBF	BENZO(B)FLUORANTHENE	217	2.39	90	239	50	130	2	30
5	BJKF	BENZO(J)+(K)FLUORANTHENE	223	2.39	93	239	50	130	1	30
5	BAP	BENZO(A)PYRENE	230	2.39	96	239	50	130	0	30
6	IND	INDENO(1,2,3-CD)PYRENE	241	2.39	100	239	50	130	1	30
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	239	2.39	100	239	50	130	1	30
6	GHI	BENZO(GHI)PERYLENE	211	2.39	88	239	50	130	0	30
A	2MN	2-METHYLNAPHTHALENE	221	2.39	92	239	50	130	0	30

Surrogates (% Recovery)	
NAPHTHALENE-D8	95
PHENANTHRENE-D10	101
BENZO(A)PYRENE-D12	97
5B(H)CHOLANE	108

Project Name: PAMPILLA 2
Project Number:

Client ID	HC PES 28SEP2023		Duplicate Sample		
Lab ID	L2358868-01		WG1846978-4		
Matrix	SOLID		SOLID		
Matrix Description					
Reference Method	8270E-SIM(M)		8270E-SIM(M)		
Batch ID	WG1846978		WG1846978		
Date Collected	9/28/2023		NA		
Date Received	10/5/2023		11/1/2023		
Date Prepped	11/1/2023		11/1/2023		
Date Analyzed	11/7/2023		11/7/2023		
Sample Size(wet)	0.00423	g	0.00385	g	
% Solid	100		100		
File ID	F911062325		F911062326		
Units	mg/kg		mg/kg		
Final Volume	1		1		
Dilution	1		1		
Reporting Limit	1.18		1.3		

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
2	D0	CIS/TRANS-DECALIN	492		1.18	381		1.30	25	30	
2	D1	C1-DECALINS	1850		2.36	1500		2.60	21	30	
2	D2	C2-DECALINS	2980		2.36	2490		2.60	18	30	
2	D3	C3-DECALINS	2310		2.36	1980		2.60	15	30	
2	D4	C4-DECALINS	2890		2.36	2450		2.60	16	30	
S	BT0	BENZOTHIOPHENE		U	2.36		U	2.60		30	NC
2	BT1	C1-BENZO(B)THIOPHENES	140		2.36	120		2.60	15	30	
2	BT2	C2-BENZO(B)THIOPHENES	60.6		2.36	51.9		2.60	15	30	
2	BT3	C3-BENZO(B)THIOPHENES	151		2.36	131		2.60	14	30	
2	BT4	C4-BENZO(B)THIOPHENES	183		2.36	153		2.60	18	30	
A	N0	NAPHTHALENE	19.2		2.36	15.5		2.60	21	30	
2	N1	C1-NAPHTHALENES	14.5	G	2.36	12.0	G	2.60	19	30	
2	N2	C2-NAPHTHALENES	441		2.36	377		2.60	16	30	
2	N3	C3-NAPHTHALENES	1410		2.36	1190		2.60	17	30	
2	N4	C4-NAPHTHALENES	2040		2.36	1720		2.60	17	30	
2	B	BIPHENYL	3.17	B	2.36	3.17	B	2.60	0	30	
3	DF	DIBENZOFURAN	2.26	J	2.36	2.28	J	2.60		30	NC
3	AY	ACENAPHTHYLENE	10.5		2.36	8.00		2.60	27	30	
3	AE	ACENAPHTHENE	28.7		2.36	22.3		2.60	25	30	
3	F0	FLUORENE	60.4		2.36	47.2		2.60	25	30	
3	F1	C1-FLUORENES	260		2.36	218		2.60	18	30	
3	F2	C2-FLUORENES	750		2.36	618		2.60	19	30	
3	F3	C3-FLUORENES	824		2.36	691		2.60	18	30	
3	A0	ANTHRACENE		U	2.36		U	2.60		30	NC
3	P0	PHENANTHRENE	20.2		2.36	16.8		2.60	18	30	
3	PA1	C1-PHENANTHRENES/ANTHRACENES	170		2.36	142		2.60	18	30	
3	PA2	C2-PHENANTHRENES/ANTHRACENES	618		2.36	522		2.60	17	30	
3	PA3	C3-PHENANTHRENES/ANTHRACENES	585		2.36	503		2.60	15	30	
3	PA4	C4-PHENANTHRENES/ANTHRACENES	412		2.36	354		2.60	15	30	
3	RET	RETENE	520		2.36	451		2.60	14	30	
3	DBT0	DIBENZOTHIOPHENE	11.9		2.36	9.81		2.60	19	30	
3	DBT1	C1-DIBENZOTHIOPHENES	218		2.36	182		2.60	18	30	
3	DBT2	C2-DIBENZOTHIOPHENES	604		2.36	506		2.60	18	30	
3	DBT3	C3-DIBENZOTHIOPHENES	581		2.36	491		2.60	17	30	
3	DBT4	C4-DIBENZOTHIOPHENES	312		2.36	268		2.60	15	30	
4	BF	BENZO(B)FLUORENE	9.44		2.36	7.65		2.60	21	30	
4	FL0	FLUORANTHENE	32.8		2.36	27.6		2.60	17	30	
4	PY0	PYRENE	59.2		2.36	50.0		2.60	17	30	
4	FP1	C1-FLUORANTHENES/PYRENES	81.8		2.36	70.5		2.60	15	30	
4	FP2	C2-FLUORANTHENES/PYRENES	81.0		2.36	69.4		2.60	15	30	
4	FP3	C3-FLUORANTHENES/PYRENES	78.3		2.36	66.1		2.60	17	30	
4	FP4	C4-FLUORANTHENES/PYRENES	65.7		2.36	56.2		2.60	16	30	
4	NBT0	NAPHTHOBENZOTHIOPHENE	8.86		2.36	7.97		2.60	11	30	
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	26.6		2.36	23.2		2.60	14	30	
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	46.4		2.36	41.7		2.60	11	30	
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	43.9		2.36	37.2		2.60	17	30	
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	32.4		2.36	28.6		2.60	12	30	
4	BA0	BENZ(A)ANTHRACENE	18.6		2.36	16.2		2.60	14	30	
4	C0	CHRYSENE/TRIPHENYLENE	20.4		2.36	17.3		2.60	16	30	
4	BC1	C1-CHRYSENES	38.3		2.36	32.0		2.60	18	30	
4	BC2	C2-CHRYSENES	56.4		2.36	49.1		2.60	14	30	
4	BC3	C3-CHRYSENES	69.3		2.36	61.9		2.60	11	30	
4	BC4	C4-CHRYSENES	49.9		2.36	44.4		2.60	12	30	
5	BBF	BENZO(B)FLUORANTHENE	14.0		2.36	12.2		2.60	14	30	
5	BJKF	BENZO(J)+(K)FLUORANTHENE	13.0		2.36	11.2		2.60	15	30	
5	BAF	BENZO(A)FLUORANTHENE	2.58		2.36	2.23	J	2.60		30	NC
5	BEP	BENZO(E)PYRENE	12.8		2.36	11.2		2.60	13	30	
5	BAP	BENZO(A)PYRENE	15.0		2.36	12.7		2.60	17	30	
5	PER	PERYLENE	7.92		2.36	6.77		2.60	16	30	

Project Name: PAMPILLA 2
Project Number:

Client ID	HC PES 28SEP2023		Duplicate Sample	
Lab ID	L2358868-01		WG1846978-4	
Matrix	SOLID		SOLID	
Matrix Description				
Reference Method	8270E-SIM(M)		8270E-SIM(M)	
Batch ID	WG1846978		WG1846978	
Date Collected	9/28/2023		NA	
Date Received	10/5/2023		11/1/2023	
Date Prepped	11/1/2023		11/1/2023	
Date Analyzed	11/7/2023		11/7/2023	
Sample Size(wet)	0.00423	g	0.00385	g
% Solid	100		100	
File ID	F911062325		F911062326	
Units	mg/kg		mg/kg	
Final Volume	1		1	
Dilution	1		1	
Reporting Limit	1.18		1.3	

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
6	IND	INDENO(1,2,3-CD)PYRENE	9.54		2.36	7.75		2.60	21	30	
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	3.84		2.36	3.06		2.60	23	30	
6	GHI	BENZO(GHI)PERYLENE	9.39		2.36	7.89		2.60	17	30	
O	CAR	CARBAZOLE	11.0		2.36	9.64		2.60	13	30	
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	98.5		2.36	82.7		2.60	17	30	
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	81.5		2.36	67.4		2.60	19	30	
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	32.9		2.36	27.3		2.60	19	30	
3	3MP	3-METHYLPHENANTHRENE (3MP)	14.0		2.36	11.8		2.60	17	30	
3	2MP	2-METHYLPHENANTHRENE (2MP)	38.2		2.36	32.0		2.60	18	30	
3	2MA	2-METHYLANTHRACENE (2MA)	15.4		2.36	12.7		2.60	19	30	
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	45.9		2.36	38.9		2.60	17	30	
3	1MP	1-METHYLPHENANTHRENE (1MP)	42.9		2.36	36.8		2.60	15	30	
A	1MN	1-METHYLNAPHTHALENE	4.53		2.36	4.73		2.60	4	30	
A	2MN	2-METHYLNAPHTHALENE	1.43	JB	2.36	1.42	JB	2.60		30	NC
2	26DMN	2,6-DIMETHYLNAPHTHALENE	125		2.36	106		2.60	16	30	
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	96.6		2.36	74.8		2.60	25	30	
H30	T19	HOPANE (T19)	71.4		2.36	59.8		2.60	18	30	
t23	T4	C23 TRICYCLIC TERPANE (T4)	30.9		2.36	28.6		2.60	8	30	
t24	T5	C24 TRICYCLIC TERPANE (T5)	17.3		2.36	14.6		2.60	17	30	
t25	T6	C25 TRICYCLIC TERPANE (T6)	20.0		2.36	16.5		2.60	19	30	
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	7.58		2.36	7.23		2.60	5	30	
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	5.41		2.36	4.42		2.60	20	30	
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	4.79		2.36	4.06		2.60	16	30	
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	5.85		2.36	5.06		2.60	14	30	
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	7.12		2.36	4.87		2.60	38	30	Q
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	6.28		2.36	4.93		2.60	24	30	
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	5.86		2.36	5.53		2.60	6	30	
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	13.9		2.36	12.2		2.60	13	30	
t30S	T11a	C30 TRICYCLIC TERPANE-22S	4.71		2.36	3.95		2.60	18	30	
t30R	T11b	C30 TRICYCLIC TERPANE-22R	5.25		2.36	3.74		2.60	34	30	Q
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	17.6		2.36	14.1		2.60	22	30	
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	3.59		2.36	5.58		2.60	43	30	Q
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	6.31		2.36	5.02		2.60	23	30	
H29	T15	30-NORHOPANE (T15)	48.6		2.36	40.3		2.60	19	30	
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	14.6		2.36	10.4		2.60	34	30	Q
X	X	17A(H)-DIAHOPANE (X)	3.98		2.36	3.46		2.60	14	30	
M29	T17	30-NORMORETANE (T17)	7.50		2.36	5.68		2.60	28	30	
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	17.6		2.36	13.5		2.60	26	30	
M30	T20	MORETANE (T20)	9.90		2.36	10.5		2.60	6	30	
H31S	T21	30-HOMOHOPANE-22S (T21)	26.7		2.36	23.1		2.60	14	30	
H31R	T22	30-HOMOHOPANE-22R (T22)	23.4		2.36	21.1		2.60	10	30	
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	9.30		2.36	8.76		2.60	6	30	
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	28.8		2.36	23.4		2.60	21	30	
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	11.9		2.36	11.1		2.60	7	30	
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	12.4		2.36	12.4		2.60	0	30	
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	8.23		2.36	6.08		2.60	30	30	
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	13.5		2.36	12.4		2.60	8	30	
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	6.44		2.36	6.02		2.60	7	30	
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	8.24		2.36	6.10		2.60	30	30	
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	6.48		2.36	3.76		2.60	53	30	Q
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	16.2		2.36	14.1		2.60	14	30	
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	9.37		2.36	6.09		2.60	42	30	Q
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	6.83		2.36	5.29		2.60	25	30	
aa27S	S12	17A(H)20SC27/C29DIA	18.3		2.36	15.2		2.60	19	30	
aa27R	S17	17A(H)20RC27/C29DIA	22.9		2.36	22.2		2.60	3	30	
d29R	S18	UNKNOWN STERANE (S18)	4.43		2.36	3.39		2.60	27	30	
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	1.42	J	2.36	1.58	J	2.60		30	NC
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	10.1		2.36	9.02		2.60	11	30	
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	13.1		2.36	12.4		2.60	5	30	

Project Name: PAMPILLA 2
Project Number:

Client ID	HC PES 28SEP2023		Duplicate Sample	
Lab ID	L2358868-01		WG1846978-4	
Matrix	SOLID		SOLID	
Matrix Description				
Reference Method	8270E-SIM(M)		8270E-SIM(M)	
Batch ID	WG1846978		WG1846978	
Date Collected	9/28/2023		NA	
Date Received	10/5/2023		11/1/2023	
Date Prepped	11/1/2023		11/1/2023	
Date Analyzed	11/7/2023		11/7/2023	
Sample Size(wet)	0.00423	g	0.00385	g
% Solid	100		100	
File ID	F911062325		F911062326	
Units	mg/kg		mg/kg	
Final Volume	1		1	
Dilution	1		1	
Reporting Limit	1.18		1.3	

Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	RPD	RPD Limit	
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	12.9	2.36	13.6	2.60	5	30	
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	11.8	2.36	10.3	2.60	14	30	
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	13.6	2.36	13.0	2.60	5	30	
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	13.9	2.36	12.4	2.60	11	30	
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	14.4	2.36	13.3	2.60	8	30	
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	16.8	2.36	15.6	2.60	7	30	
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	18.2	2.36	18.8	2.60	3	30	
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	12.7	2.36	8.45	2.60	40	30	Q
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	75.2	2.36	62.5	2.60	18	30	
SC28TAS	TAS02	C28,20S TAS	47.3	2.36	40.8	2.60	15	30	
RC27TAS	TAS03	C27,20R TAS	51.1	2.36	40.7	2.60	23	30	
RC28TAS	TAS04	C28,20R TAS	38.2	2.36	34.0	2.60	12	30	

Surrogates (% Recovery)		
NAPHTHALENE-D8	89	90
PHENANTHRENE-D10	98	95
BENZO(A)PYRENE-D12	98	99
5B(H)CHOLANE	110	110

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1848812-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1848812-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	11/1/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F910312314
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	443	1.94	93	477.66	65	135
2	D1	C1-DECALINS	730	1.94	96	760.39	65	135
2	D2	C2-DECALINS	670	1.94	99	675.98	65	135
2	D3	C3-DECALINS	390	1.94	106	366.46	65	135
2	D4	C4-DECALINS	378	1.94	104	362.78	65	135
S	BT0	BENZOTHIOPHENE	5.46	1.94	95	5.75	65	135
2	BT1	C1-BENZO(B)THIOPHENES	28.2	1.94	94	29.96	65	135
2	BT2	C2-BENZO(B)THIOPHENES	49.9	1.94	98	50.93	65	135
2	BT3	C3-BENZO(B)THIOPHENES	111	1.94	108	103.18	65	135
2	BT4	C4-BENZO(B)THIOPHENES	110	1.94	121	90.8	65	135
A	N0	NAPHTHALENE	512	1.94	90	565.56	65	135
2	N1	C1-NAPHTHALENES	1090	1.94	90	1208.32	65	135
2	N2	C2-NAPHTHALENES	1440	1.94	99	1450.37	65	135
2	N3	C3-NAPHTHALENES	1090	1.94	104	1052.74	65	135
2	N4	C4-NAPHTHALENES	646	1.94	111	583.65	65	135
2	B	BIPHENYL	133	1.94	91	145.7	65	135
3	DF	DIBENZOFURAN	53.8	1.94	108	49.63	65	135
3	AY	ACENAPHTHYLENE	7.8	1.94	113	6.91	65	135
3	AE	ACENAPHTHENE	18.1	1.94	99	18.35	65	135
3	F0	FLUORENE	69.8	1.94	99	70.69	65	135
3	F1	C1-FLUORENES	171	1.94	105	162.7	65	135
3	F2	C2-FLUORENES	265	1.94	105	251.87	65	135
3	F3	C3-FLUORENES	286	1.94	118	242.29	65	135
3	P0	PHENANTHRENE	190	1.94	101	188.41	65	135
3	PA1	C1-PHENANTHRENES/ANTHRACENES	440	1.94	113	388.12	65	135
3	PA2	C2-PHENANTHRENES/ANTHRACENES	519	1.94	119	434.38	65	135
3	PA3	C3-PHENANTHRENES/ANTHRACENES	373	1.94	121	308.67	65	135
3	PA4	C4-PHENANTHRENES/ANTHRACENES	169	1.94	130	129.94	65	135
3	DBT0	DIBENZOTHIOPHENE	128	1.94	98	130.56	65	135
3	DBT1	C1-DIBENZOTHIOPHENES	286	1.94	104	275.34	65	135
3	DBT2	C2-DIBENZOTHIOPHENES	440	1.94	119	369.42	65	135
3	DBT3	C3-DIBENZOTHIOPHENES	433	1.94	125	345.39	65	135
3	DBT4	C4-DIBENZOTHIOPHENES	253	1.94	131	193.51	65	135
4	FL0	FLUORANTHENE	4.25	1.94	113	3.77	65	135
4	PY0	PYRENE	12.3	1.94	106	11.65	65	135
4	FP1	C1-FLUORANTHENES/PYRENES	55.5	1.94	102	54.43	65	135
4	FP2	C2-FLUORANTHENES/PYRENES	102	1.94	114	89.07	65	135
4	FP3	C3-FLUORANTHENES/PYRENES	134	1.94	122	109.78	65	135
4	FP4	C4-FLUORANTHENES/PYRENES	122	1.94	125	97.22	65	135
4	NBT0	NAPHTHOBENZOTHIOPHENE	37.2	1.94	95	39.13	65	135
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	103	1.94	97	106.13	65	135
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	153	1.94	102	150.09	65	135
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	126	1.94	104	120.77	65	135
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	91.1	1.94	107	85.38	65	135
4	BA0	BENZ(A)ANTHRACENE	2.94	1.94	129	2.28	65	135
4	C0	CHRYSENE/TRIPHENYLENE	38.5	1.94	105	36.66	65	135
4	BC1	C1-CHRYSENES	69.8	1.94	108	64.59	65	135
4	BC2	C2-CHRYSENES	100	1.94	114	87.41	65	135
4	BC3	C3-CHRYSENES	116	1.94	114	101.29	65	135
4	BC4	C4-CHRYSENES	79.3	1.94	125	63.42	65	135
5	BBF	BENZO(B)FLUORANTHENE	5.72	1.94	106	5.4	65	135
5	BEP	BENZO(E)PYRENE	10.1	1.94	102	9.88	65	135
5	BAP	BENZO(A)PYRENE	2.43	1.94	120	2.03	65	135
5	PER	PERYLENE	3.66	1.94	110	3.34	65	135
6	GHI	BENZO(GHI)PERYLENE	4.25	1.94	118	3.59	65	135
O	CAR	CARBAZOLE	6.2	1.94	102	6.09	65	135
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	132	1.94	100	131.38	65	135
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	105	1.94	107	98.05	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1848812-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1848812-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	11/1/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F910312314
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)	45.9	1.94	114	40.36	65	135
3	3MP	3-METHYLPHENANTHRENE (3MP)	89.5	1.94	113	79.32	65	135
3	2MA	2-METHYLANTHRACENE (2MA)	3.6	1.94	120	3	65	135
3	1MP	1-METHYLPHENANTHRENE (1MP)	98.1	1.94	112	87.93	65	135
A	1MN	1-METHYLNAPHTHALENE	768	1.94	97	793.54	65	135
A	2MN	2-METHYLNAPHTHALENE	981	1.94	90	1087.89	65	135
2	26DMN	2,6-DIMETHYLNAPHTHALENE	624	1.94	98	635.33	65	135
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	151	1.94	103	147.12	65	135
H30	T19	HOPANE (T19)	166	1.94	103	161.24	65	135
t23	T4	C23 TRICYCLIC TERPANE (T4)	52.2	1.94	75	69.8	65	135
t24	T5	C24 TRICYCLIC TERPANE (T5)	36.3	1.94	86	42.1	65	135
t25	T6	C25 TRICYCLIC TERPANE (T6)	37.0	1.94	92	40.4	65	135
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	14.4	1.94	101	14.2	65	135
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	15.8	1.94	97	16.3	65	135
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	12.9	1.94	88	14.6	65	135
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	18.6	1.94	115	16.2	65	135
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	16.5	1.94	94	17.6	65	135
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	19.1	1.94	100	19.2	65	135
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	23.0	1.94	110	21	65	135
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	29.3	1.94	104	28.3	65	135
t30S	T11a	C30 TRICYCLIC TERPANE-22S	14.0	1.94	92	15.3	65	135
t30R	T11b	C30 TRICYCLIC TERPANE-22R	13.6	1.94	90	15.2	65	135
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	35.2	1.94	102	34.4	65	135
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	5.93	1.94	85	7	65	135
H29	T15	30-NORHOPANE (T15)	89.5	1.94	99	90.7	65	135
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	23.3	1.94	100	23.3	65	135
X	X	17A(H)-DIAHOPANE (X)	12.0	1.94	92	13	65	135
M29	T17	30-NORMORETANE (T17)	10.8	1.94	96	11.2	65	135
M30	T20	MORETANE (T20)	16.8	1.94	103	16.3	65	135
H31S	T21	30-HOMOHOPANE-22S (T21)	69.8	1.94	103	67.6	65	135
H31R	T22	30-HOMOHOPANE-22R (T22)	58.9	1.94	101	58.3	65	135
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	50.7	1.94	104	48.9	65	135
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	36.8	1.94	103	35.6	65	135
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	38.6	1.94	100	38.8	65	135
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	25.7	1.94	100	25.6	65	135
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	28.4	1.94	102	27.9	65	135
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	20.3	1.94	102	19.8	65	135
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	29.4	1.94	102	28.8	65	135
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	22.8	1.94	102	22.3	65	135
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	56.2	1.94	117	48.1	65	135
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	30.0	1.94	120	25.1	65	135
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	27.0	1.94	109	24.8	65	135
aa27S	S12	17A(H)20SC27/C29DIA	68.4	1.94	114	59.74	65	135
aa27R	S17	17A(H)20RC27/C29DIA	82.6	1.94	115	71.55	65	135
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	4.51	1.94	119	3.8	65	135
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	37.8	1.94	114	33	65	135
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	37.5	1.94	116	32.2	65	135
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	51.3	1.94	99	51.7	65	135
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	40.9	1.94	113	36.1	65	135
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	39.4	1.94	103	38.4	65	135
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	40.2	1.94	101	39.7	65	135
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	47.4	1.94	116	41	65	135
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	52.8	1.94	102	51.7	65	135
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	58.7	1.94	108	54.6	65	135
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	43.0	1.94	112	38.2	65	135
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	361	1.94	125	289.3	65	135
SC28TAS	TAS02	C28,20S TAS	228	1.94	125	182.5	65	135
RC27TAS	TAS03	C27,20R TAS	218	1.94	123	177.1	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1848812-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1848812-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	11/1/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F910312314
Units	mg/kg
Final Volume	10
Dilution	1
Reporting Limit	1.94

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
RC28TAS	TAS04	C28,20R TAS	190	1.94	128	148.1	65	135

Project Name: PAMPILLA 2
Project Number:

	SHIP'S TANKS	
Client ID	COMPOSITE SAMPLE	
Lab ID	L2358868-02	
Matrix	OIL	
Matrix Description		
Reference Method	8270E-SIM(M)	
Batch ID	WG1847594	
Date Collected	1/14/2022	
Date Received	5/4/2022	
Date Prepped	12/22/2022	
Date Analyzed	11/8/2023	
Sample Size(wet)	0.0584	g
% Solid	100	
File ID	F911062329	
Units	mg/kg	
Final Volume	10	
Dilution	1	
Reporting Limit	0.856	

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN	446		0.856
2	D1	C1-DECALINS	916		1.71
2	D2	C2-DECALINS	839		1.71
2	D3	C3-DECALINS	443		1.71
2	D4	C4-DECALINS	444		1.71
S	BT0	BENZOTHIOPHENE	2.64		1.71
2	BT1	C1-BENZO(B)THIOPHENES	14.8		1.71
2	BT2	C2-BENZO(B)THIOPHENES	11.4		1.71
2	BT3	C3-BENZO(B)THIOPHENES	24.7		1.71
2	BT4	C4-BENZO(B)THIOPHENES	25.7		1.71
A	N0	NAPHTHALENE	258		1.71
2	N1	C1-NAPHTHALENES	644		1.71
2	N2	C2-NAPHTHALENES	1030		1.71
2	N3	C3-NAPHTHALENES	777		1.71
2	N4	C4-NAPHTHALENES	377		1.71
2	B	BIPHENYL	36.7		1.71
3	DF	DIBENZOFURAN	2.50		1.71
3	AY	ACENAPHTHYLENE	3.73		1.71
3	AE	ACENAPHTHENE	12.3		1.71
3	F0	FLUORENE	41.3		1.71
3	F1	C1-FLUORENES	123		1.71
3	F2	C2-FLUORENES	207		1.71
3	F3	C3-FLUORENES	222		1.71
3	A0	ANTHRACENE		U	1.71
3	P0	PHENANTHRENE	208		1.71
3	PA1	C1-PHENANTHRENES/ANTHRACENES	428		1.71
3	PA2	C2-PHENANTHRENES/ANTHRACENES	497		1.71
3	PA3	C3-PHENANTHRENES/ANTHRACENES	357		1.71
3	PA4	C4-PHENANTHRENES/ANTHRACENES	145		1.71
3	RET	RETENE		U	1.71
3	DBT0	DIBENZOTHIOPHENE	21.0		1.71
3	DBT1	C1-DIBENZOTHIOPHENES	64.7		1.71
3	DBT2	C2-DIBENZOTHIOPHENES	78.2		1.71
3	DBT3	C3-DIBENZOTHIOPHENES	68.4		1.71
3	DBT4	C4-DIBENZOTHIOPHENES	38.0		1.71
4	BF	BENZO(B)FLUORENE	4.04		1.71
4	FL0	FLUORANTHENE	2.79		1.71
4	PY0	PYRENE	22.9		1.71
4	FP1	C1-FLUORANTHENES/PYRENES	60.1		1.71
4	FP2	C2-FLUORANTHENES/PYRENES	94.5		1.71
4	FP3	C3-FLUORANTHENES/PYRENES	134		1.71
4	FP4	C4-FLUORANTHENES/PYRENES	124		1.71
4	NBT0	NAPHTHOBENZOTHIOPHENE	10.8		1.71
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	23.9		1.71
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	33.3		1.71
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	22.3		1.71
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	26.3		1.71
4	BA0	BENZ(A)ANTHRACENE	3.10		1.71
4	C0	CHRYSENE/TRIPHENYLENE	54.2		1.71
4	BC1	C1-CHRYSENES	102		1.71
4	BC2	C2-CHRYSENES	156		1.71
4	BC3	C3-CHRYSENES	192		1.71
4	BC4	C4-CHRYSENES	123		1.71

Project Name: PAMPILLA 2
Project Number:

	SHIP'S TANKS	
Client ID	COMPOSITE SAMPLE	
Lab ID	L2358868-02	
Matrix	OIL	
Matrix Description		
Reference Method	8270E-SIM(M)	
Batch ID	WG1847594	
Date Collected	1/14/2022	
Date Received	5/4/2022	
Date Prepped	12/22/2022	
Date Analyzed	11/8/2023	
Sample Size(wet)	0.0584	g
% Solid	100	
File ID	F911062329	
Units	mg/kg	
Final Volume	10	
Dilution	1	
Reporting Limit	0.856	

Class	Abbrev	Analytes	Result		SSRL
5	BBF	BENZO(B)FLUORANTHENE	6.48		1.71
5	BJKF	BENZO(J)+(K)FLUORANTHENE	0.534	J	1.71
5	BAF	BENZO(A)FLUORANTHENE		U	1.71
5	BEP	BENZO(E)PYRENE	17.6		1.71
5	BAP	BENZO(A)PYRENE	2.86		1.71
5	PER	PERYLENE	0.506	J	1.71
6	IND	INDENO(1,2,3-CD)PYRENE	1.37	J	1.71
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	1.44	J	1.71
6	GHI	BENZO(GHI)PERYLENE	4.01		1.71
O	CAR	CARBAZOLE	8.26		1.71
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	30.2		1.71
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	25.5		1.71
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	8.12		1.71
3	3MP	3-METHYLPHENANTHRENE (3MP)	99.2		1.71
3	2MP	2-METHYLPHENANTHRENE (2MP)	114		1.71
3	2MA	2-METHYLANTHRACENE (2MA)	2.55		1.71
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	117		1.71
3	1MP	1-METHYLPHENANTHRENE (1MP)	88.4		1.71
A	1MN	1-METHYLNAPHTHALENE	399		1.71
A	2MN	2-METHYLNAPHTHALENE	625		1.71
2	26DMN	2,6-DIMETHYLNAPHTHALENE	556		1.71
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	97.7		1.71
H30	T19	HOPANE (T19)	392		1.71
t23	T4	C23 TRICYCLIC TERPANE (T4)	74.8		1.71
t24	T5	C24 TRICYCLIC TERPANE (T5)	55.1		1.71
t25	T6	C25 TRICYCLIC TERPANE (T6)	51.6		1.71
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	18.0		1.71
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	30.6		1.71
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	27.4		1.71
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	29.8		1.71
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	31.6		1.71
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	25.4		1.71
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	29.4		1.71
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	29.2		1.71
t30S	T11a	C30 TRICYCLIC TERPANE-22S	34.8		1.71
t30R	T11b	C30 TRICYCLIC TERPANE-22R	24.2		1.71
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	71.7		1.71
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	32.9		1.71
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	38.9		1.71
H29	T15	30-NORHOPANE (T15)	195		1.71
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	33.6		1.71
X	X	17A(H)-DIAHOPANE (X)	21.3		1.71
M29	T17	30-NORMORETANE (T17)	22.5		1.71
OL	T18	18A(H)&18B(H)-OLEANANES (T18)		U	1.71
M30	T20	MORETANE (T20)	49.6		1.71
H31S	T21	30-HOMOHOPANE-22S (T21)	128		1.71
H31R	T22	30-HOMOHOPANE-22R (T22)	138		1.71
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	67.5		1.71
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	97.1		1.71
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	69.4		1.71
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	60.2		1.71
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	39.4		1.71
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	46.6		1.71

Project Name: PAMPILLA 2
Project Number:

	SHIP'S TANKS	
Client ID	COMPOSITE SAMPLE	
Lab ID	L2358868-02	
Matrix	OIL	
Matrix Description		
Reference Method	8270E-SIM(M)	
Batch ID	WG1847594	
Date Collected	1/14/2022	
Date Received	5/4/2022	
Date Prepped	12/22/2022	
Date Analyzed	11/8/2023	
Sample Size(wet)	0.0584	g
% Solid	100	
File ID	F911062329	
Units	mg/kg	
Final Volume	10	
Dilution	1	
Reporting Limit	0.856	

Class	Abbrev	Analytes	Result	SSRL
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	29.8	1.71
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	28.3	1.71
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	30.9	1.71
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	35.2	1.71
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	19.5	1.71
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	9.39	1.71
aa27S	S12	17A(H)20SC27/C29DIA	48.3	1.71
aa27R	S17	17A(H)20RC27/C29DIA	62.1	1.71
d29R	S18	UNKNOWN STERANE (S18)	4.62	1.71
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	4.30	1.71
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	31.0	1.71
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	23.6	1.71
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	28.3	1.71
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	24.1	1.71
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	35.9	1.71
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	35.0	1.71
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	20.5	1.71
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	23.1	1.71
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	29.7	1.71
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	17.1	1.71
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	69.2	1.71
SC28TAS	TAS02	C28,20S TAS	57.3	1.71
RC27TAS	TAS03	C27,20R TAS	49.2	1.71
RC28TAS	TAS04	C28,20R TAS	48.4	1.71

Surrogates (% Recovery)	
NAPHTHALENE-D8	76
PHENANTHRENE-D10	80
BENZO(A)PYRENE-D12	88
5B(H)CHOLANE	105

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.)

HC SRG 16OCT2023

To: Refinería La Pampilla S.A.A.

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

Date: November 21, 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 October16, 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 "HC SRG 16OCT2023" was shipped to Alpha Analytical Labs in Mansfield, MA under chain of custody (COC) and arrived at 19.3°C on October 23, 2023 with a DHL Tracking # 2649563770 (Seal number 0203980).

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 HC SRG 16OCT2023 (HC SRG16) are shown in Figures 1A and1B respectively.

GC/FID Analysis

The GC/FID chromatogram for the HC SRG16 sample (Figure 1B), consists of a heavy oil in the C_{15} – C_{40} range. This sample appears to be moderately weathered due to evaporation as indicated by the loss of *n*-alkanes and unresolved complex mixture (UCM) up to C_{15} *n*-alkanes. The petroleum GC/FID signature is consistent with a moderately weathered heavy 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 HC SRG16 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 HC SRG16 sample are provided in Figures 2A and 2B respectively. The PAH histogram for the HC SRG16 sample (Figure 2B) shows this sample is weathered by evaporation as indicated by the loss of decalins and lower proportion of naphthalenes compared to the source oil (Figure 2A). There are differences in the proportion of the sulfur containing dibenzothiophenes compared to phenanthrenes indicating a higher sulfur oil compared to the source oil.

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 HC SRG16 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 HC SRG16 sample are presented in Figures 4A and 4B respectively. The biomarker traces show many differences including tri and tetracyclic terpane triplet (T6a, T6a, and T6c),[3] the proportion of TS and TM (T11 and T12)[2], norhopane and hopane (T15 and T19)[2], and an decrease in gammacerane (T22A) and T7-T10 relative to the source oil. In addition, sample HC SRG16 contains oleanane (T18) which is absent in the source oil. These differences indicate the HC SRG16 sample and source oil are derived from a different source of petroleum.

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

[3] Hostettler, F. D. and Kvenvolden, K. A. Kvenvolden. Geochemical changes in crude oil spilled from the Exxon Valdez supertanker into Prince William Sound, Alaska Org. Geochem. Vol. 21, No. 8/9, pp. 927-936, 1994.

Figure 5 is a double source ratio plot for the biomarkers norhopane/hopane versus TS/TM. Differences in these ratio plots are a function of crude oil source and refinery processing.[2] The source oil and HC SRG16 sample plot away from each other indicating a different source of petroleum.

Conclusion

The HC SRG 16OCT2023 sample consists of a moderately weathered heavy oil. The FID, PAH and biomarker analysis indicate the petroleum detected in the source oil and the HC SRG 16OCT2023 sample are chemically different and was derived from a different source of petroleum.

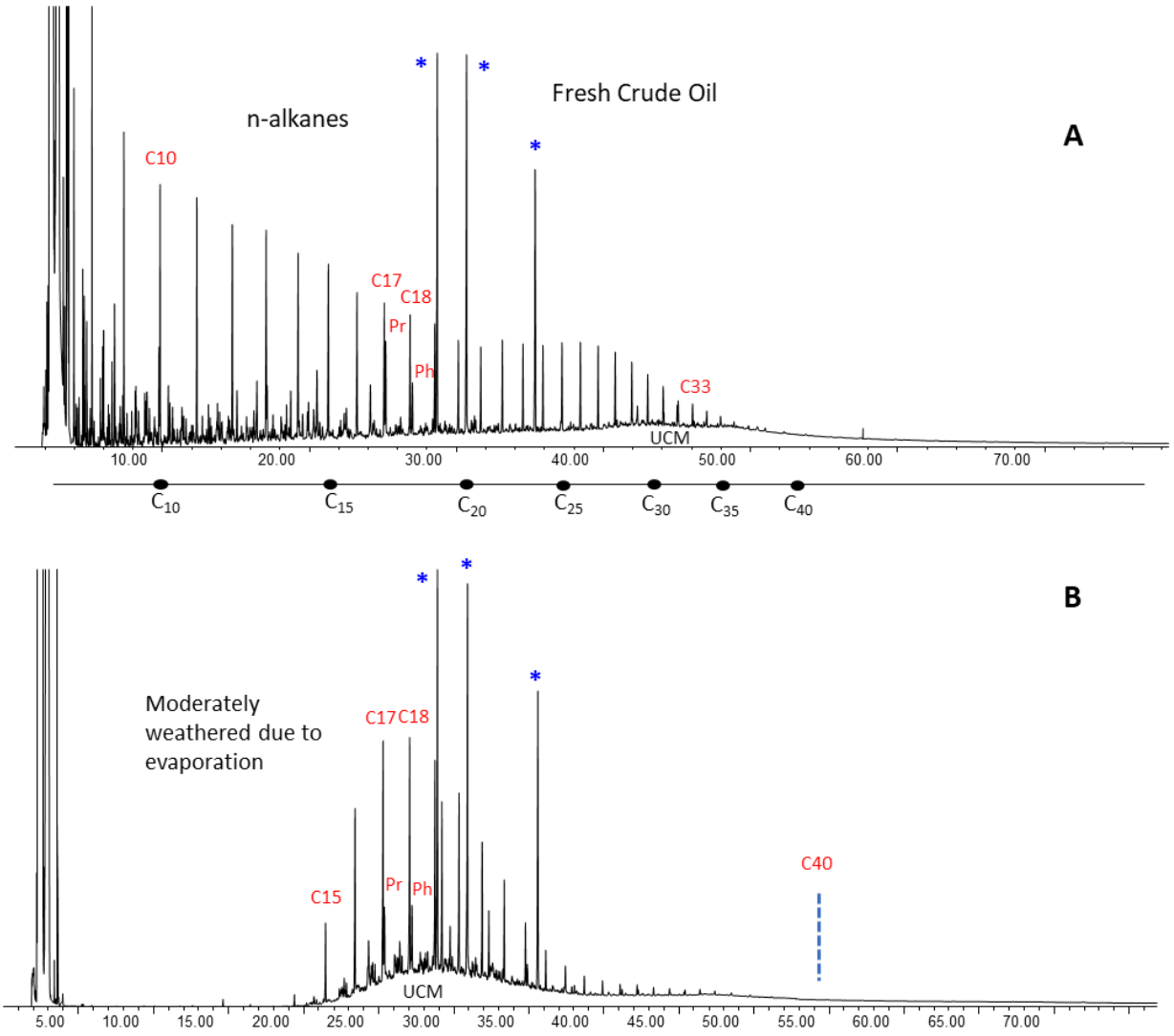

Figure 1. GC/FID "fingerprints" for the field samples.
Carbon ranges annotated below the x-axis analysis time scale.

A) Ship's Tanks Composite Sample
B) HC SRG 16OCT2023
'*': Laboratory-added Internal Standard

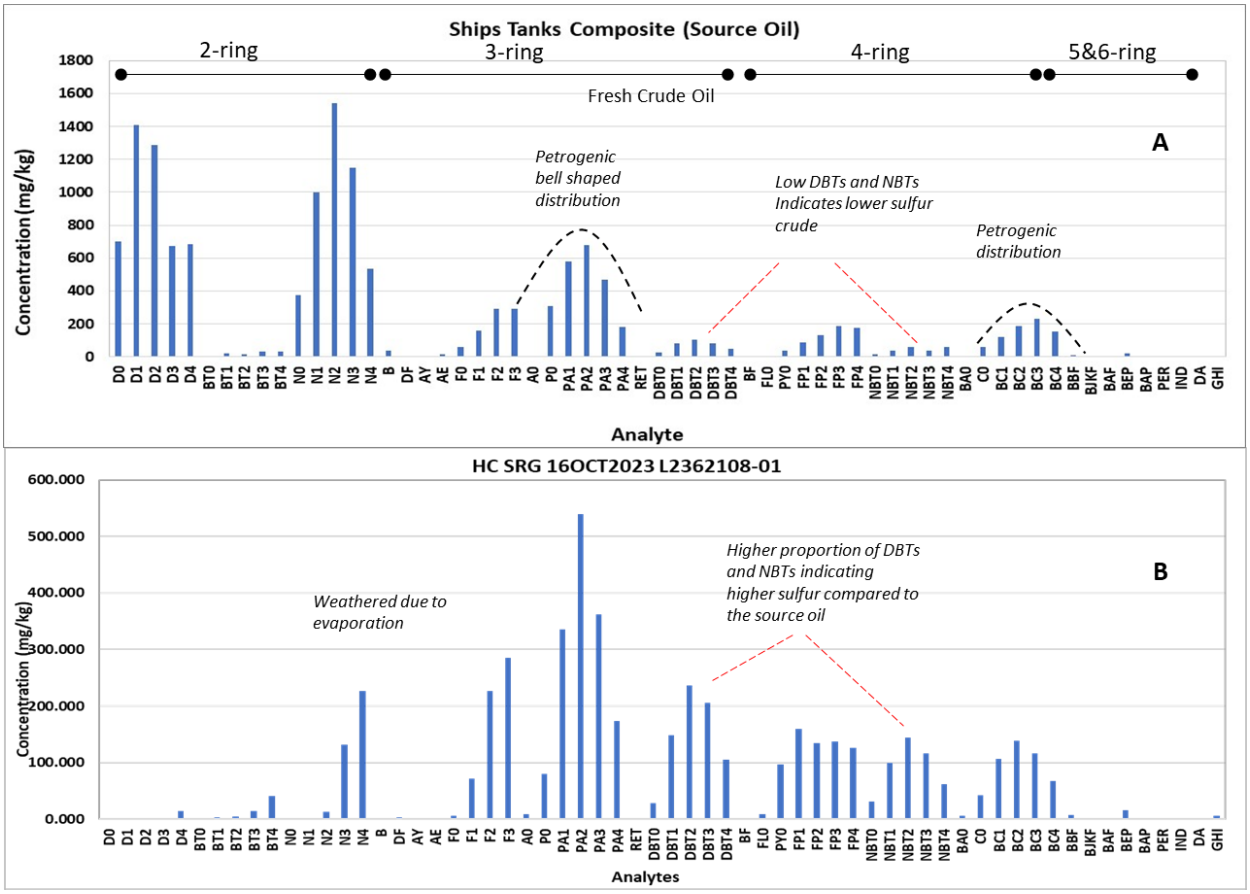

Figure 2. PAH Histograms

A) Ship's Tanks Composite Sample

B) HC SRG 16OCT2023

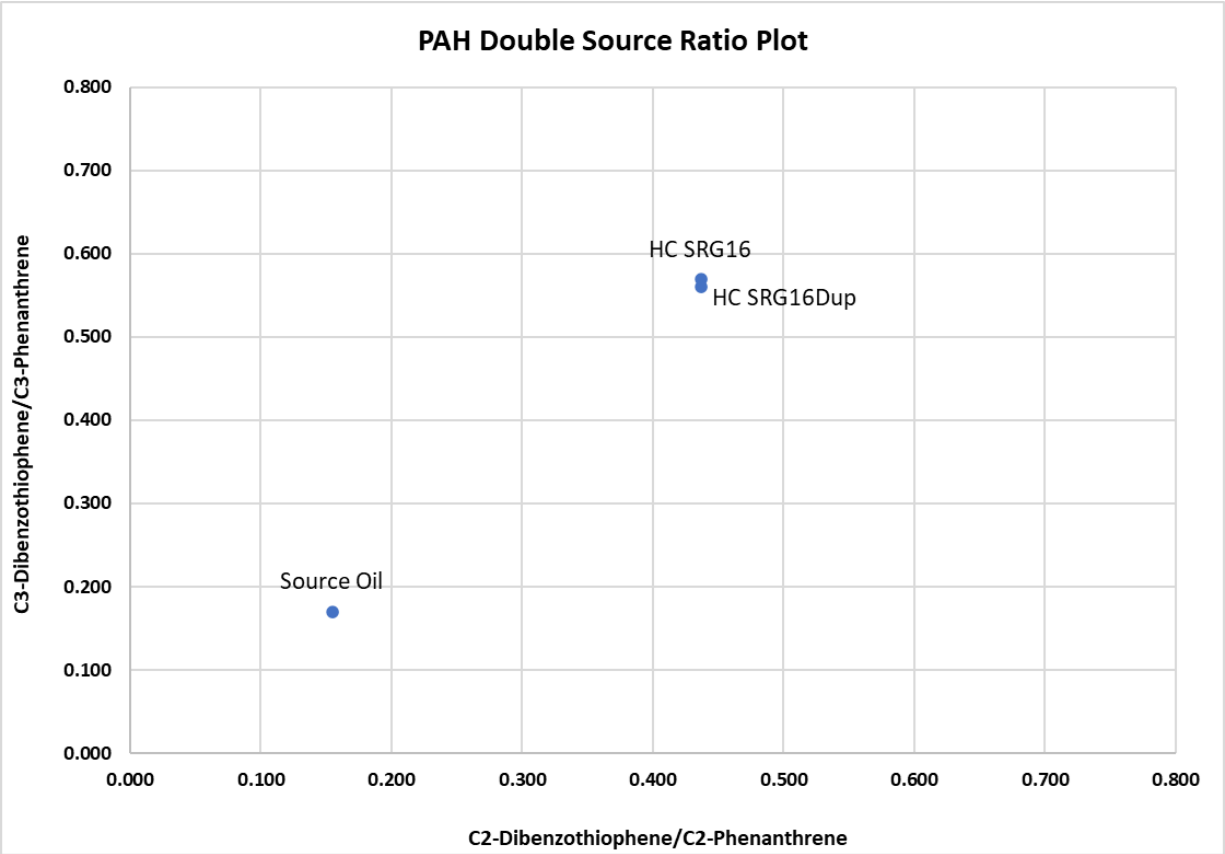

Figure 3. PAH Double Source Ratio Plots

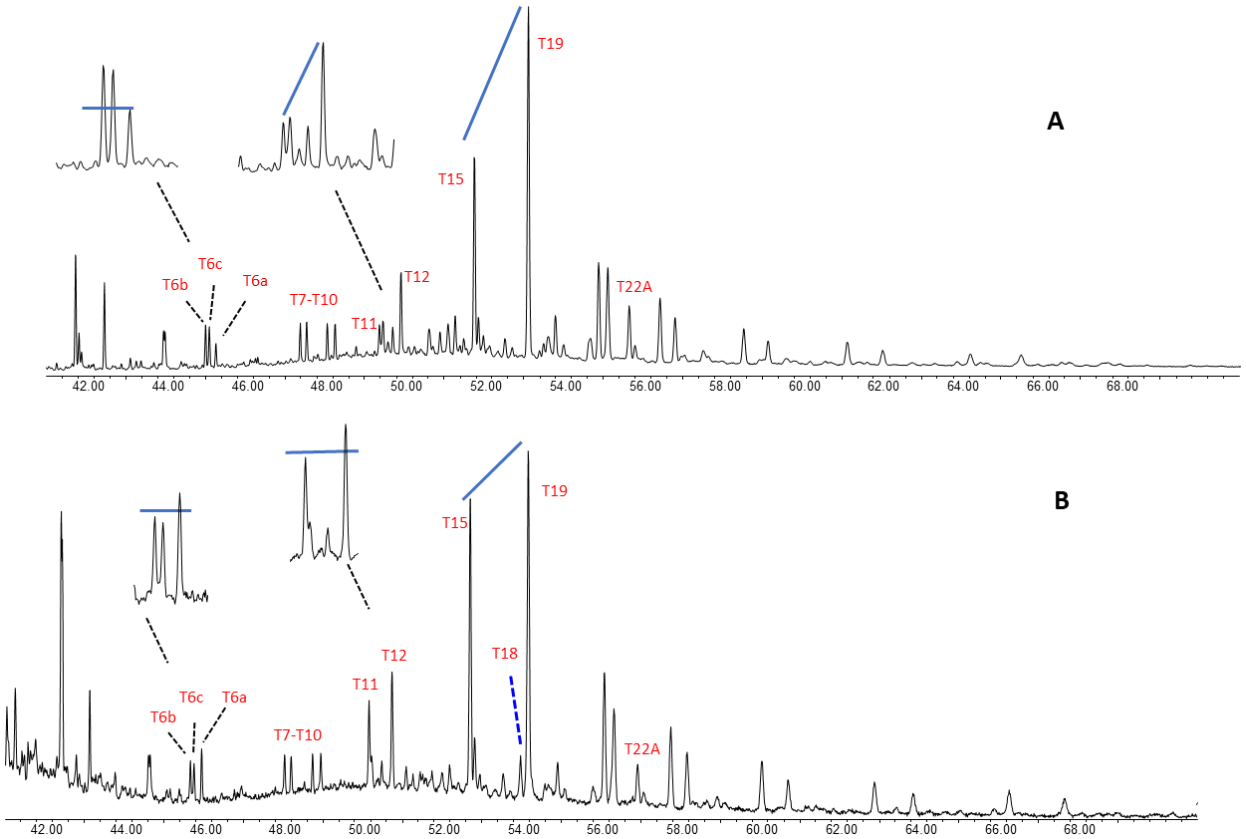

Figure 4. Biomarker m/z 191 Triterpane Fingerprint Traces

A) Ship's Tanks Composite Sample
B) HC SRG 16OCT2023

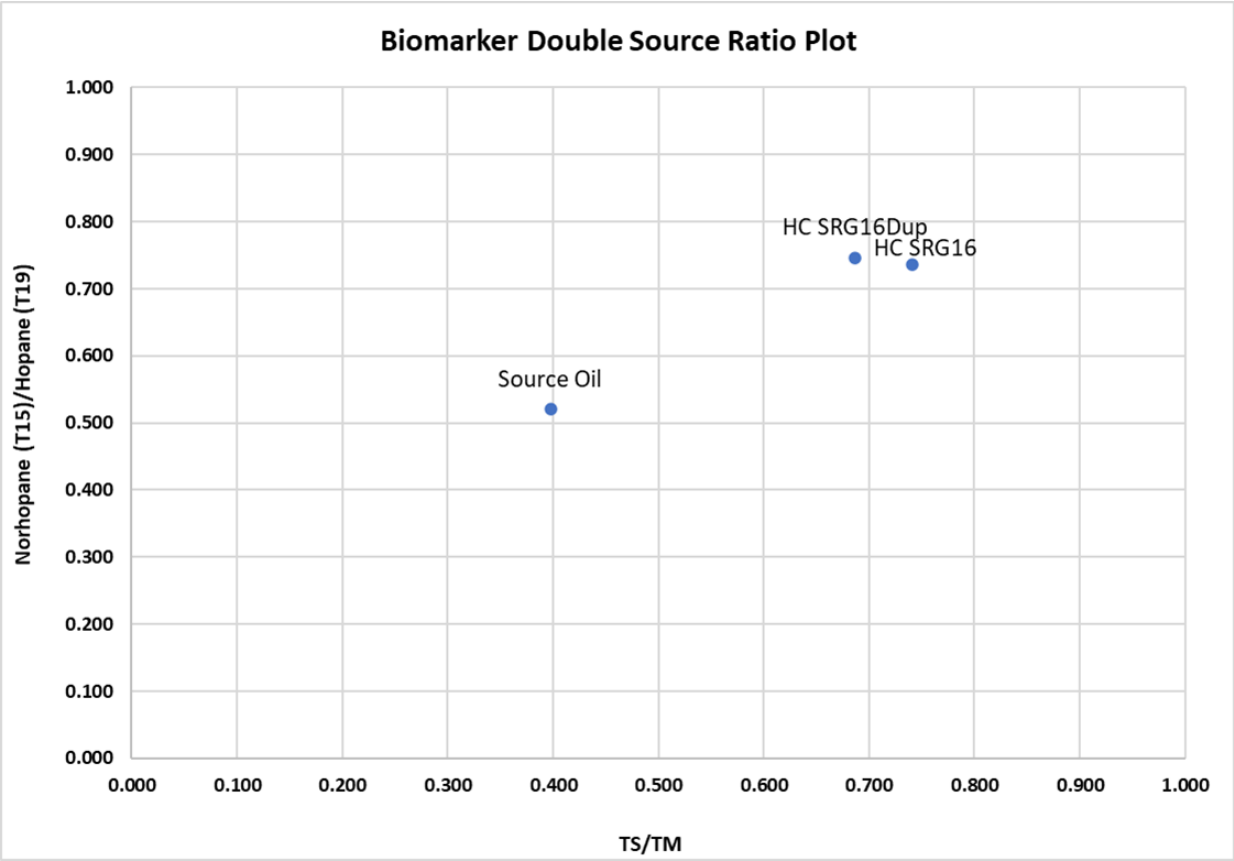

Figure 5. Biomarker Double Source Ratio Plots

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
HC SRG 16OCT2023	L2362108-01	09/28/2023	Oily Solid	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
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

Serial_No:11202316:56

10/23/23

L2362108

CERPER CERTIFICACIONES DEL PERU S.A.

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

N° 011110

Página 1 de 1

EXPEDIENTE: Exma-14226-202
HS: 23008123
JOB NUMBER: 23LM00321846349

SOLICITANTE: REFINERIA LA PAMPILLA S.A.A
LUGAR: PLAYA SANTA ROSA GRANDE
NORMA:
Distrito: Santa Rosa | Provincia: LIMA | Departamento: LIMA
PERSONA DE CONTACTO: Ing. Arturo Purizaca

1 SMEWW-APHA-AWWA-WEF 24 th Ed. 2023. Collection and preservation of samples. Part 1060 A-B ( ) 1060 B-C ( ) 10200 B ( ) 10300 B ( ) 10500 B ( ) 10750 B ( )
2 Instrucción 5014 Toma de muestras de sedimentos ( )
3 NTP 214.005 - 1997 (Revisada el 2016) Agua Potable. Toma de muestra. ITEM 4.4 ( ) ITEM 4.5 ( )
4 RM N° 271-2020-PRODUCE. Protocolo para el Monitoreo de efluentes de los establecimientos industriales pesqueros de consumo humano directo e indirecto
5 RJ N° 010-2016-ANA. Protocolo nacional para el monitoreo de la calidad de los recursos hídricos superficiales ( )
6 NTP-ISO 5667-10 2012 (Revisada el 2016) Calidad de agua. Muestreo. Parte 10 - Guía para el muestreo de aguas residuales ( )
7 NTP 214.060 2016 AGUAS RESIDUALES. Protocolo de muestreo de aguas residuales no domésticas que se descargan en la red de alcantarillado ( )
8 RM N° 273-2013-VIVIENDA. Protocolo de monitoreo de la calidad de los efluentes de las plantas de tratamiento de aguas residuales domésticas o municipales - PTAR ( )
9 RM N° 085-2014-MINAM. Guía para el muestreo de suelos ( )
Protocolo de muestreo de calidad de agua sub sector hidrocarburos DGAAE-EM ( )

DESCRIPCIÓN DE LA MUESTRA

	PUNTO DE LA TOMA DE MUESTRA	MUESTREO		MATRIZ (1)	GEOREFERENCIA (UTM WGS84)		ALTITUD (m.s.n.m) / ZONA (17,18,19) (K,L,M)	CANTIDAD DE ENVASES
		FECHA	HORA		ESTE (m)	NORTE (m)		
-01	HC SRG 16OCT2023	16.10.23	15:36	*	0261797	8695906	18L	01
							Total de Envases	01

FINGER PRINT ✓

PARÁMETROS DE ANÁLISIS EN EL LABORATORIO

PARÁMETROS DE CAMPO: pH (Unidades de pH) | Temperatura Ambiental (°C) | Temperatura (°C) | Oxígeno Disuelto (mg/L) | Conductividad µS/cm ( ) mS/cm ( ) | Salinidad (UPS) | Cloro residual mg Cl/L Libre ( ) Total ( ) | Turbiedad (UNT) | Caudal (m³/s) | Transparencia 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
LDO = Lodo
Otro: * Restos Sólidos de Hidrocarburos.

Condiciones de las muestras:
Temperatura ambiente ( ) Refrigerada (✓) Congelada ( ) Caja conservadora (✓)
Herméticamente cerrada (✓) Ice pack (✓) Hielo de calidad potable ( )

Equipos: Utilizados

	Equipo	Código		Equipo	Código
1	GPS	3126	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 recolección de la muestra la cual presenta una coloración oscura y olor a hidrocarburos. La muestra fue precintada en campo N° Precinto 0203980. Se tomaron las coordenadas IN SITU.

Responsable de la toma de muestra
Firma: [signature]
Inspector Cerper: JC Gutierrez
Inspectores de apoyo:
Hora de inicio: 14:00 Hora de término: 16:45

Representante del cliente
Firma: [signature]
Nombre: Rodriguez Ramirez Edith M.
DNI: 47219303
Cargo: Supervisor

Rec: [signature] 10/23/23 12:45

Recepción de muestras
Nombre: Teran Vidal A. [signature]
Fecha: 18-10-2023 Hora: 9:00 AM

INTERTEK TESTING SERVICES PERU S.A.
18 OCT. 2023
RECIBIDO

Attachment 2

Analytical Data

Project Name: PAMPILLA 2
Project Number:

Client ID	HC SRG 16OCT2023
Lab ID	L2362108-01
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1849866
Date Collected	10/16/2023
Date Received	10/23/2023
Date Prepped	11/15/2023
Date Analyzed	11/15/2023
Sample Size(wet)	0.00386 g
% Solid	100
File ID	F611152320
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	259

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)	6.22	J	259
SHC	C10	DECANE (C10)		U	259
SHC	C11	UNDECANE	6.74	J	259
SHC	C12	DODECANE (C12)	4.66	J	259
SHC	C13	TRIDECANE	12.7	J	259
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	25.4	J	259
SHC	C14	TETRADECANE (C14)	345		259
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	404		259
SHC	C15	PENTADECANE (C15)	2620		259
SHC	C16	HEXADECANE (C16)	6020		259
SHC	1650	NORPRISTANE (1650)	1860		259
SHC	C17	HEPTADECANE (C17)	7630		259
SHC	Pr	PRISTANE	3200		259
SHC	C18	OCTADECANE (C18)	7910		259
SHC	Ph	PHYTANE	2970		259
SHC	C19	NONADECANE (C19)	6420		259
SHC	C20	EICOSANE (C20)	5620		259
SHC	C21	HENEICOSANE (C21)	3920		259
SHC	C22	DOCOSANE (C22)	2870		259
SHC	C23	TRICOSANE (C23)	1830		259
SHC	C24	TETRACOSANE (C24)	1210		259
SHC	C25	PENTACOSANE (C25)	926		259
SHC	C26	HEXACOSANE (C26)	585		259
SHC	C27	HEPTACOSANE (C27)	451		259
SHC	C28	OCTACOSANE (C28)	319		259
SHC	C29	NONACOSANE (C29)	314		259
SHC	C30	TRIACONTANE (C30)	276		259
SHC	C31	HENTATRIACONTANE (C31)	214	J	259
SHC	C32	DOTRIACONTANE (C32)	172	J	259
SHC	C33	TRITRIACONTANE (C33)	190	J	259
SHC	C34	TETRATRIACONTANE (C34)	155	J	259
SHC	C35	PENTATRIACONTANE (C35)	159	J	259
SHC	C36	HEXATRIACONTANE (C36)	96.6	J	259
SHC	C37	HEPTATRIACONTANE (C37)	73.8	J	259
SHC	C38	OCTATRIACONTANE (C38)	58.3	J	259
SHC	C39	NONATRIACONTANE (C39)	35.2	J	259
SHC	C40	TETRACONTANE (C40)	39.4	J	259
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	507000		8550
SHC	TSH	TOTAL SATURATED HYDROCARBONS	58900	J	259

Surrogates (% Recovery)	
O-TERPHENYL	91
D50-TETRACOSANE	89

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1849866-1
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1849866
Date Collected	NA
Date Received	11/8/2023
Date Prepped	11/15/2023
Date Analyzed	11/15/2023
Sample Size(wet)	0.00386 g
% Solid	100
File ID	F611152312
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	259

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)		U	259
SHC	C10	DECANE (C10)		U	259
SHC	C11	UNDECANE		U	259
SHC	C12	DODECANE (C12)		U	259
SHC	C13	TRIDECANE		U	259
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)		U	259
SHC	C14	TETRADECANE (C14)		U	259
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)		U	259
SHC	C15	PENTADECANE (C15)		U	259
SHC	C16	HEXADECANE (C16)		U	259
SHC	1650	NORPRISTANE (1650)		U	259
SHC	C17	HEPTADECANE (C17)		U	259
SHC	Pr	PRISTANE		U	259
SHC	C18	OCTADECANE (C18)		U	259
SHC	Ph	PHYTANE		U	259
SHC	C19	NONADECANE (C19)		U	259
SHC	C20	EICOSANE (C20)		U	259
SHC	C21	HENEICOSANE (C21)		U	259
SHC	C22	DOCOSANE (C22)		U	259
SHC	C23	TRICOSANE (C23)	9.84	J	259
SHC	C24	TETRACOSANE (C24)		U	259
SHC	C25	PENTACOSANE (C25)		U	259
SHC	C26	HEXACOSANE (C26)		U	259
SHC	C27	HEPTACOSANE (C27)		U	259
SHC	C28	OCTACOSANE (C28)		U	259
SHC	C29	NONACOSANE (C29)		U	259
SHC	C30	TRIACONTANE (C30)		U	259
SHC	C31	HENTATRIACONTANE (C31)		U	259
SHC	C32	DOTRIACONTANE (C32)		U	259
SHC	C33	TRITRIACONTANE (C33)		U	259
SHC	C34	TETRATRIACONTANE (C34)		U	259
SHC	C35	PENTATRIACONTANE (C35)		U	259
SHC	C36	HEXATRIACONTANE (C36)		U	259
SHC	C37	HEPTATRIACONTANE (C37)		U	259
SHC	C38	OCTATRIACONTANE (C38)		U	259
SHC	C39	NONATRIACONTANE (C39)		U	259
SHC	C40	TETRACONTANE (C40)		U	259
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)		U	8550
SHC	TSH	TOTAL SATURATED HYDROCARBONS	9.84	J	259

Surrogates (% Recovery)	
O-TERPHENYL	96
D50-TETRACOSANE	96

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1849866-2
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1849866
Date Collected	NA
Date Received	11/8/2023
Date Prepped	11/15/2023
Date Analyzed	11/15/2023
Sample Size(wet)	0.00386 g
% Solid	100
File ID	F611152314
Units	%
Final Volume	1
Dilution	1
Reporting Limit	259

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	NONANE (C9)	5150	259	99	5180	50	130
SHC	C10	DECANE (C10)	4840	259	93	5180	50	130
SHC	C12	DODECANE (C12)	4990	259	96	5180	50	130
SHC	C14	TETRADECANE (C14)	5060	259	98	5180	50	130
SHC	C16	HEXADECANE (C16)	5360	259	103	5180	50	130
SHC	C18	OCTADECANE (C18)	5620	259	108	5180	50	130
SHC	C19	NONADECANE (C19)	5070	259	98	5180	50	130
SHC	C20	EICOSANE (C20)	5140	259	99	5180	50	130
SHC	C22	DOCOSANE (C22)	4980	259	96	5180	50	130
SHC	C24	TETRACOSANE (C24)	5220	259	101	5180	50	130
SHC	C26	HEXACOSANE (C26)	4890	259	94	5180	50	130
SHC	C28	OCTACOSANE (C28)	4840	259	93	5180	50	130
SHC	C30	TRIACONTANE (C30)	4860	259	94	5180	50	130
SHC	C36	HEXATRIACONTANE (C36)	4050	259	78	5180	50	130

Surrogates (% Recovery)	
O-TERPHENYL	94
D50-TETRACOSANE	95

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate	
Lab ID	WG1849866-3	
Matrix	SOLID	
Matrix Description		
Reference Method	8015D(M)	
Batch ID	WG1849866	
Date Collected	NA	
Date Received	11/8/2023	
Date Prepped	11/15/2023	
Date Analyzed	11/15/2023	
Sample Size(wet)	0.00386	g
% Solid	100	
File ID	F611152316	
Units	%	
Final Volume	1	
Dilution	1	
Reporting Limit	259	

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
SHC	C9	NONANE (C9)	5180	259	100	5180	50	130	1	30
SHC	C10	DECANE (C10)	4880	259	94	5180	50	130	1	30
SHC	C12	DODECANE (C12)	5020	259	97	5180	50	130	1	30
SHC	C14	TETRADECANE (C14)	5110	259	98	5180	50	130	0	30
SHC	C16	HEXADECANE (C16)	5390	259	104	5180	50	130	1	30
SHC	C18	OCTADECANE (C18)	5650	259	109	5180	50	130	1	30
SHC	C19	NONADECANE (C19)	5100	259	98	5180	50	130	0	30
SHC	C20	EICOSANE (C20)	5160	259	100	5180	50	130	1	30
SHC	C22	DOCOSANE (C22)	5000	259	96	5180	50	130	0	30
SHC	C24	TETRACOSANE (C24)	5230	259	101	5180	50	130	0	30
SHC	C26	HEXACOSANE (C26)	4910	259	95	5180	50	130	1	30
SHC	C28	OCTACOSANE (C28)	4860	259	94	5180	50	130	1	30
SHC	C30	TRIACONTANE (C30)	4880	259	94	5180	50	130	0	30
SHC	C36	HEXATRIACONTANE (C36)	4160	259	80	5180	50	130	3	30

Surrogates (% Recovery)	
O-TERPHENYL	94
D50-TETRACOSANE	94

Project Name: PAMPILLA 2
Project Number:

Client ID		HC SRG 16OCT2023		Duplicate Sample	
Lab ID		L2362108-01		WG1849866-4	
Matrix		SOLID		SOLID	
Matrix Description					
Reference Method		8015D(M)		8015D(M)	
Batch ID		WG1849866		WG1849866	
Date Collected		10/16/2023		NA	
Date Received		10/23/2023		11/8/2023	
Date Prepped		11/15/2023		11/15/2023	
Date Analyzed		11/15/2023		11/16/2023	
Sample Size(wet)		0.00386	g	0.00366	g
% Solid		100		100	
File ID		F611152320		F611152322	
Units		mg/kg		mg/kg	
Final Volume		1		1	
Dilution		1		1	
Reporting Limit		259		273	

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
SHC	C9	NONANE (C9)	6.22	J	259	6.56	J	273		30	NC
SHC	C10	DECANE (C10)		U	259	3.55	J	273		30	X
SHC	C11	UNDECANE	6.74	J	259	6.83	J	273		30	NC
SHC	C12	DODECANE (C12)	4.66	J	259	4.37	J	273		30	NC
SHC	C13	TRIDECANE	12.7	J	259	14.5	J	273		30	NC
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	25.4	J	259	28.4	J	273		30	NC
SHC	C14	TETRADECANE (C14)	345		259	382		273	10	30	
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	404		259	471		273	15	30	
SHC	C15	PENTADECANE (C15)	2620		259	2910		273	10	30	
SHC	C16	HEXADECANE (C16)	6020		259	6440		273	7	30	
SHC	1650	NORPRISTANE (1650)	1860		259	1960		273	5	30	
SHC	C17	HEPTADECANE (C17)	7630		259	7960		273	4	30	
SHC	Pr	PRISTANE	3200		259	3340		273	4	30	
SHC	C18	OCTADECANE (C18)	7910		259	8110		273	2	30	
SHC	Ph	PHYTANE	2970		259	3090		273	4	30	
SHC	C19	NONADECANE (C19)	6420		259	6540		273	2	30	
SHC	C20	EICOSANE (C20)	5620		259	5680		273	1	30	
SHC	C21	HENEICOSANE (C21)	3920		259	3990		273	2	30	
SHC	C22	DOCOSANE (C22)	2870		259	2900		273	1	30	
SHC	C23	TRICOSANE (C23)	1830		259	1800		273	2	30	
SHC	C24	TETRACOSANE (C24)	1210		259	1200		273	1	30	
SHC	C25	PENTACOSANE (C25)	926		259	896		273	3	30	
SHC	C26	HEXACOSANE (C26)	585		259	572		273	2	30	
SHC	C27	HEPTACOSANE (C27)	451		259	432		273	4	30	
SHC	C28	OCTACOSANE (C28)	319		259	313		273	2	30	
SHC	C29	NONACOSANE (C29)	314		259	303		273	4	30	
SHC	C30	TRIACONTANE (C30)	276		259	255	J	273		30	NC
SHC	C31	HENTATRIACONTANE (C31)	214	J	259	210	J	273		30	NC
SHC	C32	DOTRIACONTANE (C32)	172	J	259	166	J	273		30	NC
SHC	C33	TRITRIACONTANE (C33)	190	J	259	186	J	273		30	NC
SHC	C34	TETRATRIACONTANE (C34)	155	J	259	152	J	273		30	NC
SHC	C35	PENTATRIACONTANE (C35)	159	J	259	150	J	273		30	NC
SHC	C36	HEXATRIACONTANE (C36)	96.6	J	259	80.9	J	273		30	NC
SHC	C37	HEPTATRIACONTANE (C37)	73.8	J	259	57.4	J	273		30	NC
SHC	C38	OCTATRIACONTANE (C38)	58.3	J	259	59.8	J	273		30	NC
SHC	C39	NONATRIACONTANE (C39)	35.2	J	259	42.3	J	273		30	NC
SHC	C40	TETRACONTANE (C40)	39.4	J	259	35.0	J	273		30	NC
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	507000		8550	528000		9020	4	30	
SHC	TSH	TOTAL SATURATED HYDROCARBONS	58900	J	259	60700	J	273		30	NC

Surrogates (% Recovery)		
O-TERPHENYL	91	92
D50-TETRACOSANE	89	90

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1836137-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8015D(M)-A2-NFSHC
Batch ID	WG1836137-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	9/9/2023
Sample Size(wet)	0.1008 g
% Solid	100
File ID	F609082330
Units	mg/kg
Final Volume	10
Dilution	1
Reporting Limit	0.992

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	NONANE (C9)	6480	0.992	103	6286	65	135
SHC	C10	DECANE (C10)	5280	0.992	105	5047	65	135
SHC	C11	UNDECANE	4780	0.992	102	4703	65	135
SHC	C12	DODECANE (C12)	4470	0.992	108	4155	65	135
SHC	C13	TRIDECANE	4110	0.992	101	4058	65	135
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	939	0.992	111	845	65	135
SHC	C14	TETRADECANE (C14)	3770	0.992	103	3670	65	135
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	1480	0.992	108	1367	65	135
SHC	C15	PENTADECANE (C15)	4320	0.992	118	3660	65	135
SHC	C16	HEXADECANE (C16)	3410	0.992	102	3330	65	135
SHC	1650	NORPRISTANE (1650)	1230	0.992	112	1093	65	135
SHC	C17	HEPTADECANE (C17)	2930	0.992	97	3012	65	135
SHC	Pr	PRISTANE	2250	0.992	105	2145	65	135
SHC	C18	OCTADECANE (C18)	2580	0.992	96	2700	65	135
SHC	Ph	PHYTANE	1420	0.992	117	1215	65	135
SHC	C19	NONADECANE (C19)	2490	0.992	108	2305	65	135
SHC	C20	EICOSANE (C20)	2630	0.992	112	2337	65	135
SHC	C21	HENEICOSANE (C21)	2180	0.992	107	2044	65	135
SHC	C22	DOCOSANE (C22)	2050	0.992	104	1972	65	135
SHC	C23	TRICOSANE (C23)	1800	0.992	103	1745	65	135
SHC	C24	TETRACOSANE (C24)	1730	0.992	105	1641	65	135
SHC	C25	PENTACOSANE (C25)	1830	0.992	117	1562	65	135
SHC	C26	HEXACOSANE (C26)	1390	0.992	101	1378	65	135
SHC	C27	HEPTACOSANE (C27)	1120	0.992	103	1083	65	135
SHC	C28	OCTACOSANE (C28)	778	0.992	100	776	65	135
SHC	C29	NONACOSANE (C29)	778	0.992	106	734	65	135
SHC	C30	TRIACONTANE (C30)	612	0.992	98	627	65	135
SHC	C31	HENTATRIACONTANE (C31)	502	0.992	98	514	65	135
SHC	C32	DOTRIACONTANE (C32)	539	0.992	118	458	65	135
SHC	C33	TRITRIACONTANE (C33)	402	0.992	104	388	65	135
SHC	C34	TETRATRIACONTANE (C34)	337	0.992	97	347	65	135
SHC	C35	PENTATRIACONTANE (C35)	254	0.992	91	278	65	135
SHC	C36	HEXATRIACONTANE (C36)	181	0.992	97	186	65	135
SHC	C37	HEPTATRIACONTANE (C37)	163	0.992	107	152	65	135
SHC	C38	OCTATRIACONTANE (C38)	125	0.992	95	131	65	135
SHC	C39	NONATRIACONTANE (C39)	87.9	0.992	99	89	65	135
SHC	C40	TETRACONTANE (C40)	74.8	0.992	81	92	65	135
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	569000	0.992	102	554993	65	135
SHC	TSH	TOTAL SATURATED HYDROCARBONS	80263	0.992	118	68122	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	HC SRG 16OCT2023
Lab ID	L2362108-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1849866
Date Collected	10/16/2023
Date Received	10/23/2023
Date Prepped	11/15/2023
Date Analyzed	11/17/2023
Sample Size(wet)	0.00386 g
% Solid	100
File ID	F1211162312
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.3

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN		U	1.30
2	D1	C1-DECALINS	0.949	J	2.59
2	D2	C2-DECALINS		U	2.59
2	D3	C3-DECALINS		U	2.59
2	D4	C4-DECALINS	14.9		2.59
S	BT0	BENZOTHIOPHENE	0.103	J	2.59
2	BT1	C1-BENZO(B)THIOPHENES	3.72		2.59
2	BT2	C2-BENZO(B)THIOPHENES	4.08	G	2.59
2	BT3	C3-BENZO(B)THIOPHENES	14.0		2.59
2	BT4	C4-BENZO(B)THIOPHENES	40.8		2.59
A	N0	NAPHTHALENE	0.752	JB	2.59
2	N1	C1-NAPHTHALENES	1.46	JB	2.59
2	N2	C2-NAPHTHALENES	13.4		2.59
2	N3	C3-NAPHTHALENES	131		2.59
2	N4	C4-NAPHTHALENES	227		2.59
2	B	BIPHENYL	1.99	J	2.59
3	DF	DIBENZOFURAN	3.87		2.59
3	AY	ACENAPHTHYLENE	2.37	J	2.59
3	AE	ACENAPHTHENE	1.35	J	2.59
3	F0	FLUORENE	5.60		2.59
3	F1	C1-FLUORENES	71.2		2.59
3	F2	C2-FLUORENES	226		2.59
3	F3	C3-FLUORENES	285		2.59
3	A0	ANTHRACENE	9.50		2.59
3	P0	PHENANTHRENE	79.7		2.59
3	PA1	C1-PHENANTHRENES/ANTHRACENES	335		2.59
3	PA2	C2-PHENANTHRENES/ANTHRACENES	540		2.59
3	PA3	C3-PHENANTHRENES/ANTHRACENES	362		2.59
3	PA4	C4-PHENANTHRENES/ANTHRACENES	174		2.59
3	RET	RETENE		U	2.59
3	DBT0	DIBENZOTHIOPHENE	27.9		2.59
3	DBT1	C1-DIBENZOTHIOPHENES	149		2.59
3	DBT2	C2-DIBENZOTHIOPHENES	236		2.59
3	DBT3	C3-DIBENZOTHIOPHENES	206		2.59
3	DBT4	C4-DIBENZOTHIOPHENES	105		2.59
4	BF	BENZO(B)FLUORENE	2.53	J	2.59
4	FL0	FLUORANTHENE	8.86		2.59
4	PY0	PYRENE	96.6		2.59
4	FP1	C1-FLUORANTHENES/PYRENES	159		2.59
4	FP2	C2-FLUORANTHENES/PYRENES	134		2.59
4	FP3	C3-FLUORANTHENES/PYRENES	137		2.59
4	FP4	C4-FLUORANTHENES/PYRENES	126		2.59
4	NBT0	NAPHTHOBENZOTHIOPHENE	31.1		2.59
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	100		2.59
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	144		2.59
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	116		2.59
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	62.2		2.59
4	BA0	BENZ(A)ANTHRACENE	5.84		2.59
4	C0	CHRYSENE/TRIPHENYLENE	42.2		2.59

Project Name: PAMPILLA 2
Project Number:

Client ID	HC SRG 16OCT2023
Lab ID	L2362108-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1849866
Date Collected	10/16/2023
Date Received	10/23/2023
Date Prepped	11/15/2023
Date Analyzed	11/17/2023
Sample Size(wet)	0.00386 g
% Solid	100
File ID	F1211162312
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.3

Class	Abbrev	Analytes	Result		SSRL
4	BC1	C1-CHRYSENES	107		2.59
4	BC2	C2-CHRYSENES	139		2.59
4	BC3	C3-CHRYSENES	117		2.59
4	BC4	C4-CHRYSENES	68.0		2.59
5	BBF	BENZO(B)FLUORANTHENE	6.79		2.59
5	BJKF	BENZO(J)+(K)FLUORANTHENE	1.71	J	2.59
5	BAF	BENZO(A)FLUORANTHENE		U	2.59
5	BEP	BENZO(E)PYRENE	16.1		2.59
5	BAP	BENZO(A)PYRENE	1.39	J	2.59
5	PER	PERYLENE	0.675	J	2.59
6	IND	INDENO(1,2,3-CD)PYRENE	2.40	J	2.59
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	2.33	J	2.59
6	GHI	BENZO(GHI)PERYLENE	6.70		2.59
O	CAR	CARBAZOLE	2.52	J	2.59
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	57.4		2.59
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	65.1		2.59
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	15.0		2.59
3	3MP	3-METHYLPHENANTHRENE (3MP)	100		2.59
3	2MP	2-METHYLPHENANTHRENE (2MP)	102		2.59
3	2MA	2-METHYLANTHRACENE (2MA)	2.69		2.59
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	70.2		2.59
3	1MP	1-METHYLPHENANTHRENE (1MP)	54.6		2.59
A	1MN	1-METHYLNAPHTHALENE	0.732	JB	2.59
A	2MN	2-METHYLNAPHTHALENE	1.13	JB	2.59
2	26DMN	2,6-DIMETHYLNAPHTHALENE	4.49		2.59
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	24.3		2.59
H30	T19	HOPANE (T19)	83.0		2.59
t23	T4	C23 TRICYCLIC TERPANE (T4)	42.6		2.59
t24	T5	C24 TRICYCLIC TERPANE (T5)	15.7		2.59
t25	T6	C25 TRICYCLIC TERPANE (T6)	13.2		2.59
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	8.66		2.59
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	6.29		2.59
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	5.30		2.59
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	6.72		2.59
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	5.98		2.59
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	6.24		2.59
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	6.54		2.59
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	16.3		2.59
t30S	T11a	C30 TRICYCLIC TERPANE-22S	5.05		2.59
t30R	T11b	C30 TRICYCLIC TERPANE-22R	5.04		2.59
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	22.0		2.59
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	5.64		2.59
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	6.74		2.59
H29	T15	30-NORHOPANE (T15)	61.1		2.59
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	11.7		2.59
X	X	17A(H)-DIAHOPANE (X)	3.83		2.59
M29	T17	30-NORMORETANE (T17)	7.20		2.59
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	12.1		2.59
M30	T20	MORETANE (T20)	9.10		2.59

Project Name: PAMPILLA 2
Project Number:

Client ID	HC SRG 16OCT2023
Lab ID	L2362108-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1849866
Date Collected	10/16/2023
Date Received	10/23/2023
Date Prepped	11/15/2023
Date Analyzed	11/17/2023
Sample Size(wet)	0.00386 g
% Solid	100
File ID	F1211162312
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.3

Class	Abbrev	Analytes	Result	SSRL
H31S	T21	30-HOMOHOPANE-22S (T21)	36.0	2.59
H31R	T22	30-HOMOHOPANE-22R (T22)	32.7	2.59
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	11.6	2.59
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	24.4	2.59
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	17.3	2.59
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	17.4	2.59
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	10.4	2.59
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	12.1	2.59
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	10.1	2.59
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	10.6	2.59
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	7.71	2.59
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	16.4	2.59
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	9.44	2.59
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	6.92	2.59
aa27S	S12	17A(H)20SC27/C29DIA	25.0	2.59
aa27R	S17	17A(H)20RC27/C29DIA	27.2	2.59
d29R	S18	UNKNOWN STERANE (S18)	3.77	2.59
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	2.13 J	2.59
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	14.1	2.59
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	14.1	2.59
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	15.9	2.59
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	17.8	2.59
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	22.9	2.59
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	21.3	2.59
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	20.1	2.59
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	23.3	2.59
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	31.1	2.59
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	18.2	2.59
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	34.8	2.59
SC28TAS	TAS02	C28,20S TAS	24.7	2.59
RC27TAS	TAS03	C27,20R TAS	25.4	2.59
RC28TAS	TAS04	C28,20R TAS	19.1	2.59

Surrogates (% Recovery)	
NAPHTHALENE-D8	88
PHENANTHRENE-D10	91
BENZO(A)PYRENE-D12	107
5B(H)CHOLANE	102

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1849866-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1849866
Date Collected	NA
Date Received	11/8/2023
Date Prepped	11/15/2023
Date Analyzed	11/16/2023
Sample Size(wet)	0.00386 g
% Solid	100
File ID	F1211162309
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.3

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN		U	1.30
2	D1	C1-DECALINS		U	2.59
2	D2	C2-DECALINS		U	2.59
2	D3	C3-DECALINS		U	2.59
2	D4	C4-DECALINS		U	2.59
S	BT0	BENZOTHIOPHENE		U	2.59
2	BT1	C1-BENZO(B)THIOPHENES		U	2.59
2	BT2	C2-BENZO(B)THIOPHENES		U	2.59
2	BT3	C3-BENZO(B)THIOPHENES		U	2.59
2	BT4	C4-BENZO(B)THIOPHENES		U	2.59
A	N0	NAPHTHALENE	0.180	J	2.59
2	N1	C1-NAPHTHALENES	0.254	J	2.59
2	N2	C2-NAPHTHALENES		U	2.59
2	N3	C3-NAPHTHALENES		U	2.59
2	N4	C4-NAPHTHALENES		U	2.59
2	B	BIPHENYL	0.132	J	2.59
3	DF	DIBENZOFURAN		U	2.59
3	AY	ACENAPHTHYLENE		U	2.59
3	AE	ACENAPHTHENE		U	2.59
3	F0	FLUORENE	0.138	J	2.59
3	F1	C1-FLUORENES		U	2.59
3	F2	C2-FLUORENES		U	2.59
3	F3	C3-FLUORENES		U	2.59
3	A0	ANTHRACENE		U	2.59
3	P0	PHENANTHRENE	0.129	J	2.59
3	PA1	C1-PHENANTHRENES/ANTHRACENES		U	2.59
3	PA2	C2-PHENANTHRENES/ANTHRACENES		U	2.59
3	PA3	C3-PHENANTHRENES/ANTHRACENES		U	2.59
3	PA4	C4-PHENANTHRENES/ANTHRACENES		U	2.59
3	RET	RETENE		U	2.59
3	DBT0	DIBENZOTHIOPHENE		U	2.59
3	DBT1	C1-DIBENZOTHIOPHENES		U	2.59
3	DBT2	C2-DIBENZOTHIOPHENES		U	2.59
3	DBT3	C3-DIBENZOTHIOPHENES		U	2.59
3	DBT4	C4-DIBENZOTHIOPHENES		U	2.59
4	BF	BENZO(B)FLUORENE		U	2.59
4	FL0	FLUORANTHENE		U	2.59
4	PY0	PYRENE	0.0544	J	2.59
4	FP1	C1-FLUORANTHENES/PYRENES		U	2.59
4	FP2	C2-FLUORANTHENES/PYRENES		U	2.59
4	FP3	C3-FLUORANTHENES/PYRENES		U	2.59
4	FP4	C4-FLUORANTHENES/PYRENES		U	2.59
4	NBT0	NAPHTHOBENZOTHIOPHENE		U	2.59
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES		U	2.59
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES		U	2.59
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES		U	2.59
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES		U	2.59
4	BA0	BENZ(A)ANTHRACENE		U	2.59
4	C0	CHRYSENE/TRIPHENYLENE	0.0466	J	2.59

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1849866-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1849866
Date Collected	NA
Date Received	11/8/2023
Date Prepped	11/15/2023
Date Analyzed	11/16/2023
Sample Size(wet)	0.00386 g
% Solid	100
File ID	F1211162309
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.3

Class	Abbrev	Analytes	Result		SSRL
4	BC1	C1-CHRYSENES		U	2.59
4	BC2	C2-CHRYSENES		U	2.59
4	BC3	C3-CHRYSENES		U	2.59
4	BC4	C4-CHRYSENES		U	2.59
5	BBF	BENZO(B)FLUORANTHENE		U	2.59
5	BJKF	BENZO(J)+(K)FLUORANTHENE		U	2.59
5	BAF	BENZO(A)FLUORANTHENE		U	2.59
5	BEP	BENZO(E)PYRENE		U	2.59
5	BAP	BENZO(A)PYRENE		U	2.59
5	PER	PERYLENE		U	2.59
6	IND	INDENO(1,2,3-CD)PYRENE	0.0927	J	2.59
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE		U	2.59
6	GHI	BENZO(GHI)PERYLENE	0.133	J	2.59
O	CAR	CARBAZOLE		U	2.59
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)		U	2.59
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)		U	2.59
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)		U	2.59
3	3MP	3-METHYLPHENANTHRENE (3MP)		U	2.59
3	2MP	2-METHYLPHENANTHRENE (2MP)		U	2.59
3	2MA	2-METHYLANTHRACENE (2MA)		U	2.59
3	9MP	9/4-METHYLPHENANTHRENE (9MP)		U	2.59
3	1MP	1-METHYLPHENANTHRENE (1MP)		U	2.59
A	1MN	1-METHYLNAPHTHALENE	0.106	J	2.59
A	2MN	2-METHYLNAPHTHALENE	0.150	J	2.59
2	26DMN	2,6-DIMETHYLNAPHTHALENE		U	2.59
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE		U	2.59
H30	T19	HOPANE (T19)		U	2.59
t23	T4	C23 TRICYCLIC TERPANE (T4)		U	2.59
t24	T5	C24 TRICYCLIC TERPANE (T5)		U	2.59
t25	T6	C25 TRICYCLIC TERPANE (T6)		U	2.59
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)		U	2.59
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)		U	2.59
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)		U	2.59
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)		U	2.59
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)		U	2.59
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)		U	2.59
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)		U	2.59
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)		U	2.59
t30S	T11a	C30 TRICYCLIC TERPANE-22S		U	2.59
t30R	T11b	C30 TRICYCLIC TERPANE-22R		U	2.59
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)		U	2.59
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)		U	2.59
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)		U	2.59
H29	T15	30-NORHOPANE (T15)		U	2.59
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)		U	2.59
X	X	17A(H)-DIAHOPANE (X)		U	2.59
M29	T17	30-NORMORETANE (T17)		U	2.59
OL	T18	18A(H)&18B(H)-OLEANANES (T18)		U	2.59
M30	T20	MORETANE (T20)		U	2.59

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1849866-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1849866
Date Collected	NA
Date Received	11/8/2023
Date Prepped	11/15/2023
Date Analyzed	11/16/2023
Sample Size(wet)	0.00386 g
% Solid	100
File ID	F1211162309
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.3

Class	Abbrev	Analytes	Result		SSRL
H31S	T21	30-HOMOHOPANE-22S (T21)		U	2.59
H31R	T22	30-HOMOHOPANE-22R (T22)		U	2.59
T22A	T22A	GAMMACERANE/C32-DIAHOPANE		U	2.59
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)		U	2.59
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)		U	2.59
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)		U	2.59
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)		U	2.59
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)		U	2.59
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)		U	2.59
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)		U	2.59
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)		U	2.59
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)		U	2.59
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)		U	2.59
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)		U	2.59
aa27S	S12	17A(H)20SC27/C29DIA		U	2.59
aa27R	S17	17A(H)20RC27/C29DIA		U	2.59
d29R	S18	UNKNOWN STERANE (S18)		U	2.59
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)		U	2.59
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)		U	2.59
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)		U	2.59
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)		U	2.59
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)		U	2.59
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)		U	2.59
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)		U	2.59
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)		U	2.59
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)		U	2.59
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)		U	2.59
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)		U	2.59
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS		U	2.59
SC28TAS	TAS02	C28,20S TAS		U	2.59
RC27TAS	TAS03	C27,20R TAS		U	2.59
RC28TAS	TAS04	C28,20R TAS		U	2.59

Surrogates (% Recovery)	
NAPHTHALENE-D8	89
PHENANTHRENE-D10	107
BENZO(A)PYRENE-D12	104
5B(H)CHOLANE	101

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1849866-2
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1849866
Date Collected	NA
Date Received	11/8/2023
Date Prepped	11/15/2023
Date Analyzed	11/16/2023
Sample Size(wet)	0.00386 g
% Solid	100
File ID	F1211162310
Units	%
Final Volume	1
Dilution	1
Reporting Limit	2.59

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
A	N0	NAPHTHALENE	212	2.59	82	259	50	130
3	AY	ACENAPHTHYLENE	232	2.59	89	259	50	130
3	AE	ACENAPHTHENE	227	2.59	87	259	50	130
3	F0	FLUORENE	244	2.59	94	259	50	130
3	A0	ANTHRACENE	264	2.59	102	259	50	130
3	P0	PHENANTHRENE	249	2.59	96	259	50	130
4	FL0	FLUORANTHENE	258	2.59	99	259	50	130
4	PY0	PYRENE	269	2.59	104	259	50	130
4	BA0	BENZ(A)ANTHRACENE	245	2.59	95	259	50	130
4	C0	CHRYSENE/TRIPHENYLENE	229	2.59	88	259	50	130
5	BBF	BENZO(B)FLUORANTHENE	239	2.59	92	259	50	130
5	BJKF	BENZO(J)+(K)FLUORANTHENE	234	2.59	90	259	50	130
5	BAP	BENZO(A)PYRENE	237	2.59	92	259	50	130
6	IND	INDENO(1,2,3-CD)PYRENE	245	2.59	94	259	50	130
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	247	2.59	95	259	50	130
6	GHI	BENZO(GHI)PERYLENE	220	2.59	85	259	50	130
A	2MN	2-METHYLNAPHTHALENE	218	2.59	84	259	50	130

Surrogates (% Recovery)	
NAPHTHALENE-D8	87
PHENANTHRENE-D10	106
BENZO(A)PYRENE-D12	101
5B(H)CHOLANE	98

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1849866-3
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1849866
Date Collected	NA
Date Received	11/8/2023
Date Prepped	11/15/2023
Date Analyzed	11/16/2023
Sample Size(wet)	0.00386 g
% Solid	100
File ID	F1211162311
Units	%
Final Volume	1
Dilution	1
Reporting Limit	2.59

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
A	N0	NAPHTHALENE	213	2.59	82	259	50	130	0	30
3	AY	ACENAPHTHYLENE	230	2.59	89	259	50	130	0	30
3	AE	ACENAPHTHENE	226	2.59	87	259	50	130	0	30
3	F0	FLUORENE	242	2.59	94	259	50	130	0	30
3	A0	ANTHRACENE	263	2.59	102	259	50	130	0	30
3	P0	PHENANTHRENE	249	2.59	96	259	50	130	0	30
4	FL0	FLUORANTHENE	259	2.59	100	259	50	130	1	30
4	PY0	PYRENE	270	2.59	104	259	50	130	0	30
4	BA0	BENZ(A)ANTHRACENE	246	2.59	95	259	50	130	0	30
4	C0	CHRYSENE/TRIPHENYLENE	228	2.59	88	259	50	130	0	30
5	BBF	BENZO(B)FLUORANTHENE	239	2.59	92	259	50	130	0	30
5	BJKF	BENZO(J)+(K)FLUORANTHENE	232	2.59	90	259	50	130	0	30
5	BAP	BENZO(A)PYRENE	238	2.59	92	259	50	130	0	30
6	IND	INDENO(1,2,3-CD)PYRENE	244	2.59	94	259	50	130	0	30
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	247	2.59	95	259	50	130	0	30
6	GHI	BENZO(GHI)PERYLENE	218	2.59	84	259	50	130	1	30
A	2MN	2-METHYLNAPHTHALENE	218	2.59	84	259	50	130	0	30

Surrogates (% Recovery)	
NAPHTHALENE-D8	87
PHENANTHRENE-D10	107
BENZO(A)PYRENE-D12	100
5B(H)CHOLANE	96

Project Name: PAMPILLA 2
Project Number:

Client ID	HC SRG 16OCT2023	Duplicate Sample
Lab ID	L2362108-01	WG1849866-4
Matrix	SOLID	SOLID
Matrix Description		
Reference Method	8270E-SIM(M)	8270E-SIM(M)
Batch ID	WG1849866	WG1849866
Date Collected	10/16/2023	NA
Date Received	10/23/2023	11/8/2023
Date Prepped	11/15/2023	11/15/2023
Date Analyzed	11/17/2023	11/17/2023
Sample Size(wet)	0.00386 g	0.00366 g
% Solid	100	100
File ID	F1211162312	F1211162313
Units	mg/kg	mg/kg
Final Volume	1	1
Dilution	1	1
Reporting Limit	1.3	1.37

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
2	D0	CIS/TRANS-DECALIN		U	1.30		U	1.37		30	NC
2	D1	C1-DECALINS	0.949	J	2.59	1.03	J	2.73		30	NC
2	D2	C2-DECALINS		U	2.59		U	2.73		30	NC
2	D3	C3-DECALINS		U	2.59		U	2.73		30	NC
2	D4	C4-DECALINS	14.9		2.59	17.0		2.73	13	30	
S	BT0	BENZOTHIOPHENE	0.103	J	2.59	0.0888	J	2.73		30	NC
2	BT1	C1-BENZO(B)THIOPHENES	3.72		2.59	4.06		2.73	9	30	
2	BT2	C2-BENZO(B)THIOPHENES	4.08	G	2.59	4.59	G	2.73	12	30	
2	BT3	C3-BENZO(B)THIOPHENES	14.0		2.59	16.4		2.73	16	30	
2	BT4	C4-BENZO(B)THIOPHENES	40.8		2.59	43.5		2.73	6	30	
A	N0	NAPHTHALENE	0.752	JB	2.59	0.777	JB	2.73		30	NC
2	N1	C1-NAPHTHALENES	1.46	JB	2.59	1.76	JB	2.73		30	NC
2	N2	C2-NAPHTHALENES	13.4		2.59	16.3		2.73	20	30	
2	N3	C3-NAPHTHALENES	131		2.59	155		2.73	17	30	
2	N4	C4-NAPHTHALENES	227		2.59	256		2.73	12	30	
2	B	BIPHENYL	1.99	J	2.59	2.23	J	2.73		30	NC
3	DF	DIBENZOFURAN	3.87		2.59	4.32		2.73	11	30	
3	AY	ACENAPHTHYLENE	2.37	J	2.59	2.51	J	2.73		30	NC
3	AE	ACENAPHTHENE	1.35	J	2.59	1.83	J	2.73		30	NC
3	F0	FLUORENE	5.60		2.59	7.05		2.73	23	30	
3	F1	C1-FLUORENES	71.2		2.59	75.9		2.73	6	30	
3	F2	C2-FLUORENES	226		2.59	249		2.73	10	30	
3	F3	C3-FLUORENES	285		2.59	305		2.73	7	30	
3	A0	ANTHRACENE	9.50		2.59	9.85		2.73	4	30	
3	P0	PHENANTHRENE	79.7		2.59	87.0		2.73	9	30	
3	PA1	C1-PHENANTHRENES/ANTHRACENES	335		2.59	355		2.73	6	30	
3	PA2	C2-PHENANTHRENES/ANTHRACENES	540		2.59	577		2.73	7	30	
3	PA3	C3-PHENANTHRENES/ANTHRACENES	362		2.59	391		2.73	8	30	
3	PA4	C4-PHENANTHRENES/ANTHRACENES	174		2.59	184		2.73	6	30	
3	RET	RETENE		U	2.59		U	2.73		30	NC
3	DBT0	DIBENZOTHIOPHENE	27.9		2.59	30.3		2.73	8	30	
3	DBT1	C1-DIBENZOTHIOPHENES	149		2.59	159		2.73	6	30	
3	DBT2	C2-DIBENZOTHIOPHENES	236		2.59	252		2.73	7	30	
3	DBT3	C3-DIBENZOTHIOPHENES	206		2.59	219		2.73	6	30	
3	DBT4	C4-DIBENZOTHIOPHENES	105		2.59	109		2.73	4	30	
4	BF	BENZO(B)FLUORENE	2.53	J	2.59	3.23		2.73		30	NC
4	FL0	FLUORANTHENE	8.86		2.59	10.1		2.73	13	30	
4	PY0	PYRENE	96.6		2.59	105		2.73	8	30	
4	FP1	C1-FLUORANTHENES/PYRENES	159		2.59	173		2.73	8	30	
4	FP2	C2-FLUORANTHENES/PYRENES	134		2.59	145		2.73	8	30	
4	FP3	C3-FLUORANTHENES/PYRENES	137		2.59	144		2.73	5	30	
4	FP4	C4-FLUORANTHENES/PYRENES	126		2.59	136		2.73	8	30	
4	NBT0	NAPHTHOBENZOTHIOPHENE	31.1		2.59	32.1		2.73	3	30	
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	100		2.59	105		2.73	5	30	
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	144		2.59	157		2.73	9	30	
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	116		2.59	120		2.73	3	30	
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	62.2		2.59	69.7		2.73	11	30	
4	BA0	BENZ(A)ANTHRACENE	5.84		2.59	6.59		2.73	12	30	
4	C0	CHRYSENE/TRIPHENYLENE	42.2		2.59	45.5		2.73	8	30	

Project Name: PAMPILLA 2
Project Number:

Client ID			HC SRG 16OCT2023			Duplicate Sample				
Lab ID			L2362108-01			WG1849866-4				
Matrix			SOLID			SOLID				
Matrix Description										
Reference Method			8270E-SIM(M)			8270E-SIM(M)				
Batch ID			WG1849866			WG1849866				
Date Collected			10/16/2023			NA				
Date Received			10/23/2023			11/8/2023				
Date Prepped			11/15/2023			11/15/2023				
Date Analyzed			11/17/2023			11/17/2023				
Sample Size(wet)			0.00386	g		0.00366	g			
% Solid			100			100				
File ID			F1211162312			F1211162313				
Units			mg/kg			mg/kg				
Final Volume			1			1				
Dilution			1			1				
Reporting Limit			1.3			1.37				
Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
4	BC1	C1-CHRYSENES	107		2.59	114		2.73	6	30	
4	BC2	C2-CHRYSENES	139		2.59	144		2.73	4	30	
4	BC3	C3-CHRYSENES	117		2.59	126		2.73	7	30	
4	BC4	C4-CHRYSENES	68.0		2.59	73.9		2.73	8	30	
5	BBF	BENZO(B)FLUORANTHENE	6.79		2.59	7.26		2.73	7	30	
5	BJKF	BENZO(J)+(K)FLUORANTHENE	1.71	J	2.59	1.92	J	2.73		30	NC
5	BAF	BENZO(A)FLUORANTHENE		U	2.59		U	2.73		30	NC
5	BEP	BENZO(E)PYRENE	16.1		2.59	17.3		2.73	7	30	
5	BAP	BENZO(A)PYRENE	1.39	J	2.59	1.50	J	2.73		30	NC
5	PER	PERYLENE	0.675	J	2.59	0.838	J	2.73		30	NC
6	IND	INDENO(1,2,3-CD)PYRENE	2.40	J	2.59	2.56	J	2.73		30	NC
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	2.33	J	2.59	2.40	J	2.73		30	NC
6	GHI	BENZO(GHI)PERYLENE	6.70		2.59	6.75		2.73	1	30	
O	CAR	CARBAZOLE	2.52	J	2.59	2.46	J	2.73		30	NC
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	57.4		2.59	61.4		2.73	7	30	
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	65.1		2.59	69.9		2.73	7	30	
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	15.0		2.59	17.6		2.73	16	30	
3	3MP	3-METHYLPHENANTHRENE (3MP)	100		2.59	108		2.73	8	30	
3	2MP	2-METHYLPHENANTHRENE (2MP)	102		2.59	109		2.73	7	30	
3	2MA	2-METHYLANTHRACENE (2MA)	2.69		2.59	3.00		2.73	11	30	
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	70.2		2.59	74.9		2.73	6	30	
3	1MP	1-METHYLPHENANTHRENE (1MP)	54.6		2.59	59.6		2.73	9	30	
A	1MN	1-METHYLNAPHTHALENE	0.732	JB	2.59	0.888	JB	2.73		30	NC
A	2MN	2-METHYLNAPHTHALENE	1.13	JB	2.59	1.19	JB	2.73		30	NC
2	26DMN	2,6-DIMETHYLNAPHTHALENE	4.49		2.59	5.40		2.73	18	30	
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	24.3		2.59	29.1		2.73	18	30	
H30	T19	HOPANE (T19)	83.0		2.59	84.1		2.73	1	30	
t23	T4	C23 TRICYCLIC TERPANE (T4)	42.6		2.59	42.2		2.73	1	30	
t24	T5	C24 TRICYCLIC TERPANE (T5)	15.7		2.59	15.6		2.73	1	30	
t25	T6	C25 TRICYCLIC TERPANE (T6)	13.2		2.59	13.4		2.73	2	30	
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	8.66		2.59	9.64		2.73	11	30	
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	6.29		2.59	5.84		2.73	7	30	
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	5.30		2.59	5.66		2.73	7	30	
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	6.72		2.59	6.98		2.73	4	30	
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	5.98		2.59	7.31		2.73	20	30	
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	6.24		2.59	5.65		2.73	10	30	
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	6.54		2.59	6.41		2.73	2	30	
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	16.3		2.59	16.0		2.73	2	30	
t30S	T11a	C30 TRICYCLIC TERPANE-22S	5.05		2.59	4.74		2.73	6	30	
t30R	T11b	C30 TRICYCLIC TERPANE-22R	5.04		2.59	4.68		2.73	7	30	
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	22.0		2.59	23.3		2.73	6	30	
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	5.64		2.59	5.24		2.73	7	30	
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	6.74		2.59	6.76		2.73	0	30	
H29	T15	30-NORHOPANE (T15)	61.1		2.59	62.8		2.73	3	30	
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	11.7		2.59	11.8		2.73	1	30	
X	X	17A(H)-DIAHOPANE (X)	3.83		2.59	4.18		2.73	9	30	
M29	T17	30-NORMORETANE (T17)	7.20		2.59	7.52		2.73	4	30	
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	12.1		2.59	11.0		2.73	10	30	
M30	T20	MORETANE (T20)	9.10		2.59	10.9		2.73	18	30	

Project Name: PAMPILLA 2
Project Number:

Client ID			HC SRG 16OCT2023		Duplicate Sample			
Lab ID			L2362108-01		WG1849866-4			
Matrix			SOLID		SOLID			
Matrix Description								
Reference Method			8270E-SIM(M)		8270E-SIM(M)			
Batch ID			WG1849866		WG1849866			
Date Collected			10/16/2023		NA			
Date Received			10/23/2023		11/8/2023			
Date Prepped			11/15/2023		11/15/2023			
Date Analyzed			11/17/2023		11/17/2023			
Sample Size(wet)			0.00386 g		0.00366 g			
% Solid			100		100			
File ID			F1211162312		F1211162313			
Units			mg/kg		mg/kg			
Final Volume			1		1			
Dilution			1		1			
Reporting Limit			1.3		1.37			
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	RPD	RPD Limit
H31S	T21	30-HOMOHOPANE-22S (T21)	36.0	2.59	34.0	2.73	6	30
H31R	T22	30-HOMOHOPANE-22R (T22)	32.7	2.59	31.8	2.73	3	30
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	11.6	2.59	10.2	2.73	13	30
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	24.4	2.59	24.3	2.73	0	30
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	17.3	2.59	17.6	2.73	2	30
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	17.4	2.59	16.3	2.73	7	30
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	10.4	2.59	10.8	2.73	4	30
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	12.1	2.59	12.7	2.73	5	30
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	10.1	2.59	8.94	2.73	12	30
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	10.6	2.59	10.5	2.73	1	30
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	7.71	2.59	8.80	2.73	13	30
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	16.4	2.59	13.7	2.73	18	30
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	9.44	2.59	8.76	2.73	7	30
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	6.92	2.59	7.78	2.73	12	30
aa27S	S12	17A(H)20SC27/C29DIA	25.0	2.59	24.1	2.73	4	30
aa27R	S17	17A(H)20RC27/C29DIA	27.2	2.59	29.8	2.73	9	30
d29R	S18	UNKNOWN STERANE (S18)	3.77	2.59	4.03	2.73	7	30
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	2.13 J	2.59	1.82 J	2.73		30 NC
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	14.1	2.59	13.4	2.73	5	30
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	14.1	2.59	14.8	2.73	5	30
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	15.9	2.59	15.8	2.73	1	30
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	17.8	2.59	18.0	2.73	1	30
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	22.9	2.59	22.4	2.73	2	30
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	21.3	2.59	20.9	2.73	2	30
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	20.1	2.59	18.9	2.73	6	30
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	23.3	2.59	22.4	2.73	4	30
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	31.1	2.59	30.2	2.73	3	30
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	18.2	2.59	18.3	2.73	1	30
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	34.8	2.59	34.8	2.73	0	30
SC28TAS	TAS02	C28,20S TAS	24.7	2.59	27.6	2.73	11	30
RC27TAS	TAS03	C27,20R TAS	25.4	2.59	25.8	2.73	2	30
RC28TAS	TAS04	C28,20R TAS	19.1	2.59	18.4	2.73	4	30

Surrogates (% Recovery)		
NAPHTHALENE-D8	88	91
PHENANTHRENE-D10	91	92
BENZO(A)PYRENE-D12	107	108
5B(H)CHOLANE	102	104

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1849193-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1849193-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	11/7/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F1211062314
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	522	1.94	109	477.66	65	135
2	D1	C1-DECALINS	785	1.94	103	760.39	65	135
2	D2	C2-DECALINS	678	1.94	100	675.98	65	135
2	D3	C3-DECALINS	347	1.94	95	366.46	65	135
2	D4	C4-DECALINS	328	1.94	90	362.78	65	135
S	BT0	BENZOTHIOPHENE	6.36	1.94	111	5.75	65	135
2	BT1	C1-BENZO(B)THIOPHENES	31.8	1.94	106	29.96	65	135
2	BT2	C2-BENZO(B)THIOPHENES	50.4	1.94	99	50.93	65	135
2	BT3	C3-BENZO(B)THIOPHENES	95.5	1.94	93	103.18	65	135
2	BT4	C4-BENZO(B)THIOPHENES	81.2	1.94	89	90.8	65	135
A	N0	NAPHTHALENE	596	1.94	105	565.56	65	135
2	N1	C1-NAPHTHALENES	1260	1.94	104	1208.32	65	135
2	N2	C2-NAPHTHALENES	1460	1.94	101	1450.37	65	135
2	N3	C3-NAPHTHALENES	1040	1.94	99	1052.74	65	135
2	N4	C4-NAPHTHALENES	543	1.94	93	583.65	65	135
2	B	BIPHENYL	156	1.94	107	145.7	65	135
3	DF	DIBENZOFURAN	61.2	1.94	123	49.63	65	135
3	AY	ACENAPHTHYLENE	7.15	1.94	103	6.91	65	135
3	AE	ACENAPHTHENE	19.9	1.94	108	18.35	65	135
3	F0	FLUORENE	83.4	1.94	118	70.69	65	135
3	F1	C1-FLUORENES	178	1.94	109	162.7	65	135
3	F2	C2-FLUORENES	246	1.94	98	251.87	65	135
3	F3	C3-FLUORENES	227	1.94	94	242.29	65	135
3	P0	PHENANTHRENE	219	1.94	116	188.41	65	135
3	PA1	C1-PHENANTHRENES/ANTHRACENES	420	1.94	108	388.12	65	135
3	PA2	C2-PHENANTHRENES/ANTHRACENES	445	1.94	102	434.38	65	135
3	PA3	C3-PHENANTHRENES/ANTHRACENES	326	1.94	106	308.67	65	135
3	PA4	C4-PHENANTHRENES/ANTHRACENES	133	1.94	102	129.94	65	135
3	DBT0	DIBENZOTHIOPHENE	150	1.94	115	130.56	65	135
3	DBT1	C1-DIBENZOTHIOPHENES	289	1.94	105	275.34	65	135
3	DBT2	C2-DIBENZOTHIOPHENES	387	1.94	105	369.42	65	135
3	DBT3	C3-DIBENZOTHIOPHENES	370	1.94	107	345.39	65	135
3	DBT4	C4-DIBENZOTHIOPHENES	213	1.94	110	193.51	65	135
4	FL0	FLUORANTHENE	4.42	1.94	117	3.77	65	135
4	PY0	PYRENE	12.5	1.94	107	11.65	65	135
4	FP1	C1-FLUORANTHENES/PYRENES	62.8	1.94	115	54.43	65	135
4	FP2	C2-FLUORANTHENES/PYRENES	102	1.94	114	89.07	65	135
4	FP3	C3-FLUORANTHENES/PYRENES	132	1.94	120	109.78	65	135
4	FP4	C4-FLUORANTHENES/PYRENES	121	1.94	124	97.22	65	135
4	NBT0	NAPHTHOBENZOTHIOPHENE	47.1	1.94	120	39.13	65	135
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	134	1.94	126	106.13	65	135
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	182	1.94	121	150.09	65	135
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	153	1.94	127	120.77	65	135
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	103	1.94	121	85.38	65	135
4	BA0	BENZ(A)ANTHRACENE	2.88	1.94	126	2.28	65	135
4	C0	CHRYSENE/TRIPHENYLENE	41.6	1.94	113	36.66	65	135
4	BC1	C1-CHRYSENES	79.2	1.94	123	64.59	65	135
4	BC2	C2-CHRYSENES	104	1.94	119	87.41	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1849193-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1849193-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	11/7/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F1211062314
Units	mg/kg
Final Volume	10
Dilution	1
Reporting Limit	1.94

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
4	BC3	C3-CHRYSENES	122	1.94	120	101.29	65	135
4	BC4	C4-CHRYSENES	72.2	1.94	114	63.42	65	135
5	BBF	BENZO(B)FLUORANTHENE	5.52	1.94	102	5.4	65	135
5	BEP	BENZO(E)PYRENE	10.6	1.94	107	9.88	65	135
5	BAP	BENZO(A)PYRENE	2.09	1.94	103	2.03	65	135
5	PER	PERYLENE	3.24	1.94	97	3.34	65	135
6	GHI	BENZO(GHI)PERYLENE	3.53	1.94	98	3.59	65	135
O	CAR	CARBAZOLE	5.88	1.94	97	6.09	65	135
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	136	1.94	104	131.38	65	135
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	104	1.94	106	98.05	65	135
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	45.0	1.94	111	40.36	65	135
3	3MP	3-METHYLPHENANTHRENE (3MP)	84.8	1.94	107	79.32	65	135
3	2MA	2-METHYLANTHRACENE (2MA)	3.3	1.94	110	3	65	135
3	1MP	1-METHYLPHENANTHRENE (1MP)	96.4	1.94	110	87.93	65	135
A	1MN	1-METHYLNAPHTHALENE	867	1.94	109	793.54	65	135
A	2MN	2-METHYLNAPHTHALENE	1110	1.94	102	1087.89	65	135
2	26DMN	2,6-DIMETHYLNAPHTHALENE	703	1.94	111	635.33	65	135
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	169	1.94	115	147.12	65	135
H30	T19	HOPANE (T19)	164	1.94	102	161.24	65	135
t23	T4	C23 TRICYCLIC TERPANE (T4)	72.0	1.94	103	69.8	65	135
t24	T5	C24 TRICYCLIC TERPANE (T5)	39.0	1.94	93	42.1	65	135
t25	T6	C25 TRICYCLIC TERPANE (T6)	37.5	1.94	93	40.4	65	135
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	14.3	1.94	101	14.2	65	135
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	16.7	1.94	102	16.3	65	135
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	12.4	1.94	85	14.6	65	135
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	19.2	1.94	118	16.2	65	135
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	16.5	1.94	94	17.6	65	135
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	17.6	1.94	92	19.2	65	135
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	22.1	1.94	105	21	65	135
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	28.1	1.94	99	28.3	65	135
t30S	T11a	C30 TRICYCLIC TERPANE-22S	13.5	1.94	88	15.3	65	135
t30R	T11b	C30 TRICYCLIC TERPANE-22R	13.1	1.94	86	15.2	65	135
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	34.2	1.94	99	34.4	65	135
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	5.78	1.94	83	7	65	135
H29	T15	30-NORHOPANE (T15)	89.2	1.94	98	90.7	65	135
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	23.9	1.94	102	23.3	65	135
X	X	17A(H)-DIAHOPANE (X)	12.9	1.94	99	13	65	135
M29	T17	30-NORMORETANE (T17)	10.4	1.94	93	11.2	65	135
M30	T20	MORETANE (T20)	15.4	1.94	94	16.3	65	135
H31S	T21	30-HOMOHOPANE-22S (T21)	68.8	1.94	102	67.6	65	135
H31R	T22	30-HOMOHOPANE-22R (T22)	59.2	1.94	102	58.3	65	135
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	50.6	1.94	103	48.9	65	135
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	36.1	1.94	101	35.6	65	135
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	39.5	1.94	102	38.8	65	135
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	25.9	1.94	101	25.6	65	135
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	28.2	1.94	101	27.9	65	135
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	20.0	1.94	101	19.8	65	135
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	29.8	1.94	103	28.8	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1849193-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1849193-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	11/7/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F1211062314
Units	mg/kg
Final Volume	10
Dilution	1
Reporting Limit	1.94

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	22.4	1.94	100	22.3	65	135
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	56.3	1.94	117	48.1	65	135
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	30.1	1.94	120	25.1	65	135
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	27.5	1.94	111	24.8	65	135
aa27S	S12	17A(H)20SC27/C29DIA	70.3	1.94	118	59.74	65	135
aa27R	S17	17A(H)20RC27/C29DIA	83.2	1.94	116	71.55	65	135
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	4.2	1.94	110	3.8	65	135
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	35.5	1.94	108	33	65	135
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	38.4	1.94	119	32.2	65	135
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	51.3	1.94	99	51.7	65	135
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	38.8	1.94	107	36.1	65	135
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	44.8	1.94	117	38.4	65	135
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	46.3	1.94	117	39.7	65	135
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	49.3	1.94	120	41	65	135
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	61.4	1.94	119	51.7	65	135
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	70.0	1.94	128	54.6	65	135
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	39.6	1.94	104	38.2	65	135
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	295	1.94	102	289.3	65	135
SC28TAS	TAS02	C28,20S TAS	198	1.94	108	182.5	65	135
RC27TAS	TAS03	C27,20R TAS	188	1.94	106	177.1	65	135
RC28TAS	TAS04	C28,20R TAS	152	1.94	103	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 concentration.

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.)

ERM TIENE MÁS DE 160 OFICINAS EN LOS SIGUIENTES PAÍSES Y TERRITORIOS EN TODO EL MUNDO

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