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

Memorando Técnico Complementario No. 14

PREPARADO PARA
RELAPASAA

FECHA
14 de febrero 2024

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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.

Con fecha del 14 de diciembre de 2023, RELAPASAA remitió a OEFA con cargo recepción 2023-E01-572291, 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.12"*, (en adelante *Memorando Técnico Complementario No. 12*) en el que se reportaron los resultados de análisis Fingerprint de las muestras tomadas los días 28 de setiembre y 16 de octubre del 2023 cuyo origen no se relaciona con la composición del crudo Buzios.

Con fecha del 08 de febrero de 2024, RELAPASAA remitió a OEFA con cargo recepción 2024-E01-019181, 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.13"*, (en adelante *Memorando Técnico Complementario No. 13*) en el que se reportaron los resultados de análisis Fingerprint de la muestra tomada el día 23 de enero del 2024 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 una muestra tomada el día 25 de enero del 2024, 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, al Memorando Técnico Complementario No.11 remitido el 8 de noviembre del 2023, al Memorando Técnico Complementario No.12 remitido el 14 de diciembre del 2023 y al Memorando Técnico Complementario No.13 remitido el 08 de febrero del 2024.

2. MUESTREO Y ANÁLISIS DE LABORATORIO

El día 25 de enero del 2024, se recolectó 01 muestra adicional, 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). La muestra fue tomada por personal del laboratorio independiente AGQ, colectada en frasco de vidrio, rotulada, precintado, siendo finalmente ITS quien la 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.

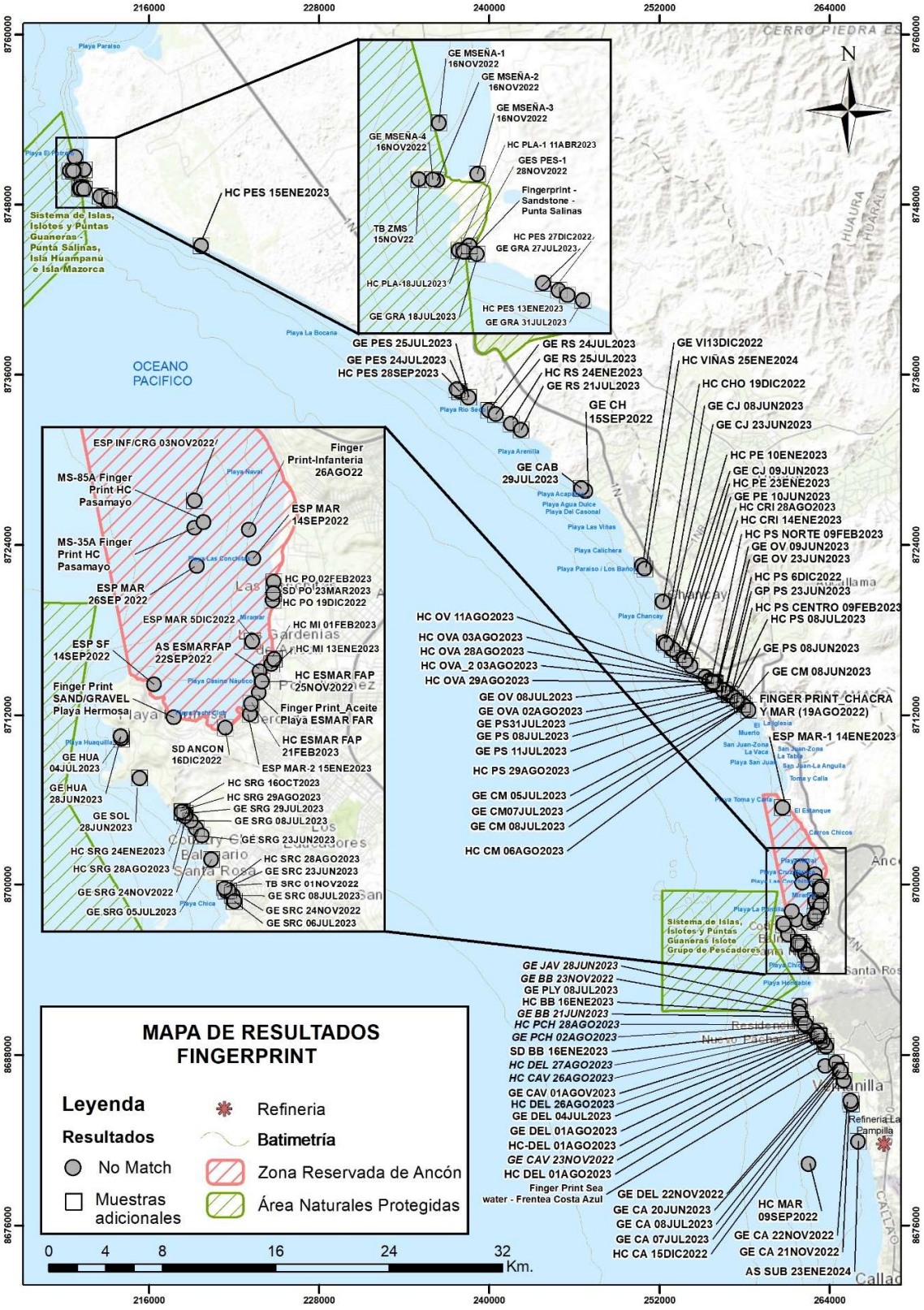

FIGURA 4-1. UBICACIÓN DE LAS MUESTRAS TOMADAS PARA ANÁLISIS DE FINGERPRINT.

Notas:
No Match = Químicamente no compatible con el crudo Buzios
Fuente: ERM – febrero, 2024

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.

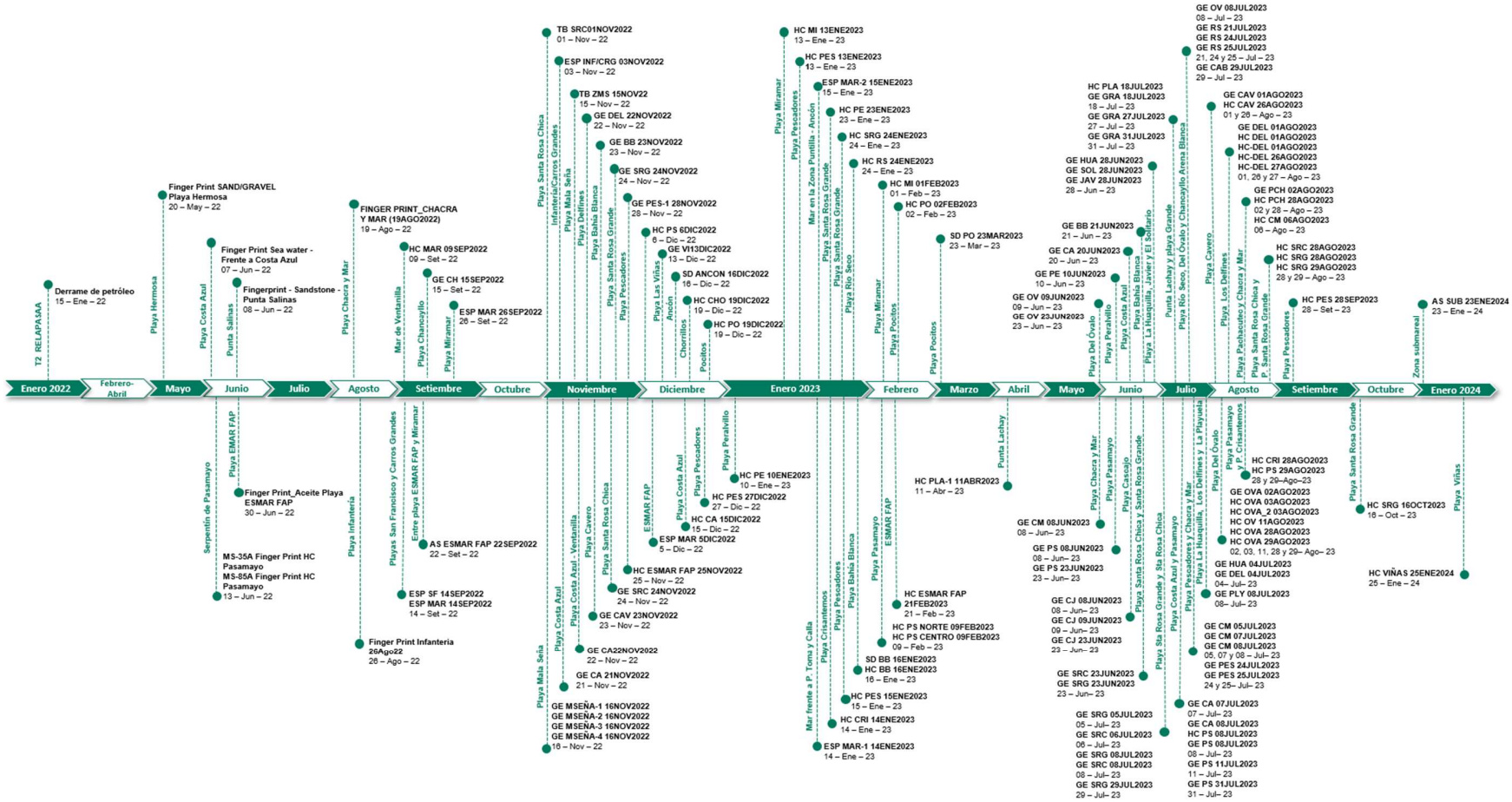

FIGURA 4-2. LÍNEA DE TIEMPO DE MUESTRAS DE FINGERPRINT CUYO ORIGEN ES DIFERENTE AL DEL CRUDO BUZIOS.

Fuente: Elaboración propia. ERM – febrero, 2024

3. RESULTADOS

3.1 RESULTADO DE LAS MUESTRAS AJENAS AL CRUDO BUZIOS

En la presente actualización, se detallan los resultados de 01 muestra adicional químicamente no compatible 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 la muestra adicional reportada 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: Viñas	**Fecha de muestreo:** 25 de enero de 2024
	**Nombre de la muestra:** *HC VIÑAS 25ENE2024* **Precintado por:** AGQ **Precinto N°:** 002621 **Enviado a NewFields por:** Intertek Testing Services Perú S.A Coordenadas UTM WGS84 18L 0250945 E, 8722303 N
	Descripción: Hidrocarburo encontrado sobre rocas en Viñas. **Resultado:** La muestra *HC VIÑAS 25ENE2024* consiste en un crudo o petróleo pesado significativamente intemperizado que ha sido cortado con un producto más ligero de la gama de los disolventes o, alternativamente representa más de una liberación de múltiples productos. Los resultados de los análisis de FID, HAP y biomarcadores indican que **el petróleo detectado en la muestra *HC VIÑAS 25ENE2024* 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 VIÑAS 25ENE2024	Hidrocarburo	25-ene-24	Viñas	La muestra *HC VIÑAS 25ENE2024* consiste en un crudo o petróleo pesado significativamente intemperizado que ha sido cortado con un producto más ligero de la gama de los disolventes o, alternativamente representa más de una liberación de múltiples productos. Los resultados de los análisis de FID, HAP y biomarcadores indican que **el petróleo detectado en la muestra *HC VIÑAS 25ENE2024* 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 2024

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 ha identificado una muestra adicional colectada de hidrocarburo que no es químicamente compatible con el crudo Buzios y que proviene de una distinta fuente de hidrocarburo. Esta muestra fue colectada en playa Viñas.
- Hasta el momento, mediante el análisis de *Fingerprint*, como técnica de análisis químico forense, se han identificado un total de 126 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, 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 VIÑAS 25ENE2024* – 25 de enero 2024

Muestra *HC VIÑAS 25ENE2024* precintada – 25 de enero 2024

ANEXO B – RESULTADOS ANALÍTICOS DE FINGERPRINT

HC VIÑAS 25ENE2024

To: Refinería La Pampilla S.A.A.

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

Date: February 7, 2024

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 January 25, 2024 (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 VINAS 25ENE2024" was shipped to Alpha Analytical Labs in Mansfield, MA under chain of custody (COC) and arrived at 17.7°C on January 30, 2024 with a DHL Tracking # 9680050564 (Seal number 002621).

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 VINAS 25ENE2024 (HC V25) are shown in Figures 1A and1B respectively.

GC/FID Analysis

The GC/FID chromatogram for the HC V25 sample (Figure 1B), indicates that this sample consists of a broad C_{14} – C_{44+} range material that contains a bimodal "hump" possibly an indication of two products. This material has undergone significant weathering due to both evaporation and biodegradation as indicated by the lack of resolved n-alkanes. In addition, there is a lighter C_9 – C_{12} solvent range material that appears to be less weathered as indicated by the presence of resolved compounds which are absent in the heavier material. The petroleum detected in the sample is consistent with a significantly weathered heavy oil that has been cut with a lighter solvent product or alternatively represents a mixture of more than one release.

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 V25 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 V25 sample are provided in Figures 2A and 2B respectively. The PAH histogram for the HC V25 sample (Figure 2B) shows this sample is weathered by evaporation as indicated by the lower proportion of decalins and naphthalenes relative to the source oil (Figure 2A). The petroleum in HC V25 contains a pyrogenic PAH component that is not present in the source oil. This is evident in the higher proportion of the parent PAHs colored in red (Figure 2B) compared to its' C_1-C_4-alkyl homologues along with an increase in the 5 and 6 ring PAHs (e.g. benzo(a)pyrene and benzo(g,h,i)perylene).

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 V25 sample plot near each other and indicate that these two oils have similar sulfur characteristics.

The biomarker triterpene m/z 191 ion traces for the source oil and the HC V25 sample are presented in Figures 4A and 4B respectively. The biomarker traces show many differences including 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 V25 contains an abundance of oleanane (T18) which is absent in the source oil. These differences indicate the HC V25 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.

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 V25 sample plot away from each other indicating a different source of petroleum.

Conclusion

The HC VINAS 25ENE2024 sample consists of a significantly weathered heavy oil that has been cut with a lighter solvent range product or alternatively represents more than one release of multiple products. The FID, PAH and biomarker analysis indicate the petroleum detected in the source oil and the HC VINAS 25ENE2024 sample are chemically different and was derived from a different source of petroleum.

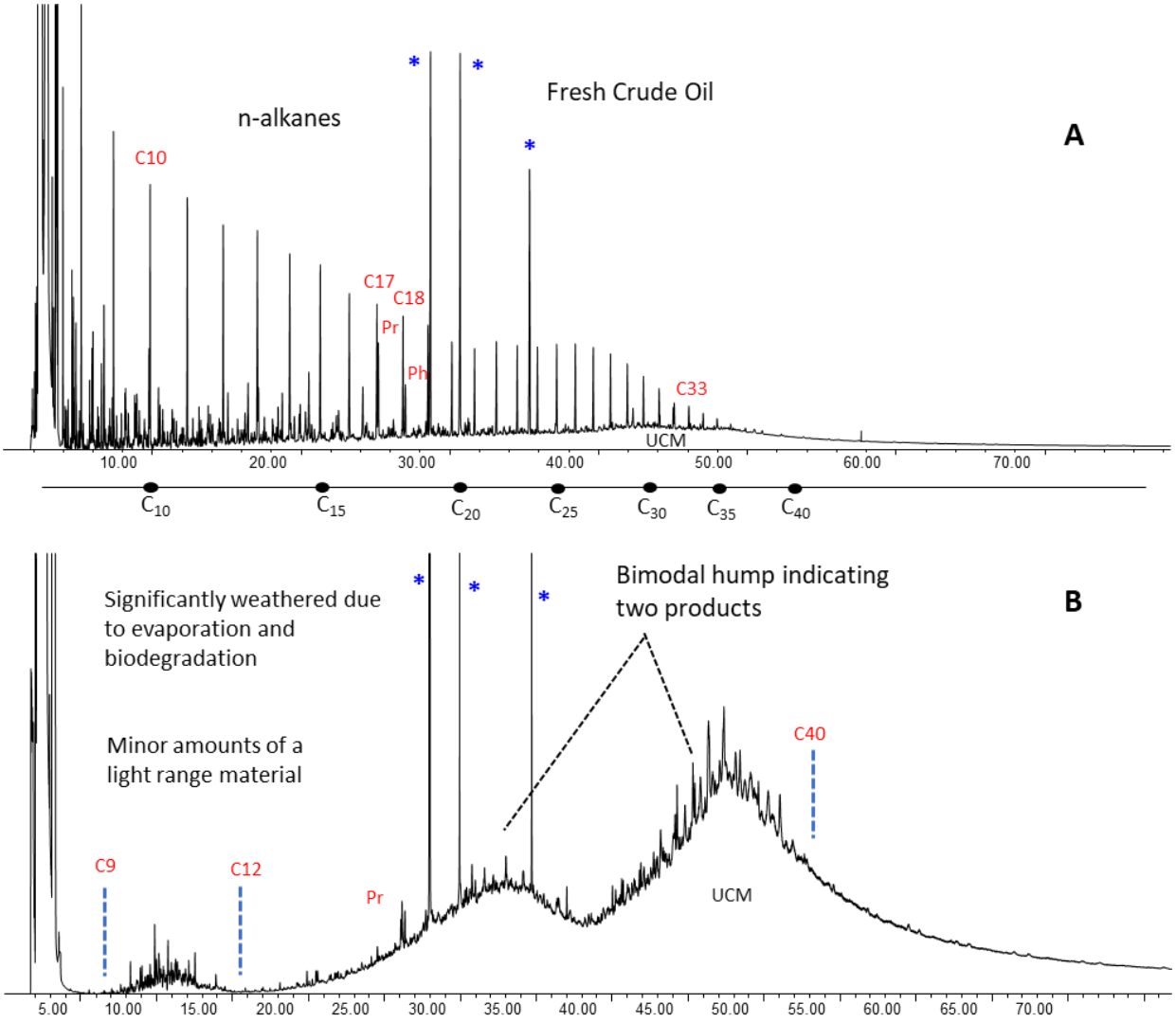

Figure 1. GC/FID "fingerprints" for the field samples.
Carbon ranges annotated below the x-axis analysis time scale.

A) Ship's Tanks Composite Sample
B) HC VINAS 25ENE2024
'*': Laboratory-added Internal Standard

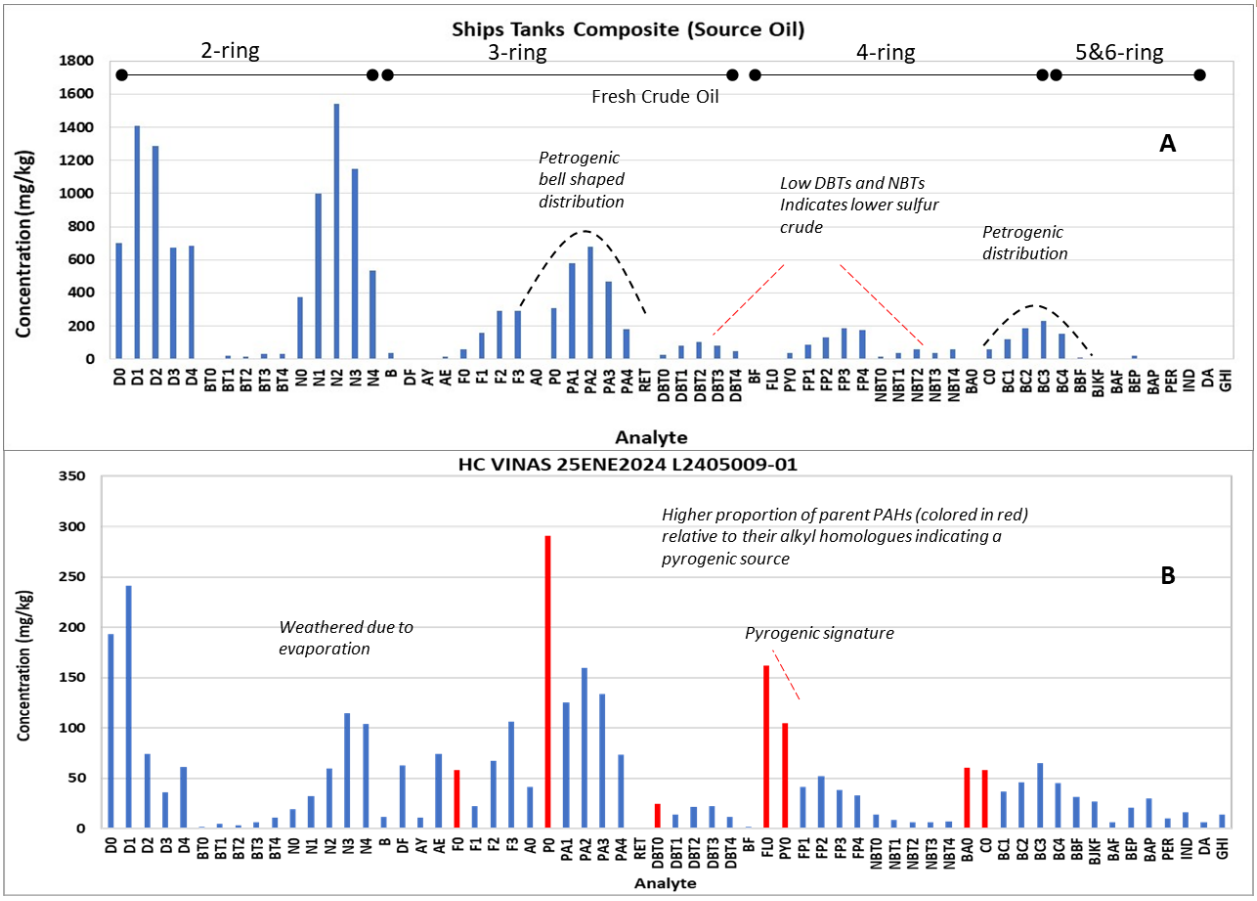

Figure 2. PAH Histograms

A) Ship's Tanks Composite Sample
B) HC VINAS 25ENE2024

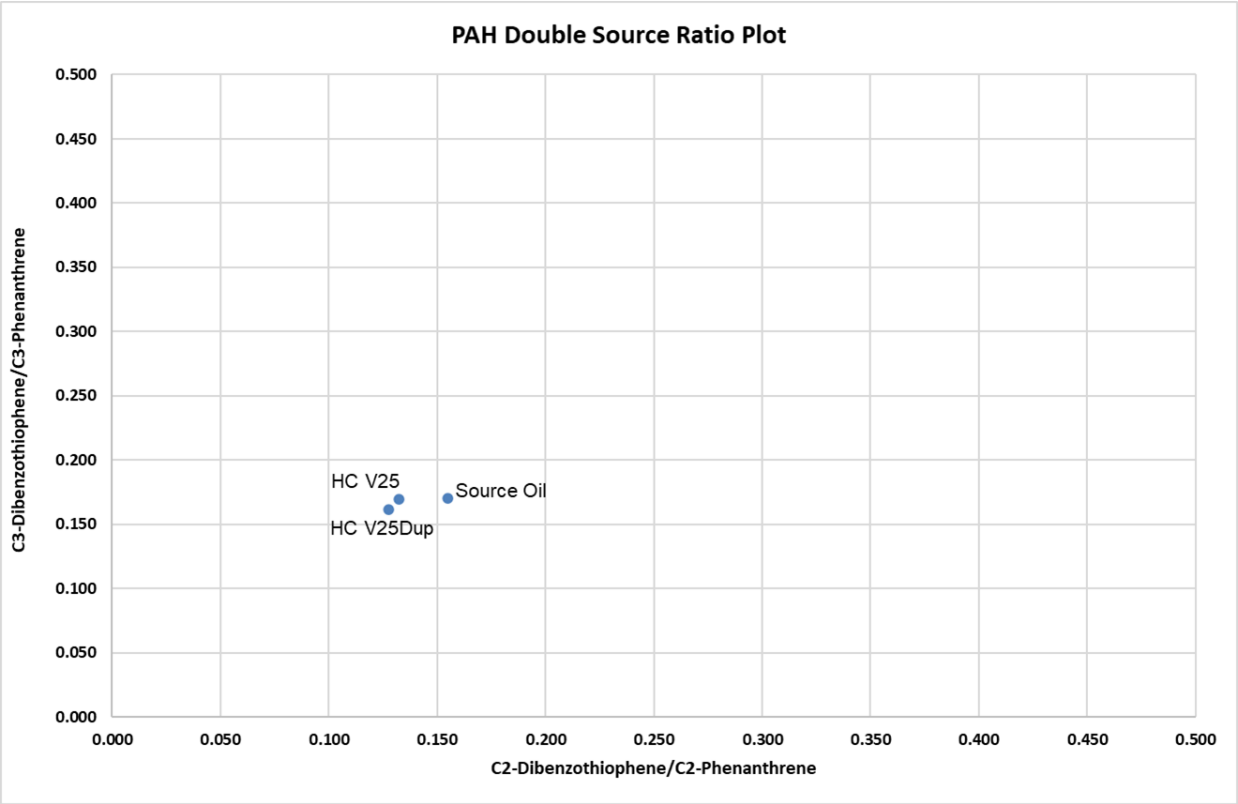

Figure 3. PAH Double Source Ratio Plots

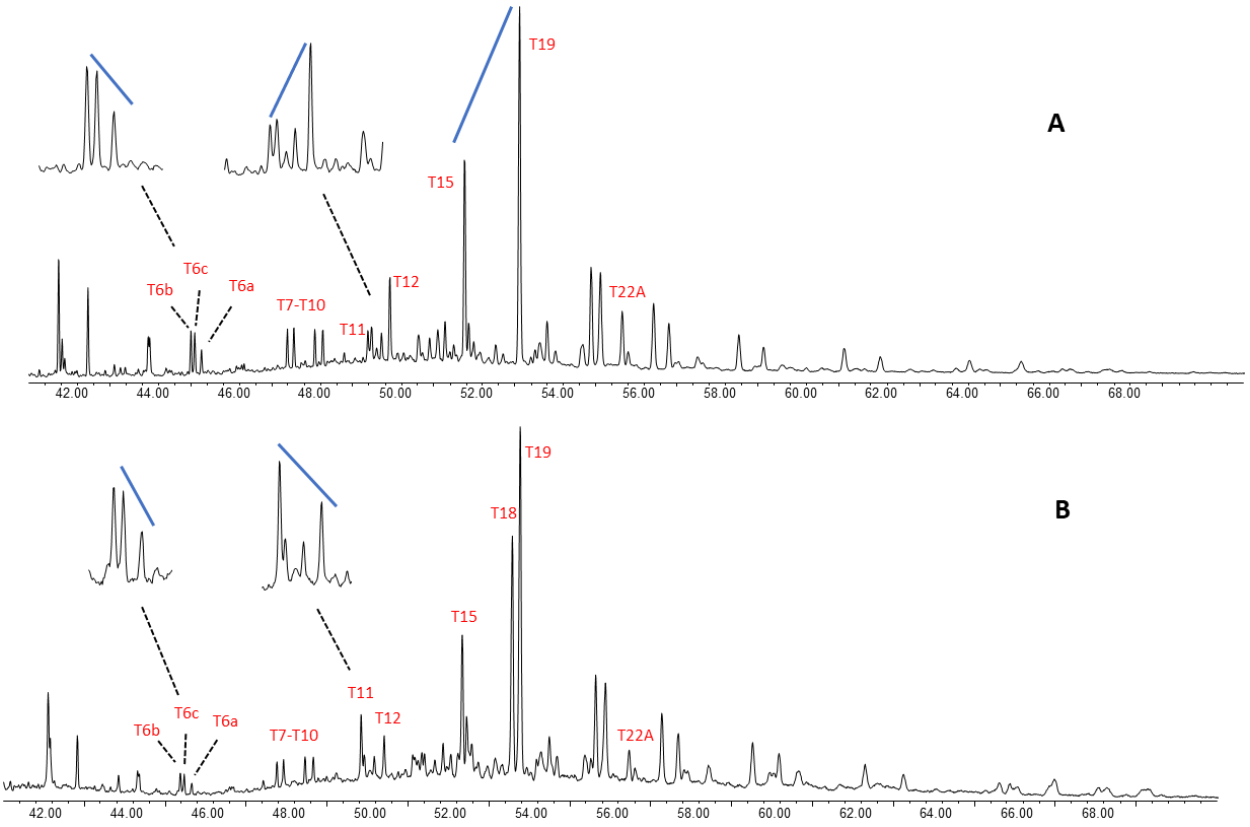

Figure 4. Biomarker m/z 191 Triterpane Fingerprint Traces

A) Ship's Tanks Composite Sample
B) HC VINAS 25ENE2024

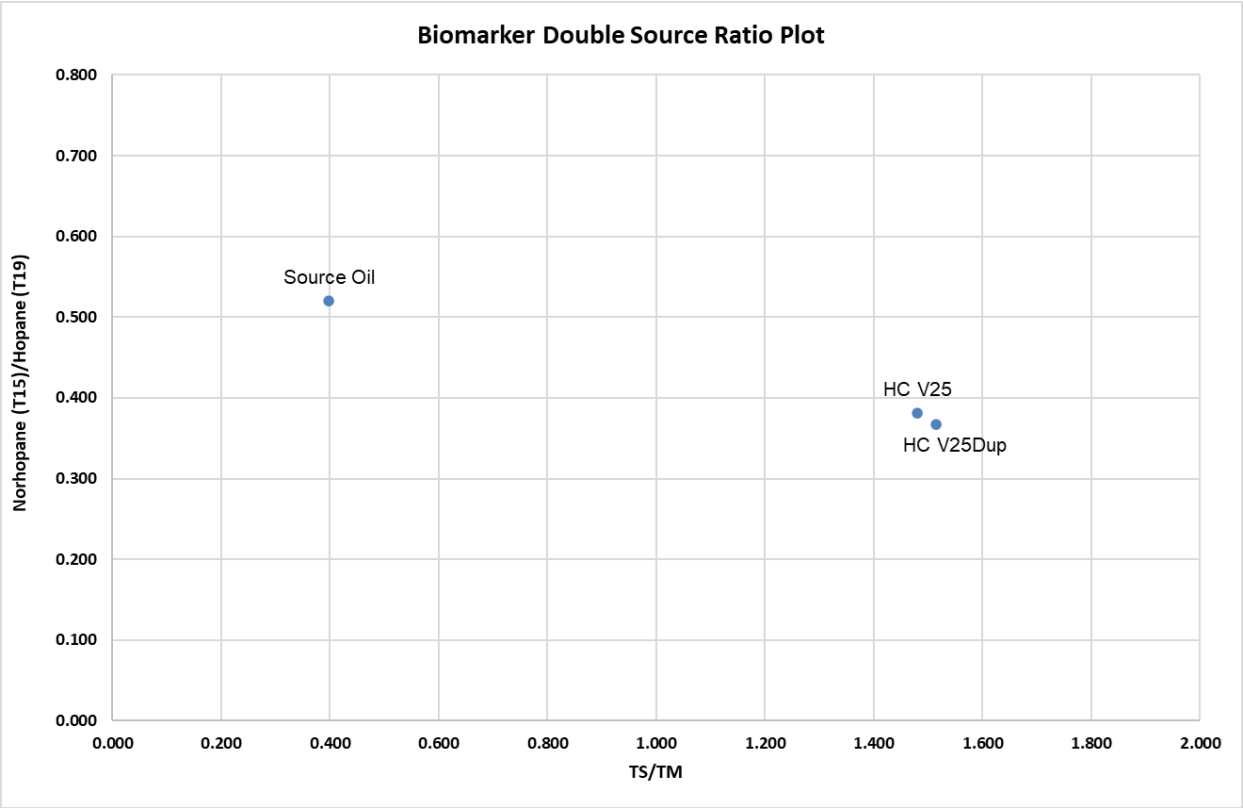

Figure 5. Biomarker Double Source Ratio Plots

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 VINAS 25ENE2024	L2405009-01	01/25/2024	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

1/30/24 L2405009

CADENA DE CUSTODIA / SOLICITUD DE ANÁLISIS

PARA SER LLENADO POR COMERCIAL AGQ

N° Presupuesto / Contrato	QSP-PE240100009	Cod. Cliente	
N° Proyecto / Estudio		N° Dire. Entrega	

CLIENTE y RUC	Refinería La Pampilla S. A. A.
CONTACTO	Giancarlo Enrico
TELÉFONO / e-mail	Giancarlosantiago.enrico@repsol.com / 999489711
DATOS DE CLIENTE TERCERO	
RAZON SOCIAL	
DATOS DEL PROYECTO	
NOMBRE DEL PROYECTO	Monitoreo de Hallazgos en formaciones costeras – Finger Print
LUGAR DE MUESTREO (Finca / Área)	Playa Viñas
CONTACTO AGQ	José Maldonado Chalco
N° OS / DC	4500960706

Código de Laboratorio	Punto de Muestreo / Descripción	Muestreo Fecha (dd-mm-aa)	Muestreo Hora (24:00)	Tipo de muestra* Sub tipo**	Coordenadas UTM N-m/LISO	Número de envases/ punto de muestreo	Análisis tipo Aplicados (AT)
-01	HC VIÑAS 25ENE2024	25/01/2024	15:10	Hidrocarburo	N: 8722303 E: 0250945 18L		

ANÁLISIS REQUERIDOS

PARÁMETROS	Parámetros In Sit
Finger Print	

Indicar con una (X) los recuadros inferiores según los análisis requeridos por cada muestra

Frasco	pH<2
	pH>2
Envase	E
	P
	V

* Tipo de Muestra (Categoría)	** Sub Tipo (Sub categoría)
1. Agua Residual	Doméstica = (A); Municipal = (B); Industrial = (C)
2. Agua Natural Subterránea	Manantial/ Pozo = (A); Termal)= (B)
3. Agua Natural Superficial	Río = (A); Lago/Laguna = (B); Deposición atmosférica - lluvia (C)
4. Agua de Consumo Humano	Bebida Potable = (A); Bebida Envasada= (B); Piscina = (C); Laguna Artificial = (D)
5. Agua salinas	Mar = (A), Salobre = (B); Salmuera (C)
6. Agua de Proceso	Circulación/Enfriamiento = (A); Alimentación para Caldera = (B), Agua de Calderas (C); Lixiviación = (D); Purificada (E); Inyección-Reinyección (F)
7. Muestra Sólida	Suelo = (A); Lodo = (B); Sedimento = (C)
8. Residuos	Sólido = (A); Líquido = (B)
9. Ruido	

Muestreo Realizado Por:	
Empresa :	AGQ PERU S.A.C.
Responsable :	E. Carranza / M. Nuñez
Firma :	

Supervisor / Cliente:	
Nombre	Giancarlo Enrico
Cargo	Supervisor de operaciones
Firma :	

Procedimiento de Muestreo	
PNT / PPI :	211
PNT / PPI :	
PNT / PPI :	

INFORMACIÓN DEL MUESTREO

Fitoplanctón (Cualitativo)	
Zooplancton (Cuantitativo / Cualitativo)	
Perifiton	

Muestras Hidrobiológicas

Datos Equipos de Monitoreo (Solo AGQ)

Equipo	N° de serie

OBSERVACIONES PARA EL INFORME

SE PROCEDIO A LLEGAR AL PUNTO INDICADO POR EL REPRESENTANTE DEL CLIENTE, SE REALIZO EL PROCEDIMIENTO DE CARACTERIZACION DE LA MUESTRA Y PRECINTADO EN CAMPO EN PRESENCIA DEL REPRESENTANTE DEL CLIENTE. SE USO EL PECINTO N° 002621. SE TOMARON LAS COORDENADAS IN SITU.

OBSERVACIONES DE LA MUESTRA (No se considera en el informe)

AGQ PERU SAC
25 ENE. 2024
RECIBIDO

Recibido por :	RUDY MEZA MEDINA DNI: 42121481
Fecha : (dd-mm-aa)	25/01/2024
Hora : (24:00)	17:20
Mensajería Nacional	
N° de Guía	

SOLO PARA SER LLENADO POR OPERACIONES - RECEPCIÓN DE MUESTRAS - AGQ

7° 5,6°

Mensajería Local	
Condición de la(s) Muestra(s)	CONFORME / NO CONFORME
Cadena de frío	SI / NO
N° de Guía	
Entrega cliente en AGQ	

Oscar Vidal A
40454276
26-01-2024

Intertek
26 ENE. 2024
LAB. CALER BRETT

Rec: 1/30/24 11:34

Attachment 2

Analytical Data

Project Name: PAMPILLA 2
Project Number:

Client ID	HC VINAS 25ENE2024
Lab ID	L2405009-01
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1880040
Date Collected	1/25/2024
Date Received	1/30/2024
Date Prepped	1/31/2024
Date Analyzed	2/2/2024
Sample Size(wet)	0.00478 g
% Solid	100
File ID	F1702012447
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	209

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)	10.2	J	209
SHC	C10	DECANE (C10)	45.6	J	209
SHC	C11	UNDECANE	52.5	J	209
SHC	C12	DODECANE (C12)		U	209
SHC	C13	TRIDECANE	12.1	J	209
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	53.3	J	209
SHC	C14	TETRADECANE (C14)	19.2	J	209
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	95.0	J	209
SHC	C15	PENTADECANE (C15)		U	209
SHC	C16	HEXADECANE (C16)	54.2	J	209
SHC	1650	NORPRISTANE (1650)	105	J	209
SHC	C17	HEPTADECANE (C17)		U	209
SHC	Pr	PRISTANE	146	J	209
SHC	C18	OCTADECANE (C18)	454		209
SHC	Ph	PHYTANE	290		209
SHC	C19	NONADECANE (C19)	118	J	209
SHC	C20	EICOSANE (C20)		U	209
SHC	C21	HENEICOSANE (C21)	209		209
SHC	C22	DOCOSANE (C22)		U	209
SHC	C23	TRICOSANE (C23)		U	209
SHC	C24	TETRACOSANE (C24)		U	209
SHC	C25	PENTACOSANE (C25)	301		209
SHC	C26	HEXACOSANE (C26)		U	209
SHC	C27	HEPTACOSANE (C27)		U	209
SHC	C28	OCTACOSANE (C28)		U	209
SHC	C29	NONACOSANE (C29)		U	209
SHC	C30	TRIACONTANE (C30)		U	209
SHC	C31	HENTATRIACONTANE (C31)	206	J	209
SHC	C32	DOTRIACONTANE (C32)	121	J	209
SHC	C33	TRITRIACONTANE (C33)	546		209
SHC	C34	TETRATRIACONTANE (C34)		U	209
SHC	C35	PENTATRIACONTANE (C35)	1880		209
SHC	C36	HEXATRIACONTANE (C36)	847		209
SHC	C37	HEPTATRIACONTANE (C37)	466		209
SHC	C38	OCTATRIACONTANE (C38)	1250		209
SHC	C39	NONATRIACONTANE (C39)		U	209
SHC	C40	TETRACONTANE (C40)		U	209
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	634000		6900
SHC	TSH	TOTAL SATURATED HYDROCARBONS	7280	J	209

Surrogates (% Recovery)	
O-TERPHENYL	99
D50-TETRACOSANE	103

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1880040-1
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1880040
Date Collected	NA
Date Received	1/31/2024
Date Prepped	1/31/2024
Date Analyzed	2/1/2024
Sample Size(wet)	0.00458 g
% Solid	100
File ID	F1702012411
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	218

Class	Abbrev	Analytes	Result	SSRL
SHC	C9	NONANE (C9)	U	218
SHC	C10	DECANE (C10)	U	218
SHC	C11	UNDECANE	U	218
SHC	C12	DODECANE (C12)	U	218
SHC	C13	TRIDECANE	U	218
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	U	218
SHC	C14	TETRADECANE (C14)	U	218
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	U	218
SHC	C15	PENTADECANE (C15)	U	218
SHC	C16	HEXADECANE (C16)	U	218
SHC	1650	NORPRISTANE (1650)	U	218
SHC	C17	HEPTADECANE (C17)	U	218
SHC	Pr	PRISTANE	U	218
SHC	C18	OCTADECANE (C18)	U	218
SHC	Ph	PHYTANE	U	218
SHC	C19	NONADECANE (C19)	U	218
SHC	C20	EICOSANE (C20)	U	218
SHC	C21	HENEICOSANE (C21)	U	218
SHC	C22	DOCOSANE (C22)	U	218
SHC	C23	TRICOSANE (C23)	U	218
SHC	C24	TETRACOSANE (C24)	U	218
SHC	C25	PENTACOSANE (C25)	U	218
SHC	C26	HEXACOSANE (C26)	U	218
SHC	C27	HEPTACOSANE (C27)	U	218
SHC	C28	OCTACOSANE (C28)	U	218
SHC	C29	NONACOSANE (C29)	U	218
SHC	C30	TRIACONTANE (C30)	U	218
SHC	C31	HENTATRIACONTANE (C31)	U	218
SHC	C32	DOTRIACONTANE (C32)	U	218
SHC	C33	TRITRIACONTANE (C33)	U	218
SHC	C34	TETRATRIACONTANE (C34)	U	218
SHC	C35	PENTATRIACONTANE (C35)	U	218
SHC	C36	HEXATRIACONTANE (C36)	U	218
SHC	C37	HEPTATRIACONTANE (C37)	U	218
SHC	C38	OCTATRIACONTANE (C38)	U	218
SHC	C39	NONATRIACONTANE (C39)	U	218
SHC	C40	TETRACONTANE (C40)	U	218
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	U	7200
SHC	TSH	TOTAL SATURATED HYDROCARBONS	U	218

Surrogates (% Recovery)	
O-TERPHENYL	100
D50-TETRACOSANE	103

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1880040-2
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1880040
Date Collected	NA
Date Received	1/31/2024
Date Prepped	1/31/2024
Date Analyzed	2/1/2024
Sample Size(wet)	0.00458 g
% Solid	100
File ID	F1702012415
Units	%
Final Volume	1
Dilution	1
Reporting Limit	218

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	NONANE (C9)	4390	218	100	4370	50	130
SHC	C10	DECANE (C10)	4280	218	98	4370	50	130
SHC	C12	DODECANE (C12)	4320	218	99	4370	50	130
SHC	C14	TETRADECANE (C14)	4130	218	94	4370	50	130
SHC	C16	HEXADECANE (C16)	4680	218	107	4370	50	130
SHC	C18	OCTADECANE (C18)	4570	218	104	4370	50	130
SHC	C19	NONADECANE (C19)	4190	218	96	4370	50	130
SHC	C20	EICOSANE (C20)	4500	218	103	4370	50	130
SHC	C22	DOCOSANE (C22)	4340	218	99	4370	50	130
SHC	C24	TETRACOSANE (C24)	4560	218	104	4370	50	130
SHC	C26	HEXACOSANE (C26)	4460	218	102	4370	50	130
SHC	C28	OCTACOSANE (C28)	4420	218	101	4370	50	130
SHC	C30	TRIACONTANE (C30)	4500	218	103	4370	50	130
SHC	C36	HEXATRIACONTANE (C36)	3890	218	89	4370	50	130

Surrogates (% Recovery)	
O-TERPHENYL	104
D50-TETRACOSANE	107

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate	
Lab ID	WG1880040-3	
Matrix	SOLID	
Matrix Description		
Reference Method	8015D(M)	
Batch ID	WG1880040	
Date Collected	NA	
Date Received	1/31/2024	
Date Prepped	1/31/2024	
Date Analyzed	2/1/2024	
Sample Size(wet)	0.00458	g
% Solid	100	
File ID	F1702012417	
Units	%	
Final Volume	1	
Dilution	1	
Reporting Limit	218	

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
SHC	C9	NONANE (C9)	4410	218	101	4370	50	130	1	30
SHC	C10	DECANE (C10)	4300	218	98	4370	50	130	0	30
SHC	C12	DODECANE (C12)	4360	218	100	4370	50	130	1	30
SHC	C14	TETRADECANE (C14)	4180	218	96	4370	50	130	2	30
SHC	C16	HEXADECANE (C16)	4740	218	108	4370	50	130	1	30
SHC	C18	OCTADECANE (C18)	4620	218	106	4370	50	130	2	30
SHC	C19	NONADECANE (C19)	4250	218	97	4370	50	130	1	30
SHC	C20	EICOSANE (C20)	4590	218	105	4370	50	130	2	30
SHC	C22	DOCOSANE (C22)	4420	218	101	4370	50	130	2	30
SHC	C24	TETRACOSANE (C24)	4650	218	106	4370	50	130	2	30
SHC	C26	HEXACOSANE (C26)	4520	218	104	4370	50	130	2	30
SHC	C28	OCTACOSANE (C28)	4480	218	102	4370	50	130	1	30
SHC	C30	TRIACONTANE (C30)	4560	218	104	4370	50	130	1	30
SHC	C36	HEXATRIACONTANE (C36)	4040	218	92	4370	50	130	3	30

Surrogates (% Recovery)	
O-TERPHENYL	103
D50-TETRACOSANE	106

Project Name: PAMPILLA 2
Project Number:

Client ID			HC VINAS 25ENE2024			Duplicate Sample				
Lab ID			L2405009-01			WG1880040-5				
Matrix			SOLID			SOLID				
Matrix Description										
Reference Method			8015D(M)			8015D(M)				
Batch ID			WG1880040			WG1880040				
Date Collected			1/25/2024			NA				
Date Received			1/30/2024			1/31/2024				
Date Prepped			1/31/2024			1/31/2024				
Date Analyzed			2/2/2024			2/2/2024				
Sample Size(wet)			0.00478	g		0.00469	g			
% Solid			100			100				
File ID			F1702012447			F1702012449				
Units			mg/kg			mg/kg				
Final Volume			1			1				
Dilution			1			1				
Reporting Limit			209			213				
Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit
SHC	C9	NONANE (C9)	10.2	J	209	13.6	J	213		30 NC
SHC	C10	DECANE (C10)	45.6	J	209	55.6	J	213		30 NC
SHC	C11	UNDECANE	52.5	J	209	67.2	J	213		30 NC
SHC	C12	DODECANE (C12)		U	209		U	213		30 NC
SHC	C13	TRIDECANE	12.1	J	209	14.7	J	213		30 NC
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	53.3	J	209	61.2	J	213		30 NC
SHC	C14	TETRADECANE (C14)	19.2	J	209	20.5	J	213		30 NC
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	95.0	J	209	103	J	213		30 NC
SHC	C15	PENTADECANE (C15)		U	209		U	213		30 NC
SHC	C16	HEXADECANE (C16)	54.2	J	209	65.4	J	213		30 NC
SHC	1650	NORPRISTANE (1650)	105	J	209	143	J	213		30 NC
SHC	C17	HEPTADECANE (C17)		U	209		U	213		30 NC
SHC	Pr	PRISTANE	146	J	209	164	J	213		30 NC
SHC	C18	OCTADECANE (C18)	454		209	528		213	15	30
SHC	Ph	PHYTANE	290		209	319		213	10	30
SHC	C19	NONADECANE (C19)	118	J	209	98.5	J	213		30 NC
SHC	C20	EICOSANE (C20)		U	209		U	213		30 NC
SHC	C21	HENEICOSANE (C21)	209		209	212	J	213		30 NC
SHC	C22	DOCOSANE (C22)		U	209		U	213		30 NC
SHC	C23	TRICOSANE (C23)		U	209		U	213		30 NC
SHC	C24	TETRACOSANE (C24)		U	209		U	213		30 NC
SHC	C25	PENTACOSANE (C25)	301		209	324		213	7	30
SHC	C26	HEXACOSANE (C26)		U	209		U	213		30 NC
SHC	C27	HEPTACOSANE (C27)		U	209		U	213		30 NC
SHC	C28	OCTACOSANE (C28)		U	209		U	213		30 NC
SHC	C29	NONACOSANE (C29)		U	209		U	213		30 NC
SHC	C30	TRIACONTANE (C30)		U	209		U	213		30 NC
SHC	C31	HENTATRIACONTANE (C31)	206	J	209	223		213		30 NC
SHC	C32	DOTRIACONTANE (C32)	121	J	209	133	J	213		30 NC
SHC	C33	TRITRIACONTANE (C33)	546		209	453		213	19	30
SHC	C34	TETRATRIACONTANE (C34)		U	209		U	213		30 NC
SHC	C35	PENTATRIACONTANE (C35)	1880		209	2170		213	14	30
SHC	C36	HEXATRIACONTANE (C36)	847		209	899		213	6	30
SHC	C37	HEPTATRIACONTANE (C37)	466		209	538		213	14	30
SHC	C38	OCTATRIACONTANE (C38)	1250		209	1430		213	13	30
SHC	C39	NONATRIACONTANE (C39)		U	209		U	213		30 NC
SHC	C40	TETRACONTANE (C40)		U	209		U	213		30 NC
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	634000		6900	707000		7040	11	30
SHC	TSH	TOTAL SATURATED HYDROCARBONS	7280	J	209	8040	J	213		30 NC

Surrogates (% Recovery)		
O-TERPHENYL	99	98
D50-TETRACOSANE	103	107

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1786523-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8015D(M)-A2-NFSHC
Batch ID	WG1786523-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	4/25/2023
Sample Size(wet)	0.10176 g
% Solid	100
File ID	F1704242329
Units	mg/kg
Final Volume	10
Dilution	1
Reporting Limit	0.983

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	NONANE (C9)	6700	0.983	106	6286	65	135
SHC	C10	DECANE (C10)	5260	0.983	104	5047	65	135
SHC	C11	UNDECANE	4920	0.983	105	4703	65	135
SHC	C12	DODECANE (C12)	4450	0.983	107	4155	65	135
SHC	C13	TRIDECANE	4200	0.983	103	4058	65	135
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	957	0.983	113	845	65	135
SHC	C14	TETRADECANE (C14)	3820	0.983	104	3670	65	135
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	1460	0.983	107	1367	65	135
SHC	C15	PENTADECANE (C15)	4300	0.983	117	3660	65	135
SHC	C16	HEXADECANE (C16)	3490	0.983	105	3330	65	135
SHC	1650	NORPRISTANE (1650)	1140	0.983	104	1093	65	135
SHC	C17	HEPTADECANE (C17)	2980	0.983	99	3012	65	135
SHC	Pr	PRISTANE	2340	0.983	109	2145	65	135
SHC	C18	OCTADECANE (C18)	2710	0.983	100	2700	65	135
SHC	Ph	PHYTANE	1480	0.983	122	1215	65	135
SHC	C19	NONADECANE (C19)	2580	0.983	112	2305	65	135
SHC	C20	EICOSANE (C20)	2600	0.983	111	2337	65	135
SHC	C21	HENEICOSANE (C21)	2270	0.983	111	2044	65	135
SHC	C22	DOCOSANE (C22)	2030	0.983	103	1972	65	135
SHC	C23	TRICOSANE (C23)	1970	0.983	113	1745	65	135
SHC	C24	TETRACOSANE (C24)	1800	0.983	110	1641	65	135
SHC	C25	PENTACOSANE (C25)	1800	0.983	115	1562	65	135
SHC	C26	HEXACOSANE (C26)	1440	0.983	104	1378	65	135
SHC	C27	HEPTACOSANE (C27)	1220	0.983	113	1083	65	135
SHC	C28	OCTACOSANE (C28)	866	0.983	112	776	65	135
SHC	C29	NONACOSANE (C29)	877	0.983	119	734	65	135
SHC	C30	TRIACONTANE (C30)	655	0.983	104	627	65	135
SHC	C31	HENTATRIACONTANE (C31)	640	0.983	124	514	65	135
SHC	C32	DOTRIACONTANE (C32)	406	0.983	89	458	65	135
SHC	C33	TRITRIACONTANE (C33)	378	0.983	97	388	65	135
SHC	C34	TETRATRIACONTANE (C34)	326	0.983	94	347	65	135
SHC	C35	PENTATRIACONTANE (C35)	324	0.983	116	278	65	135
SHC	C36	HEXATRIACONTANE (C36)	182	0.983	98	186	65	135
SHC	C37	HEPTATRIACONTANE (C37)	180	0.983	118	152	65	135
SHC	C38	OCTATRIACONTANE (C38)	148	0.983	113	131	65	135
SHC	C39	NONATRIACONTANE (C39)	100	0.983	112	89	65	135
SHC	C40	TETRACONTANE (C40)	94.8	0.983	103	92	65	135
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	566000	0.983	102	554993	65	135
SHC	TSH	TOTAL SATURATED HYDROCARBONS	82694	0.983	121	68122	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	HC VINAS 25ENE2024
Lab ID	L2405009-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1880040
Date Collected	1/25/2024
Date Received	1/30/2024
Date Prepped	1/31/2024
Date Analyzed	2/4/2024
Sample Size(wet)	0.00478 g
% Solid	100
File ID	F1402012446
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.05

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN	193		1.05
2	D1	C1-DECALINS	241		2.09
2	D2	C2-DECALINS	74.4		2.09
2	D3	C3-DECALINS	36.0		2.09
2	D4	C4-DECALINS	61.0		2.09
S	BT0	BENZOTHIOPHENE	1.48	J	2.09
2	BT1	C1-BENZO(B)THIOPHENES	4.98		2.09
2	BT2	C2-BENZO(B)THIOPHENES	3.35		2.09
2	BT3	C3-BENZO(B)THIOPHENES	6.67		2.09
2	BT4	C4-BENZO(B)THIOPHENES	11.1		2.09
A	N0	NAPHTHALENE	19.1		2.09
2	N1	C1-NAPHTHALENES	32.5		2.09
2	N2	C2-NAPHTHALENES	60.0		2.09
2	N3	C3-NAPHTHALENES	115		2.09
2	N4	C4-NAPHTHALENES	104		2.09
2	B	BIPHENYL	11.3		2.09
3	DF	DIBENZOFURAN	62.4		2.09
3	AY	ACENAPHTHYLENE	11.2		2.09
3	AE	ACENAPHTHENE	74.1		2.09
3	F0	FLUORENE	58.2		2.09
3	F1	C1-FLUORENES	22.7		2.09
3	F2	C2-FLUORENES	67.6		2.09
3	F3	C3-FLUORENES	106		2.09
3	A0	ANTHRACENE	41.7		2.09
3	P0	PHENANTHRENE	291		2.09
3	PA1	C1-PHENANTHRENES/ANTHRACENES	125		2.09
3	PA2	C2-PHENANTHRENES/ANTHRACENES	160		2.09
3	PA3	C3-PHENANTHRENES/ANTHRACENES	134		2.09
3	PA4	C4-PHENANTHRENES/ANTHRACENES	73.2		2.09
3	RET	RETENE		U	2.09
3	DBT0	DIBENZOTHIOPHENE	24.7		2.09
3	DBT1	C1-DIBENZOTHIOPHENES	14.0		2.09
3	DBT2	C2-DIBENZOTHIOPHENES	21.2		2.09
3	DBT3	C3-DIBENZOTHIOPHENES	22.7		2.09
3	DBT4	C4-DIBENZOTHIOPHENES	11.9		2.09
4	BF	BENZO(B)FLUORENE	1.90	J	2.09
4	FL0	FLUORANTHENE	162		2.09
4	PY0	PYRENE	105		2.09
4	FP1	C1-FLUORANTHENES/PYRENES	41.4		2.09
4	FP2	C2-FLUORANTHENES/PYRENES	51.9		2.09
4	FP3	C3-FLUORANTHENES/PYRENES	38.3		2.09
4	FP4	C4-FLUORANTHENES/PYRENES	33.0		2.09
4	NBT0	NAPHTHOBENZOTHIOPHENE	13.9		2.09
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	8.91		2.09
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	6.01		2.09
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	6.02		2.09
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	6.96		2.09
4	BA0	BENZ(A)ANTHRACENE	60.2		2.09
4	C0	CHRYSENE/TRIPHENYLENE	58.3		2.09
4	BC1	C1-CHRYSENES	37.1		2.09
4	BC2	C2-CHRYSENES	45.9		2.09
4	BC3	C3-CHRYSENES	65.0		2.09
4	BC4	C4-CHRYSENES	45.5		2.09
5	BBF	BENZO(B)FLUORANTHENE	31.3		2.09

Project Name: PAMPILLA 2
Project Number:

Client ID	HC VINAS 25ENE2024
Lab ID	L2405009-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1880040
Date Collected	1/25/2024
Date Received	1/30/2024
Date Prepped	1/31/2024
Date Analyzed	2/4/2024
Sample Size(wet)	0.00478 g
% Solid	100
File ID	F1402012446
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.05

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE	27.0		2.09
5	BAF	BENZO(A)FLUORANTHENE	6.00		2.09
5	BEP	BENZO(E)PYRENE	20.8		2.09
5	BAP	BENZO(A)PYRENE	29.6		2.09
5	PER	PERYLENE	10.3		2.09
6	IND	INDENO(1,2,3-CD)PYRENE	16.6		2.09
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	6.05		2.09
6	GHI	BENZO(GHI)PERYLENE	13.6		2.09
O	CAR	CARBAZOLE	22.9		2.09
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	6.19		2.09
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	3.89		2.09
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	1.32	J	2.09
3	3MP	3-METHYLPHENANTHRENE (3MP)	29.0		2.09
3	2MP	2-METHYLPHENANTHRENE (2MP)	32.9		2.09
3	2MA	2-METHYLANTHRACENE (2MA)	7.75		2.09
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	29.7		2.09
3	1MP	1-METHYLPHENANTHRENE (1MP)	18.6		2.09
A	1MN	1-METHYLNAPHTHALENE	23.8		2.09
A	2MN	2-METHYLNAPHTHALENE	26.5		2.09
2	26DMN	2,6-DIMETHYLNAPHTHALENE	26.2		2.09
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	24.2		2.09
H30	T19	HOPANE (T19)	462		2.09
t23	T4	C23 TRICYCLIC TERPANE (T4)	102		2.09
t24	T5	C24 TRICYCLIC TERPANE (T5)	47.1		2.09
t25	T6	C25 TRICYCLIC TERPANE (T6)	33.4		2.09
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	11.7		2.09
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	18.6		2.09
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	18.4		2.09
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	22.1		2.09
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	29.8		2.09
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	24.7		2.09
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	22.1		2.09
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	72.4		2.09
t30S	T11a	C30 TRICYCLIC TERPANE-22S	23.7		2.09
t30R	T11b	C30 TRICYCLIC TERPANE-22R	22.0		2.09
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	48.9		2.09
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	17.1		2.09
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	37.0		2.09
H29	T15	30-NORHOPANE (T15)	176		2.09
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	72.4		2.09
X	X	17A(H)-DIAHOPANE (X)	43.4		2.09
M29	T17	30-NORMORETANE (T17)	43.5		2.09
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	316		2.09
M30	T20	MORETANE (T20)	60.2		2.09
H31S	T21	30-HOMOHOPANE-22S (T21)	140		2.09
H31R	T22	30-HOMOHOPANE-22R (T22)	172		2.09
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	49.0		2.09
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	118		2.09
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	83.7		2.09
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	93.6		2.09
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	56.8		2.09
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	54.2		2.09
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	38.5		2.09
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	25.8		2.09

Project Name: PAMPILLA 2
Project Number:

Client ID	HC VINAS 25ENE2024	
Lab ID	L2405009-01	
Matrix	SOLID	
Matrix Description		
Reference Method	8270E-SIM(M)	
Batch ID	WG1880040	
Date Collected	1/25/2024	
Date Received	1/30/2024	
Date Prepped	1/31/2024	
Date Analyzed	2/4/2024	
Sample Size(wet)	0.00478	g
% Solid	100	
File ID	F1402012446	
Units	mg/kg	
Final Volume	1	
Dilution	1	
Reporting Limit	1.05	

Class	Abbrev	Analytes	Result		SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	71.2	G	2.09
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	56.9		2.09
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	27.2		2.09
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	32.8		2.09
aa27S	S12	17A(H)20SC27/C29DIA	123		2.09
aa27R	S17	17A(H)20RC27/C29DIA	195		2.09
d29R	S18	UNKNOWN STERANE (S18)	13.2		2.09
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	8.10		2.09
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	79.5		2.09
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	138		2.09
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	115		2.09
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	123		2.09
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	179		2.09
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	167		2.09
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	217		2.09
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	228		2.09
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	215		2.09
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	144		2.09
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	84.4		2.09
SC28TAS	TAS02	C28,20S TAS	78.5		2.09
RC27TAS	TAS03	C27,20R TAS	60.6		2.09
RC28TAS	TAS04	C28,20R TAS	45.8		2.09

Surrogates (% Recovery)	
NAPHTHALENE-D8	93
PHENANTHRENE-D10	74
BENZO(A)PYRENE-D12	123
5B(H)CHOLANE	112

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1880040-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1880040
Date Collected	NA
Date Received	1/31/2024
Date Prepped	1/31/2024
Date Analyzed	2/3/2024
Sample Size(wet)	0.00458 g
% Solid	100
File ID	F1402012433
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.09

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN		U	1.09
2	D1	C1-DECALINS		U	2.18
2	D2	C2-DECALINS		U	2.18
2	D3	C3-DECALINS		U	2.18
2	D4	C4-DECALINS		U	2.18
S	BT0	BENZOTHIOPHENE		U	2.18
2	BT1	C1-BENZO(B)THIOPHENES		U	2.18
2	BT2	C2-BENZO(B)THIOPHENES		U	2.18
2	BT3	C3-BENZO(B)THIOPHENES		U	2.18
2	BT4	C4-BENZO(B)THIOPHENES		U	2.18
A	N0	NAPHTHALENE	0.126	J	2.18
2	N1	C1-NAPHTHALENES	0.260	J	2.18
2	N2	C2-NAPHTHALENES		U	2.18
2	N3	C3-NAPHTHALENES		U	2.18
2	N4	C4-NAPHTHALENES		U	2.18
2	B	BIPHENYL	0.135	J	2.18
3	DF	DIBENZOFURAN		U	2.18
3	AY	ACENAPHTHYLENE		U	2.18
3	AE	ACENAPHTHENE		U	2.18
3	F0	FLUORENE	0.132	J	2.18
3	F1	C1-FLUORENES		U	2.18
3	F2	C2-FLUORENES		U	2.18
3	F3	C3-FLUORENES		U	2.18
3	A0	ANTHRACENE	0.0456	J	2.18
3	P0	PHENANTHRENE	0.200	J	2.18
3	PA1	C1-PHENANTHRENES/ANTHRACENES	0.240	J	2.18
3	PA2	C2-PHENANTHRENES/ANTHRACENES		U	2.18
3	PA3	C3-PHENANTHRENES/ANTHRACENES		U	2.18
3	PA4	C4-PHENANTHRENES/ANTHRACENES		U	2.18
3	RET	RETENE		U	2.18
3	DBT0	DIBENZOTHIOPHENE	0.0943	J	2.18
3	DBT1	C1-DIBENZOTHIOPHENES		U	2.18
3	DBT2	C2-DIBENZOTHIOPHENES		U	2.18
3	DBT3	C3-DIBENZOTHIOPHENES		U	2.18
3	DBT4	C4-DIBENZOTHIOPHENES		U	2.18
4	BF	BENZO(B)FLUORENE		U	2.18
4	FL0	FLUORANTHENE	0.0528	J	2.18
4	PY0	PYRENE	0.0723	J	2.18
4	FP1	C1-FLUORANTHENES/PYRENES		U	2.18
4	FP2	C2-FLUORANTHENES/PYRENES		U	2.18
4	FP3	C3-FLUORANTHENES/PYRENES		U	2.18
4	FP4	C4-FLUORANTHENES/PYRENES		U	2.18
4	NBT0	NAPHTHOBENZOTHIOPHENE	0.0485	J	2.18
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES		U	2.18
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES		U	2.18
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES		U	2.18
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES		U	2.18
4	BA0	BENZ(A)ANTHRACENE	0.0618	J	2.18
4	C0	CHRYSENE/TRIPHENYLENE	0.133	J	2.18
4	BC1	C1-CHRYSENES		U	2.18
4	BC2	C2-CHRYSENES		U	2.18
4	BC3	C3-CHRYSENES		U	2.18
4	BC4	C4-CHRYSENES		U	2.18
5	BBF	BENZO(B)FLUORANTHENE	0.230	J	2.18

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1880040-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1880040
Date Collected	NA
Date Received	1/31/2024
Date Prepped	1/31/2024
Date Analyzed	2/3/2024
Sample Size(wet)	0.00458 g
% Solid	100
File ID	F1402012433
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.09

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE	0.176	J	2.18
5	BAF	BENZO(A)FLUORANTHENE		U	2.18
5	BEP	BENZO(E)PYRENE	0.278	J	2.18
5	BAP	BENZO(A)PYRENE	0.148	J	2.18
5	PER	PERYLENE		U	2.18
6	IND	INDENO(1,2,3-CD)PYRENE	0.379	J	2.18
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	0.217	J	2.18
6	GHI	BENZO(GHI)PERYLENE	0.317	J	2.18
O	CAR	CARBAZOLE		U	2.18
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)		U	2.18
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)		U	2.18
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)		U	2.18
3	3MP	3-METHYLPHENANTHRENE (3MP)		U	2.18
3	2MP	2-METHYLPHENANTHRENE (2MP)	0.0430	J	2.18
3	2MA	2-METHYLANTHRACENE (2MA)		U	2.18
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	0.0539	J	2.18
3	1MP	1-METHYLPHENANTHRENE (1MP)	0.0596	J	2.18
A	1MN	1-METHYLNAPHTHALENE	0.165	J	2.18
A	2MN	2-METHYLNAPHTHALENE	0.244	J	2.18
2	26DMN	2,6-DIMETHYLNAPHTHALENE		U	2.18
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE		U	2.18
H30	T19	HOPANE (T19)		U	2.18
t23	T4	C23 TRICYCLIC TERPANE (T4)		U	2.18
t24	T5	C24 TRICYCLIC TERPANE (T5)		U	2.18
t25	T6	C25 TRICYCLIC TERPANE (T6)		U	2.18
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)		U	2.18
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)		U	2.18
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)		U	2.18
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)		U	2.18
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)		U	2.18
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)		U	2.18
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)		U	2.18
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)		U	2.18
t30S	T11a	C30 TRICYCLIC TERPANE-22S		U	2.18
t30R	T11b	C30 TRICYCLIC TERPANE-22R		U	2.18
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)		U	2.18
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)		U	2.18
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)		U	2.18
H29	T15	30-NORHOPANE (T15)		U	2.18
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)		U	2.18
X	X	17A(H)-DIAHOPANE (X)		U	2.18
M29	T17	30-NORMORETANE (T17)		U	2.18
OL	T18	18A(H)&18B(H)-OLEANANES (T18)		U	2.18
M30	T20	MORETANE (T20)		U	2.18
H31S	T21	30-HOMOHOPANE-22S (T21)		U	2.18
H31R	T22	30-HOMOHOPANE-22R (T22)		U	2.18
T22A	T22A	GAMMACERANE/C32-DIAHOPANE		U	2.18
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)		U	2.18
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)		U	2.18
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)		U	2.18
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)		U	2.18
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)		U	2.18
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)		U	2.18
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)		U	2.18

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1880040-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1880040
Date Collected	NA
Date Received	1/31/2024
Date Prepped	1/31/2024
Date Analyzed	2/3/2024
Sample Size(wet)	0.00458 g
% Solid	100
File ID	F1402012433
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.09

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	U	2.18
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	U	2.18
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	U	2.18
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	U	2.18
aa27S	S12	17A(H)20SC27/C29DIA	U	2.18
aa27R	S17	17A(H)20RC27/C29DIA	U	2.18
d29R	S18	UNKNOWN STERANE (S18)	U	2.18
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	U	2.18
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	U	2.18
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	U	2.18
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	U	2.18
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	U	2.18
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	U	2.18
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	U	2.18
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	U	2.18
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	U	2.18
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	U	2.18
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	U	2.18
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	U	2.18
SC28TAS	TAS02	C28,20S TAS	U	2.18
RC27TAS	TAS03	C27,20R TAS	U	2.18
RC28TAS	TAS04	C28,20R TAS	U	2.18

Surrogates (% Recovery)	
NAPHTHALENE-D8	90
PHENANTHRENE-D10	100
BENZO(A)PYRENE-D12	130
5B(H)CHOLANE	103

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1880040-2
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1880040
Date Collected	NA
Date Received	1/31/2024
Date Prepped	1/31/2024
Date Analyzed	2/3/2024
Sample Size(wet)	0.00458 g
% Solid	100
File ID	F1402012434
Units	%
Final Volume	1
Dilution	1
Reporting Limit	2.18

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
A	N0	NAPHTHALENE	206	2.18	95	218	50	130
3	AY	ACENAPHTHYLENE	214	2.18	98	218	50	130
3	AE	ACENAPHTHENE	200	2.18	91	218	50	130
3	F0	FLUORENE	209	2.18	96	218	50	130
3	A0	ANTHRACENE	220	2.18	101	218	50	130
3	P0	PHENANTHRENE	195	2.18	89	218	50	130
4	FL0	FLUORANTHENE	136	2.18	62	218	50	130
4	PY0	PYRENE	153	2.18	70	218	50	130
4	BA0	BENZ(A)ANTHRACENE	244	2.18	112	218	50	130
4	C0	CHRYSENE/TRIPHENYLENE	233	2.18	107	218	50	130
5	BBF	BENZO(B)FLUORANTHENE	244	2.18	112	218	50	130
5	BJKF	BENZO(J)+(K)FLUORANTHENE	248	2.18	113	218	50	130
5	BAP	BENZO(A)PYRENE	273	2.18	125	218	50	130
6	IND	INDENO(1,2,3-CD)PYRENE	285	2.18	130	218	50	130
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	281	2.18	129	218	50	130
6	GHI	BENZO(GHI)PERYLENE	264	2.18	121	218	50	130
A	2MN	2-METHYLNAPHTHALENE	196	2.18	90	218	50	130

Surrogates (% Recovery)	
NAPHTHALENE-D8	101
PHENANTHRENE-D10	97
BENZO(A)PYRENE-D12	124
5B(H)CHOLANE	99

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1880040-3
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1880040
Date Collected	NA
Date Received	1/31/2024
Date Prepped	1/31/2024
Date Analyzed	2/3/2024
Sample Size(wet)	0.00458 g
% Solid	100
File ID	F1402012435
Units	%
Final Volume	1
Dilution	1
Reporting Limit	2.18

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
A	N0	NAPHTHALENE	213	2.18	98	218	50	130	3	30
3	AY	ACENAPHTHYLENE	222	2.18	102	218	50	130	4	30
3	AE	ACENAPHTHENE	206	2.18	94	218	50	130	3	30
3	F0	FLUORENE	214	2.18	98	218	50	130	2	30
3	A0	ANTHRACENE	228	2.18	104	218	50	130	3	30
3	P0	PHENANTHRENE	202	2.18	92	218	50	130	3	30
4	FL0	FLUORANTHENE	140	2.18	64	218	50	130	3	30
4	PY0	PYRENE	158	2.18	72	218	50	130	3	30
4	BA0	BENZ(A)ANTHRACENE	251	2.18	115	218	50	130	3	30
4	C0	CHRYSENE/TRIPHENYLENE	239	2.18	110	218	50	130	3	30
5	BBF	BENZO(B)FLUORANTHENE	251	2.18	115	218	50	130	3	30
5	BJKF	BENZO(J)+(K)FLUORANTHENE	255	2.18	117	218	50	130	3	30
5	BAP	BENZO(A)PYRENE	282	2.18	129	218	50	130	3	30
6	IND	INDENO(1,2,3-CD)PYRENE	280	2.18	128	218	50	130	2	30
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	282	2.18	129	218	50	130	0	30
6	GHI	BENZO(GHI)PERYLENE	272	2.18	125	218	50	130	3	30
A	2MN	2-METHYLNAPHTHALENE	202	2.18	93	218	50	130	3	30

Surrogates (% Recovery)	
NAPHTHALENE-D8	102
PHENANTHRENE-D10	98
BENZO(A)PYRENE-D12	125
5B(H)CHOLANE	101

Project Name: PAMPILLA 2
Project Number:

Client ID	HC VINAS 25ENE2024		Duplicate Sample	
Lab ID	L2405009-01		WG1880040-5	
Matrix	SOLID		SOLID	
Matrix Description				
Reference Method	8270E-SIM(M)		8270E-SIM(M)	
Batch ID	WG1880040		WG1880040	
Date Collected	1/25/2024		NA	
Date Received	1/30/2024		1/31/2024	
Date Prepped	1/31/2024		1/31/2024	
Date Analyzed	2/4/2024		2/4/2024	
Sample Size(wet)	0.00478	g	0.00469	g
% Solid	100		100	
File ID	F1402012446		F1402012447	
Units	mg/kg		mg/kg	
Final Volume	1		1	
Dilution	1		1	
Reporting Limit	1.05		1.07	

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
2	D0	CIS/TRANS-DECALIN	193		1.05	245		1.07	24	30	
2	D1	C1-DECALINS	241		2.09	304		2.13	23	30	
2	D2	C2-DECALINS	74.4		2.09	92.2		2.13	21	30	
2	D3	C3-DECALINS	36.0		2.09	42.0		2.13	15	30	
2	D4	C4-DECALINS	61.0		2.09	64.4		2.13	5	30	
S	BT0	BENZOTHIOPHENE	1.48	J	2.09	1.87	J	2.13		30	NC
2	BT1	C1-BENZO(B)THIOPHENES	4.98		2.09	3.76		2.13	28	30	
2	BT2	C2-BENZO(B)THIOPHENES	3.35		2.09	3.64		2.13	8	30	
2	BT3	C3-BENZO(B)THIOPHENES	6.67		2.09	7.00		2.13	5	30	
2	BT4	C4-BENZO(B)THIOPHENES	11.1		2.09	11.3		2.13	2	30	
A	N0	NAPHTHALENE	19.1		2.09	24.1		2.13	23	30	
2	N1	C1-NAPHTHALENES	32.5		2.09	39.8		2.13	20	30	
2	N2	C2-NAPHTHALENES	60.0		2.09	69.8		2.13	15	30	
2	N3	C3-NAPHTHALENES	115		2.09	127		2.13	10	30	
2	N4	C4-NAPHTHALENES	104		2.09	111		2.13	7	30	
2	B	BIPHENYL	11.3		2.09	13.2		2.13	16	30	
3	DF	DIBENZOFURAN	62.4		2.09	71.0		2.13	13	30	
3	AY	ACENAPHTHYLENE	11.2		2.09	10.7		2.13	5	30	
3	AE	ACENAPHTHENE	74.1		2.09	82.8		2.13	11	30	
3	F0	FLUORENE	58.2		2.09	67.6		2.13	15	30	
3	F1	C1-FLUORENES	22.7		2.09	25.1		2.13	10	30	
3	F2	C2-FLUORENES	67.6		2.09	72.6		2.13	7	30	
3	F3	C3-FLUORENES	106		2.09	113		2.13	6	30	
3	A0	ANTHRACENE	41.7		2.09	45.7		2.13	9	30	
3	P0	PHENANTHRENE	291		2.09	328		2.13	12	30	
3	PA1	C1-PHENANTHRENES/ANTHRACENES	125		2.09	138		2.13	10	30	
3	PA2	C2-PHENANTHRENES/ANTHRACENES	160		2.09	174		2.13	8	30	
3	PA3	C3-PHENANTHRENES/ANTHRACENES	134		2.09	146		2.13	9	30	
3	PA4	C4-PHENANTHRENES/ANTHRACENES	73.2		2.09	79.9		2.13	9	30	
3	RET	RETENE		U	2.09		U	2.13		30	NC
3	DBT0	DIBENZOTHIOPHENE	24.7		2.09	27.7		2.13	11	30	
3	DBT1	C1-DIBENZOTHIOPHENES	14.0		2.09	15.3		2.13	9	30	
3	DBT2	C2-DIBENZOTHIOPHENES	21.2		2.09	22.2		2.13	5	30	
3	DBT3	C3-DIBENZOTHIOPHENES	22.7		2.09	23.6		2.13	4	30	
3	DBT4	C4-DIBENZOTHIOPHENES	11.9		2.09	12.3		2.13	3	30	
4	BF	BENZO(B)FLUORENE	1.90	J	2.09	2.29		2.13		30	NC
4	FL0	FLUORANTHENE	162		2.09	175		2.13	8	30	
4	PY0	PYRENE	105		2.09	111		2.13	6	30	
4	FP1	C1-FLUORANTHENES/PYRENES	41.4		2.09	45.0		2.13	8	30	
4	FP2	C2-FLUORANTHENES/PYRENES	51.9		2.09	55.0		2.13	6	30	
4	FP3	C3-FLUORANTHENES/PYRENES	38.3		2.09	42.6		2.13	11	30	
4	FP4	C4-FLUORANTHENES/PYRENES	33.0		2.09	36.7		2.13	11	30	
4	NBT0	NAPHTHOBENZOTHIOPHENE	13.9		2.09	15.2		2.13	9	30	
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	8.91		2.09	9.70		2.13	8	30	
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	6.01		2.09	6.76		2.13	12	30	
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	6.02		2.09	6.59		2.13	9	30	
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	6.96		2.09	7.70		2.13	10	30	
4	BA0	BENZ(A)ANTHRACENE	60.2		2.09	60.3		2.13	0	30	
4	C0	CHRYSENE/TRIPHENYLENE	58.3		2.09	58.0		2.13	1	30	
4	BC1	C1-CHRYSENES	37.1		2.09	37.6		2.13	1	30	
4	BC2	C2-CHRYSENES	45.9		2.09	46.9		2.13	2	30	
4	BC3	C3-CHRYSENES	65.0		2.09	66.4		2.13	2	30	
4	BC4	C4-CHRYSENES	45.5		2.09	46.6		2.13	2	30	
5	BBF	BENZO(B)FLUORANTHENE	31.3		2.09	29.9		2.13	5	30	
5	BJKF	BENZO(J)+(K)FLUORANTHENE	27.0		2.09	28.8		2.13	6	30	
5	BAF	BENZO(A)FLUORANTHENE	6.00		2.09	6.10		2.13	2	30	
5	BEP	BENZO(E)PYRENE	20.8		2.09	20.2		2.13	3	30	
5	BAP	BENZO(A)PYRENE	29.6		2.09	29.3		2.13	1	30	
5	PER	PERYLENE	10.3		2.09	11.0		2.13	7	30	
6	IND	INDENO(1,2,3-CD)PYRENE	16.6		2.09	17.1		2.13	3	30	
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	6.05		2.09	6.48		2.13	7	30	

Project Name: PAMPILLA 2
Project Number:

Client ID	HC VINAS 25ENE2024		Duplicate Sample	
Lab ID	L2405009-01		WG1880040-5	
Matrix	SOLID		SOLID	
Matrix Description				
Reference Method	8270E-SIM(M)		8270E-SIM(M)	
Batch ID	WG1880040		WG1880040	
Date Collected	1/25/2024		NA	
Date Received	1/30/2024		1/31/2024	
Date Prepped	1/31/2024		1/31/2024	
Date Analyzed	2/4/2024		2/4/2024	
Sample Size(wet)	0.00478	g	0.00469	g
% Solid	100		100	
File ID	F1402012446		F1402012447	
Units	mg/kg		mg/kg	
Final Volume	1		1	
Dilution	1		1	
Reporting Limit	1.05		1.07	

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
6	GHI	BENZO(GHI)PERYLENE	13.6		2.09	13.9		2.13	2	30	
O	CAR	CARBAZOLE	22.9		2.09	26.5		2.13	15	30	
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	6.19		2.09	6.48		2.13	5	30	
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	3.89		2.09	5.21		2.13	29	30	
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	1.32	J	2.09	1.42	J	2.13		30	NC
3	3MP	3-METHYLPHENANTHRENE (3MP)	29.0		2.09	32.4		2.13	11	30	
3	2MP	2-METHYLPHENANTHRENE (2MP)	32.9		2.09	36.6		2.13	11	30	
3	2MA	2-METHYLANTHRACENE (2MA)	7.75		2.09	8.11		2.13	5	30	
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	29.7		2.09	32.5		2.13	9	30	
3	1MP	1-METHYLPHENANTHRENE (1MP)	18.6		2.09	20.9		2.13	12	30	
A	1MN	1-METHYLNAPHTHALENE	23.8		2.09	29.2		2.13	20	30	
A	2MN	2-METHYLNAPHTHALENE	26.5		2.09	32.6		2.13	21	30	
2	26DMN	2,6-DIMETHYLNAPHTHALENE	26.2		2.09	30.6		2.13	15	30	
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	24.2		2.09	29.0		2.13	18	30	
H30	T19	HOPANE (T19)	462		2.09	482		2.13	4	30	
t23	T4	C23 TRICYCLIC TERPANE (T4)	102		2.09	105		2.13	3	30	
t24	T5	C24 TRICYCLIC TERPANE (T5)	47.1		2.09	48.8		2.13	4	30	
t25	T6	C25 TRICYCLIC TERPANE (T6)	33.4		2.09	35.9		2.13	7	30	
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	11.7		2.09	11.3		2.13	3	30	
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	18.6		2.09	19.6		2.13	5	30	
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	18.4		2.09	17.6		2.13	4	30	
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	22.1		2.09	26.0		2.13	16	30	
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	29.8		2.09	31.8		2.13	6	30	
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	24.7		2.09	24.3		2.13	2	30	
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	22.1		2.09	28.2		2.13	24	30	
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	72.4		2.09	74.8		2.13	3	30	
t30S	T11a	C30 TRICYCLIC TERPANE-22S	23.7		2.09	25.4		2.13	7	30	
t30R	T11b	C30 TRICYCLIC TERPANE-22R	22.0		2.09	25.4		2.13	14	30	
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	48.9		2.09	49.4		2.13	1	30	
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	17.1		2.09	18.4		2.13	7	30	
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	37.0		2.09	37.6		2.13	2	30	
H29	T15	30-NORHOPANE (T15)	176		2.09	177		2.13	1	30	
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	72.4		2.09	76.1		2.13	5	30	
X	X	17A(H)-DIAHOPANE (X)	43.4		2.09	44.9		2.13	3	30	
M29	T17	30-NORMORETANE (T17)	43.5		2.09	42.3		2.13	3	30	
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	316		2.09	332		2.13	5	30	
M30	T20	MORETANE (T20)	60.2		2.09	60.4		2.13	0	30	
H31S	T21	30-HOMOHOPANE-22S (T21)	140		2.09	150		2.13	7	30	
H31R	T22	30-HOMOHOPANE-22R (T22)	172		2.09	180		2.13	5	30	
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	49.0		2.09	47.8		2.13	2	30	
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	118		2.09	120		2.13	2	30	
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	83.7		2.09	89.8		2.13	7	30	
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	93.6		2.09	100		2.13	7	30	
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	56.8		2.09	56.8		2.13	0	30	
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	54.2		2.09	53.6		2.13	1	30	
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	38.5		2.09	40.3		2.13	5	30	
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	25.8		2.09	28.6		2.13	10	30	
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	71.2	G	2.09	67.6	G	2.13	5	30	
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	56.9		2.09	55.4		2.13	3	30	
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	27.2		2.09	32.9		2.13	19	30	
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	32.8		2.09	38.9		2.13	17	30	
aa27S	S12	17A(H)20SC27/C29DIA	123		2.09	134		2.13	9	30	
aa27R	S17	17A(H)20RC27/C29DIA	195		2.09	200		2.13	3	30	
d29R	S18	UNKNOWN STERANE (S18)	13.2		2.09	14.9		2.13	12	30	
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	8.10		2.09	9.32		2.13	14	30	
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	79.5		2.09	100		2.13	23	30	
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	138		2.09	149		2.13	8	30	
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	115		2.09	119		2.13	3	30	
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	123		2.09	132		2.13	7	30	
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	179		2.09	187		2.13	4	30	
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	167		2.09	180		2.13	7	30	

Project Name: PAMPILLA 2
Project Number:

Client ID		HC VINAS 25ENE2024		Duplicate Sample	
Lab ID		L2405009-01		WG1880040-5	
Matrix		SOLID		SOLID	
Matrix Description					
Reference Method		8270E-SIM(M)		8270E-SIM(M)	
Batch ID		WG1880040		WG1880040	
Date Collected		1/25/2024		NA	
Date Received		1/30/2024		1/31/2024	
Date Prepped		1/31/2024		1/31/2024	
Date Analyzed		2/4/2024		2/4/2024	
Sample Size(wet)		0.00478	g	0.00469	g
% Solid		100		100	
File ID		F1402012446		F1402012447	
Units		mg/kg		mg/kg	
Final Volume		1		1	
Dilution		1		1	
Reporting Limit		1.05		1.07	

Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	RPD	RPD Limit
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	217	2.09	224	2.13	3	30
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	228	2.09	255	2.13	11	30
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	215	2.09	237	2.13	10	30
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	144	2.09	141	2.13	2	30
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	84.4	2.09	81.8	2.13	3	30
SC28TAS	TAS02	C28,20S TAS	78.5	2.09	77.1	2.13	2	30
RC27TAS	TAS03	C27,20R TAS	60.6	2.09	60.5	2.13	0	30
RC28TAS	TAS04	C28,20R TAS	45.8	2.09	52.5	2.13	14	30

Surrogates (% Recovery)		
NAPHTHALENE-D8	93	95
PHENANTHRENE-D10	74	75
BENZO(A)PYRENE-D12	123	125
5B(H)CHOLANE	112	113

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude	
Lab ID	WG1873173-1	
Matrix	OIL	
Matrix Description	Crude Oil	
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER	
Batch ID	WG1873173-1	
Date Collected	N/A	
Date Received	N/A	
Date Prepped	N/A	
Date Analyzed	1/6/2024	
Sample Size(wet)	0.05184	g
% Solid	100	
File ID	F1401052428	
Units	mg/kg	
Final Volume	10	
Dilution	1	
Reporting Limit	1.93	

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
2	D0	CIS/TRANS-DECALIN	490	1.93	102	477.66	65	135
2	D1	C1-DECALINS	755	1.93	99	760.39	65	135
2	D2	C2-DECALINS	651	1.93	96	675.98	65	135
2	D3	C3-DECALINS	321	1.93	88	366.46	65	135
2	D4	C4-DECALINS	282	1.93	78	362.78	65	135
S	BT0	BENZOTHIOPHENE	5.39	1.93	94	5.75	65	135
2	BT1	C1-BENZO(B)THIOPHENES	27.4	1.93	91	29.96	65	135
2	BT2	C2-BENZO(B)THIOPHENES	49.1	1.93	96	50.93	65	135
2	BT3	C3-BENZO(B)THIOPHENES	92.1	1.93	89	103.18	65	135
2	BT4	C4-BENZO(B)THIOPHENES	84.3	1.93	93	90.8	65	135
A	N0	NAPHTHALENE	590	1.93	104	565.56	65	135
2	N1	C1-NAPHTHALENES	1160	1.93	96	1208.32	65	135
2	N2	C2-NAPHTHALENES	1320	1.93	91	1450.37	65	135
2	N3	C3-NAPHTHALENES	964	1.93	92	1052.74	65	135
2	N4	C4-NAPHTHALENES	513	1.93	88	583.65	65	135
2	B	BIPHENYL	144	1.93	99	145.7	65	135
3	DF	DIBENZOFURAN	53.9	1.93	109	49.63	65	135
3	AY	ACENAPHTHYLENE	6.32	1.93	92	6.91	65	135
3	AE	ACENAPHTHENE	16.5	1.93	90	18.35	65	135
3	F0	FLUORENE	71.8	1.93	102	70.69	65	135
3	F1	C1-FLUORENES	151	1.93	93	162.7	65	135
3	F2	C2-FLUORENES	224	1.93	89	251.87	65	135
3	F3	C3-FLUORENES	205	1.93	85	242.29	65	135
3	P0	PHENANTHRENE	177	1.93	94	188.41	65	135
3	PA1	C1-PHENANTHRENES/ANTHRACENES	360	1.93	93	388.12	65	135
3	PA2	C2-PHENANTHRENES/ANTHRACENES	387	1.93	89	434.38	65	135
3	PA3	C3-PHENANTHRENES/ANTHRACENES	254	1.93	82	308.67	65	135
3	PA4	C4-PHENANTHRENES/ANTHRACENES	103	1.93	79	129.94	65	135
3	DBT0	DIBENZOTHIOPHENE	116	1.93	89	130.56	65	135
3	DBT1	C1-DIBENZOTHIOPHENES	249	1.93	90	275.34	65	135
3	DBT2	C2-DIBENZOTHIOPHENES	307	1.93	83	369.42	65	135
3	DBT3	C3-DIBENZOTHIOPHENES	281	1.93	81	345.39	65	135
3	DBT4	C4-DIBENZOTHIOPHENES	155	1.93	80	193.51	65	135
4	FL0	FLUORANTHENE	2.95	1.93	78	3.77	65	135
4	PY0	PYRENE	9.05	1.93	78	11.65	65	135
4	FP1	C1-FLUORANTHENES/PYRENES	45.6	1.93	84	54.43	65	135
4	FP2	C2-FLUORANTHENES/PYRENES	75.2	1.93	84	89.07	65	135
4	FP3	C3-FLUORANTHENES/PYRENES	89.2	1.93	81	109.78	65	135
4	FP4	C4-FLUORANTHENES/PYRENES	75.8	1.93	78	97.22	65	135
4	NBT0	NAPHTHOBENZOTHIOPHENE	32.1	1.93	82	39.13	65	135
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	88.9	1.93	84	106.13	65	135
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	120	1.93	80	150.09	65	135
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	94.4	1.93	78	120.77	65	135
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	62.3	1.93	73	85.38	65	135
4	BA0	BENZ(A)ANTHRACENE	2.51	1.93	110	2.28	65	135
4	C0	CHRYSENE/TRIPHENYLENE	36.0	1.93	98	36.66	65	135
4	BC1	C1-CHRYSENES	64.6	1.93	100	64.59	65	135
4	BC2	C2-CHRYSENES	85.1	1.93	97	87.41	65	135
4	BC3	C3-CHRYSENES	97.1	1.93	96	101.29	65	135
4	BC4	C4-CHRYSENES	56.2	1.93	89	63.42	65	135
5	BBF	BENZO(B)FLUORANTHENE	5.36	1.93	99	5.4	65	135
5	BEP	BENZO(E)PYRENE	10.2	1.93	103	9.88	65	135
5	BAP	BENZO(A)PYRENE	2.02	1.93	100	2.03	65	135
5	PER	PERYLENE	3.25	1.93	97	3.34	65	135
6	GHI	BENZO(GHI)PERYLENE	4.18	1.93	116	3.59	65	135
O	CAR	CARBAZOLE	5.03	1.93	83	6.09	65	135
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	124	1.93	94	131.38	65	135
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	86.2	1.93	88	98.05	65	135
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	34.5	1.93	86	40.36	65	135
3	3MP	3-METHYLPHENANTHRENE (3MP)	71.4	1.93	90	79.32	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude	
Lab ID	WG1873173-1	
Matrix	OIL	
Matrix Description	Crude Oil	
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER	
Batch ID	WG1873173-1	
Date Collected	N/A	
Date Received	N/A	
Date Prepped	N/A	
Date Analyzed	1/6/2024	
Sample Size(wet)	0.05184	g
% Solid	100	
File ID	F1401052428	
Units	mg/kg	
Final Volume	10	
Dilution	1	
Reporting Limit	1.93	

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
3	2MA	2-METHYLANTHRACENE (2MA)	2.66	1.93	89	3	65	135
3	1MP	1-METHYLPHENANTHRENE (1MP)	80.2	1.93	91	87.93	65	135
A	1MN	1-METHYLNAPHTHALENE	789	1.93	99	793.54	65	135
A	2MN	2-METHYLNAPHTHALENE	1000	1.93	92	1087.89	65	135
2	26DMN	2,6-DIMETHYLNAPHTHALENE	623	1.93	98	635.33	65	135
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	137	1.93	93	147.12	65	135
H30	T19	HOPANE (T19)	172	1.93	107	161.24	65	135
t23	T4	C23 TRICYCLIC TERPANE (T4)	89.0	1.93	128	69.8	65	135
t24	T5	C24 TRICYCLIC TERPANE (T5)	46.0	1.93	109	42.1	65	135
t25	T6	C25 TRICYCLIC TERPANE (T6)	45.0	1.93	111	40.4	65	135
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	17.0	1.93	120	14.2	65	135
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	19.0	1.93	116	16.3	65	135
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	17.0	1.93	116	14.6	65	135
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	19.5	1.93	120	16.2	65	135
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	19.4	1.93	110	17.6	65	135
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	22.1	1.93	115	19.2	65	135
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	26.6	1.93	127	21	65	135
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	33.6	1.93	119	28.3	65	135
t30S	T11a	C30 TRICYCLIC TERPANE-22S	18.5	1.93	121	15.3	65	135
t30R	T11b	C30 TRICYCLIC TERPANE-22R	18.6	1.93	122	15.2	65	135
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	39.0	1.93	113	34.4	65	135
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	6.93	1.93	99	7	65	135
H29	T15	30-NORHOPANE (T15)	97.9	1.93	108	90.7	65	135
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	24.2	1.93	104	23.3	65	135
X	X	17A(H)-DIAHOPANE (X)	13.7	1.93	105	13	65	135
M29	T17	30-NORMORETANE (T17)	12.7	1.93	113	11.2	65	135
M30	T20	MORETANE (T20)	16.2	1.93	99	16.3	65	135
H31S	T21	30-HOMOHOPANE-22S (T21)	71.9	1.93	106	67.6	65	135
H31R	T22	30-HOMOHOPANE-22R (T22)	62.6	1.93	107	58.3	65	135
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	51.1	1.93	104	48.9	65	135
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	35.6	1.93	100	35.6	65	135
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	41.5	1.93	107	38.8	65	135
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	25.8	1.93	101	25.6	65	135
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	29.6	1.93	106	27.9	65	135
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	19.3	1.93	98	19.8	65	135
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	28.0	1.93	97	28.8	65	135
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	24.0	1.93	108	22.3	65	135
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	57.5	1.93	120	48.1	65	135
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	29.0	1.93	116	25.1	65	135
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	30.8	1.93	124	24.8	65	135
aa27S	S12	17A(H)20SC27/C29DIA	68.5	1.93	115	59.74	65	135
aa27R	S17	17A(H)20RC27/C29DIA	79.4	1.93	111	71.55	65	135
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	2.67	1.93	70	3.8	65	135
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	38.7	1.93	117	33	65	135
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	39.1	1.93	121	32.2	65	135
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	63.3	1.93	122	51.7	65	135
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	39.8	1.93	110	36.1	65	135
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	40.2	1.93	105	38.4	65	135
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	41.6	1.93	105	39.7	65	135
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	42.8	1.93	104	41	65	135
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	55.0	1.93	106	51.7	65	135
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	57.1	1.93	104	54.6	65	135
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	35.7	1.93	93	38.2	65	135
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	359	1.93	124	289.3	65	135
SC28TAS	TAS02	C28,20S TAS	207	1.93	113	182.5	65	135
RC27TAS	TAS03	C27,20R TAS	207	1.93	117	177.1	65	135
RC28TAS	TAS04	C28,20R TAS	169	1.93	114	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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Francia
Alemania
Ghana
Guyana
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Italia
Japón
Kazajistán
Kenia
Malasia
México
Mozambique
Países Bajos
Nueva Zelanda
Perú
Polonia
Portugal
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España
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Vietnam