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

Memorando Técnico Complementario No.10

18 de octubre de 2023

Proyecto No.: 0633786

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Titulo	Muestreo y Caracterización de Hidrocarburos ajenos a la Terminal 2 de RELAPASAA en la Costa de Ventanilla y Chancay
Subtitulo	Memorando Técnico Complementario No.10
Proyecto No.	0633786
Fecha	18 de octubre de 2023
Versión	1.0
Autor	Alejandro Guido Zárate
Cliente	RELAPASAA

Documento historia

				Aprobación de ERM		
Versión	Revisión	Autor	Revisado por	Nombre	Fecha	Comentarios
Borrador	13/10/2023	Alejandro Guido	Francisco Pinilla		16/10/2023	

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 septiembre 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 septiembre 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.

El presente documento tiene como objetivo presentar los resultados de los análisis *Fingerprint* de siete muestras tomadas los días 02, 03, 06, 11 y 27 de agosto 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 y al Memorando Técnico Complementario No.9 remitido el 29 de septiembre del 2023.

2. MUESTREO Y ANÁLISIS DE LABORATORIO

Los días 02, 03, 06, 11 y 27 de agosto del 2023, se recolectó un total de 07 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.

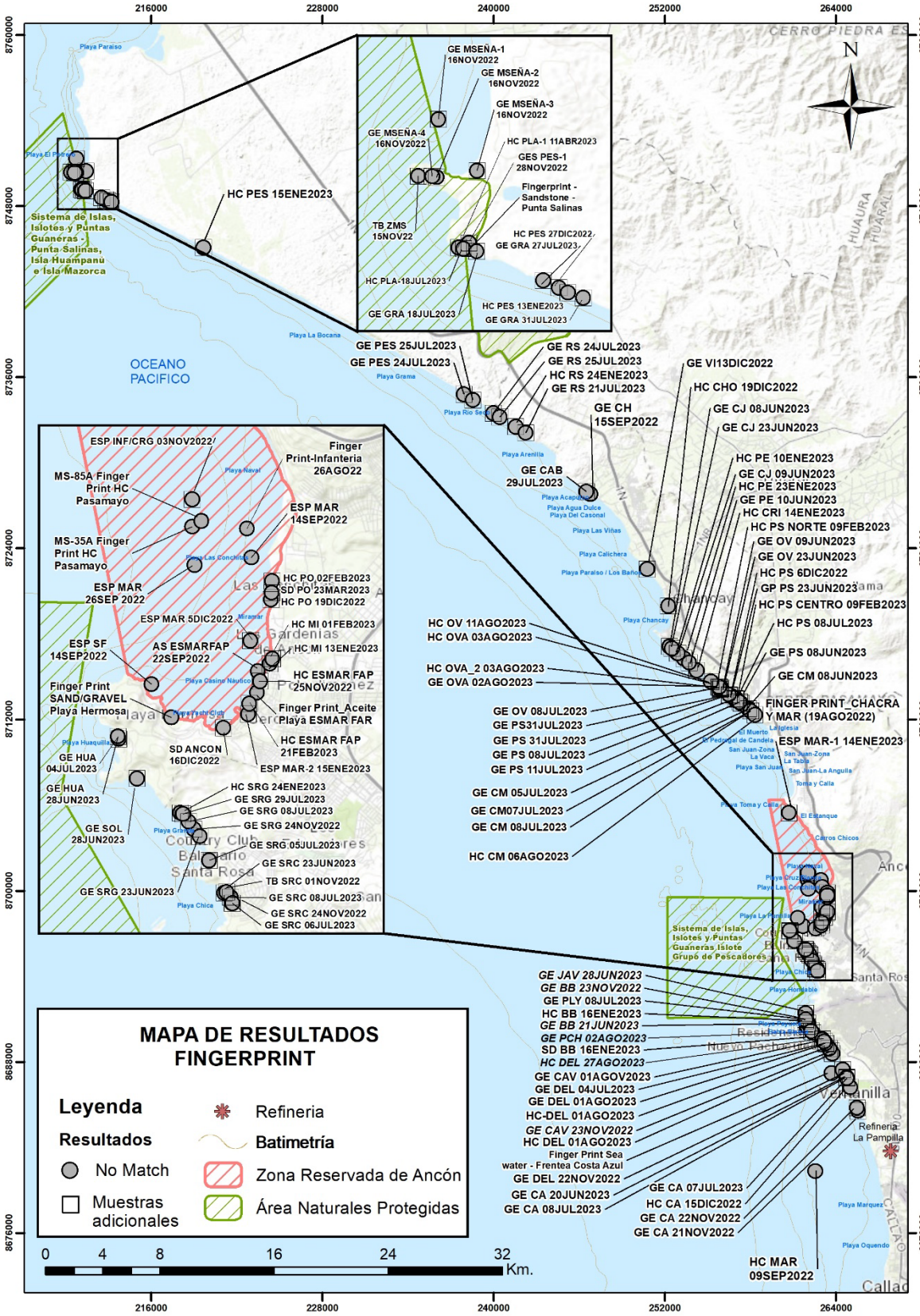


Figura 4-1. *Ubicación de las muestras tomadas para análisis de Fingerprint*

Notas:
No Match = Químicamente no compatible con el crudo Buzios

Fuente: ERM - octubre, 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.

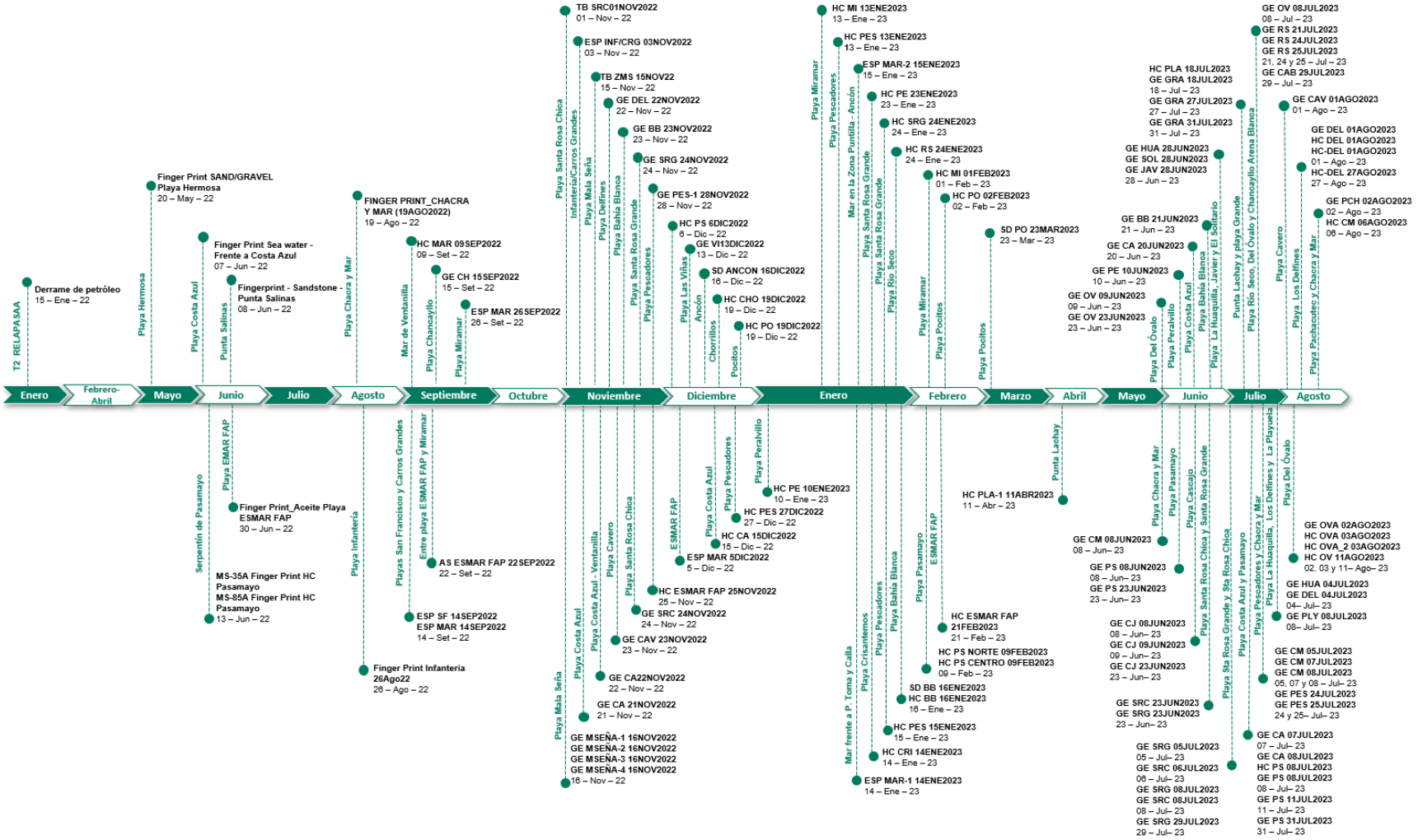


Figura 4-2. *Línea de tiempo de muestras de Fingerprint cuyo origen es diferente al del crudo Buzios*

Fuente: Elaboración propia. ERM – octubre, 2023

3. RESULTADOS

3.1 Resultado de las Muestras Ajenas al Crudo Buzios

En la presente actualización, se detallan los resultados de 07 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 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: Playa Pachacutec	**Fecha de muestreo:** 02 de agosto de 2023
	**Nombre de la muestra:** *GE PCH 02AGO2023* **Precintado por:** CERPER **Precinto N°:** 202388 **Enviado a NewFields por:** Intertek Testing Services Perú S.A Coordenadas UTM WGS84 18L 0262272 E, 8690159 N
	Descripción: Glóbulos anómalos encontrados en playa Pachacutec. **Resultado:** La muestra *GE PCH 02AGO2023* consiste en un crudo o petróleo pesado moderadamente intemperizado. Los resultados de los análisis de HAP y biomarcadores indican que **el petróleo detectado en la muestra *GE PCH 02AGO2023* y el petróleo del crudo de origen (Buzios) son químicamente diferentes, y se derivan de una fuente de petróleo distinta.**

Ubicación: Playa Del Óvalo	**Fecha de muestreo:** 02 de agosto de 2023
	**Nombre de la muestra:** *GE OVA 02AGO2023* **Precintado por:** CERPER **Precinto N°:** 200976 **Enviado a NewFields por:** Intertek Testing Services Perú S.A Coordenadas UTM WGS84 18L 0255770 E, 8714308 N
	Descripción: Glóbulos anómalos encontrados en playa Del Óvalo. **Resultado:** La muestra *GE OVA 02AGO2023* consiste en un crudo o petróleo pesado moderadamente intemperizado. Los resultados de los análisis de HAP y biomarcadores indican que **el petróleo detectado en la muestra *GE OVA 02AGO2023* y el petróleo del crudo de origen (Buzios) son químicamente diferentes, y se derivan de una fuente de petróleo distinta.**

Ubicación: Playa Del Óvalo	**Fecha de muestreo:** 03 de agosto de 2023
	**Nombre de la muestra:** *HC OVA 03AGO2023* **Precintado por:** CERPER **Precinto N°:** 203921 y 203922 **Enviado a NewFields por:** Intertek Testing Services Perú S.A Coordenadas UTM WGS84 18L 0255234 E, 8714678 N
	Descripción: Hidrocarburo encontrado sobre los cantos rodados en playa Del Óvalo. Rocas impregnadas, difícil recuperación del material. **Resultado:** La muestra *HC OVA 03AGO2023* consiste en un crudo o petróleo pesado moderadamente/severamente intemperizado. Los resultados de los análisis de HAP y biomarcadores indican que **el petróleo detectado en la muestra *HC OVA 03AGO2023* y el petróleo del crudo de origen (Buzios) son químicamente diferentes, y se derivan de una fuente de petróleo distinta.**

Ubicación: Playa Del Óvalo	**Fecha de muestreo:** 03 de agosto de 2023
	**Nombre de la muestra:** *HC OVA_2 03AGO2023* **Precintado por:** CERPER **Precinto N°:** 203923 **Enviado a NewFields por:** Intertek Testing Services Perú S.A Coordenadas UTM WGS84 18L 0255802 E, 8714307 N
	Descripción: Restos de hidrocarburo negro encontrados en playa Del Óvalo. **Resultado:** La muestra *HC OVA_2 03AGO2023* consiste en un crudo o petróleo pesado moderadamente intemperizado. Los resultados de los análisis de HAP y biomarcadores indican que **el petróleo detectado en la muestra *HC OVA_2 AGO2023* y el petróleo del crudo de origen (Buzios) son químicamente diferentes, y se derivan de una fuente de petróleo distinta.**

Ubicación: Playa Chacra y Mar	**Fecha de muestreo:** 06 de agosto de 2023
	**Nombre de la muestra:** *HC CM 06AGO2023* **Precintado por:** CERPER **Precinto N°:** 203924 **Enviado a NewFields por:** Intertek Testing Services Perú S.A Coordenadas UTM WGS84 18L 0258299 E, 8712338 N
	Descripción: Restos de hidrocarburo encontrados en playa Chacra y Mar. **Resultado:** La muestra *HC CM 06AGO2023* consiste en un crudo o petróleo pesado moderadamente intemperizado. Los resultados de los análisis de HAP y biomarcadores indican que **el petróleo detectado en la muestra *HC CM 06AGO2023* y el petróleo del crudo de origen (Buzios) son químicamente diferentes, y se derivan de una fuente de petróleo distinta.**

Ubicación: Playa Del Óvalo	**Fecha de muestreo:** 11 de agosto de 2023
	**Nombre de la muestra:** *HC OV 11AGO2023* **Precintado por:** CERPER **Precinto N°:** 203929 **Enviado a NewFields por:** Intertek Testing Services Perú S.A Coordenadas UTM WGS84 18L 0255222 E, 8714685 N
	Descripción: Hidrocarburos impregnados en canto rodado en playa Del Óvalo. **Resultado:** La muestra *HC OV 11AGO2023* consiste en un crudo o petróleo pesado moderadamente intemperizado. Los resultados de los análisis de HAP y biomarcadores indican que **el petróleo detectado en la muestra *HC OV 11AGO2023* y el petróleo del crudo de origen (Buzios) son químicamente diferentes, y se derivan de una fuente de petróleo distinta.**

Ubicación: Playa Los Delfines	**Fecha de muestreo:** 27 de agosto de 2023
	**Nombre de la muestra:** *HC DEL 27AGO2023* **Precintado por:** CERPER **Precinto N°:** 200938 **Enviado a NewFields por:** Intertek Testing Services Perú S.A Coordenadas UTM WGS84 18L 0263166 E, 8689425 N
	Descripción: Restos sólidos de hidrocarburo con olor a hidrocarburo encontrados en playa Los Delfines. **Resultado:** La muestra *HC DEL 27AGO2023* consiste en un crudo o petróleo pesado intemperizado que contiene bajos niveles de un producto más ligero. Los resultados de los análisis de HAP y biomarcadores indican que **el petróleo detectado en la muestra *HC DEL 27AGO2023* 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	GE PCH 02AGO2023	Glóbulos anómalos	02-ago-23	Pachacutec	La muestra *GE PCH 02AGO2023* consiste en un crudo o petróleo pesado moderadamente intemperizado. Los resultados de los análisis de HAP y biomarcadores indican que **el petróleo detectado en la muestra *GE PCH 02AGO2023* y el petróleo del crudo de origen (Buzios) son químicamente diferentes, y se derivan de una fuente de petróleo distinta.**
2	GE OVA 02AGO2023	Glóbulos anómalos	02-ago-23	Del Óvalo	La muestra *GE OVA 02AGO2023* consiste en un crudo o petróleo pesado moderadamente intemperizado. Los resultados de los análisis de HAP y biomarcadores indican que **el petróleo detectado en la muestra *GE OVA 02AGO2023* y el petróleo del crudo de origen (Buzios) son químicamente diferentes, y se derivan de una fuente de petróleo distinta.**
3	HC OVA 03AGO2023	Hidrocarburos	03-ago-23	Del Óvalo	La muestra *HC OVA 03AGO2023* consiste en un crudo o petróleo pesado moderadamente/severamente intemperizado. Los resultados de los análisis de HAP y biomarcadores indican que **el petróleo detectado en la muestra *HC OVA 03AGO2023* y el petróleo del crudo de origen (Buzios) son químicamente diferentes, y se derivan de una fuente de petróleo distinta.**
4	HC OVA_2 03AGO2023	Restos sólidos de hidrocarburos	03-ago-23	Del Óvalo	La muestra *HC OVA_2 03AGO2023* consiste en un crudo o petróleo pesado moderadamente intemperizado. Los resultados de los análisis de HAP y biomarcadores indican que **el petróleo detectado en la muestra *HC OVA_2 AGO2023* y el petróleo del crudo de origen (Buzios) son químicamente diferentes, y se derivan de una fuente de petróleo distinta.**
5	HC CM 06AGO2023	Restos sólidos de hidrocarburos	06-ago-23	Chacra y Mar	La muestra *HC CM 06AGO2023* consiste en un crudo o petróleo pesado moderadamente intemperizado. Los resultados de los análisis de HAP y biomarcadores indican que **el petróleo detectado en la muestra *HC CM 06AGO2023* y el petróleo del crudo de origen (Buzios) son químicamente diferentes, y se derivan de una fuente de petróleo distinta.**
6	HC OV 11AGO2023	Hidrocarburos	11-ago-23	Del Óvalo	La muestra *HC OV 11AGO2023* consiste en un crudo o petróleo pesado moderadamente intemperizado. Los resultados de los análisis de HAP y biomarcadores indican que **el petróleo detectado en la muestra *HC OV 11AGO2023* y el petróleo del crudo de origen (Buzios) son químicamente diferentes, y se derivan de una fuente de petróleo distinta.**
7	HC DEL 27AGO2023	Restos sólidos de hidrocarburos	27-ago-23	Los Delfines	La muestra *HC DEL 27AGO2023* consiste en un crudo o petróleo pesado intemperizado que contiene bajos niveles de un producto más ligero. Los resultados de los análisis de HAP y biomarcadores indican que **el petróleo detectado en la muestra *HC DEL 27AGO2023* 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

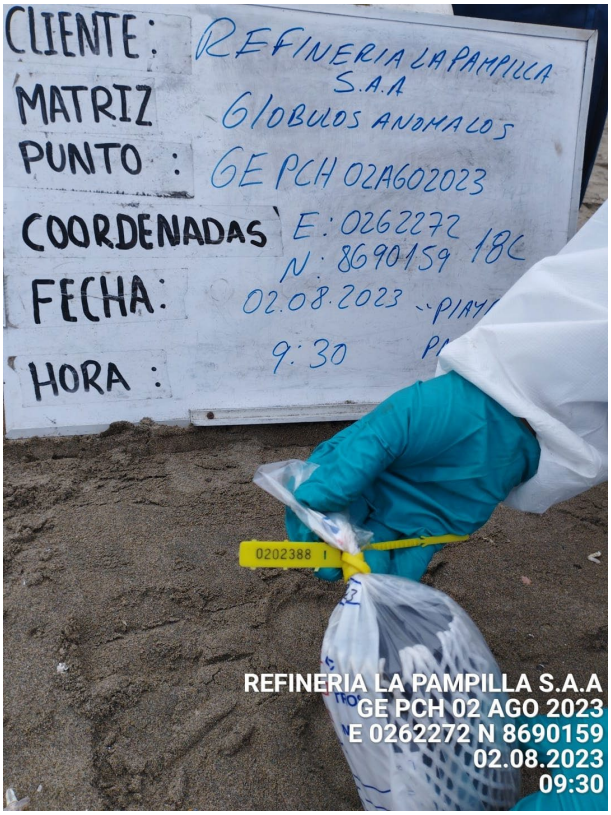
Los resultados de *Fingerprint*, permiten concluir lo siguiente:

- En el presente informe, mediante el análisis de *Fingerprint*, como técnica de análisis químico forense, se han identificado siete 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 Chacra y Mar, Del Óvalo, Los Delfines y Pachacutec.
- Hasta el momento, mediante el análisis de *Fingerprint*, como técnica de análisis químico forense, se han identificado un total de 112 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, Pachacutec 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

Muestras de Fingerprint que no coinciden con el crudo Buzios

Toma de muestra *GE PCH 02AGO2023*– 02 de agosto 2023



Muestra *GE PCH 02AGO2023* precintada – 02 de agosto 2023

Material de la muestra *GE OVA 02AGO2023*– 02 de agosto 2023

Muestra *GE OVA 02AGO2023* precintada – 02 de agosto 2023

Toma de muestra *HC OVA 03AGO2023*– 03 de agosto 2023

Muestra *HC OVA 03AGO2023* precintada – 03 de agosto 2023

Toma de muestra *HC OVA_2 03AGO2023*– 03 de agosto 2023

Muestra *HC OVA_2 03AGO2023* precintada – 03 de agosto 2023

Toma de muestra *HC CM 06AGO2023*– 06 de agosto 2023

Muestra *HC CM 06AGO2023* precintada – 06 de agosto 2023

Toma de muestra *HC OVA 11AGO2023*– 11 de agosto 2023

Muestra *HC OVA 11AGO2023* precintada – 11 de agosto 2023

Toma de muestra *HC DEL 27AGO2023*– 27 de agosto 2023

Muestra *HC DEL 27AGO2023* precintada – 27 de agosto 2023

ANEXO B – RESULTADOS ANALÍTICOS DE FINGERPRINT

GE PCH 02AGO2023

To: Refinería La Pampilla S.A.A.

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

Date: September 8, 2023

Subject: Chemical Fingerprinting of samples collected in Ventanilla, Peru

This memorandum summarizes the results of forensic chemical analysis conducted on one (1) sample that was collected by Repsol contractors on August 2, 2023 (Table 1). The sample was shipped to NewFields alliance laboratory, Alpha Analytical Laboratory, Inc. (Mansfield MA) for forensic chemical analysis. The objective of the analysis was to the degree possible, identify the product type (s) present in the sample and determine if the chemical composition match that of the source oil (Table 1).

Sample and Analysis

A sample of suspected petroleum was collected by Repsol contractors in an amber glass bottle consisting of petroleum residues. Sample "GE PCH 02AGO2023" was shipped to Alpha Analytical Labs in Mansfield, MA under chain of custody and arrived at a temperature of 23.4°C on August 9, 2023 with a DHL Tracking # 2768945421 (Seal number 0202388).

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

- The samples were analyzed using a modified EPA Method 8015 gas chromatography/flame ionization detection (GC/FID) technique to generate a high resolution chromatographic "fingerprint" of hydrocarbons present in the sample. The chromatographic "fingerprint" identifies the general nature of the hydrocarbons (e.g., petroleum product type) and relative weathering state of the sample. A suite of normal and branched-chain alkanes as well as total petroleum hydrocarbons (TPH) were also measured to aid in product identification (**Table 2**). Sample results were reported on a mg/kg (oils) basis.

- The samples were also analyzed by a modified EPA Method 8270 gas chromatography/mass spectrometry (GC/MS) method operated in the selected ion monitoring (SIM) mode to quantify concentrations of 62 oil source diagnostic parent and C1-C4 alkylated PAHs (**Table 3**), and 55 sterane and triterpane petroleum biomarkers compounds (**Table 4**). These compounds provide highly specific information pertinent to the identification of petroleum or pyrogenic PAHs and their potential origin. Sample results were reported on a mg/kg (oils) basis.

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

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

Findings

The gas chromatographic "fingerprints" of the source oil, and GE PCH 02AGO2023 (GE PCH2) are shown in Figures 1A and1B respectively.

GC/FID Analysis

The GC/FID chromatogram for the GE PCH2 sample (Figure 1B), contains a broad C_{15} – C_{44} range material consisting of resolved n-alkanes and an unresolved complex mixture (UCM) which appears as a "hump" in the chromatogram. This sample is significantly weathered in the light alkane range (C_{10}-C_{15}) relative to the source oil sample mostly due to evaporation. In addition, there is a relative increase in the UCM relative to the source oil (Figure 1A). The petroleum GC/FID signature is consistent with a moderately weathered crude or heavy fuel oil.

GC/MS Alkylated PAH and Biomarker Analysis

The PAH and biomarker molecular chemistry was evaluated to determine if there was evidence for a chemical linkage between the source oil and the GE PCH2 sample. GC/MS analysis of PAH and biomarker compounds is approximately 10 times more sensitive than the GC/FID analysis and provides source diagnostic weathering resistant chromatographic "fingerprints" of the samples.

Qualitative comparison of the PAH histograms for the source oil, and the GE PCH2 sample are provided in Figures 2A and 2B respectively. The PAH histogram for the GE PCH2 sample (Figure 2B) shows this sample is weathered as indicated by the relatively lower proportion of decalins and naphthalenes compared to the source oil. Elevated fluoranthenes/pyrenes, napthobenzothiophenes, and chrysenes relative to the source oil are also observed in this sample.

Figure 3 is a double source ratio plot of sulfur containing alkyl-dibenzothiophenes to alkyl-phenanthrenes (C2-dibenzothiophenes/C2-phenanthrenes [D2/P2] versus C3-dibenzothiophenes/C3-phenanthrenes [D3/P3]). Differences in this ratio are a function of crude oil source and refinery processing.[2] The source oil, and the GE PCH2 sample plot away from each other indicating a different oil source.

The biomarker triterpene m/z 191 ion traces for the source oil and the GE PCH2 sample are presented in Figures 4A and 4B respectively. The biomarker traces for GE PCH2 show differences in the proportions of TS and TM (T11 and T12)[2] and the presence of oleanane (T18) which is absent in the source oil. These differences indicate the GE PCH2 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 GE PCH2 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.

Conclusion

The GE PCH 02AGO2023 sample consists of a moderately weathered crude or heavy oil. The PAH and biomarker analysis indicate the petroleum detected in the source oil and GE PCH 02AGO2023 sample are chemically different and were derived from a different source of petroleum.

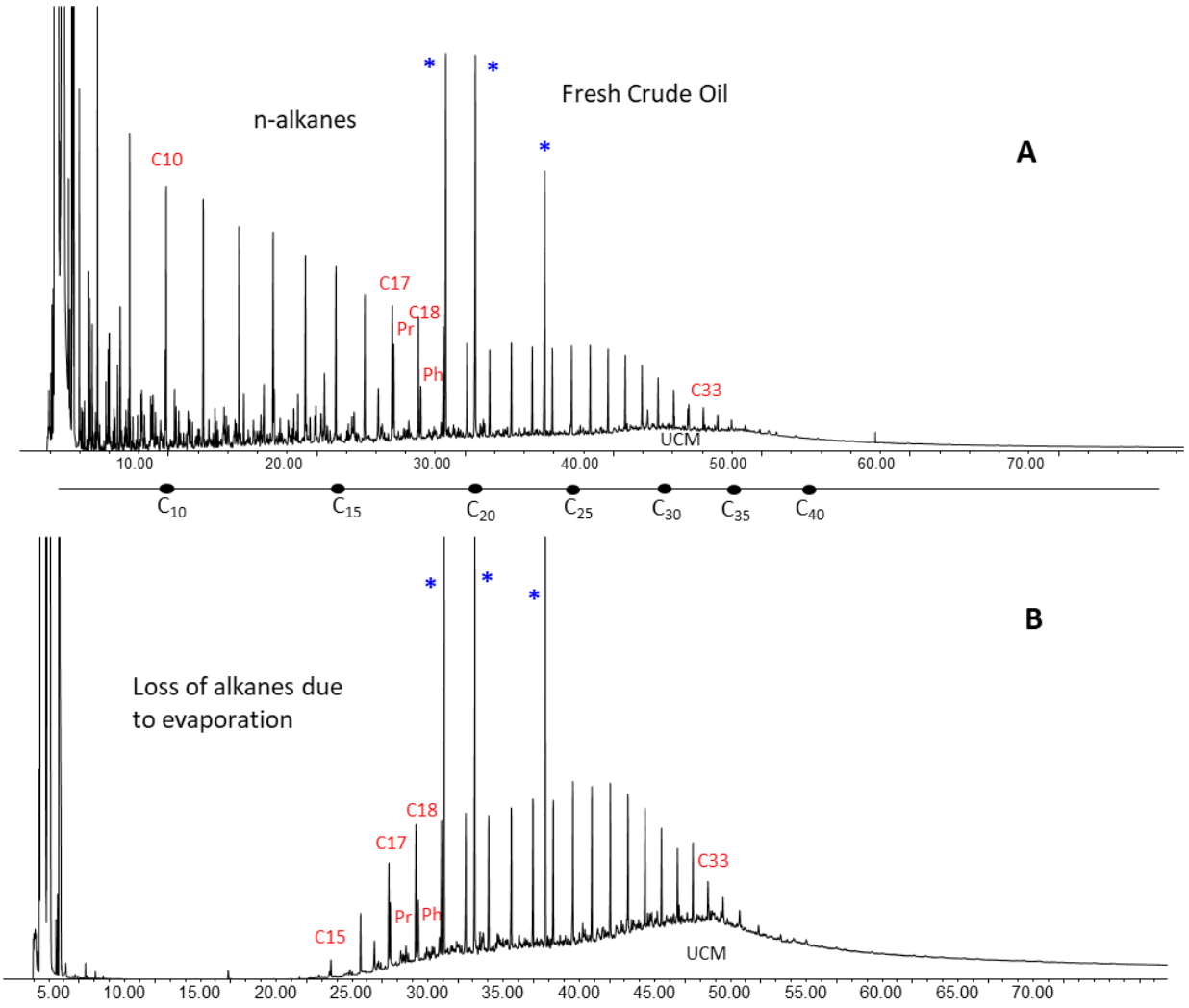


Figure 1. GC/FID "fingerprints" for the field samples.
Carbon ranges annotated below the x-axis analysis time scale.

A) Ship's Tanks Composite Sample
B) GE PCH 02AGO2023
'*': Laboratory-added Internal Standard

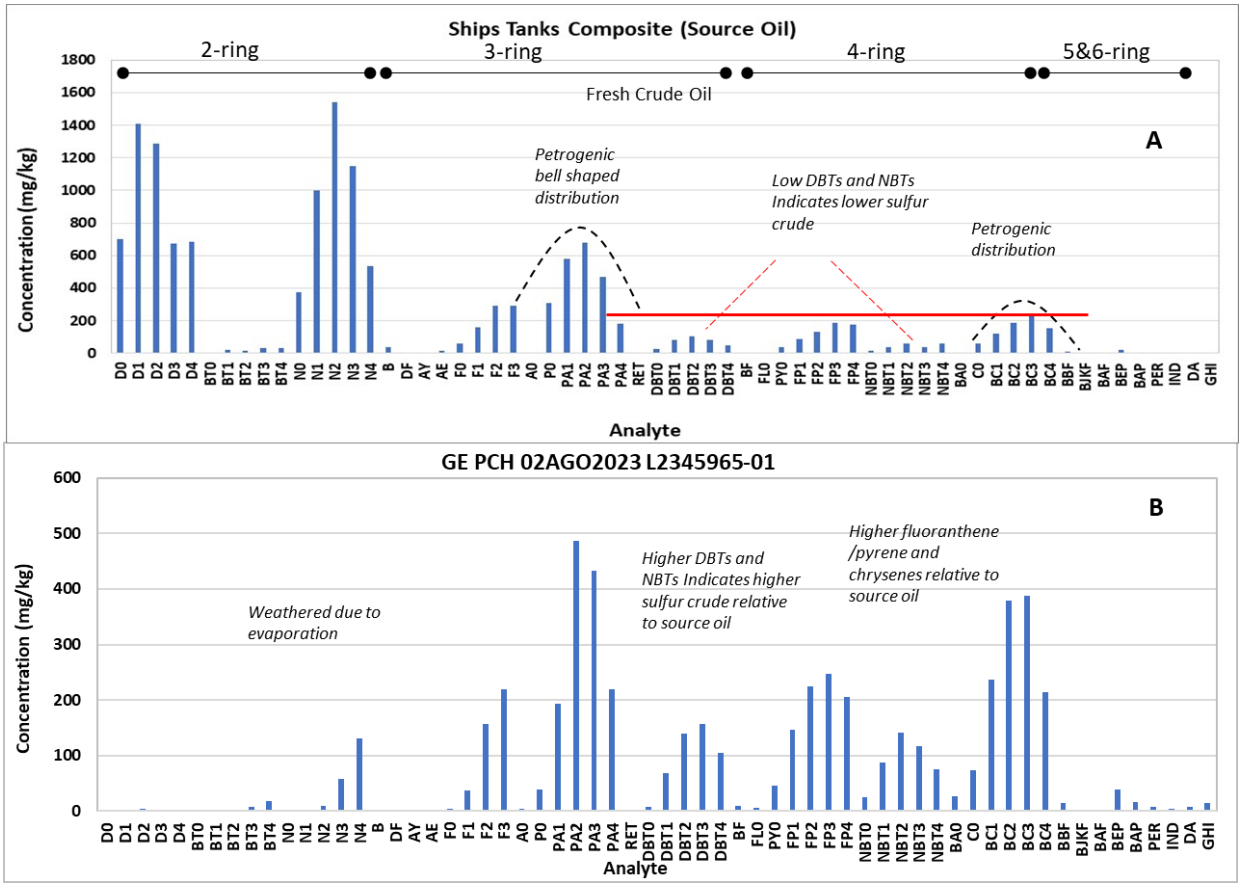


Figure 2. PAH Histograms

A) Ship's Tanks Composite Sample
B) GE PCH 02AGO2023

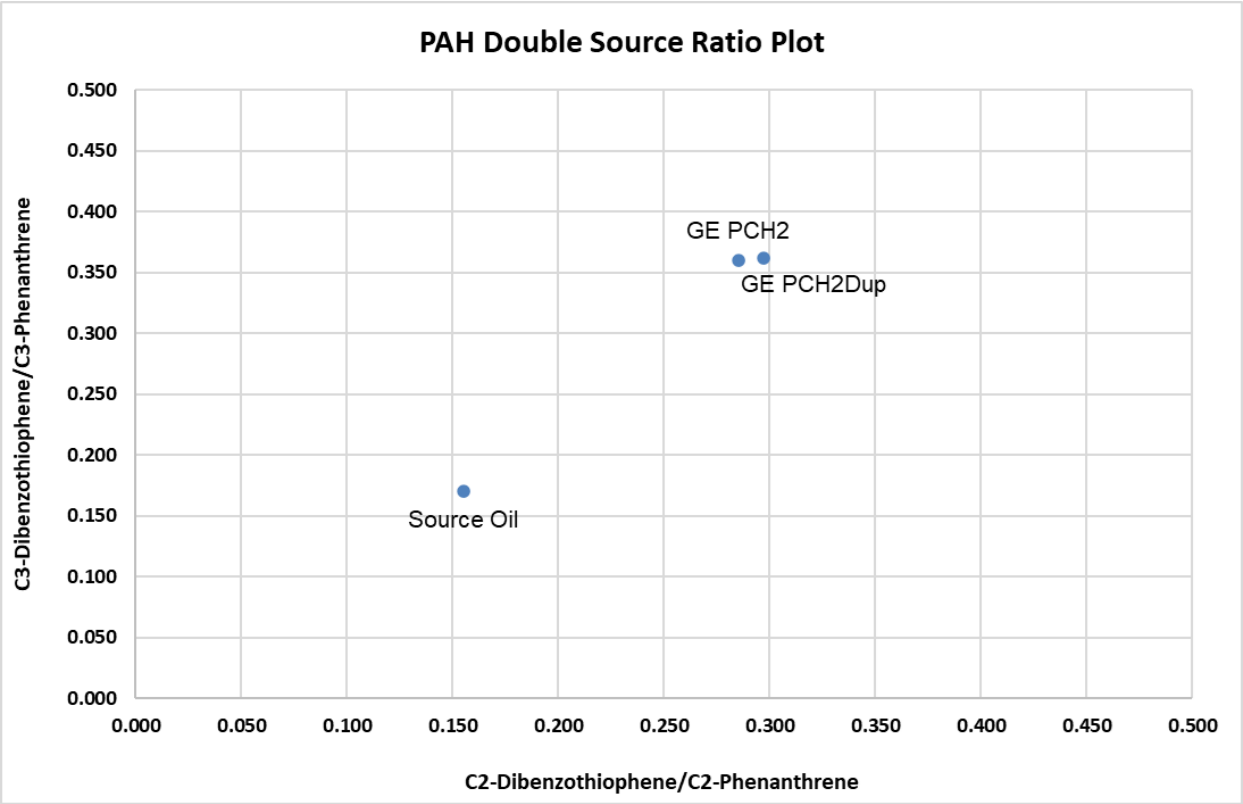


Figure 3. PAH Double Source Ratio Plot

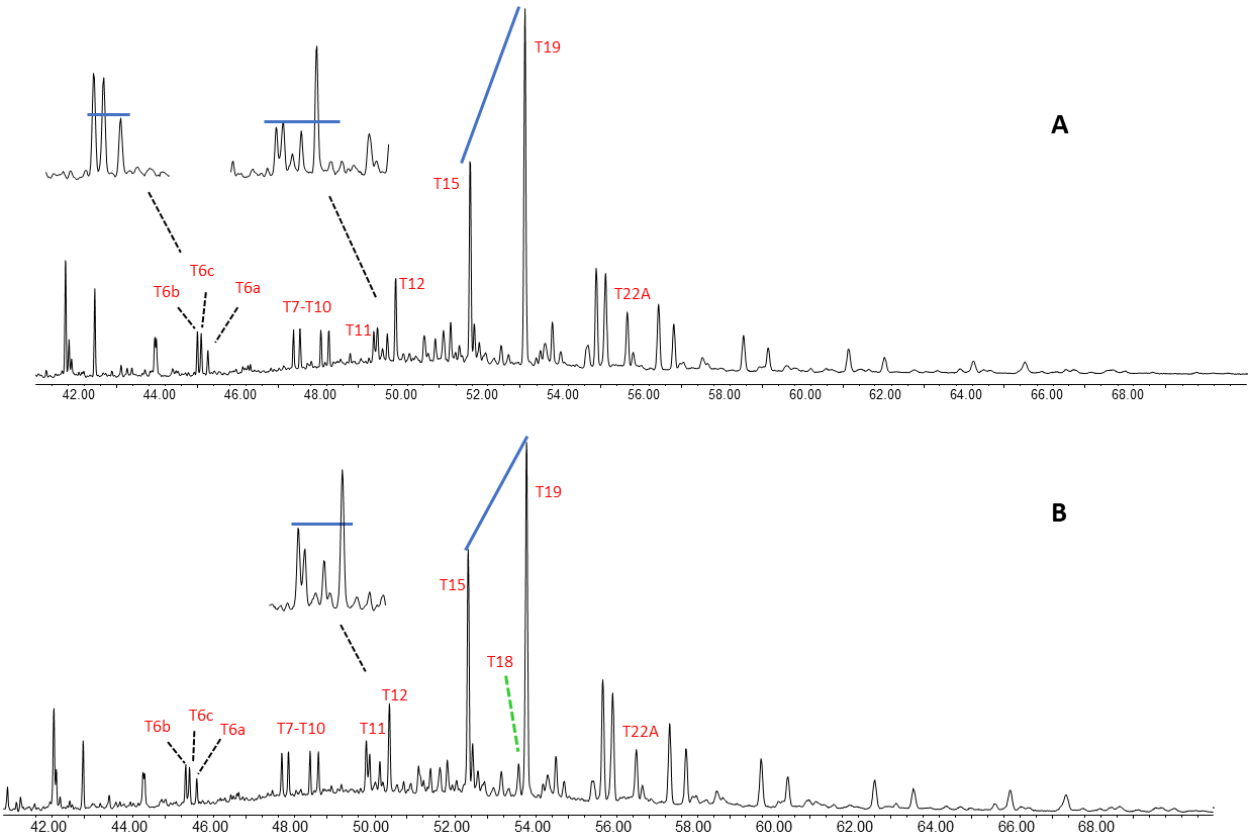


Figure 4. Biomarker m/z 191 Triterpane Fingerprint Traces

A) Ship's Tanks Composite Sample
B) GE PCH 02AGO2023

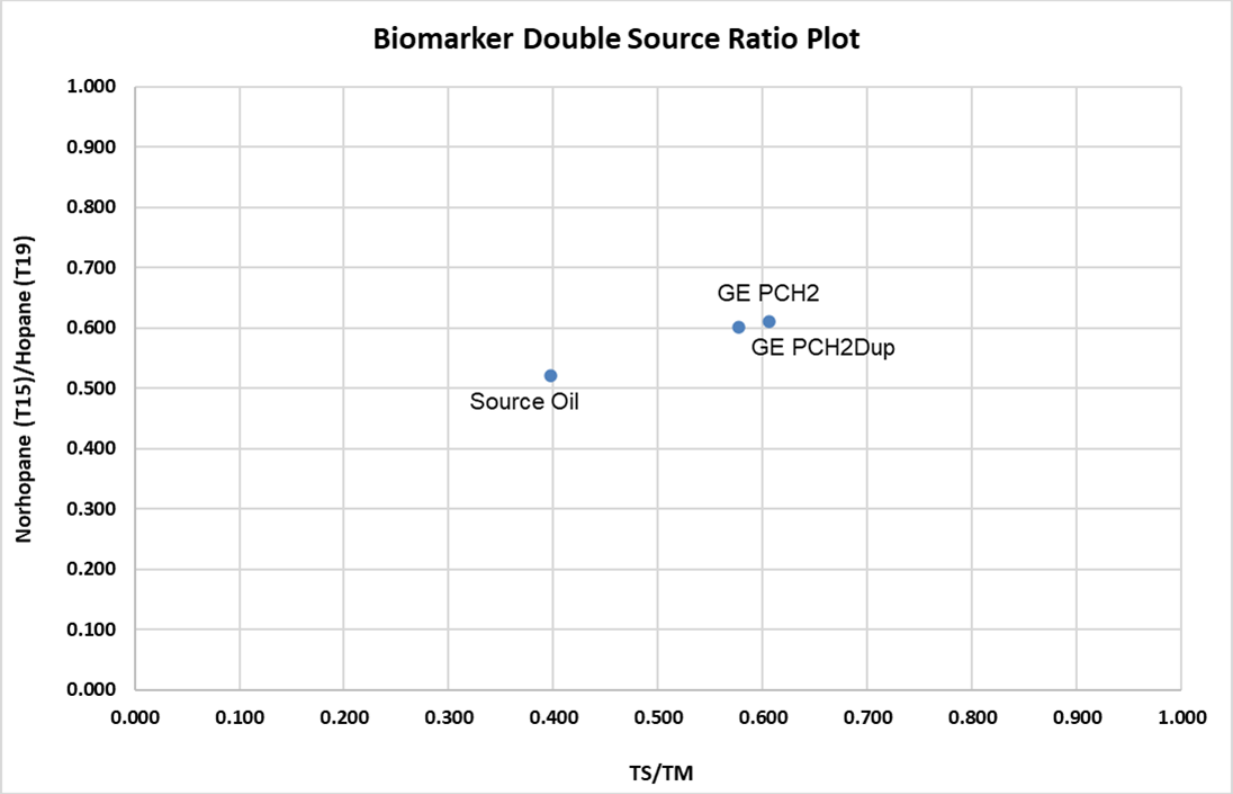


Figure 5. Biomarker Double Source Ratio Plot

Table 1. Sample List.

Field ID	Lab ID	Collection Date	Matrix	Collected by
Ship's Tanks Composite Sample	L2223310-01	01/14/2022	Source Oil	Repsol Contractor
GE PCH 02AGO2023	L2345965-01	08/2/2023	Glob	Repsol Contractor

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

Abbrev	Analytes
C9	n-Nonane (C_9)
C10	n-Decane (C_{10})
C11	n-Undecane (C_{11})
C12	n-Dodecane (C_{12})
C13	n-Tridecane (C_{13})
1380	2,6,10 Trimethyldodecane (1380)
C14	n-Tetradecane (C_{14})
1470	2,6,10 Trimethyltridecane (1470)
C15	n-Pentadecane (C_{15})
C16	n-Hexadecane (C_{16})
1650	Norpristane (1650)
C17	n-Heptadecane (C_{17})
Pr	Pristane
C18	n-Octadecane (C_{18})
Ph	Phytane
C19	n-Nonadecane (C_{19})
C20	n-Eicosane (C_{20})
C21	n-Heneicosane (C_{21})
C22	n-Docosane (C_{22})
C23	n-Tricosane (C_{23})
C24	n-Tetracosane (C_{24})
C25	n-Pentacosane (C_{25})
C26	n-Hexacosane (C_{26})
C27	n-Heptacosane (C_{27})
C28	n-Octacosane (C_{28})
C29	n-Nonacosane (C_29)
C30	n-Triacontane (C_{30})
C31	n-Hentriacontane (C_{31})
C32	n-Dotriacontane (C_{32})
C33	n-Tritriacontane (C_{33})
C34	n-Tetratriacontane (C_{34})
C35	n-Pentatriacontane (C_{35})
C36	n-Hexatriacontane (C_{36})
C37	n-Heptatriacontane (C_{37})
C38	n-Octatriacontane (C_{38})
C39	n-Nonatriacontane (C_{39})
C40	n-Tetracontane (C_{40})
TPH	Total Petroleum Hydrocarbons (C9-C44)
TSH	Total Saturated Hydrocarbons

Table 3. PAH and alkyl-PAH Target Compound List

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

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

Table 4. Triterpane and Sterane Biomarker Target Compound List.

Abbrev	Analytes
T4	C23 Tricyclic Terpane
T5	C24 Tricyclic Terpane
T6	C25 Tricyclic Terpane
T6a	C24 Tetracyclic Terpane
T6b	C26 Tricyclic Terpane-22S
T6c	C26 Tricyclic Terpane-22R
T7	C28 Tricyclic Terpane-22S
T8	C28 Tricyclic Terpane-22R
T9	C29 Tricyclic Terpane-22S
T10	C29 Tricyclic Terpane-22R
T11	18a-22,29,30-Trisnorneohopane-TS
T11a	C30 Tricyclic Terpane-22S
T11b	C30 Tricyclic Terpane-22R
T12	17a(H)-22,29,30-Trisnorhopane-TM
T14a	17a/b,21b/a 28,30-Bisnorhopane
T14b	17a(H),21b(H)-25-Norhopane
T15	30-Norhopane
T16	18a(H)-30-Norneohopane-C29Ts
X	17a(H)-Diahopane
T17	30-Normoretane
T18	18a(H)&18b(H)-Oleananes
T19	Hopane
T20	Moretane
T21	30-Homohopane-22S
T22	30-Homohopane-22S
T22A	Gammarcerane/C32-Diahopane
T26	30,31-Bishomohopane-22S
T27	30,31-Bishomohopane-22R
T30	30,31-Trishomohopane-22S
T31	30,31-Trishomohopane-22R
T32	Tetrakishomohopane-22S
T33	Tetrakishomohopane-22R
T34	Pentakishomohopane-22S
T35	Pentakishomohopane-22R

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

Attachment 1

Chain of Custody

8/9/23

C2345965

Nº 007195

CERPER
CERTIFICACIONES DEL PERÚ S.A.

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

Página 1 de 1

SOLICITANTE: REFINERIA LA PAMPILLA S.A.A

EXPEDIENTE: EXMA-010498-2023

LUGAR: PLAYA PACHACUTEC | Distrito: Ventanilla | Provincia: CALLAO | Departamento: | PERSONA DE CONTACTO: Milagros Rodriguez

HS: 23006017014656

JOB NUMBER: 23LM00230246

NORMA:

1. SMEWW – APHA – AWWA – WEF. 23rd Ed. 2017. Collection and preservation of samples. Part 1060 A-B ( ) 1060 B-C ( ) 1030 B ( ) 1020 B ( ) 1060 B ( ) 1070 B ( )
2. Instrucción 8556 / Toma de muestras de sedimentos ( )
3. NTP 214.003 - 1997 (Revisada el 2019) Agua Potable. Toma de muestra. ITEM 4.4 ( ) ITEM 4.5 ( )
4. RM Nº 227-2025-PRODUCE. Protocolo para el Monitoreo de efluentes de los establecimientos industriales pesqueros de consumo humano directo e indirecto
5. EU Nº 2016-2030 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 214.062.2018 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: _____

PARÁMETROS DE ANÁLISIS EN EL LABORATORIO

FINGER PRINT

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 Cl_2/L Libre ( ) Total ( ) | Turbiedad (UNT) | Caudal (m³/s) | Transparencia cm ( ) m ( )

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
-01 GE PCH 02AG02023	02/08/23	9:30	X	0262272	8690159	18L	01
						Total de Envases	01

(1) Matriz (s)

AC = Agua para uso y consumo humano:
AN = Agua Natural:
AP = Agua de proceso:
ASAL = Agua Salina:
AR = Agua Residual:
SM = Sedimento:
SU = Suelo
Otro: X Globulos Anomalos

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

Equipos Utilizados

	Equipo	Código		Equipo	Código
1	GPS	3/16 GSE051691	4		
2			5		
3			6		

Observaciones: Se Procedió a llegar al punto de muestreo indicado y denominado por el Representante del cliente, quien estuvo presente durante el muestreo. Se Realizó el procedimiento de Caracterización de la Muestra, la cual presenta una Coloración oscura (negro) y olor a Hidrocarburos. La Muestra fué precintada en campo en presencia del Representante del Cliente Nº Precinto: 0202388. Se tomaron las coordenadas In Situ.

Responsable de la toma de muestra:

Firma:
Inspector Cerper: Ing. Jol Cabrera F.
Inspectores de apoyo:
Hora de inicio: 8:20 Hora de término: 18:05

Representante del cliente

Firma:
Nombre: Edith Milagros Rodriguez Ramirez
DNI: 47219303
Cargo: supervisor

Rec: 8/9/23 12:16

Recepción de muestras

Nombre: Edson Vidal A.
Fecha: 03-08-2023 Hora: 11:46 AM

RECEIVED

Attachment 2

Analytical Data

Project Name: PAMPILLA 2
Project Number:

Client ID	GE PCH 02AGO2023
Lab ID	L2345965-01
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821442
Date Collected	8/2/2023
Date Received	8/9/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.0042 g
% Solid	100
File ID	F18082923074
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	238

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)	6.43	J	238
SHC	C10	DECANE (C10)	7.38	J	238
SHC	C11	UNDECANE	5.95	J	238
SHC	C12	DODECANE (C12)	15.0	J	238
SHC	C13	TRIDECANE	9.52	J	238
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	7.86	J	238
SHC	C14	TETRADECANE (C14)	37.6	J	238
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	59.5	J	238
SHC	C15	PENTADECANE (C15)	355		238
SHC	C16	HEXADECANE (C16)	1200		238
SHC	1650	NORPRISTANE (1650)	761		238
SHC	C17	HEPTADECANE (C17)	2090		238
SHC	Pr	PRISTANE	1510		238
SHC	C18	OCTADECANE (C18)	2570		238
SHC	Ph	PHYTANE	1640		238
SHC	C19	NONADECANE (C19)	2490		238
SHC	C20	EICOSANE (C20)	2620		238
SHC	C21	HENEICOSANE (C21)	2360		238
SHC	C22	DOCOSANE (C22)	2420		238
SHC	C23	TRICOSANE (C23)	2440		238
SHC	C24	TETRACOSANE (C24)	2550		238
SHC	C25	PENTACOSANE (C25)	3040		238
SHC	C26	HEXACOSANE (C26)	2540		238
SHC	C27	HEPTACOSANE (C27)	2570		238
SHC	C28	OCTACOSANE (C28)	2210		238
SHC	C29	NONACOSANE (C29)	2040		238
SHC	C30	TRIACONTANE (C30)	1570		238
SHC	C31	HENTATRIACONTANE (C31)	1300		238
SHC	C32	DOTRIACONTANE (C32)	1360		238
SHC	C33	TRITRIACONTANE (C33)	698		238
SHC	C34	TETRATRIACONTANE (C34)	559		238
SHC	C35	PENTATRIACONTANE (C35)	542		238
SHC	C36	HEXATRIACONTANE (C36)	232	J	238
SHC	C37	HEPTATRIACONTANE (C37)	185	J	238
SHC	C38	OCTATRIACONTANE (C38)	172	J	238
SHC	C39	NONATRIACONTANE (C39)		U	238
SHC	C40	TETRACONTANE (C40)		U	238
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	588000		7860
SHC	TSH	TOTAL SATURATED HYDROCARBONS	44200	J	238

Surrogates (% Recovery)	
O-TERPHENYL	102
D50-TETRACOSANE	99

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821442-1
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	8/30/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F18082923012
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	240

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)	U		240
SHC	C10	DECANE (C10)	U		240
SHC	C11	UNDECANE	U		240
SHC	C12	DODECANE (C12)	U		240
SHC	C13	TRIDECANE	U		240
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	U		240
SHC	C14	TETRADECANE (C14)	U		240
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	U		240
SHC	C15	PENTADECANE (C15)	6.47	J	240
SHC	C16	HEXADECANE (C16)	U		240
SHC	1650	NORPRISTANE (1650)	U		240
SHC	C17	HEPTADECANE (C17)	U		240
SHC	Pr	PRISTANE	U		240
SHC	C18	OCTADECANE (C18)	U		240
SHC	Ph	PHYTANE	U		240
SHC	C19	NONADECANE (C19)	U		240
SHC	C20	EICOSANE (C20)	U		240
SHC	C21	HENEICOSANE (C21)	U		240
SHC	C22	DOCOSANE (C22)	U		240
SHC	C23	TRICOSANE (C23)	U		240
SHC	C24	TETRACOSANE (C24)	U		240
SHC	C25	PENTACOSANE (C25)	126	JC	240
SHC	C26	HEXACOSANE (C26)	U		240
SHC	C27	HEPTACOSANE (C27)	U		240
SHC	C28	OCTACOSANE (C28)	U		240
SHC	C29	NONACOSANE (C29)	U		240
SHC	C30	TRIACONTANE (C30)	U		240
SHC	C31	HENTATRIACONTANE (C31)	U		240
SHC	C32	DOTRIACONTANE (C32)	U		240
SHC	C33	TRITRIACONTANE (C33)	U		240
SHC	C34	TETRATRIACONTANE (C34)	U		240
SHC	C35	PENTATRIACONTANE (C35)	U		240
SHC	C36	HEXATRIACONTANE (C36)	U		240
SHC	C37	HEPTATRIACONTANE (C37)	U		240
SHC	C38	OCTATRIACONTANE (C38)	U		240
SHC	C39	NONATRIACONTANE (C39)	U		240
SHC	C40	TETRACONTANE (C40)	U		240
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	U		7910
SHC	TSH	TOTAL SATURATED HYDROCARBONS	132	J	240

Surrogates (% Recovery)	
O-TERPHENYL	105
D50-TETRACOSANE	104

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1821442-2
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	8/30/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	f18082923016
Units	%
Final Volume	1
Dilution	1
Reporting Limit	240

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	NONANE (C9)	5190	240	108	4800	50	130
SHC	C10	DECANE (C10)	4880	240	102	4800	50	130
SHC	C12	DODECANE (C12)	4910	240	102	4800	50	130
SHC	C14	TETRADECANE (C14)	4860	240	101	4800	50	130
SHC	C16	HEXADECANE (C16)	5280	240	110	4800	50	130
SHC	C18	OCTADECANE (C18)	5280	240	110	4800	50	130
SHC	C19	NONADECANE (C19)	5070	240	106	4800	50	130
SHC	C20	EICOSANE (C20)	4990	240	104	4800	50	130
SHC	C22	DOCOSANE (C22)	4980	240	104	4800	50	130
SHC	C24	TETRACOSANE (C24)	5310	240	111	4800	50	130
SHC	C26	HEXACOSANE (C26)	5000	240	104	4800	50	130
SHC	C28	OCTACOSANE (C28)	4950	240	103	4800	50	130
SHC	C30	TRIACONTANE (C30)	4980	240	104	4800	50	130
SHC	C36	HEXATRIACONTANE (C36)	4890	240	102	4800	50	130

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

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1821442-3
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	8/30/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	f18082923018
Units	%
Final Volume	1
Dilution	1
Reporting Limit	240

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
SHC	C9	NONANE (C9)	5120	240	107	4800	50	130	1	30
SHC	C10	DECANE (C10)	4820	240	100	4800	50	130	2	30
SHC	C12	DODECANE (C12)	4830	240	101	4800	50	130	1	30
SHC	C14	TETRADECANE (C14)	4760	240	99	4800	50	130	2	30
SHC	C16	HEXADECANE (C16)	5160	240	108	4800	50	130	2	30
SHC	C18	OCTADECANE (C18)	5200	240	108	4800	50	130	2	30
SHC	C19	NONADECANE (C19)	4990	240	104	4800	50	130	2	30
SHC	C20	EICOSANE (C20)	4910	240	102	4800	50	130	2	30
SHC	C22	DOCOSANE (C22)	4910	240	102	4800	50	130	2	30
SHC	C24	TETRACOSANE (C24)	5240	240	109	4800	50	130	2	30
SHC	C26	HEXACOSANE (C26)	4950	240	103	4800	50	130	1	30
SHC	C28	OCTACOSANE (C28)	4900	240	102	4800	50	130	1	30
SHC	C30	TRIACONTANE (C30)	4930	240	103	4800	50	130	1	30
SHC	C36	HEXATRIACONTANE (C36)	4810	240	100	4800	50	130	2	30

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

Project Name: PAMPILLA 2
Project Number:

Client ID			GE PCH 02AGO2023			Duplicate Sample				
Lab ID			L2345965-01			WG1821442-6				
Matrix			SOLID			SOLID				
Matrix Description										
Reference Method			8015D(M)			8015D(M)				
Batch ID			WG1821442			WG1821442				
Date Collected			8/2/2023			NA				
Date Received			8/9/2023			8/29/2023				
Date Prepped			8/29/2023			8/29/2023				
Date Analyzed			9/1/2023			9/1/2023				
Sample Size(wet)			0.0042 g			0.004 g				
% Solid			100			100				
File ID			F18082923074			F18082923076				
Units			mg/kg			mg/kg				
Final Volume			1			1				
Dilution			1			1				
Reporting Limit			238			250				
Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit
SHC	C9	NONANE (C9)	6.43	J	238	5.25	J	250		30 NC
SHC	C10	DECANE (C10)	7.38	J	238	6.25	J	250		30 NC
SHC	C11	UNDECANE	5.95	J	238	7.00	J	250		30 NC
SHC	C12	DODECANE (C12)	15.0	J	238	17.0	J	250		30 NC
SHC	C13	TRIDECANE	9.52	J	238	16.2	J	250		30 NC
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	7.86	J	238	26.8	J	250		30 NC
SHC	C14	TETRADECANE (C14)	37.6	J	238	47.2	J	250		30 NC
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	59.5	J	238	106	J	250		30 NC
SHC	C15	PENTADECANE (C15)	355		238	413		250	15	30
SHC	C16	HEXADECANE (C16)	1200		238	1340		250	11	30
SHC	1650	NORPRISTANE (1650)	761		238	876		250	14	30
SHC	C17	HEPTADECANE (C17)	2090		238	2310		250	10	30
SHC	Pr	PRISTANE	1510		238	1800		250	18	30
SHC	C18	OCTADECANE (C18)	2570		238	2790		250	8	30
SHC	Ph	PHYTANE	1640		238	1740		250	6	30
SHC	C19	NONADECANE (C19)	2490		238	2700		250	8	30
SHC	C20	EICOSANE (C20)	2620		238	2790		250	6	30
SHC	C21	HENEICOSANE (C21)	2360		238	2480		250	5	30
SHC	C22	DOCOSANE (C22)	2420		238	2510		250	4	30
SHC	C23	TRICOSANE (C23)	2440		238	2500		250	2	30
SHC	C24	TETRACOSANE (C24)	2550		238	2630		250	3	30
SHC	C25	PENTACOSANE (C25)	3040		238	3100		250	2	30
SHC	C26	HEXACOSANE (C26)	2540		238	2630		250	3	30
SHC	C27	HEPTACOSANE (C27)	2570		238	2570		250	0	30
SHC	C28	OCTACOSANE (C28)	2210		238	2140		250	3	30
SHC	C29	NONACOSANE (C29)	2040		238	1930		250	6	30
SHC	C30	TRIACONTANE (C30)	1570		238	1520		250	3	30
SHC	C31	HENTATRIACONTANE (C31)	1300		238	1260		250	3	30
SHC	C32	DOTRIACONTANE (C32)	1360		238	1340		250	1	30
SHC	C33	TRITRIACONTANE (C33)	698		238	707		250	1	30
SHC	C34	TETRATRIACONTANE (C34)	559		238	495		250	12	30
SHC	C35	PENTATRIACONTANE (C35)	542		238	453		250	18	30
SHC	C36	HEXATRIACONTANE (C36)	232	J	238	209	J	250		30 NC
SHC	C37	HEPTATRIACONTANE (C37)	185	J	238	178	J	250		30 NC
SHC	C38	OCTATRIACONTANE (C38)	172	J	238	140	J	250		30 NC
SHC	C39	NONATRIACONTANE (C39)		U	238		U	250		30 NC
SHC	C40	TETRACONTANE (C40)		U	238		U	250		30 NC
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	588000		7860	588000		8250	0	30
SHC	TSH	TOTAL SATURATED HYDROCARBONS	44200	J	238	45800	J	250		30 NC
		Surrogates (% Recovery)								
		O-TERPHENYL	102			101				
		D50-TETRACOSANE	99			98				

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1819788-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8015D(M)-A2-NFSHC
Batch ID	WG1819788-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	8/15/2023
Sample Size(wet)	0.1008 g
% Solid	100
File ID	F18081123032
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)	7100	0.992	113	6286	65	135
SHC	C10	DECANE (C10)	5440	0.992	108	5047	65	135
SHC	C11	UNDECANE	4890	0.992	104	4703	65	135
SHC	C12	DODECANE (C12)	4660	0.992	112	4155	65	135
SHC	C13	TRIDECANE	4250	0.992	105	4058	65	135
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	952	0.992	113	845	65	135
SHC	C14	TETRADECANE (C14)	3870	0.992	105	3670	65	135
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	1520	0.992	111	1367	65	135
SHC	C15	PENTADECANE (C15)	4490	0.992	123	3660	65	135
SHC	C16	HEXADECANE (C16)	3560	0.992	107	3330	65	135
SHC	1650	NORPRISTANE (1650)	1090	0.992	100	1093	65	135
SHC	C17	HEPTADECANE (C17)	3130	0.992	104	3012	65	135
SHC	Pr	PRISTANE	2470	0.992	115	2145	65	135
SHC	C18	OCTADECANE (C18)	2640	0.992	98	2700	65	135
SHC	Ph	PHYTANE	1410	0.992	116	1215	65	135
SHC	C19	NONADECANE (C19)	2670	0.992	116	2305	65	135
SHC	C20	EICOSANE (C20)	2440	0.992	104	2337	65	135
SHC	C21	HENEICOSANE (C21)	2300	0.992	112	2044	65	135
SHC	C22	DOCOSANE (C22)	2130	0.992	108	1972	65	135
SHC	C23	TRICOSANE (C23)	1940	0.992	111	1745	65	135
SHC	C24	TETRACOSANE (C24)	1900	0.992	116	1641	65	135
SHC	C25	PENTACOSANE (C25)	1840	0.992	118	1562	65	135
SHC	C26	HEXACOSANE (C26)	1490	0.992	108	1378	65	135
SHC	C27	HEPTACOSANE (C27)	1270	0.992	117	1083	65	135
SHC	C28	OCTACOSANE (C28)	842	0.992	108	776	65	135
SHC	C29	NONACOSANE (C29)	813	0.992	111	734	65	135
SHC	C30	TRIACONTANE (C30)	682	0.992	109	627	65	135
SHC	C31	HENTATRIACONTANE (C31)	572	0.992	111	514	65	135
SHC	C32	DOTRIACONTANE (C32)	605	0.992	132	458	65	135
SHC	C33	TRITRIACONTANE (C33)	341	0.992	88	388	65	135
SHC	C34	TETRATRIACONTANE (C34)	327	0.992	94	347	65	135
SHC	C35	PENTATRIACONTANE (C35)	283	0.992	102	278	65	135
SHC	C36	HEXATRIACONTANE (C36)	172	0.992	92	186	65	135
SHC	C37	HEPTATRIACONTANE (C37)	164	0.992	108	152	65	135
SHC	C38	OCTATRIACONTANE (C38)	140	0.992	107	131	65	135
SHC	C39	NONATRIACONTANE (C39)	88.7	0.992	100	89	65	135
SHC	C40	TETRACONTANE (C40)	103	0.992	112	92	65	135
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	599000	0.992	108	554993	65	135
SHC	TSH	TOTAL SATURATED HYDROCARBONS	84685	0.992	124	68122	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	GE PCH 02AGO2023
Lab ID	L2345965-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	8/2/2023
Date Received	8/9/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.0042 g
% Solid	100
File ID	F808312328
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.19

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN	0.351	J	1.19
2	D1	C1-DECALINS	1.84	J	2.38
2	D2	C2-DECALINS	4.36		2.38
2	D3	C3-DECALINS		U	2.38
2	D4	C4-DECALINS		U	2.38
S	BT0	BENZOTHIOPHENE	0.0800	J	2.38
2	BT1	C1-BENZO(B)THIOPHENES	1.20	J	2.38
2	BT2	C2-BENZO(B)THIOPHENES	2.19	J	2.38
2	BT3	C3-BENZO(B)THIOPHENES	7.49		2.38
2	BT4	C4-BENZO(B)THIOPHENES	17.5		2.38
A	N0	NAPHTHALENE	1.29	J	2.38
2	N1	C1-NAPHTHALENES	2.16	J	2.38
2	N2	C2-NAPHTHALENES	10.1		2.38
2	N3	C3-NAPHTHALENES	58.0		2.38
2	N4	C4-NAPHTHALENES	130		2.38
2	B	BIPHENYL	0.878	J	2.38
3	DF	DIBENZOFURAN	0.626	J	2.38
3	AY	ACENAPHTHYLENE	0.960	J	2.38
3	AE	ACENAPHTHENE	0.858	J	2.38
3	F0	FLUORENE	4.23		2.38
3	F1	C1-FLUORENES	37.5		2.38
3	F2	C2-FLUORENES	157		2.38
3	F3	C3-FLUORENES	220		2.38
3	A0	ANTHRACENE	4.74		2.38
3	P0	PHENANTHRENE	39.6		2.38
3	PA1	C1-PHENANTHRENES/ANTHRACENES	194		2.38
3	PA2	C2-PHENANTHRENES/ANTHRACENES	487		2.38
3	PA3	C3-PHENANTHRENES/ANTHRACENES	433		2.38
3	PA4	C4-PHENANTHRENES/ANTHRACENES	219		2.38
3	RET	RETENE		U	2.38
3	DBT0	DIBENZOTHIOPHENE	7.89		2.38
3	DBT1	C1-DIBENZOTHIOPHENES	67.9		2.38
3	DBT2	C2-DIBENZOTHIOPHENES	139		2.38
3	DBT3	C3-DIBENZOTHIOPHENES	156		2.38
3	DBT4	C4-DIBENZOTHIOPHENES	104		2.38
4	BF	BENZO(B)FLUORENE	9.22		2.38
4	FL0	FLUORANTHENE	5.70		2.38
4	PY0	PYRENE	46.2		2.38
4	FP1	C1-FLUORANTHENES/PYRENES	147		2.38
4	FP2	C2-FLUORANTHENES/PYRENES	224		2.38
4	FP3	C3-FLUORANTHENES/PYRENES	247		2.38
4	FP4	C4-FLUORANTHENES/PYRENES	206		2.38
4	NBT0	NAPHTHOBENZOTHIOPHENE	25.0		2.38
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	87.0		2.38
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	141		2.38
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	117		2.38
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	74.9		2.38
4	BA0	BENZ(A)ANTHRACENE	26.2		2.38
4	C0	CHRYSENE/TRIPHENYLENE	73.7		2.38
4	BC1	C1-CHRYSENES	236		2.38
4	BC2	C2-CHRYSENES	379		2.38
4	BC3	C3-CHRYSENES	388		2.38
4	BC4	C4-CHRYSENES	214		2.38
5	BBF	BENZO(B)FLUORANTHENE	14.5		2.38

Project Name: PAMPILLA 2
Project Number:

Client ID	GE PCH 02AGO2023
Lab ID	L2345965-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	8/2/2023
Date Received	8/9/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.0042 g
% Solid	100
File ID	F808312328
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.19

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE	2.50		2.38
5	BAF	BENZO(A)FLUORANTHENE		U	2.38
5	BEP	BENZO(E)PYRENE	38.7		2.38
5	BAP	BENZO(A)PYRENE	16.5		2.38
5	PER	PERYLENE	7.63		2.38
6	IND	INDENO(1,2,3-CD)PYRENE	4.72	B	2.38
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	7.30		2.38
6	GHI	BENZO(GHI)PERYLENE	13.8		2.38
O	CAR	CARBAZOLE	1.69	J	2.38
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	23.1		2.38
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	31.3		2.38
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	8.56		2.38
3	3MP	3-METHYLPHENANTHRENE (3MP)	40.8		2.38
3	2MP	2-METHYLPHENANTHRENE (2MP)	49.1		2.38
3	2MA	2-METHYLANTHRACENE (2MA)	5.78		2.38
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	46.6		2.38
3	1MP	1-METHYLPHENANTHRENE (1MP)	37.9		2.38
A	1MN	1-METHYLNAPHTHALENE	1.58	J	2.38
A	2MN	2-METHYLNAPHTHALENE	1.50	J	2.38
2	26DMN	2,6-DIMETHYLNAPHTHALENE	3.88		2.38
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	7.43		2.38
H30	T19	HOPANE (T19)	477		2.38
t23	T4	C23 TRICYCLIC TERPANE (T4)	97.7		2.38
t24	T5	C24 TRICYCLIC TERPANE (T5)	57.5		2.38
t25	T6	C25 TRICYCLIC TERPANE (T6)	55.8		2.38
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	21.8		2.38
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	33.7		2.38
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	32.2		2.38
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	38.7		2.38
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	40.1		2.38
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	35.6		2.38
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	39.0		2.38
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	54.6		2.38
t30S	T11a	C30 TRICYCLIC TERPANE-22S	38.8		2.38
t30R	T11b	C30 TRICYCLIC TERPANE-22R	31.2		2.38
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	90.1		2.38
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	34.8		2.38
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	25.5		2.38
H29	T15	30-NORHOPANE (T15)	291		2.38
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	52.4		2.38
X	X	17A(H)-DIAHOPANE (X)	27.7		2.38
M29	T17	30-NORMORETANE (T17)	34.8		2.38
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	46.4		2.38
M30	T20	MORETANE (T20)	60.3		2.38
H31S	T21	30-HOMOHOPANE-22S (T21)	170		2.38
H31R	T22	30-HOMOHOPANE-22R (T22)	174		2.38
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	73.7		2.38
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	127		2.38
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	90.3		2.38
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	86.8		2.38
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	56.0		2.38
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	62.3		2.38
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	44.0		2.38
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	50.3		2.38

Project Name: PAMPILLA 2
Project Number:

Client ID	GE PCH 02AGO2023
Lab ID	L2345965-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	8/2/2023
Date Received	8/9/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.0042 g
% Solid	100
File ID	F808312328
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.19

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	56.3	2.38
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	45.5	2.38
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	24.3	2.38
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	13.6	2.38
aa27S	S12	17A(H)20SC27/C29DIA	73.2	2.38
aa27R	S17	17A(H)20RC27/C29DIA	90.9	2.38
d29R	S18	UNKNOWN STERANE (S18)	10.4	2.38
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	7.02	2.38
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	40.4	2.38
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	46.4	2.38
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	48.1	2.38
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	59.8	2.38
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	60.4	2.38
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	58.3	2.38
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	49.2	2.38
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	59.3	2.38
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	69.4	2.38
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	48.6	2.38
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	138	2.38
SC28TAS	TAS02	C28,20S TAS	103	2.38
RC27TAS	TAS03	C27,20R TAS	98.1	2.38
RC28TAS	TAS04	C28,20R TAS	74.3	2.38

Surrogates (% Recovery)	
NAPHTHALENE-D8	95
PHENANTHRENE-D10	89
BENZO(A)PYRENE-D12	119
5B(H)CHOLANE	105

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821442-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F808312315
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	2.40
2	D2	C2-DECALINS		U	2.40
2	D3	C3-DECALINS		U	2.40
2	D4	C4-DECALINS		U	2.40
S	BT0	BENZOTHIOPHENE		U	2.40
2	BT1	C1-BENZO(B)THIOPHENES		U	2.40
2	BT2	C2-BENZO(B)THIOPHENES		U	2.40
2	BT3	C3-BENZO(B)THIOPHENES		U	2.40
2	BT4	C4-BENZO(B)THIOPHENES		U	2.40
A	N0	NAPHTHALENE		U	2.40
2	N1	C1-NAPHTHALENES		U	2.40
2	N2	C2-NAPHTHALENES		U	2.40
2	N3	C3-NAPHTHALENES		U	2.40
2	N4	C4-NAPHTHALENES		U	2.40
2	B	BIPHENYL		U	2.40
3	DF	DIBENZOFURAN		U	2.40
3	AY	ACENAPHTHYLENE		U	2.40
3	AE	ACENAPHTHENE		U	2.40
3	F0	FLUORENE	0.167	J	2.40
3	F1	C1-FLUORENES		U	2.40
3	F2	C2-FLUORENES		U	2.40
3	F3	C3-FLUORENES		U	2.40
3	A0	ANTHRACENE		U	2.40
3	P0	PHENANTHRENE	0.0753	J	2.40
3	PA1	C1-PHENANTHRENES/ANTHRACENES		U	2.40
3	PA2	C2-PHENANTHRENES/ANTHRACENES		U	2.40
3	PA3	C3-PHENANTHRENES/ANTHRACENES		U	2.40
3	PA4	C4-PHENANTHRENES/ANTHRACENES		U	2.40
3	RET	RETENE		U	2.40
3	DBT0	DIBENZOTHIOPHENE	0.0962	J	2.40
3	DBT1	C1-DIBENZOTHIOPHENES	0.362	J	2.40
3	DBT2	C2-DIBENZOTHIOPHENES		U	2.40
3	DBT3	C3-DIBENZOTHIOPHENES		U	2.40
3	DBT4	C4-DIBENZOTHIOPHENES		U	2.40
4	BF	BENZO(B)FLUORENE		U	2.40
4	FL0	FLUORANTHENE	0.0693	J	2.40
4	PY0	PYRENE		U	2.40
4	FP1	C1-FLUORANTHENES/PYRENES		U	2.40
4	FP2	C2-FLUORANTHENES/PYRENES		U	2.40
4	FP3	C3-FLUORANTHENES/PYRENES		U	2.40
4	FP4	C4-FLUORANTHENES/PYRENES		U	2.40
4	NBT0	NAPHTHOBENZOTHIOPHENE		U	2.40
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES		U	2.40
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES		U	2.40
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES		U	2.40
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES		U	2.40
4	BA0	BENZ(A)ANTHRACENE	0.103	J	2.40
4	C0	CHRYSENE/TRIPHENYLENE	0.140	J	2.40
4	BC1	C1-CHRYSENES		U	2.40
4	BC2	C2-CHRYSENES		U	2.40
4	BC3	C3-CHRYSENES		U	2.40
4	BC4	C4-CHRYSENES		U	2.40
5	BBF	BENZO(B)FLUORANTHENE	0.145	J	2.40

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821442-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F808312315
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.2

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE	0.124	J	2.40
5	BAF	BENZO(A)FLUORANTHENE		U	2.40
5	BEP	BENZO(E)PYRENE	0.226	J	2.40
5	BAP	BENZO(A)PYRENE		U	2.40
5	PER	PERYLENE		U	2.40
6	IND	INDENO(1,2,3-CD)PYRENE	0.539	J	2.40
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	0.280	J	2.40
6	GHI	BENZO(GHI)PERYLENE	0.944	J	2.40
O	CAR	CARBAZOLE	0.168	J	2.40
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	0.106	J	2.40
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)		U	2.40
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	0.157	J	2.40
3	3MP	3-METHYLPHENANTHRENE (3MP)		U	2.40
3	2MP	2-METHYLPHENANTHRENE (2MP)		U	2.40
3	2MA	2-METHYLANTHRACENE (2MA)		U	2.40
3	9MP	9/4-METHYLPHENANTHRENE (9MP)		U	2.40
3	1MP	1-METHYLPHENANTHRENE (1MP)		U	2.40
A	1MN	1-METHYLNAPHTHALENE		U	2.40
A	2MN	2-METHYLNAPHTHALENE		U	2.40
2	26DMN	2,6-DIMETHYLNAPHTHALENE		U	2.40
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE		U	2.40
H30	T19	HOPANE (T19)		U	2.40
t23	T4	C23 TRICYCLIC TERPANE (T4)		U	2.40
t24	T5	C24 TRICYCLIC TERPANE (T5)		U	2.40
t25	T6	C25 TRICYCLIC TERPANE (T6)		U	2.40
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)		U	2.40
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)		U	2.40
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)		U	2.40
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)		U	2.40
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)		U	2.40
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)		U	2.40
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)		U	2.40
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)		U	2.40
t30S	T11a	C30 TRICYCLIC TERPANE-22S		U	2.40
t30R	T11b	C30 TRICYCLIC TERPANE-22R		U	2.40
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)		U	2.40
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)		U	2.40
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)		U	2.40
H29	T15	30-NORHOPANE (T15)		U	2.40
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)		U	2.40
X	X	17A(H)-DIAHOPANE (X)		U	2.40
M29	T17	30-NORMORETANE (T17)		U	2.40
OL	T18	18A(H)&18B(H)-OLEANANES (T18)		U	2.40
M30	T20	MORETANE (T20)		U	2.40
H31S	T21	30-HOMOHOPANE-22S (T21)		U	2.40
H31R	T22	30-HOMOHOPANE-22R (T22)		U	2.40
T22A	T22A	GAMMACERANE/C32-DIAHOPANE		U	2.40
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)		U	2.40
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)		U	2.40
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)		U	2.40
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)		U	2.40
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)		U	2.40
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)		U	2.40
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)		U	2.40

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821442-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F808312315
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.2

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	U	2.40
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	U	2.40
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	U	2.40
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	U	2.40
aa27S	S12	17A(H)20SC27/C29DIA	U	2.40
aa27R	S17	17A(H)20RC27/C29DIA	U	2.40
d29R	S18	UNKNOWN STERANE (S18)	U	2.40
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	U	2.40
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	U	2.40
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	U	2.40
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	U	2.40
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	U	2.40
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	U	2.40
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	U	2.40
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	U	2.40
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	U	2.40
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	U	2.40
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	U	2.40
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	U	2.40
SC28TAS	TAS02	C28,20S TAS	U	2.40
RC27TAS	TAS03	C27,20R TAS	U	2.40
RC28TAS	TAS04	C28,20R TAS	U	2.40

Surrogates (% Recovery)	
NAPHTHALENE-D8	97
PHENANTHRENE-D10	116
BENZO(A)PYRENE-D12	122
5B(H)CHOLANE	104

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1821442-2
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F808312316
Units	%
Final Volume	1
Dilution	1
Reporting Limit	2.4

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
A	N0	NAPHTHALENE	228	2.40	95	240	50	130
3	AY	ACENAPHTHYLENE	232	2.40	97	240	50	130
3	AE	ACENAPHTHENE	243	2.40	101	240	50	130
3	F0	FLUORENE	251	2.40	104	240	50	130
3	A0	ANTHRACENE	276	2.40	115	240	50	130
3	P0	PHENANTHRENE	253	2.40	105	240	50	130
4	FL0	FLUORANTHENE	210	2.40	87	240	50	130
4	PY0	PYRENE	228	2.40	95	240	50	130
4	BA0	BENZ(A)ANTHRACENE	257	2.40	107	240	50	130
4	C0	CHRYSENE/TRIPHENYLENE	238	2.40	99	240	50	130
5	BBF	BENZO(B)FLUORANTHENE	261	2.40	109	240	50	130
5	BJKF	BENZO(J)+(K)FLUORANTHENE	258	2.40	108	240	50	130
5	BAP	BENZO(A)PYRENE	257	2.40	107	240	50	130
6	IND	INDENO(1,2,3-CD)PYRENE	283	2.40	118	240	50	130
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	292	2.40	122	240	50	130
6	GHI	BENZO(GHI)PERYLENE	252	2.40	105	240	50	130
A	2MN	2-METHYLNAPHTHALENE	226	2.40	94	240	50	130

Surrogates (% Recovery)	
NAPHTHALENE-D8	100
PHENANTHRENE-D10	111
BENZO(A)PYRENE-D12	118
5B(H)CHOLANE	101

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1821442-3
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F808312317
Units	%
Final Volume	1
Dilution	1
Reporting Limit	2.4

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
A	N0	NAPHTHALENE	226	2.40	94	240	50	130	1	30
3	AY	ACENAPHTHYLENE	231	2.40	96	240	50	130	1	30
3	AE	ACENAPHTHENE	242	2.40	101	240	50	130	0	30
3	F0	FLUORENE	246	2.40	102	240	50	130	2	30
3	A0	ANTHRACENE	274	2.40	114	240	50	130	1	30
3	P0	PHENANTHRENE	248	2.40	104	240	50	130	1	30
4	FL0	FLUORANTHENE	203	2.40	85	240	50	130	2	30
4	PY0	PYRENE	223	2.40	93	240	50	130	2	30
4	BA0	BENZ(A)ANTHRACENE	255	2.40	106	240	50	130	1	30
4	C0	CHRYSENE/TRIPHENYLENE	234	2.40	98	240	50	130	1	30
5	BBF	BENZO(B)FLUORANTHENE	258	2.40	108	240	50	130	1	30
5	BJKF	BENZO(J)+(K)FLUORANTHENE	254	2.40	106	240	50	130	2	30
5	BAP	BENZO(A)PYRENE	256	2.40	106	240	50	130	1	30
6	IND	INDENO(1,2,3-CD)PYRENE	275	2.40	115	240	50	130	3	30
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	290	2.40	121	240	50	130	1	30
6	GHI	BENZO(GHI)PERYLENE	250	2.40	104	240	50	130	1	30
A	2MN	2-METHYLNAPHTHALENE	226	2.40	94	240	50	130	0	30

Surrogates (% Recovery)	
NAPHTHALENE-D8	99
PHENANTHRENE-D10	110
BENZO(A)PYRENE-D12	118
5B(H)CHOLANE	101

Project Name: PAMPILLA 2
Project Number:

Client ID	GE PCH 02AGO2023			Duplicate Sample		
Lab ID	L2345965-01			WG1821442-6		
Matrix	SOLID			SOLID		
Matrix Description						
Reference Method	8270E-SIM(M)			8270E-SIM(M)		
Batch ID	WG1821442			WG1821442		
Date Collected	8/2/2023			NA		
Date Received	8/9/2023			8/29/2023		
Date Prepped	8/29/2023			8/29/2023		
Date Analyzed	9/1/2023			9/2/2023		
Sample Size(wet)	0.0042	g		0.004	g	
% Solid	100			100		
File ID	F808312328			F808312329		
Units	mg/kg			mg/kg		
Final Volume	1			1		
Dilution	1			1		
Reporting Limit	1.19			1.25		

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
2	D0	CIS/TRANS-DECALIN	0.351	J	1.19	1.41		1.25		30	NC
2	D1	C1-DECALINS	1.84	J	2.38	4.04		2.50		30	NC
2	D2	C2-DECALINS	4.36		2.38	8.92		2.50	69	30	Q
2	D3	C3-DECALINS		U	2.38	9.20		2.50		30	X
2	D4	C4-DECALINS		U	2.38	21.2		2.50		30	X
S	BT0	BENZOTHIOPHENE	0.0800	J	2.38	0.210	J	2.50		30	NC
2	BT1	C1-BENZO(B)THIOPHENES	1.20	J	2.38	2.95		2.50		30	NC
2	BT2	C2-BENZO(B)THIOPHENES	2.19	J	2.38	7.98		2.50		30	NC
2	BT3	C3-BENZO(B)THIOPHENES	7.49		2.38	15.4		2.50	69	30	Q
2	BT4	C4-BENZO(B)THIOPHENES	17.5		2.38	23.9		2.50	31	30	Q
A	N0	NAPHTHALENE	1.29	J	2.38	1.74	J	2.50		30	NC
2	N1	C1-NAPHTHALENES	2.16	J	2.38	10.4		2.50		30	NC
2	N2	C2-NAPHTHALENES	10.1		2.38	82.7		2.50	156	30	Q
2	N3	C3-NAPHTHALENES	58.0		2.38	156		2.50	92	30	Q
2	N4	C4-NAPHTHALENES	130		2.38	195		2.50	40	30	Q
2	B	BIPHENYL	0.878	J	2.38	2.64		2.50		30	NC
3	DF	DIBENZOFURAN	0.626	J	2.38	1.77	J	2.50		30	NC
3	AY	ACENAPHTHYLENE	0.960	J	2.38	1.28	J	2.50		30	NC
3	AE	ACENAPHTHENE	0.858	J	2.38	3.63		2.50		30	NC
3	F0	FLUORENE	4.23		2.38	8.75		2.50	70	30	Q
3	F1	C1-FLUORENES	37.5		2.38	53.2		2.50	35	30	Q
3	F2	C2-FLUORENES	157		2.38	197		2.50	23	30	
3	F3	C3-FLUORENES	220		2.38	263		2.50	18	30	
3	A0	ANTHRACENE	4.74		2.38	6.44		2.50	30	30	
3	P0	PHENANTHRENE	39.6		2.38	57.2		2.50	36	30	Q
3	PA1	C1-PHENANTHRENES/ANTHRACENES	194		2.38	246		2.50	24	30	
3	PA2	C2-PHENANTHRENES/ANTHRACENES	487		2.38	558		2.50	14	30	
3	PA3	C3-PHENANTHRENES/ANTHRACENES	433		2.38	484		2.50	11	30	
3	PA4	C4-PHENANTHRENES/ANTHRACENES	219		2.38	244		2.50	11	30	
3	RET	RETENE		U	2.38		U	2.50		30	NC
3	DBT0	DIBENZOTHIOPHENE	7.89		2.38	12.2		2.50	43	30	Q
3	DBT1	C1-DIBENZOTHIOPHENES	67.9		2.38	83.7		2.50	21	30	
3	DBT2	C2-DIBENZOTHIOPHENES	139		2.38	166		2.50	18	30	
3	DBT3	C3-DIBENZOTHIOPHENES	156		2.38	175		2.50	11	30	
3	DBT4	C4-DIBENZOTHIOPHENES	104		2.38	116		2.50	11	30	
4	BF	BENZO(B)FLUORENE	9.22		2.38	10.6		2.50	14	30	
4	FL0	FLUORANTHENE	5.70		2.38	7.04		2.50	21	30	
4	PY0	PYRENE	46.2		2.38	53.2		2.50	14	30	
4	FP1	C1-FLUORANTHENES/PYRENES	147		2.38	169		2.50	14	30	
4	FP2	C2-FLUORANTHENES/PYRENES	224		2.38	251		2.50	11	30	
4	FP3	C3-FLUORANTHENES/PYRENES	247		2.38	269		2.50	9	30	
4	FP4	C4-FLUORANTHENES/PYRENES	206		2.38	216		2.50	5	30	
4	NBT0	NAPHTHOBENZOTHIOPHENE	25.0		2.38	26.8		2.50	7	30	
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	87.0		2.38	95.6		2.50	9	30	
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	141		2.38	150		2.50	6	30	
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	117		2.38	122		2.50	4	30	
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	74.9		2.38	79.0		2.50	5	30	
4	BA0	BENZ(A)ANTHRACENE	26.2		2.38	33.4		2.50	24	30	
4	C0	CHRYSENE/TRIPHENYLENE	73.7		2.38	77.8		2.50	5	30	
4	BC1	C1-CHRYSENES	236		2.38	250		2.50	6	30	
4	BC2	C2-CHRYSENES	379		2.38	390		2.50	3	30	
4	BC3	C3-CHRYSENES	388		2.38	390		2.50	1	30	
4	BC4	C4-CHRYSENES	214		2.38	210		2.50	2	30	
5	BBF	BENZO(B)FLUORANTHENE	14.5		2.38	14.7		2.50	1	30	
5	BJKF	BENZO(J)+(K)FLUORANTHENE	2.50		2.38	3.31		2.50	28	30	
5	BAF	BENZO(A)FLUORANTHENE		U	2.38		U	2.50		30	NC
5	BEP	BENZO(E)PYRENE	38.7		2.38	39.0		2.50	1	30	
5	BAP	BENZO(A)PYRENE	16.5		2.38	17.8		2.50	8	30	
5	PER	PERYLENE	7.63		2.38	7.54		2.50	1	30	
6	IND	INDENO(1,2,3-CD)PYRENE	4.72	B	2.38	4.91	B	2.50	4	30	
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	7.30		2.38	8.50		2.50	15	30	

Project Name: PAMPILLA 2
Project Number:

Client ID	GE PCH 02AGO2023		Duplicate Sample		
Lab ID	L2345965-01		WG1821442-6		
Matrix	SOLID		SOLID		
Matrix Description					
Reference Method	8270E-SIM(M)		8270E-SIM(M)		
Batch ID	WG1821442		WG1821442		
Date Collected	8/2/2023		NA		
Date Received	8/9/2023		8/29/2023		
Date Prepped	8/29/2023		8/29/2023		
Date Analyzed	9/1/2023		9/2/2023		
Sample Size(wet)	0.0042	g	0.004	g	
% Solid	100		100		
File ID	F808312328		F808312329		
Units	mg/kg		mg/kg		
Final Volume	1		1		
Dilution	1		1		
Reporting Limit	1.19		1.25		

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
6	GHI	BENZO(GHI)PERYLENE	13.8		2.38	14.9		2.50	8	30	
O	CAR	CARBAZOLE	1.69	J	2.38	2.46	J	2.50		30	NC
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	23.1		2.38	30.5		2.50	28	30	
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	31.3		2.38	36.3		2.50	15	30	
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	8.56		2.38	10.6		2.50	21	30	
3	3MP	3-METHYLPHENANTHRENE (3MP)	40.8		2.38	54.6		2.50	29	30	
3	2MP	2-METHYLPHENANTHRENE (2MP)	49.1		2.38	63.5		2.50	26	30	
3	2MA	2-METHYLANTHRACENE (2MA)	5.78		2.38	9.15		2.50	45	30	Q
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	46.6		2.38	56.6		2.50	19	30	
3	1MP	1-METHYLPHENANTHRENE (1MP)	37.9		2.38	47.0		2.50	21	30	
A	1MN	1-METHYLNAPHTHALENE	1.58	J	2.38	11.6		2.50		30	NC
A	2MN	2-METHYLNAPHTHALENE	1.50	J	2.38	5.12		2.50		30	NC
2	26DMN	2,6-DIMETHYLNAPHTHALENE	3.88		2.38	35.3		2.50	160	30	Q
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	7.43		2.38	17.8		2.50	82	30	Q
H30	T19	HOPANE (T19)	477		2.38	460		2.50	4	30	
t23	T4	C23 TRICYCLIC TERPANE (T4)	97.7		2.38	103		2.50	5	30	
t24	T5	C24 TRICYCLIC TERPANE (T5)	57.5		2.38	60.1		2.50	4	30	
t25	T6	C25 TRICYCLIC TERPANE (T6)	55.8		2.38	55.3		2.50	1	30	
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	21.8		2.38	22.4		2.50	3	30	
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	33.7		2.38	34.2		2.50	1	30	
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	32.2		2.38	33.0		2.50	2	30	
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	38.7		2.38	37.2		2.50	4	30	
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	40.1		2.38	40.3		2.50	0	30	
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	35.6		2.38	33.8		2.50	5	30	
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	39.0		2.38	37.3		2.50	4	30	
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	54.6		2.38	53.0		2.50	3	30	
t30S	T11a	C30 TRICYCLIC TERPANE-22S	38.8		2.38	38.8		2.50	0	30	
t30R	T11b	C30 TRICYCLIC TERPANE-22R	31.2		2.38	31.4		2.50	1	30	
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	90.1		2.38	91.8		2.50	2	30	
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	34.8		2.38	34.9		2.50	0	30	
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	25.5		2.38	25.0		2.50	2	30	
H29	T15	30-NORHOPANE (T15)	291		2.38	277		2.50	5	30	
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	52.4		2.38	50.2		2.50	4	30	
X	X	17A(H)-DIAHOPANE (X)	27.7		2.38	27.1		2.50	2	30	
M29	T17	30-NORMORETANE (T17)	34.8		2.38	31.9		2.50	9	30	
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	46.4		2.38	43.5		2.50	6	30	
M30	T20	MORETANE (T20)	60.3		2.38	60.1		2.50	0	30	
H31S	T21	30-HOMOHOPANE-22S (T21)	170		2.38	164		2.50	4	30	
H31R	T22	30-HOMOHOPANE-22R (T22)	174		2.38	172		2.50	1	30	
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	73.7		2.38	75.4		2.50	2	30	
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	127		2.38	121		2.50	5	30	
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	90.3		2.38	91.7		2.50	2	30	
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	86.8		2.38	83.3		2.50	4	30	
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	56.0		2.38	54.3		2.50	3	30	
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	62.3		2.38	59.0		2.50	5	30	
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	44.0		2.38	45.0		2.50	2	30	
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	50.3		2.38	50.3		2.50	0	30	
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	56.3		2.38	55.8		2.50	1	30	
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	45.5		2.38	44.4		2.50	2	30	
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	24.3		2.38	25.1		2.50	3	30	
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	13.6		2.38	12.5		2.50	8	30	
aa27S	S12	17A(H)20SC27/C29DIA	73.2		2.38	71.6		2.50	2	30	
aa27R	S17	17A(H)20RC27/C29DIA	90.9		2.38	87.5		2.50	4	30	
d29R	S18	UNKNOWN STERANE (S18)	10.4		2.38	11.5		2.50	10	30	
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	7.02		2.38	6.89		2.50	2	30	
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	40.4		2.38	47.0		2.50	15	30	
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	46.4		2.38	45.3		2.50	2	30	
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	48.1		2.38	46.8		2.50	3	30	
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	59.8		2.38	44.6		2.50	29	30	
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	60.4		2.38	60.8		2.50	1	30	
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	58.3		2.38	56.1		2.50	4	30	

Project Name: PAMPILLA 2
Project Number:

Client ID	GE PCH 02AGO2023		Duplicate Sample	
Lab ID	L2345965-01		WG1821442-6	
Matrix	SOLID		SOLID	
Matrix Description				
Reference Method	8270E-SIM(M)		8270E-SIM(M)	
Batch ID	WG1821442		WG1821442	
Date Collected	8/2/2023		NA	
Date Received	8/9/2023		8/29/2023	
Date Prepped	8/29/2023		8/29/2023	
Date Analyzed	9/1/2023		9/2/2023	
Sample Size(wet)	0.0042	g	0.004	g
% Solid	100		100	
File ID	F808312328		F808312329	
Units	mg/kg		mg/kg	
Final Volume	1		1	
Dilution	1		1	
Reporting Limit	1.19		1.25	

Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	RPD	RPD Limit
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	49.2	2.38	46.2	2.50	6	30
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	59.3	2.38	55.2	2.50	7	30
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	69.4	2.38	76.3	2.50	9	30
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	48.6	2.38	41.3	2.50	16	30
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	138	2.38	142	2.50	3	30
SC28TAS	TAS02	C28,20S TAS	103	2.38	89.3	2.50	14	30
RC27TAS	TAS03	C27,20R TAS	98.1	2.38	101	2.50	3	30
RC28TAS	TAS04	C28,20R TAS	74.3	2.38	75.5	2.50	2	30

Surrogates (% Recovery)		
NAPHTHALENE-D8	95	98
PHENANTHRENE-D10	89	89
BENZO(A)PYRENE-D12	119	117
5B(H)CHOLANE	105	108

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1819802-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1819802-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	8/24/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F808232315
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	501	1.94	105	477.66	65	135
2	D1	C1-DECALINS	814	1.94	107	760.39	65	135
2	D2	C2-DECALINS	775	1.94	115	675.98	65	135
2	D3	C3-DECALINS	430	1.94	117	366.46	65	135
2	D4	C4-DECALINS	420	1.94	116	362.78	65	135
S	BT0	BENZOTHIOPHENE	6.74	1.94	117	5.75	65	135
2	BT1	C1-BENZO(B)THIOPHENES	35.2	1.94	117	29.96	65	135
2	BT2	C2-BENZO(B)THIOPHENES	58.2	1.94	114	50.93	65	135
2	BT3	C3-BENZO(B)THIOPHENES	121	1.94	117	103.18	65	135
2	BT4	C4-BENZO(B)THIOPHENES	113	1.94	124	90.8	65	135
A	N0	NAPHTHALENE	506	1.94	90	565.56	65	135
2	N1	C1-NAPHTHALENES	1050	1.94	87	1208.32	65	135
2	N2	C2-NAPHTHALENES	1390	1.94	96	1450.37	65	135
2	N3	C3-NAPHTHALENES	1100	1.94	104	1052.74	65	135
2	N4	C4-NAPHTHALENES	690	1.94	118	583.65	65	135
2	B	BIPHENYL	146	1.94	100	145.7	65	135
3	DF	DIBENZOFURAN	59.8	1.94	120	49.63	65	135
3	AY	ACENAPHTHYLENE	7.54	1.94	109	6.91	65	135
3	AE	ACENAPHTHENE	17.0	1.94	93	18.35	65	135
3	F0	FLUORENE	77.4	1.94	109	70.69	65	135
3	F1	C1-FLUORENES	175	1.94	108	162.7	65	135
3	F2	C2-FLUORENES	282	1.94	112	251.87	65	135
3	F3	C3-FLUORENES	279	1.94	115	242.29	65	135
3	P0	PHENANTHRENE	185	1.94	98	188.41	65	135
3	PA1	C1-PHENANTHRENES/ANTHRACENES	406	1.94	105	388.12	65	135
3	PA2	C2-PHENANTHRENES/ANTHRACENES	489	1.94	112	434.38	65	135
3	PA3	C3-PHENANTHRENES/ANTHRACENES	350	1.94	113	308.67	65	135
3	PA4	C4-PHENANTHRENES/ANTHRACENES	145	1.94	112	129.94	65	135
3	DBT0	DIBENZOTHIOPHENE	123	1.94	94	130.56	65	135
3	DBT1	C1-DIBENZOTHIOPHENES	263	1.94	96	275.34	65	135
3	DBT2	C2-DIBENZOTHIOPHENES	384	1.94	104	369.42	65	135
3	DBT3	C3-DIBENZOTHIOPHENES	363	1.94	105	345.39	65	135
3	DBT4	C4-DIBENZOTHIOPHENES	208	1.94	107	193.51	65	135
4	FL0	FLUORANTHENE	4.09	1.94	108	3.77	65	135
4	PY0	PYRENE	13.1	1.94	112	11.65	65	135
4	FP1	C1-FLUORANTHENES/PYRENES	59.5	1.94	109	54.43	65	135
4	FP2	C2-FLUORANTHENES/PYRENES	101	1.94	113	89.07	65	135
4	FP3	C3-FLUORANTHENES/PYRENES	116	1.94	106	109.78	65	135
4	FP4	C4-FLUORANTHENES/PYRENES	102	1.94	105	97.22	65	135
4	NBT0	NAPHTHOBENZOTHIOPHENE	42.4	1.94	108	39.13	65	135
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	115	1.94	108	106.13	65	135
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	154	1.94	103	150.09	65	135
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	124	1.94	103	120.77	65	135
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	90.0	1.94	105	85.38	65	135
4	BA0	BENZ(A)ANTHRACENE	2.78	1.94	122	2.28	65	135
4	C0	CHRYSENE/TRIPHENYLENE	42.7	1.94	116	36.66	65	135
4	BC1	C1-CHRYSENES	69.5	1.94	108	64.59	65	135
4	BC2	C2-CHRYSENES	92.5	1.94	106	87.41	65	135
4	BC3	C3-CHRYSENES	105	1.94	104	101.29	65	135
4	BC4	C4-CHRYSENES	62.8	1.94	99	63.42	65	135
5	BBF	BENZO(B)FLUORANTHENE	6.75	1.94	125	5.4	65	135
5	BEP	BENZO(E)PYRENE	10.7	1.94	108	9.88	65	135
5	BAP	BENZO(A)PYRENE	2.19	1.94	108	2.03	65	135
5	PER	PERYLENE	3.69	1.94	110	3.34	65	135
6	GHI	BENZO(GHI)PERYLENE	4.07	1.94	113	3.59	65	135
O	CAR	CARBAZOLE	5.62	1.94	92	6.09	65	135
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	121	1.94	92	131.38	65	135
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	93.0	1.94	95	98.05	65	135
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	40.6	1.94	100	40.36	65	135
3	3MP	3-METHYLPHENANTHRENE (3MP)	84.0	1.94	106	79.32	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1819802-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1819802-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	8/24/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F808232315
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	2MA	2-METHYLANTHRACENE (2MA)	3.49	1.94	116	3	65	135
3	1MP	1-METHYLPHENANTHRENE (1MP)	93.2	1.94	106	87.93	65	135
A	1MN	1-METHYLNAPHTHALENE	744	1.94	94	793.54	65	135
A	2MN	2-METHYLNAPHTHALENE	902	1.94	83	1087.89	65	135
2	26DMN	2,6-DIMETHYLNAPHTHALENE	606	1.94	95	635.33	65	135
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	148	1.94	100	147.12	65	135
H30	T19	HOPANE (T19)	196	1.94	122	161.24	65	135
t23	T4	C23 TRICYCLIC TERPANE (T4)	71.0	1.94	102	69.8	65	135
t24	T5	C24 TRICYCLIC TERPANE (T5)	43.4	1.94	103	42.1	65	135
t25	T6	C25 TRICYCLIC TERPANE (T6)	44.6	1.94	110	40.4	65	135
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	17.2	1.94	121	14.2	65	135
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	19.2	1.94	118	16.3	65	135
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	15.6	1.94	107	14.6	65	135
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	21.0	1.94	130	16.2	65	135
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	22.8	1.94	130	17.6	65	135
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	21.3	1.94	111	19.2	65	135
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	26.2	1.94	125	21	65	135
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	33.0	1.94	117	28.3	65	135
t30S	T11a	C30 TRICYCLIC TERPANE-22S	17.8	1.94	116	15.3	65	135
t30R	T11b	C30 TRICYCLIC TERPANE-22R	18.2	1.94	120	15.2	65	135
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	41.5	1.94	121	34.4	65	135
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	6.96	1.94	99	7	65	135
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	9.37	1.94	116	8.1	65	135
H29	T15	30-NORHOPANE (T15)	108	1.94	119	90.7	65	135
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	27.2	1.94	117	23.3	65	135
X	X	17A(H)-DIAHOPANE (X)	15.3	1.94	118	13	65	135
M29	T17	30-NORMORETANE (T17)	13.5	1.94	120	11.2	65	135
M30	T20	MORETANE (T20)	19.4	1.94	119	16.3	65	135
H31S	T21	30-HOMOHOPANE-22S (T21)	81.7	1.94	121	67.6	65	135
H31R	T22	30-HOMOHOPANE-22R (T22)	70.9	1.94	122	58.3	65	135
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	60.4	1.94	124	48.9	65	135
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	43.5	1.94	122	35.6	65	135
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	47.8	1.94	123	38.8	65	135
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	31.2	1.94	122	25.6	65	135
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	35.4	1.94	127	27.9	65	135
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	23.8	1.94	120	19.8	65	135
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	35.6	1.94	124	28.8	65	135
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	29.7	1.94	133	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)	28.7	1.94	114	25.1	65	135
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	27.8	1.94	112	24.8	65	135
aa27S	S12	17A(H)20SC27/C29DIA	70.7	1.94	118	59.74	65	135
aa27R	S17	17A(H)20RC27/C29DIA	87.6	1.94	122	71.55	65	135
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	4.72	1.94	124	3.8	65	135
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	39.6	1.94	120	33	65	135
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	40.7	1.94	126	32.2	65	135
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	51.9	1.94	100	51.7	65	135
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	41.6	1.94	115	36.1	65	135
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	45.3	1.94	118	38.4	65	135
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	47.3	1.94	119	39.7	65	135
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	50.6	1.94	123	41	65	135
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	64.0	1.94	124	51.7	65	135
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	69.8	1.94	128	54.6	65	135
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	43.1	1.94	113	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	199	1.94	109	182.5	65	135
RC27TAS	TAS03	C27,20R TAS	185	1.94	104	177.1	65	135
RC28TAS	TAS04	C28,20R TAS	154	1.94	104	148.1	65	135

List of Potential Qualifiers

A: Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B: The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C: Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D: Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E: Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F: The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum

G: The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H: The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I: The lower value for the two columns has been reported due to obvious interference.

J: Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

J: Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

J: Estimated value. The Target analyte concentration is below the Limit of Quantitation (LOQ), but above the Detection Limit (DL). This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

M: Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND: Not detected at the Limit of Quantitation (LOQ) for the sample.

ND: Not detected at the Limit of Detection (LOD) for the sample.

ND: Not detected at the reporting limit (RL) for the sample.

ND: Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ: Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P: The RPD between the results for the two columns exceeds the method-specified criteria.

Q: The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R: Analytical results are from sample re-analysis.

RE: Analytical results are from sample re-extraction.

S: Analytical results are from modified screening analysis.

U: Not detected at the reported detection limit for the sample.

V: The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z: The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

GE OVA 02AGO2023

To: Refinería La Pampilla S.A.A.

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

Date: September 8, 2023

Subject: Chemical Fingerprinting of samples collected in Ventanilla, Peru

This memorandum summarizes the results of forensic chemical analysis conducted on one (1) sample that was collected by Repsol contractors on August 2, 2023 (Table 1). The sample was shipped to NewFields alliance laboratory, Alpha Analytical Laboratory, Inc. (Mansfield MA) for forensic chemical analysis. The objective of the analysis was to the degree possible, identify the product type (s) present in the sample and determine if the chemical composition match that of the source oil (Table 1).

Sample and Analysis

A sample of suspected petroleum was collected by Repsol contractors in an amber glass bottle consisting of petroleum residues. Sample "GE OVA 02AGO2023" was shipped to Alpha Analytical Labs in Mansfield, MA under chain of custody and arrived at a temperature of 23.4°C on August 9, 2023 with a DHL Tracking # 2768945421 (Seal number 200976).

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

- The samples were analyzed using a modified EPA Method 8015 gas chromatography/flame ionization detection (GC/FID) technique to generate a high resolution chromatographic "fingerprint" of hydrocarbons present in the sample. The chromatographic "fingerprint" identifies the general nature of the hydrocarbons (e.g., petroleum product type) and relative weathering state of the sample. A suite of normal and branched-chain alkanes as well as total petroleum hydrocarbons (TPH) were also measured to aid in product identification (**Table 2**). Sample results were reported on a mg/kg (oils) basis.

- The samples were also analyzed by a modified EPA Method 8270 gas chromatography/mass spectrometry (GC/MS) method operated in the selected ion monitoring (SIM) mode to quantify concentrations of 62 oil source diagnostic parent and C1-C4 alkylated PAHs (**Table 3**), and 55 sterane and triterpane petroleum biomarkers compounds (**Table 4**). These compounds provide highly specific information pertinent to the identification of petroleum or pyrogenic PAHs and their potential origin. Sample results were reported on a mg/kg (oils) basis.

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

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

Findings

The gas chromatographic "fingerprints" of the source oil, and GE OVA 02AGO2023 (GE OVA2) are shown in Figures 1A and1B respectively.

GC/FID Analysis

The GC/FID chromatogram for the GE OVA2 sample (Figure 1B), contains a broad C_{15} – C_{44} range material consisting of resolved n-alkanes and an unresolved complex mixture (UCM) which appears as a "hump" in the chromatogram. This sample is significantly weathered in the light alkane range (C_{10}-C_{15}) relative to the source oil due to evaporation and biodegradation. In addition, there is a relative increase in the UCM relative to the source oil (Figure 1A). The petroleum GC/FID signature is consistent with a moderately weathered crude or heavy fuel oil.

GC/MS Alkylated PAH and Biomarker Analysis

The PAH and biomarker molecular chemistry was evaluated to determine if there was evidence for a chemical linkage between the source oil and the GE OVA2 sample. GC/MS analysis of PAH and biomarker compounds is approximately 10 times more sensitive than the GC/FID analysis and provides source diagnostic weathering resistant chromatographic "fingerprints" of the samples.

Qualitative comparison of the PAH histograms for the source oil, and the GE OVA2 sample are provided in Figures 2A and 2B respectively. The PAH histogram for the GE OVA2 sample (Figure 2B) shows this sample is weathered as indicated by the loss of decalins and relatively lower proportion of naphthalenes compared to the source oil. Elevated fluoranthenes/pyrenes, napthobenzothiophenes, and chrysenes relative to the source oil are also observed in this sample.

Figure 3 is a double source ratio plot of sulfur containing alkyl-dibenzothiophenes to alkyl-phenanthrenes (C2-dibenzothiophenes/C2-phenanthrenes [D2/P2] versus C3-dibenzothiophenes/C3-phenanthrenes [D3/P3]). Differences in this ratio are a function of crude oil source and refinery processing.[2] The source oil, and the GE OVA2 sample plot away from each other indicating a different oil source.

The biomarker triterpene m/z 191 ion traces for the source oil and the GE OVA2 sample are presented in Figures 4A and 4B respectively. The biomarker traces for GE OVA2 show differences in the proportions of TS and TM (T11 and T12)[2] and the presence of oleanane (T18) which is absent in the source oil. These differences indicate the GE OVA2 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 GE OVA2 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.

Conclusion

The GE OVA 02AGO2023 sample consists of a moderately weathered crude or heavy oil. The PAH and biomarker analysis indicate the petroleum detected in the source oil and GE OVA 02AGO2023 sample are chemically different and were derived from a different source of petroleum.

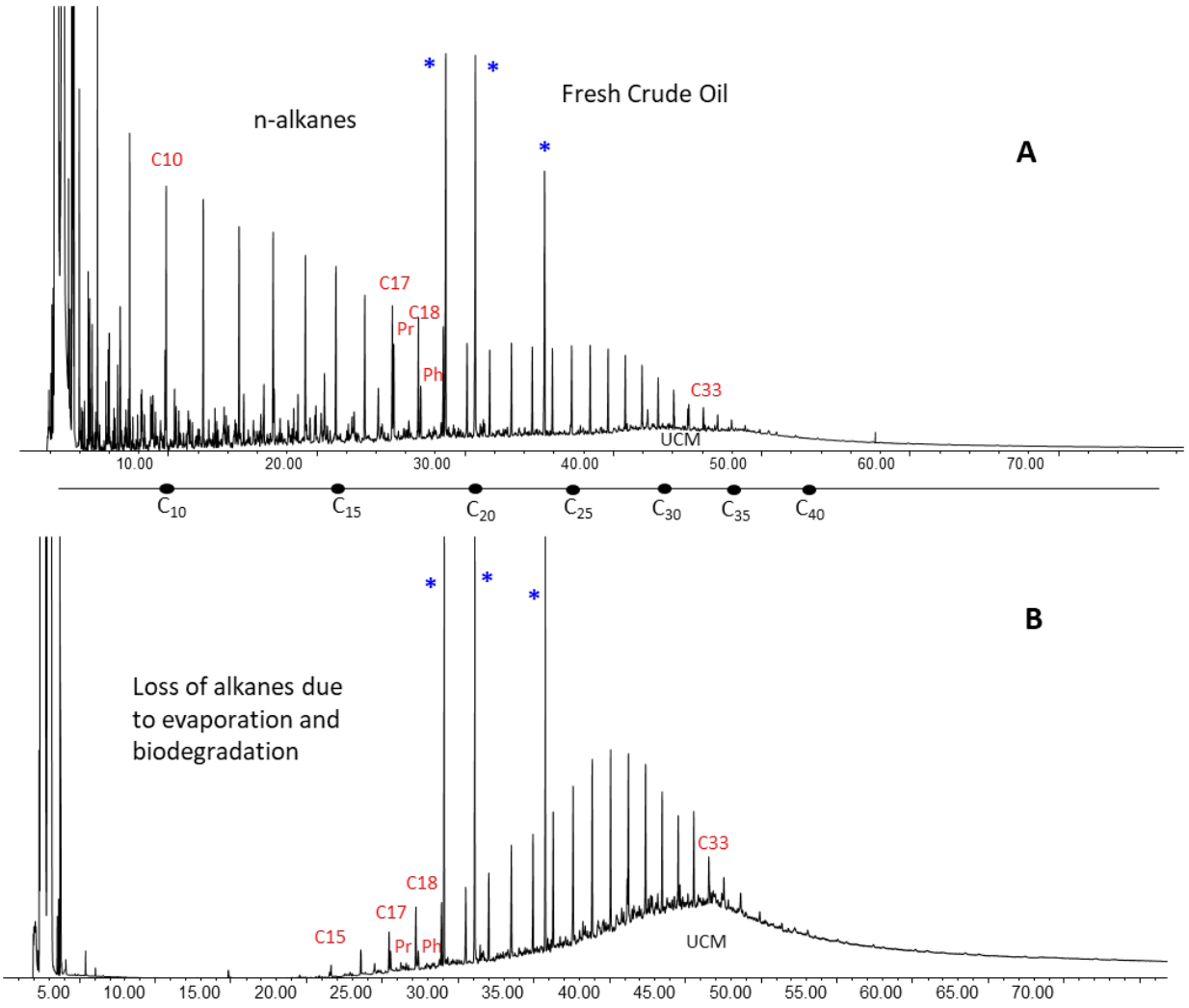


Figure 1. GC/FID "fingerprints" for the field samples.
Carbon ranges annotated below the x-axis analysis time scale.

A) Ship's Tanks Composite Sample
B) GE OVA 02AGO2023
'*': Laboratory-added Internal Standard

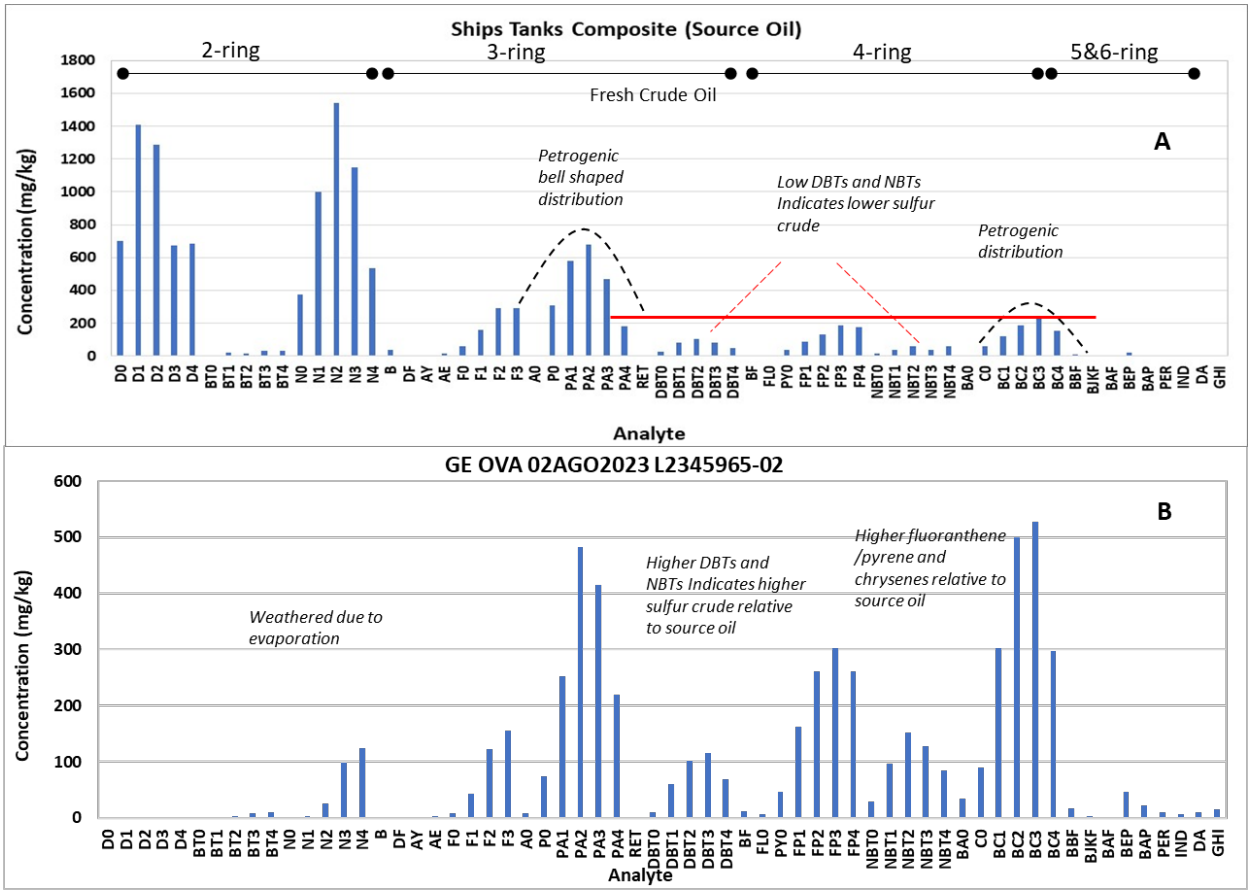


Figure 2. PAH Histograms

A) Ship's Tanks Composite Sample
B) GE OVA 02AGO2023

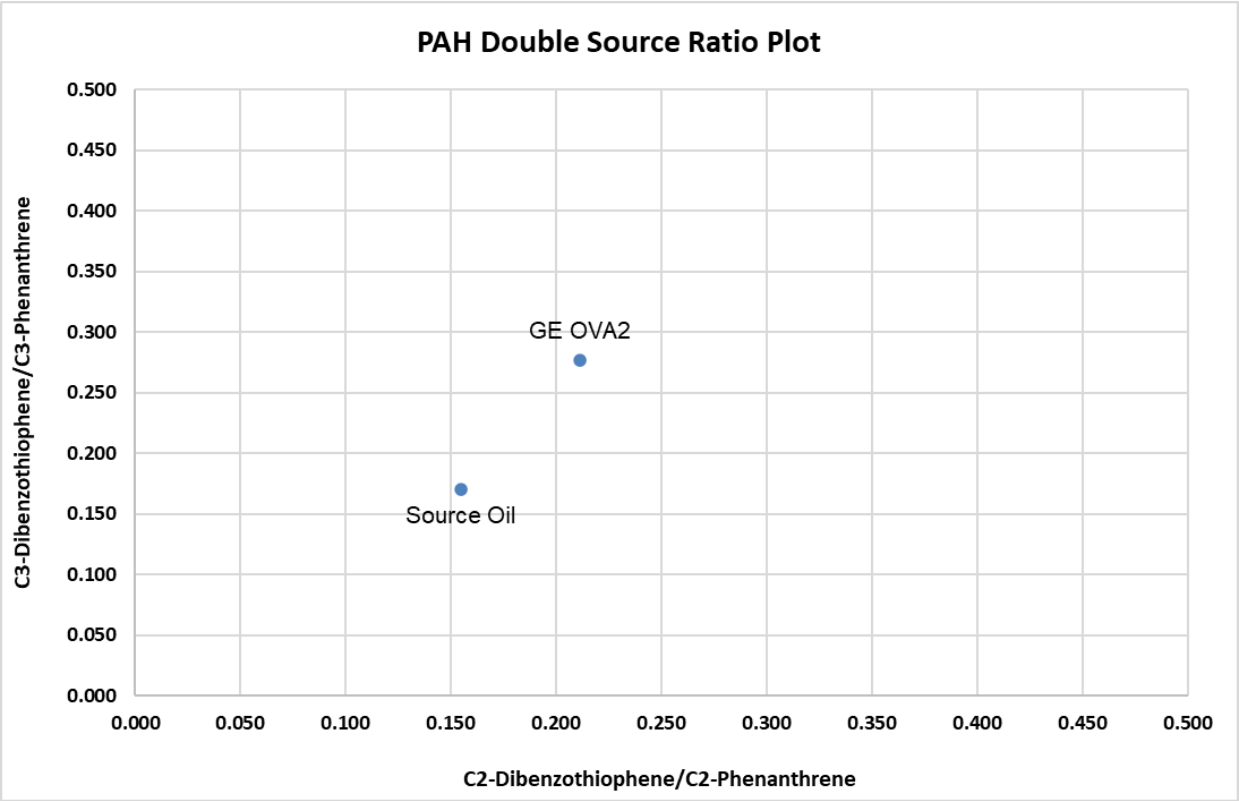


Figure 3. PAH Double Source Ratio Plot

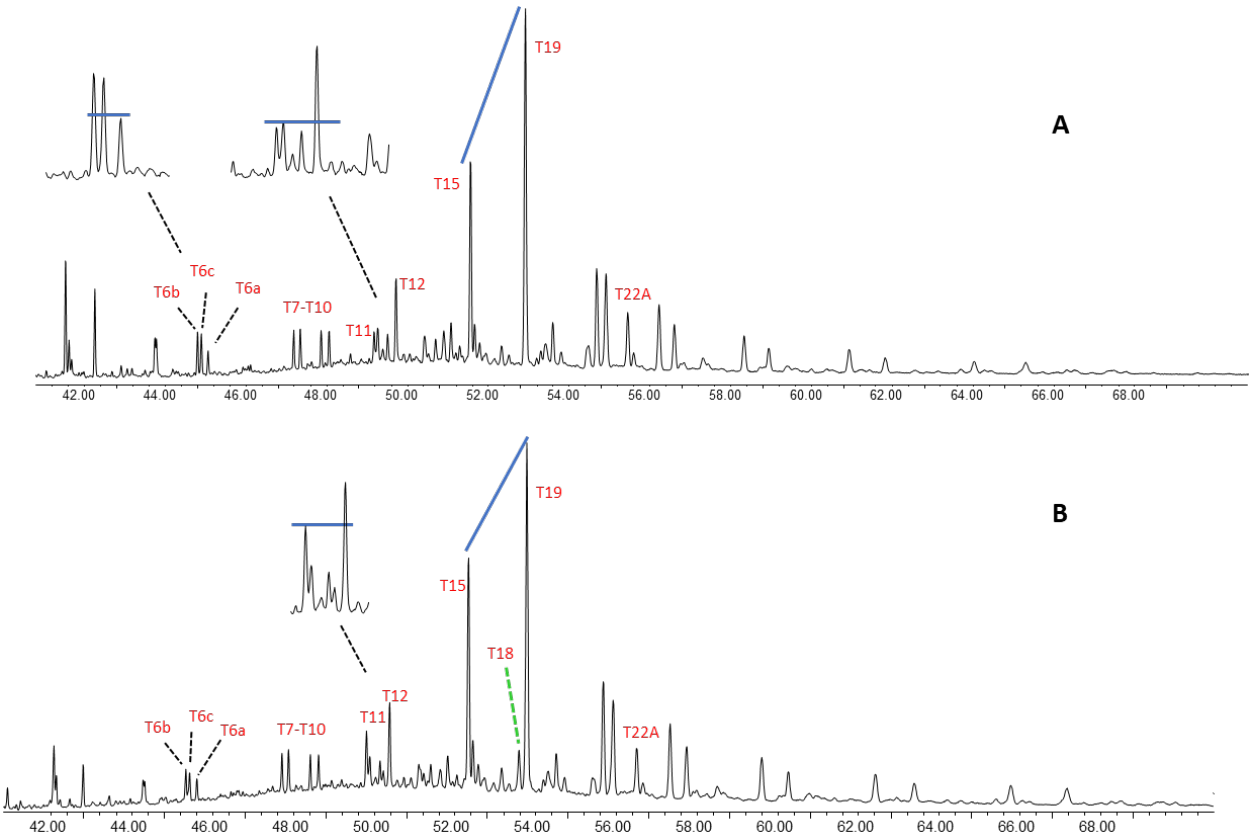


Figure 4. Biomarker m/z 191 Triterpane Fingerprint Traces

A) Ship's Tanks Composite Sample
B) GE OVA 02AGO2023

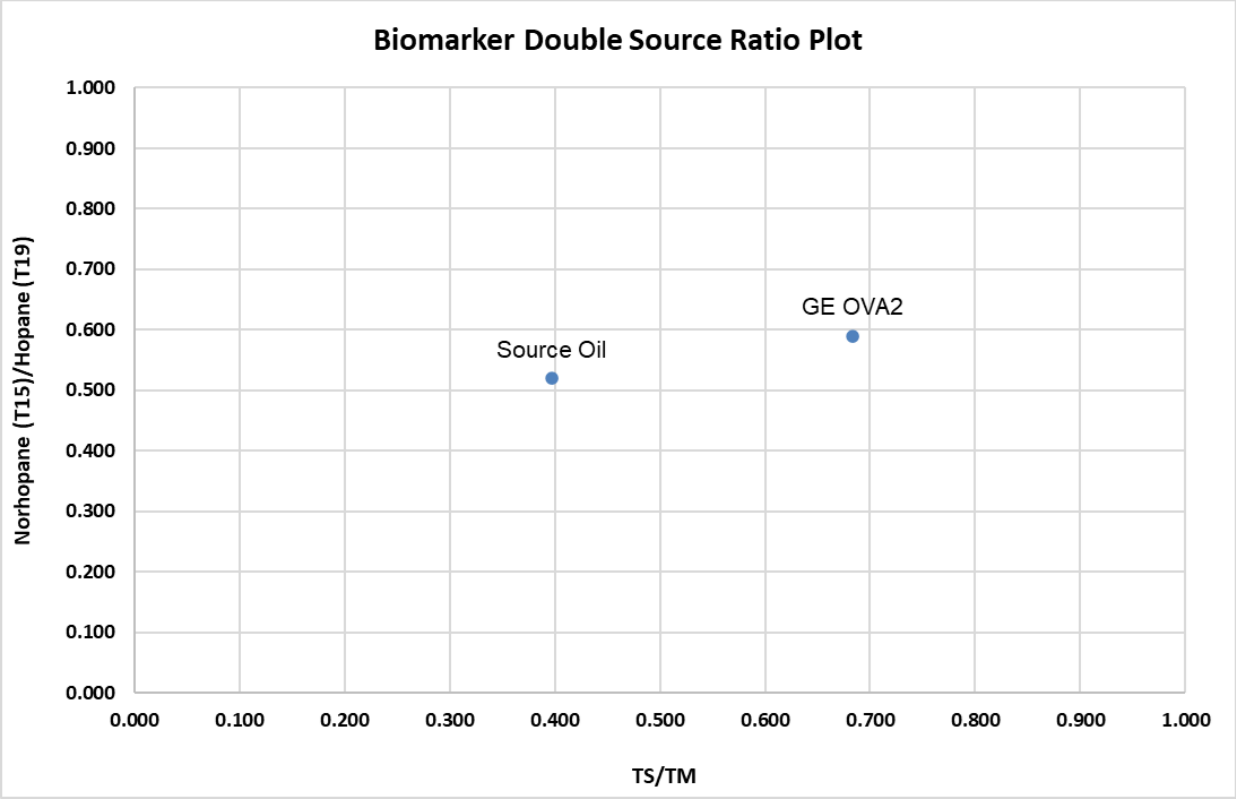


Figure 5. Biomarker Double Source Ratio Plot

Table 1. Sample List.

Field ID	Lab ID	Collection Date	Matrix	Collected by
Ship's Tanks Composite Sample	L2223310-01	01/14/2022	Source Oil	Repsol Contractor
GE OVA 02AGO2023	L2345965-02	08/2/2023	Glob	Repsol Contractor

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

Abbrev	Analytes
C9	n-Nonane (C_9)
C10	n-Decane (C_{10})
C11	n-Undecane (C_{11})
C12	n-Dodecane (C_{12})
C13	n-Tridecane (C_{13})
1380	2,6,10 Trimethyldodecane (1380)
C14	n-Tetradecane (C_{14})
1470	2,6,10 Trimethyltridecane (1470)
C15	n-Pentadecane (C_{15})
C16	n-Hexadecane (C_{16})
1650	Norpristane (1650)
C17	n-Heptadecane (C_{17})
Pr	Pristane
C18	n-Octadecane (C_{18})
Ph	Phytane
C19	n-Nonadecane (C_{19})
C20	n-Eicosane (C_{20})
C21	n-Heneicosane (C_{21})
C22	n-Docosane (C_{22})
C23	n-Tricosane (C_{23})
C24	n-Tetracosane (C_{24})
C25	n-Pentacosane (C_{25})
C26	n-Hexacosane (C_{26})
C27	n-Heptacosane (C_{27})
C28	n-Octacosane (C_{28})
C29	n-Nonacosane (C_29)
C30	n-Triacontane (C_{30})
C31	n-Hentriacontane (C_{31})
C32	n-Dotriacontane (C_{32})
C33	n-Tritriacontane (C_{33})
C34	n-Tetratriacontane (C_{34})
C35	n-Pentatriacontane (C_{35})
C36	n-Hexatriacontane (C_{36})
C37	n-Heptatriacontane (C_{37})
C38	n-Octatriacontane (C_{38})
C39	n-Nonatriacontane (C_{39})
C40	n-Tetracontane (C_{40})
TPH	Total Petroleum Hydrocarbons (C9-C44)
TSH	Total Saturated Hydrocarbons

Table 3. PAH and alkyl-PAH Target Compound List

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

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

Table 4. Triterpane and Sterane Biomarker Target Compound List.

Abbrev	Analytes
T4	C23 Tricyclic Terpane
T5	C24 Tricyclic Terpane
T6	C25 Tricyclic Terpane
T6a	C24 Tetracyclic Terpane
T6b	C26 Tricyclic Terpane-22S
T6c	C26 Tricyclic Terpane-22R
T7	C28 Tricyclic Terpane-22S
T8	C28 Tricyclic Terpane-22R
T9	C29 Tricyclic Terpane-22S
T10	C29 Tricyclic Terpane-22R
T11	18a-22,29,30-Trisnorneohopane-TS
T11a	C30 Tricyclic Terpane-22S
T11b	C30 Tricyclic Terpane-22R
T12	17a(H)-22,29,30-Trisnorhopane-TM
T14a	17a/b,21b/a 28,30-Bisnorhopane
T14b	17a(H),21b(H)-25-Norhopane
T15	30-Norhopane
T16	18a(H)-30-Norneohopane-C29Ts
X	17a(H)-Diahopane
T17	30-Normoretane
T18	18a(H)&18b(H)-Oleananes
T19	Hopane
T20	Moretane
T21	30-Homohopane-22S
T22	30-Homohopane-22S
T22A	Gammarcerane/C32-Diahopane
T26	30,31-Bishomohopane-22S
T27	30,31-Bishomohopane-22R
T30	30,31-Trishomohopane-22S
T31	30,31-Trishomohopane-22R
T32	Tetrakishomohopane-22S
T33	Tetrakishomohopane-22R
T34	Pentakishomohopane-22S
T35	Pentakishomohopane-22R

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

Attachment 1

Chain of Custody

8/9/23

L2345965

Nº 007180

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

EXPEDIENTE: EXOVA: 010498-2

PERSONA DE CONTACTO: CARLOS TORRES.

HS: 23006017

LUGAR: PLAYA DEL OVALO | Distrito: CHANCAY | Provincia: HUARAL | Departamento: LIMA

JOB NUMBER: 23LM00230246

NORMA:

1 SMEWW – APHA – AWWA - WEF 23rd Ed. 2017. Collection and preservation of samples. Part 1060 A-B ( ) 1060 B-C ( ) 10200 B ( ) 10300 B ( ) 10500 B ( ) 10750 B ( )
2 Instrucción 8000-I Toma de muestras de sedimentos ( )
3 NTP 214.003 - 1997 (Revisada el 2016) Agua Potable. Toma de muestra. ITEM 4.4 ( ) ITEM 4.5 ( )
4 RM N° 273-2000-PRODUCE. Protocolo para el Monitoreo de efluentes de los establecimientos industriales pesqueros de consumo humano directo e indirecto ( )
5 R.J N° 010-2016-ANA. Protocolo nacional para el monitoreo de la calidad de los recursos hídricos superficiales ( )
6 NTP 900.060.2012 (Revisada el 2016) Calidad de agua. Muestreo. Parte 15 - 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 ( )
10 Protocolo de monitoreo de calidad de agua cuenca hidrocarburos OGAAE-EM ( )
11 Otros ( )

PARÁMETROS DE ANÁLISIS EN EL LABORATORIO

PARÁMETROS DE CAMP

FINGER PRINT

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) (L,L,M)	CANTIDAD DE ENVASES	pH (Unidades de pH)	Temperatura Ambiental (°C)	Temperatura (°C)	Oxigeno Disuelto (mg/L)	Conductividad µS/cm ( ) mS/cm ( )	Salinidad (UPS)	Cloro residual mg Cl2/L Libre ( ) Total ( )	Turbiedad (UNT)	Caudal (m³/s)	Transparencia cm ( ) m ( )
.02 GE OVA 02AGO 2023	02/08/23	10:08 (*)		255770	8714308	18L	1										
						Total de Envases	1										

(1) Matriz (s)

AC = Agua para uso y consumo humano:
AN = Agua Natural:
AP = Agua de proceso:
ASAL = Agua Salina:
AR = Agua Residual:
SM = Sedimento:
SU = Suelo
Otro (*) GLOBULOS AHOMALOS

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

Equipos Utilizados

	Equipo	Código		Equipo	Código
1	GPS	S/N 65605169A	4		
2			5		
3			6		

Observaciones: SE PROCEDIO A TOMAR LA MUESTRAS EN EL PUNTO INDICADO, ESTAS MUESTRAS FUERON RECOLECTADAS DE LOS ALREDEDORES EN UNA BANDEJA, LUEGO TRASPASADO A UN FRASCO DE VIDRIO Y POSTERIOR MENTE PRECINTADO N° 200976. TODO EN PRESENCIA DEL REPRESENTANTE DEL CLIENTE.

Responsable de la toma de muestra:
Firma:
Inspector Cerper: MANUEL MESTANZA.
Inspectores de apoyo:
Hora de término: 18:05

Representante del cliente
Firma:
Nombre: CARLOS TORRES YACHACHIN
DNI: 40001656
Cargo: SUPERVISOR PLAYA

Rec: 8/9/23 12:16

Recepción de muestras
Nombre: Cesar Vidal A.
Fecha: 03-08-2023 Hora 11:46 AM

intertek RECEIVED

Attachment 2

Analytical Data

Project Name: PAMPILLA 2
Project Number:

Client ID	GE OVA 02AGO2023
Lab ID	L2345965-02
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821442
Date Collected	8/2/2023
Date Received	8/9/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.0046 g
% Solid	100
File ID	F18082923078
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	217

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)	6.09	J	217
SHC	C10	DECANE (C10)	7.61	J	217
SHC	C11	UNDECANE	3.04	J	217
SHC	C12	DODECANE (C12)	9.78	J	217
SHC	C13	TRIDECANE	6.52	J	217
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	7.17	J	217
SHC	C14	TETRADECANE (C14)	47.0	J	217
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	53.0	J	217
SHC	C15	PENTADECANE (C15)	229		217
SHC	C16	HEXADECANE (C16)	457		217
SHC	1650	NORPRISTANE (1650)	212	J	217
SHC	C17	HEPTADECANE (C17)	684		217
SHC	Pr	PRISTANE	462		217
SHC	C18	OCTADECANE (C18)	1030		217
SHC	Ph	PHYTANE	404		217
SHC	C19	NONADECANE (C19)	1030		217
SHC	C20	EICOSANE (C20)	1280		217
SHC	C21	HENEICOSANE (C21)	1300		217
SHC	C22	DOCOSANE (C22)	1700		217
SHC	C23	TRICOSANE (C23)	1740		217
SHC	C24	TETRACOSANE (C24)	2130		217
SHC	C25	PENTACOSANE (C25)	2700		217
SHC	C26	HEXACOSANE (C26)	2470		217
SHC	C27	HEPTACOSANE (C27)	2660		217
SHC	C28	OCTACOSANE (C28)	2320		217
SHC	C29	NONACOSANE (C29)	2230		217
SHC	C30	TRIACONTANE (C30)	1700		217
SHC	C31	HENTATRIACONTANE (C31)	1420		217
SHC	C32	DOTRIACONTANE (C32)	1360		217
SHC	C33	TRITRIACONTANE (C33)	736		217
SHC	C34	TETRATRIACONTANE (C34)	580		217
SHC	C35	PENTATRIACONTANE (C35)	540		217
SHC	C36	HEXATRIACONTANE (C36)	258		217
SHC	C37	HEPTATRIACONTANE (C37)	206	J	217
SHC	C38	OCTATRIACONTANE (C38)	162	J	217
SHC	C39	NONATRIACONTANE (C39)		U	217
SHC	C40	TETRACONTANE (C40)		U	217
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	560000		7170
SHC	TSH	TOTAL SATURATED HYDROCARBONS	32100	J	217

Surrogates (% Recovery)	
O-TERPHENYL	101
D50-TETRACOSANE	99

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821442-1
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	8/30/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F18082923012
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	240

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)	U		240
SHC	C10	DECANE (C10)	U		240
SHC	C11	UNDECANE	U		240
SHC	C12	DODECANE (C12)	U		240
SHC	C13	TRIDECANE	U		240
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	U		240
SHC	C14	TETRADECANE (C14)	U		240
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	U		240
SHC	C15	PENTADECANE (C15)	6.47	J	240
SHC	C16	HEXADECANE (C16)	U		240
SHC	1650	NORPRISTANE (1650)	U		240
SHC	C17	HEPTADECANE (C17)	U		240
SHC	Pr	PRISTANE	U		240
SHC	C18	OCTADECANE (C18)	U		240
SHC	Ph	PHYTANE	U		240
SHC	C19	NONADECANE (C19)	U		240
SHC	C20	EICOSANE (C20)	U		240
SHC	C21	HENEICOSANE (C21)	U		240
SHC	C22	DOCOSANE (C22)	U		240
SHC	C23	TRICOSANE (C23)	U		240
SHC	C24	TETRACOSANE (C24)	U		240
SHC	C25	PENTACOSANE (C25)	126	JC	240
SHC	C26	HEXACOSANE (C26)	U		240
SHC	C27	HEPTACOSANE (C27)	U		240
SHC	C28	OCTACOSANE (C28)	U		240
SHC	C29	NONACOSANE (C29)	U		240
SHC	C30	TRIACONTANE (C30)	U		240
SHC	C31	HENTATRIACONTANE (C31)	U		240
SHC	C32	DOTRIACONTANE (C32)	U		240
SHC	C33	TRITRIACONTANE (C33)	U		240
SHC	C34	TETRATRIACONTANE (C34)	U		240
SHC	C35	PENTATRIACONTANE (C35)	U		240
SHC	C36	HEXATRIACONTANE (C36)	U		240
SHC	C37	HEPTATRIACONTANE (C37)	U		240
SHC	C38	OCTATRIACONTANE (C38)	U		240
SHC	C39	NONATRIACONTANE (C39)	U		240
SHC	C40	TETRACONTANE (C40)	U		240
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	U		7910
SHC	TSH	TOTAL SATURATED HYDROCARBONS	132	J	240

Surrogates (% Recovery)	
O-TERPHENYL	105
D50-TETRACOSANE	104

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1821442-2
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	8/30/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	f18082923016
Units	%
Final Volume	1
Dilution	1
Reporting Limit	240

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	NONANE (C9)	5190	240	108	4800	50	130
SHC	C10	DECANE (C10)	4880	240	102	4800	50	130
SHC	C12	DODECANE (C12)	4910	240	102	4800	50	130
SHC	C14	TETRADECANE (C14)	4860	240	101	4800	50	130
SHC	C16	HEXADECANE (C16)	5280	240	110	4800	50	130
SHC	C18	OCTADECANE (C18)	5280	240	110	4800	50	130
SHC	C19	NONADECANE (C19)	5070	240	106	4800	50	130
SHC	C20	EICOSANE (C20)	4990	240	104	4800	50	130
SHC	C22	DOCOSANE (C22)	4980	240	104	4800	50	130
SHC	C24	TETRACOSANE (C24)	5310	240	111	4800	50	130
SHC	C26	HEXACOSANE (C26)	5000	240	104	4800	50	130
SHC	C28	OCTACOSANE (C28)	4950	240	103	4800	50	130
SHC	C30	TRIACONTANE (C30)	4980	240	104	4800	50	130
SHC	C36	HEXATRIACONTANE (C36)	4890	240	102	4800	50	130

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

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1821442-3
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	8/30/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	f18082923018
Units	%
Final Volume	1
Dilution	1
Reporting Limit	240

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
SHC	C9	NONANE (C9)	5120	240	107	4800	50	130	1	30
SHC	C10	DECANE (C10)	4820	240	100	4800	50	130	2	30
SHC	C12	DODECANE (C12)	4830	240	101	4800	50	130	1	30
SHC	C14	TETRADECANE (C14)	4760	240	99	4800	50	130	2	30
SHC	C16	HEXADECANE (C16)	5160	240	108	4800	50	130	2	30
SHC	C18	OCTADECANE (C18)	5200	240	108	4800	50	130	2	30
SHC	C19	NONADECANE (C19)	4990	240	104	4800	50	130	2	30
SHC	C20	EICOSANE (C20)	4910	240	102	4800	50	130	2	30
SHC	C22	DOCOSANE (C22)	4910	240	102	4800	50	130	2	30
SHC	C24	TETRACOSANE (C24)	5240	240	109	4800	50	130	2	30
SHC	C26	HEXACOSANE (C26)	4950	240	103	4800	50	130	1	30
SHC	C28	OCTACOSANE (C28)	4900	240	102	4800	50	130	1	30
SHC	C30	TRIACONTANE (C30)	4930	240	103	4800	50	130	1	30
SHC	C36	HEXATRIACONTANE (C36)	4810	240	100	4800	50	130	2	30

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

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1819788-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8015D(M)-A2-NFSHC
Batch ID	WG1819788-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	8/15/2023
Sample Size(wet)	0.1008 g
% Solid	100
File ID	F18081123032
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)	7100	0.992	113	6286	65	135
SHC	C10	DECANE (C10)	5440	0.992	108	5047	65	135
SHC	C11	UNDECANE	4890	0.992	104	4703	65	135
SHC	C12	DODECANE (C12)	4660	0.992	112	4155	65	135
SHC	C13	TRIDECANE	4250	0.992	105	4058	65	135
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	952	0.992	113	845	65	135
SHC	C14	TETRADECANE (C14)	3870	0.992	105	3670	65	135
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	1520	0.992	111	1367	65	135
SHC	C15	PENTADECANE (C15)	4490	0.992	123	3660	65	135
SHC	C16	HEXADECANE (C16)	3560	0.992	107	3330	65	135
SHC	1650	NORPRISTANE (1650)	1090	0.992	100	1093	65	135
SHC	C17	HEPTADECANE (C17)	3130	0.992	104	3012	65	135
SHC	Pr	PRISTANE	2470	0.992	115	2145	65	135
SHC	C18	OCTADECANE (C18)	2640	0.992	98	2700	65	135
SHC	Ph	PHYTANE	1410	0.992	116	1215	65	135
SHC	C19	NONADECANE (C19)	2670	0.992	116	2305	65	135
SHC	C20	EICOSANE (C20)	2440	0.992	104	2337	65	135
SHC	C21	HENEICOSANE (C21)	2300	0.992	112	2044	65	135
SHC	C22	DOCOSANE (C22)	2130	0.992	108	1972	65	135
SHC	C23	TRICOSANE (C23)	1940	0.992	111	1745	65	135
SHC	C24	TETRACOSANE (C24)	1900	0.992	116	1641	65	135
SHC	C25	PENTACOSANE (C25)	1840	0.992	118	1562	65	135
SHC	C26	HEXACOSANE (C26)	1490	0.992	108	1378	65	135
SHC	C27	HEPTACOSANE (C27)	1270	0.992	117	1083	65	135
SHC	C28	OCTACOSANE (C28)	842	0.992	108	776	65	135
SHC	C29	NONACOSANE (C29)	813	0.992	111	734	65	135
SHC	C30	TRIACONTANE (C30)	682	0.992	109	627	65	135
SHC	C31	HENTATRIACONTANE (C31)	572	0.992	111	514	65	135
SHC	C32	DOTRIACONTANE (C32)	605	0.992	132	458	65	135
SHC	C33	TRITRIACONTANE (C33)	341	0.992	88	388	65	135
SHC	C34	TETRATRIACONTANE (C34)	327	0.992	94	347	65	135
SHC	C35	PENTATRIACONTANE (C35)	283	0.992	102	278	65	135
SHC	C36	HEXATRIACONTANE (C36)	172	0.992	92	186	65	135
SHC	C37	HEPTATRIACONTANE (C37)	164	0.992	108	152	65	135
SHC	C38	OCTATRIACONTANE (C38)	140	0.992	107	131	65	135
SHC	C39	NONATRIACONTANE (C39)	88.7	0.992	100	89	65	135
SHC	C40	TETRACONTANE (C40)	103	0.992	112	92	65	135
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	599000	0.992	108	554993	65	135
SHC	TSH	TOTAL SATURATED HYDROCARBONS	84685	0.992	124	68122	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	GE OVA 02AGO2023
Lab ID	L2345965-02
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	8/2/2023
Date Received	8/9/2023
Date Prepped	8/29/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.0046 g
% Solid	100
File ID	F808312330
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		2.17
2	D2	C2-DECALINS	U		2.17
2	D3	C3-DECALINS	U		2.17
2	D4	C4-DECALINS	U		2.17
S	BT0	BENZOTHIOPHENE	U		2.17
2	BT1	C1-BENZO(B)THIOPHENES	1.31	J	2.17
2	BT2	C2-BENZO(B)THIOPHENES	2.94		2.17
2	BT3	C3-BENZO(B)THIOPHENES	7.63		2.17
2	BT4	C4-BENZO(B)THIOPHENES	10.4		2.17
A	N0	NAPHTHALENE	1.20	J	2.17
2	N1	C1-NAPHTHALENES	2.31		2.17
2	N2	C2-NAPHTHALENES	25.7		2.17
2	N3	C3-NAPHTHALENES	98.6		2.17
2	N4	C4-NAPHTHALENES	124		2.17
2	B	BIPHENYL	1.66	J	2.17
3	DF	DIBENZOFURAN	0.957	J	2.17
3	AY	ACENAPHTHYLENE	1.24	J	2.17
3	AE	ACENAPHTHENE	2.80		2.17
3	F0	FLUORENE	8.72		2.17
3	F1	C1-FLUORENES	43.6		2.17
3	F2	C2-FLUORENES	122		2.17
3	F3	C3-FLUORENES	155		2.17
3	A0	ANTHRACENE	7.62		2.17
3	P0	PHENANTHRENE	73.5		2.17
3	PA1	C1-PHENANTHRENES/ANTHRACENES	253		2.17
3	PA2	C2-PHENANTHRENES/ANTHRACENES	483		2.17
3	PA3	C3-PHENANTHRENES/ANTHRACENES	415		2.17
3	PA4	C4-PHENANTHRENES/ANTHRACENES	220		2.17
3	RET	RETENE	U		2.17
3	DBT0	DIBENZOTHIOPHENE	9.44		2.17
3	DBT1	C1-DIBENZOTHIOPHENES	60.6		2.17
3	DBT2	C2-DIBENZOTHIOPHENES	102		2.17
3	DBT3	C3-DIBENZOTHIOPHENES	115		2.17
3	DBT4	C4-DIBENZOTHIOPHENES	68.4		2.17
4	BF	BENZO(B)FLUORENE	11.4		2.17
4	FL0	FLUORANTHENE	6.22		2.17
4	PY0	PYRENE	46.5		2.17
4	FP1	C1-FLUORANTHENES/PYRENES	163		2.17
4	FP2	C2-FLUORANTHENES/PYRENES	261		2.17
4	FP3	C3-FLUORANTHENES/PYRENES	303		2.17
4	FP4	C4-FLUORANTHENES/PYRENES	261		2.17
4	NBT0	NAPHTHOBENZOTHIOPHENE	28.1		2.17
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	95.8		2.17
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	152		2.17
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	128		2.17
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	84.4		2.17
4	BA0	BENZ(A)ANTHRACENE	33.7		2.17
4	C0	CHRYSENE/TRIPHENYLENE	89.1		2.17
4	BC1	C1-CHRYSENES	302		2.17
4	BC2	C2-CHRYSENES	500		2.17
4	BC3	C3-CHRYSENES	527		2.17
4	BC4	C4-CHRYSENES	298		2.17
5	BBF	BENZO(B)FLUORANTHENE	16.9		2.17

Project Name: PAMPILLA 2
Project Number:

Client ID	GE OVA 02AGO2023
Lab ID	L2345965-02
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	8/2/2023
Date Received	8/9/2023
Date Prepped	8/29/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.0046 g
% Solid	100
File ID	F808312330
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.09

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE	3.45		2.17
5	BAF	BENZO(A)FLUORANTHENE		U	2.17
5	BEP	BENZO(E)PYRENE	46.8		2.17
5	BAP	BENZO(A)PYRENE	21.2		2.17
5	PER	PERYLENE	9.91		2.17
6	IND	INDENO(1,2,3-CD)PYRENE	6.08		2.17
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	9.63		2.17
6	GHI	BENZO(GHI)PERYLENE	15.0		2.17
O	CAR	CARBAZOLE	1.36	JB	2.17
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	19.7		2.17
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	30.4		2.17
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	5.08		2.17
3	3MP	3-METHYLPHENANTHRENE (3MP)	60.3		2.17
3	2MP	2-METHYLPHENANTHRENE (2MP)	75.0		2.17
3	2MA	2-METHYLANTHRACENE (2MA)	9.51		2.17
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	59.6		2.17
3	1MP	1-METHYLPHENANTHRENE (1MP)	42.5		2.17
A	1MN	1-METHYLNAPHTHALENE	1.70	J	2.17
A	2MN	2-METHYLNAPHTHALENE	1.75	J	2.17
2	26DMN	2,6-DIMETHYLNAPHTHALENE	10.0		2.17
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	12.0		2.17
H30	T19	HOPANE (T19)	493		2.17
t23	T4	C23 TRICYCLIC TERPANE (T4)	66.6		2.17
t24	T5	C24 TRICYCLIC TERPANE (T5)	38.9		2.17
t25	T6	C25 TRICYCLIC TERPANE (T6)	41.0		2.17
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	20.0		2.17
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	29.5		2.17
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	28.5		2.17
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	38.1		2.17
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	41.9		2.17
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	30.4		2.17
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	34.8		2.17
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	61.6		2.17
t30S	T11a	C30 TRICYCLIC TERPANE-22S	33.7		2.17
t30R	T11b	C30 TRICYCLIC TERPANE-22R	27.4		2.17
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	90.2		2.17
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	32.0		2.17
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	26.1		2.17
H29	T15	30-NORHOPANE (T15)	291		2.17
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	58.4		2.17
X	X	17A(H)-DIAHOPANE (X)	34.0		2.17
M29	T17	30-NORMORETANE (T17)	37.2		2.17
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	62.4		2.17
M30	T20	MORETANE (T20)	61.3		2.17
H31S	T21	30-HOMOHOPANE-22S (T21)	174		2.17
H31R	T22	30-HOMOHOPANE-22R (T22)	173		2.17
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	74.0		2.17
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	129		2.17
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	94.7		2.17
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	89.4		2.17
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	55.8		2.17
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	71.1		2.17
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	45.7		2.17
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	52.8		2.17

Project Name: PAMPILLA 2
Project Number:

Client ID	GE OVA 02AGO2023
Lab ID	L2345965-02
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	8/2/2023
Date Received	8/9/2023
Date Prepped	8/29/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.0046 g
% Solid	100
File ID	F808312330
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.09

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	60.0	2.17
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	38.3	2.17
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	23.8	2.17
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	13.1	2.17
aa27S	S12	17A(H)20SC27/C29DIA	68.7	2.17
aa27R	S17	17A(H)20RC27/C29DIA	80.9	2.17
d29R	S18	UNKNOWN STERANE (S18)	12.3	2.17
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	4.74	2.17
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	42.4	2.17
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	39.1	2.17
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	44.3	2.17
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	50.6	2.17
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	50.3	2.17
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	46.9	2.17
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	41.5	2.17
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	52.0	2.17
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	71.1	2.17
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	45.3	2.17
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	54.6	2.17
SC28TAS	TAS02	C28,20S TAS	55.4	2.17
RC27TAS	TAS03	C27,20R TAS	44.7	2.17
RC28TAS	TAS04	C28,20R TAS	34.8	2.17

Surrogates (% Recovery)	
NAPHTHALENE-D8	96
PHENANTHRENE-D10	99
BENZO(A)PYRENE-D12	116
5B(H)CHOLANE	104

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821442-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F808312315
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	2.40
2	D2	C2-DECALINS		U	2.40
2	D3	C3-DECALINS		U	2.40
2	D4	C4-DECALINS		U	2.40
S	BT0	BENZOTHIOPHENE		U	2.40
2	BT1	C1-BENZO(B)THIOPHENES		U	2.40
2	BT2	C2-BENZO(B)THIOPHENES		U	2.40
2	BT3	C3-BENZO(B)THIOPHENES		U	2.40
2	BT4	C4-BENZO(B)THIOPHENES		U	2.40
A	N0	NAPHTHALENE		U	2.40
2	N1	C1-NAPHTHALENES		U	2.40
2	N2	C2-NAPHTHALENES		U	2.40
2	N3	C3-NAPHTHALENES		U	2.40
2	N4	C4-NAPHTHALENES		U	2.40
2	B	BIPHENYL		U	2.40
3	DF	DIBENZOFURAN		U	2.40
3	AY	ACENAPHTHYLENE		U	2.40
3	AE	ACENAPHTHENE		U	2.40
3	F0	FLUORENE	0.167	J	2.40
3	F1	C1-FLUORENES		U	2.40
3	F2	C2-FLUORENES		U	2.40
3	F3	C3-FLUORENES		U	2.40
3	A0	ANTHRACENE		U	2.40
3	P0	PHENANTHRENE	0.0753	J	2.40
3	PA1	C1-PHENANTHRENES/ANTHRACENES		U	2.40
3	PA2	C2-PHENANTHRENES/ANTHRACENES		U	2.40
3	PA3	C3-PHENANTHRENES/ANTHRACENES		U	2.40
3	PA4	C4-PHENANTHRENES/ANTHRACENES		U	2.40
3	RET	RETENE		U	2.40
3	DBT0	DIBENZOTHIOPHENE	0.0962	J	2.40
3	DBT1	C1-DIBENZOTHIOPHENES	0.362	J	2.40
3	DBT2	C2-DIBENZOTHIOPHENES		U	2.40
3	DBT3	C3-DIBENZOTHIOPHENES		U	2.40
3	DBT4	C4-DIBENZOTHIOPHENES		U	2.40
4	BF	BENZO(B)FLUORENE		U	2.40
4	FL0	FLUORANTHENE	0.0693	J	2.40
4	PY0	PYRENE		U	2.40
4	FP1	C1-FLUORANTHENES/PYRENES		U	2.40
4	FP2	C2-FLUORANTHENES/PYRENES		U	2.40
4	FP3	C3-FLUORANTHENES/PYRENES		U	2.40
4	FP4	C4-FLUORANTHENES/PYRENES		U	2.40
4	NBT0	NAPHTHOBENZOTHIOPHENE		U	2.40
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES		U	2.40
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES		U	2.40
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES		U	2.40
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES		U	2.40
4	BA0	BENZ(A)ANTHRACENE	0.103	J	2.40
4	C0	CHRYSENE/TRIPHENYLENE	0.140	J	2.40
4	BC1	C1-CHRYSENES		U	2.40
4	BC2	C2-CHRYSENES		U	2.40
4	BC3	C3-CHRYSENES		U	2.40
4	BC4	C4-CHRYSENES		U	2.40
5	BBF	BENZO(B)FLUORANTHENE	0.145	J	2.40

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821442-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F808312315
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.2

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE	0.124	J	2.40
5	BAF	BENZO(A)FLUORANTHENE		U	2.40
5	BEP	BENZO(E)PYRENE	0.226	J	2.40
5	BAP	BENZO(A)PYRENE		U	2.40
5	PER	PERYLENE		U	2.40
6	IND	INDENO(1,2,3-CD)PYRENE	0.539	J	2.40
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	0.280	J	2.40
6	GHI	BENZO(GHI)PERYLENE	0.944	J	2.40
O	CAR	CARBAZOLE	0.168	J	2.40
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	0.106	J	2.40
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)		U	2.40
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	0.157	J	2.40
3	3MP	3-METHYLPHENANTHRENE (3MP)		U	2.40
3	2MP	2-METHYLPHENANTHRENE (2MP)		U	2.40
3	2MA	2-METHYLANTHRACENE (2MA)		U	2.40
3	9MP	9/4-METHYLPHENANTHRENE (9MP)		U	2.40
3	1MP	1-METHYLPHENANTHRENE (1MP)		U	2.40
A	1MN	1-METHYLNAPHTHALENE		U	2.40
A	2MN	2-METHYLNAPHTHALENE		U	2.40
2	26DMN	2,6-DIMETHYLNAPHTHALENE		U	2.40
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE		U	2.40
H30	T19	HOPANE (T19)		U	2.40
t23	T4	C23 TRICYCLIC TERPANE (T4)		U	2.40
t24	T5	C24 TRICYCLIC TERPANE (T5)		U	2.40
t25	T6	C25 TRICYCLIC TERPANE (T6)		U	2.40
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)		U	2.40
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)		U	2.40
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)		U	2.40
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)		U	2.40
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)		U	2.40
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)		U	2.40
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)		U	2.40
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)		U	2.40
t30S	T11a	C30 TRICYCLIC TERPANE-22S		U	2.40
t30R	T11b	C30 TRICYCLIC TERPANE-22R		U	2.40
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)		U	2.40
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)		U	2.40
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)		U	2.40
H29	T15	30-NORHOPANE (T15)		U	2.40
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)		U	2.40
X	X	17A(H)-DIAHOPANE (X)		U	2.40
M29	T17	30-NORMORETANE (T17)		U	2.40
OL	T18	18A(H)&18B(H)-OLEANANES (T18)		U	2.40
M30	T20	MORETANE (T20)		U	2.40
H31S	T21	30-HOMOHOPANE-22S (T21)		U	2.40
H31R	T22	30-HOMOHOPANE-22R (T22)		U	2.40
T22A	T22A	GAMMACERANE/C32-DIAHOPANE		U	2.40
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)		U	2.40
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)		U	2.40
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)		U	2.40
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)		U	2.40
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)		U	2.40
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)		U	2.40
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)		U	2.40

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821442-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F808312315
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.2

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	U	2.40
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	U	2.40
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	U	2.40
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	U	2.40
aa27S	S12	17A(H)20SC27/C29DIA	U	2.40
aa27R	S17	17A(H)20RC27/C29DIA	U	2.40
d29R	S18	UNKNOWN STERANE (S18)	U	2.40
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	U	2.40
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	U	2.40
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	U	2.40
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	U	2.40
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	U	2.40
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	U	2.40
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	U	2.40
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	U	2.40
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	U	2.40
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	U	2.40
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	U	2.40
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	U	2.40
SC28TAS	TAS02	C28,20S TAS	U	2.40
RC27TAS	TAS03	C27,20R TAS	U	2.40
RC28TAS	TAS04	C28,20R TAS	U	2.40

Surrogates (% Recovery)	
NAPHTHALENE-D8	97
PHENANTHRENE-D10	116
BENZO(A)PYRENE-D12	122
5B(H)CHOLANE	104

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1821442-2
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F808312316
Units	%
Final Volume	1
Dilution	1
Reporting Limit	2.4

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
A	N0	NAPHTHALENE	228	2.40	95	240	50	130
3	AY	ACENAPHTHYLENE	232	2.40	97	240	50	130
3	AE	ACENAPHTHENE	243	2.40	101	240	50	130
3	F0	FLUORENE	251	2.40	104	240	50	130
3	A0	ANTHRACENE	276	2.40	115	240	50	130
3	P0	PHENANTHRENE	253	2.40	105	240	50	130
4	FL0	FLUORANTHENE	210	2.40	87	240	50	130
4	PY0	PYRENE	228	2.40	95	240	50	130
4	BA0	BENZ(A)ANTHRACENE	257	2.40	107	240	50	130
4	C0	CHRYSENE/TRIPHENYLENE	238	2.40	99	240	50	130
5	BBF	BENZO(B)FLUORANTHENE	261	2.40	109	240	50	130
5	BJKF	BENZO(J)+(K)FLUORANTHENE	258	2.40	108	240	50	130
5	BAP	BENZO(A)PYRENE	257	2.40	107	240	50	130
6	IND	INDENO(1,2,3-CD)PYRENE	283	2.40	118	240	50	130
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	292	2.40	122	240	50	130
6	GHI	BENZO(GHI)PERYLENE	252	2.40	105	240	50	130
A	2MN	2-METHYLNAPHTHALENE	226	2.40	94	240	50	130

Surrogates (% Recovery)	
NAPHTHALENE-D8	100
PHENANTHRENE-D10	111
BENZO(A)PYRENE-D12	118
5B(H)CHOLANE	101

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1821442-3
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F808312317
Units	%
Final Volume	1
Dilution	1
Reporting Limit	2.4

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
A	N0	NAPHTHALENE	226	2.40	94	240	50	130	1	30
3	AY	ACENAPHTHYLENE	231	2.40	96	240	50	130	1	30
3	AE	ACENAPHTHENE	242	2.40	101	240	50	130	0	30
3	F0	FLUORENE	246	2.40	102	240	50	130	2	30
3	A0	ANTHRACENE	274	2.40	114	240	50	130	1	30
3	P0	PHENANTHRENE	248	2.40	104	240	50	130	1	30
4	FL0	FLUORANTHENE	203	2.40	85	240	50	130	2	30
4	PY0	PYRENE	223	2.40	93	240	50	130	2	30
4	BA0	BENZ(A)ANTHRACENE	255	2.40	106	240	50	130	1	30
4	C0	CHRYSENE/TRIPHENYLENE	234	2.40	98	240	50	130	1	30
5	BBF	BENZO(B)FLUORANTHENE	258	2.40	108	240	50	130	1	30
5	BJKF	BENZO(J)+(K)FLUORANTHENE	254	2.40	106	240	50	130	2	30
5	BAP	BENZO(A)PYRENE	256	2.40	106	240	50	130	1	30
6	IND	INDENO(1,2,3-CD)PYRENE	275	2.40	115	240	50	130	3	30
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	290	2.40	121	240	50	130	1	30
6	GHI	BENZO(GHI)PERYLENE	250	2.40	104	240	50	130	1	30
A	2MN	2-METHYLNAPHTHALENE	226	2.40	94	240	50	130	0	30

Surrogates (% Recovery)	
NAPHTHALENE-D8	99
PHENANTHRENE-D10	110
BENZO(A)PYRENE-D12	118
5B(H)CHOLANE	101

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1819802-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1819802-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	8/24/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F808232315
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	501	1.94	105	477.66	65	135
2	D1	C1-DECALINS	814	1.94	107	760.39	65	135
2	D2	C2-DECALINS	775	1.94	115	675.98	65	135
2	D3	C3-DECALINS	430	1.94	117	366.46	65	135
2	D4	C4-DECALINS	420	1.94	116	362.78	65	135
S	BT0	BENZOTHIOPHENE	6.74	1.94	117	5.75	65	135
2	BT1	C1-BENZO(B)THIOPHENES	35.2	1.94	117	29.96	65	135
2	BT2	C2-BENZO(B)THIOPHENES	58.2	1.94	114	50.93	65	135
2	BT3	C3-BENZO(B)THIOPHENES	121	1.94	117	103.18	65	135
2	BT4	C4-BENZO(B)THIOPHENES	113	1.94	124	90.8	65	135
A	N0	NAPHTHALENE	506	1.94	90	565.56	65	135
2	N1	C1-NAPHTHALENES	1050	1.94	87	1208.32	65	135
2	N2	C2-NAPHTHALENES	1390	1.94	96	1450.37	65	135
2	N3	C3-NAPHTHALENES	1100	1.94	104	1052.74	65	135
2	N4	C4-NAPHTHALENES	690	1.94	118	583.65	65	135
2	B	BIPHENYL	146	1.94	100	145.7	65	135
3	DF	DIBENZOFURAN	59.8	1.94	120	49.63	65	135
3	AY	ACENAPHTHYLENE	7.54	1.94	109	6.91	65	135
3	AE	ACENAPHTHENE	17.0	1.94	93	18.35	65	135
3	F0	FLUORENE	77.4	1.94	109	70.69	65	135
3	F1	C1-FLUORENES	175	1.94	108	162.7	65	135
3	F2	C2-FLUORENES	282	1.94	112	251.87	65	135
3	F3	C3-FLUORENES	279	1.94	115	242.29	65	135
3	P0	PHENANTHRENE	185	1.94	98	188.41	65	135
3	PA1	C1-PHENANTHRENES/ANTHRACENES	406	1.94	105	388.12	65	135
3	PA2	C2-PHENANTHRENES/ANTHRACENES	489	1.94	112	434.38	65	135
3	PA3	C3-PHENANTHRENES/ANTHRACENES	350	1.94	113	308.67	65	135
3	PA4	C4-PHENANTHRENES/ANTHRACENES	145	1.94	112	129.94	65	135
3	DBT0	DIBENZOTHIOPHENE	123	1.94	94	130.56	65	135
3	DBT1	C1-DIBENZOTHIOPHENES	263	1.94	96	275.34	65	135
3	DBT2	C2-DIBENZOTHIOPHENES	384	1.94	104	369.42	65	135
3	DBT3	C3-DIBENZOTHIOPHENES	363	1.94	105	345.39	65	135
3	DBT4	C4-DIBENZOTHIOPHENES	208	1.94	107	193.51	65	135
4	FL0	FLUORANTHENE	4.09	1.94	108	3.77	65	135
4	PY0	PYRENE	13.1	1.94	112	11.65	65	135
4	FP1	C1-FLUORANTHENES/PYRENES	59.5	1.94	109	54.43	65	135
4	FP2	C2-FLUORANTHENES/PYRENES	101	1.94	113	89.07	65	135
4	FP3	C3-FLUORANTHENES/PYRENES	116	1.94	106	109.78	65	135
4	FP4	C4-FLUORANTHENES/PYRENES	102	1.94	105	97.22	65	135
4	NBT0	NAPHTHOBENZOTHIOPHENE	42.4	1.94	108	39.13	65	135
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	115	1.94	108	106.13	65	135
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	154	1.94	103	150.09	65	135
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	124	1.94	103	120.77	65	135
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	90.0	1.94	105	85.38	65	135
4	BA0	BENZ(A)ANTHRACENE	2.78	1.94	122	2.28	65	135
4	C0	CHRYSENE/TRIPHENYLENE	42.7	1.94	116	36.66	65	135
4	BC1	C1-CHRYSENES	69.5	1.94	108	64.59	65	135
4	BC2	C2-CHRYSENES	92.5	1.94	106	87.41	65	135
4	BC3	C3-CHRYSENES	105	1.94	104	101.29	65	135
4	BC4	C4-CHRYSENES	62.8	1.94	99	63.42	65	135
5	BBF	BENZO(B)FLUORANTHENE	6.75	1.94	125	5.4	65	135
5	BEP	BENZO(E)PYRENE	10.7	1.94	108	9.88	65	135
5	BAP	BENZO(A)PYRENE	2.19	1.94	108	2.03	65	135
5	PER	PERYLENE	3.69	1.94	110	3.34	65	135
6	GHI	BENZO(GHI)PERYLENE	4.07	1.94	113	3.59	65	135
O	CAR	CARBAZOLE	5.62	1.94	92	6.09	65	135
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	121	1.94	92	131.38	65	135
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	93.0	1.94	95	98.05	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude	
Lab ID	WG1819802-1	
Matrix	OIL	
Matrix Description	Crude Oil	
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER	
Batch ID	WG1819802-1	
Date Collected	N/A	
Date Received	N/A	
Date Prepped	N/A	
Date Analyzed	8/24/2023	
Sample Size(wet)	0.0514	g
% Solid	100	
File ID	F808232315	
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)	40.6	1.94	100	40.36	65	135
3	3MP	3-METHYLPHENANTHRENE (3MP)	84.0	1.94	106	79.32	65	135
3	2MA	2-METHYLANTHRACENE (2MA)	3.49	1.94	116	3	65	135
3	1MP	1-METHYLPHENANTHRENE (1MP)	93.2	1.94	106	87.93	65	135
A	1MN	1-METHYLNAPHTHALENE	744	1.94	94	793.54	65	135
A	2MN	2-METHYLNAPHTHALENE	902	1.94	83	1087.89	65	135
2	26DMN	2,6-DIMETHYLNAPHTHALENE	606	1.94	95	635.33	65	135
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	148	1.94	100	147.12	65	135
H30	T19	HOPANE (T19)	196	1.94	122	161.24	65	135
t23	T4	C23 TRICYCLIC TERPANE (T4)	71.0	1.94	102	69.8	65	135
t24	T5	C24 TRICYCLIC TERPANE (T5)	43.4	1.94	103	42.1	65	135
t25	T6	C25 TRICYCLIC TERPANE (T6)	44.6	1.94	110	40.4	65	135
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	17.2	1.94	121	14.2	65	135
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	19.2	1.94	118	16.3	65	135
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	15.6	1.94	107	14.6	65	135
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	21.0	1.94	130	16.2	65	135
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	22.8	1.94	130	17.6	65	135
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	21.3	1.94	111	19.2	65	135
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	26.2	1.94	125	21	65	135
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	33.0	1.94	117	28.3	65	135
t30S	T11a	C30 TRICYCLIC TERPANE-22S	17.8	1.94	116	15.3	65	135
t30R	T11b	C30 TRICYCLIC TERPANE-22R	18.2	1.94	120	15.2	65	135
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	41.5	1.94	121	34.4	65	135
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	6.96	1.94	99	7	65	135
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	9.37	1.94	116	8.1	65	135
H29	T15	30-NORHOPANE (T15)	108	1.94	119	90.7	65	135
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	27.2	1.94	117	23.3	65	135
X	X	17A(H)-DIAHOPANE (X)	15.3	1.94	118	13	65	135
M29	T17	30-NORMORETANE (T17)	13.5	1.94	120	11.2	65	135
M30	T20	MORETANE (T20)	19.4	1.94	119	16.3	65	135
H31S	T21	30-HOMOHOPANE-22S (T21)	81.7	1.94	121	67.6	65	135
H31R	T22	30-HOMOHOPANE-22R (T22)	70.9	1.94	122	58.3	65	135
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	60.4	1.94	124	48.9	65	135
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	43.5	1.94	122	35.6	65	135
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	47.8	1.94	123	38.8	65	135
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	31.2	1.94	122	25.6	65	135
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	35.4	1.94	127	27.9	65	135
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	23.8	1.94	120	19.8	65	135
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	35.6	1.94	124	28.8	65	135
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	29.7	1.94	133	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)	28.7	1.94	114	25.1	65	135
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	27.8	1.94	112	24.8	65	135
aa27S	S12	17A(H)20SC27/C29DIA	70.7	1.94	118	59.74	65	135
aa27R	S17	17A(H)20RC27/C29DIA	87.6	1.94	122	71.55	65	135
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	4.72	1.94	124	3.8	65	135
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	39.6	1.94	120	33	65	135
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	40.7	1.94	126	32.2	65	135
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	51.9	1.94	100	51.7	65	135
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	41.6	1.94	115	36.1	65	135
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	45.3	1.94	118	38.4	65	135
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	47.3	1.94	119	39.7	65	135
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	50.6	1.94	123	41	65	135
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	64.0	1.94	124	51.7	65	135
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	69.8	1.94	128	54.6	65	135
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	43.1	1.94	113	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	199	1.94	109	182.5	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude	
Lab ID	WG1819802-1	
Matrix	OIL	
Matrix Description	Crude Oil	
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER	
Batch ID	WG1819802-1	
Date Collected	N/A	
Date Received	N/A	
Date Prepped	N/A	
Date Analyzed	8/24/2023	
Sample Size(wet)	0.0514	g
% Solid	100	
File ID	F808232315	
Units	mg/kg	
Final Volume	10	
Dilution	1	
Reporting Limit	1.94	

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
RC27TAS	TAS03	C27,20R TAS	185	1.94	104	177.1	65	135
RC28TAS	TAS04	C28,20R TAS	154	1.94	104	148.1	65	135

List of Potential Qualifiers

A: Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B: The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C: Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D: Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E: Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F: The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum

G: The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H: The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I: The lower value for the two columns has been reported due to obvious interference.

J: Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

J: Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

J: Estimated value. The Target analyte concentration is below the Limit of Quantitation (LOQ), but above the Detection Limit (DL). This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

M: Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND: Not detected at the Limit of Quantitation (LOQ) for the sample.

ND: Not detected at the Limit of Detection (LOD) for the sample.

ND: Not detected at the reporting limit (RL) for the sample.

ND: Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ: Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P: The RPD between the results for the two columns exceeds the method-specified criteria.

Q: The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R: Analytical results are from sample re-analysis.

RE: Analytical results are from sample re-extraction.

S: Analytical results are from modified screening analysis.

U: Not detected at the reported detection limit for the sample.

V: The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z: The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

HC OVA 03AGO2023

To: Refinería La Pampilla S.A.A.

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

Date: September 14, 2023

Subject: Chemical Fingerprinting of samples collected in Ventanilla, Peru

This memorandum summarizes the results of forensic chemical analysis conducted on one (1) sample that was collected by Repsol contractors on August 3, 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 two amber glass bottles consisting of petroleum residues. In order to ensure enough sample was available for analysis, two amber glass bottles of sample "HC OVA 03AGO2023" (labeled as Seal # 0203921 and 0203922 respectively) were shipped to Alpha Analytical Labs in Mansfield, MA under chain of custody. The sample arrived at a temperature of 22.8°C on August 10, 2023 with a DHL Tracking # 1507452811. The bottle labeled with Seal number 0203921 was analyzed.

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 OVA 03AGO2023 (HC OVA3) are shown in Figures 1A and1B respectively.

GC/FID Analysis

The GC/FID chromatogram for the HC OVA3 sample (Figure 1B), shows the sample is significantly weathered relative to the source oil sample due to both evaporation and biodegradation as indicated by the lack of substantial n-alkanes and the more recalcitrant isoprenoids (e.g. pristane and phytane). In addition, there is a relative increase in the unresolved complex mixture (UCM) which appears as a "hump" in the chromatogram relative to the source oil (Figure 1A). The petroleum GC/FID signature is consistent with a moderately/severely weathered crude or heavy fuel oil.

GC/MS Alkylated PAH and Biomarker Analysis

The PAH and biomarker molecular chemistry was evaluated to determine if there was evidence for a chemical linkage between the source oil and the HC OVA3 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 OVA3 sample are provided in Figures 2A and 2B respectively. The PAH histogram for the HC OVA3 sample (Figure 2B) shows this sample is weathered as indicated by the loss of decalins and relatively lower proportion of naphthalenes and fluorenes compared to the source oil. Elevated fluoranthenes/pyrenes, napthobenzothiophenes, and chrysenes relative to the source oil are also observed in this sample.

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 OVA3 sample plot away from each other indicating a different oil source.

The biomarker triterpene m/z 191 ion traces for the source oil and the HC OVA3 sample are presented in Figures 4A and 4B respectively. The biomarker traces for HC OVA3 show differences in the proportions of TS and TM (T11 and T12)[2] and the presence of oleanane (T18) which is absent in the source oil. These differences indicate the HC OVA3 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 HC OVA3 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.

Conclusion

The HC OVA 03AGO2023 sample consists of a moderately/severely weathered crude or heavy oil. The PAH and biomarker analysis indicate the petroleum detected in the source oil and HC OVA 03AGO2023 sample are chemically different and were derived from a different source of petroleum.

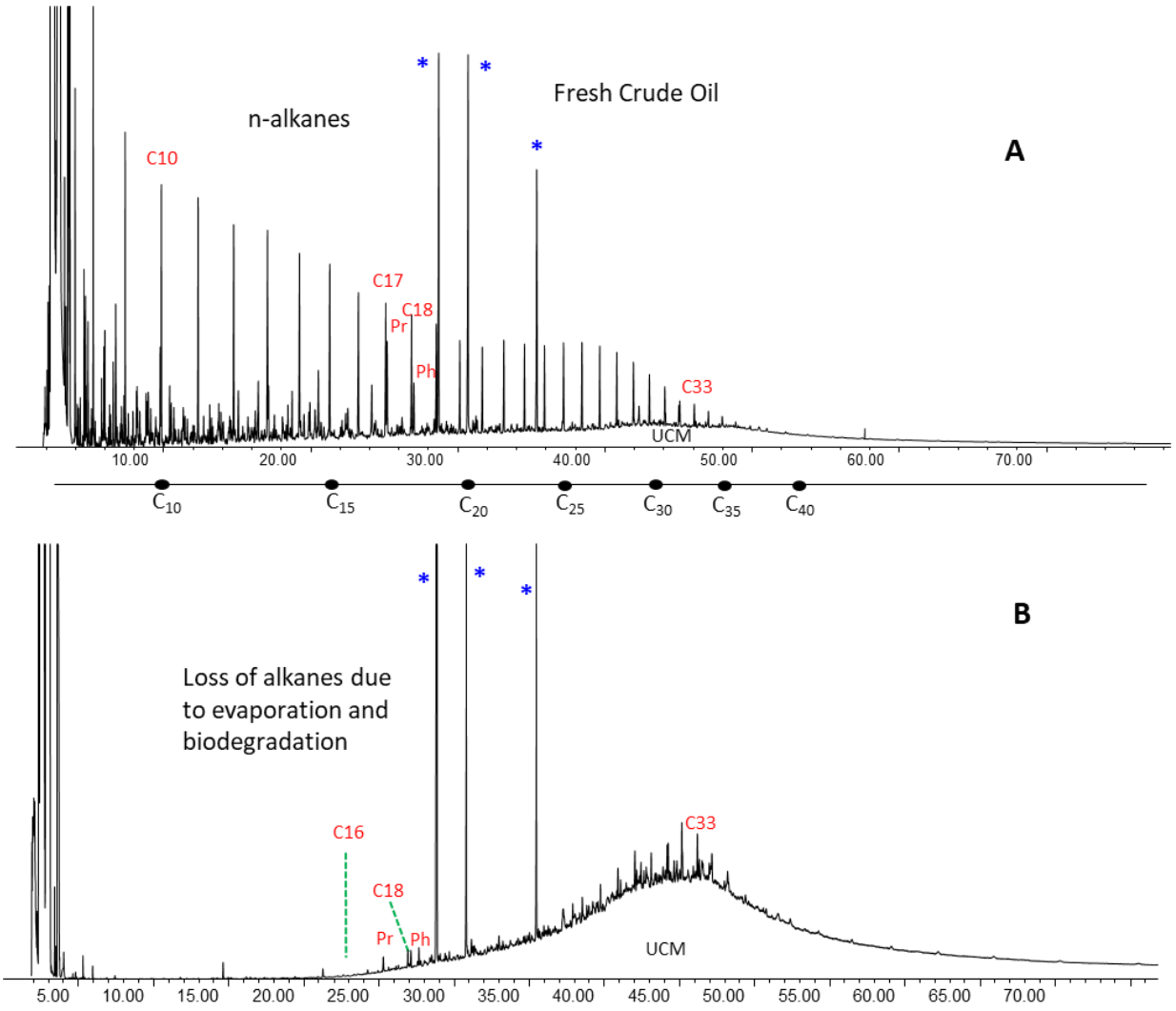


Figure 1. GC/FID "fingerprints" for the field samples.
Carbon ranges annotated below the x-axis analysis time scale.

A) Ship's Tanks Composite Sample
B) HC OVA 03AGO2023
'*': Laboratory-added Internal Standard

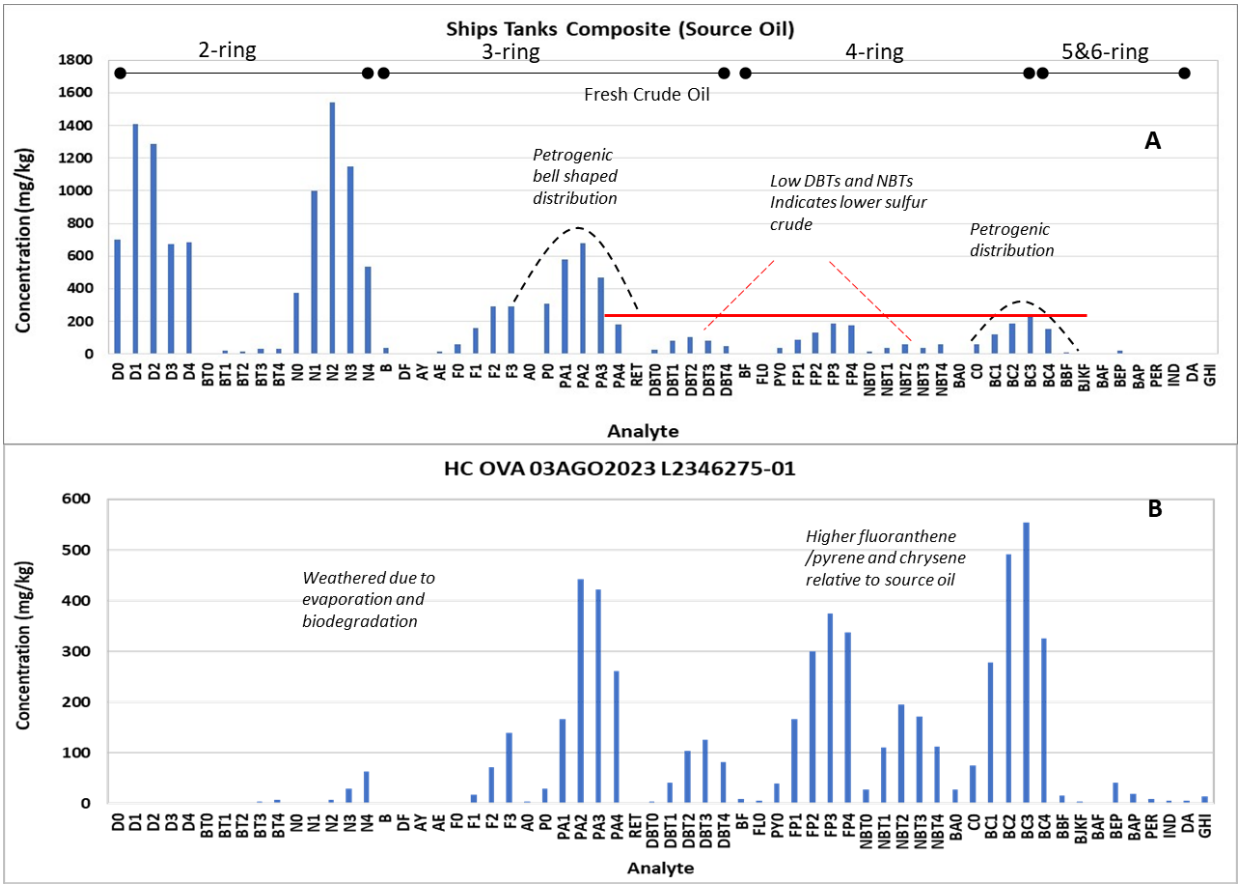


Figure 2. PAH Histograms

A) Ship's Tanks Composite Sample
B) HC OVA 03AGO2023

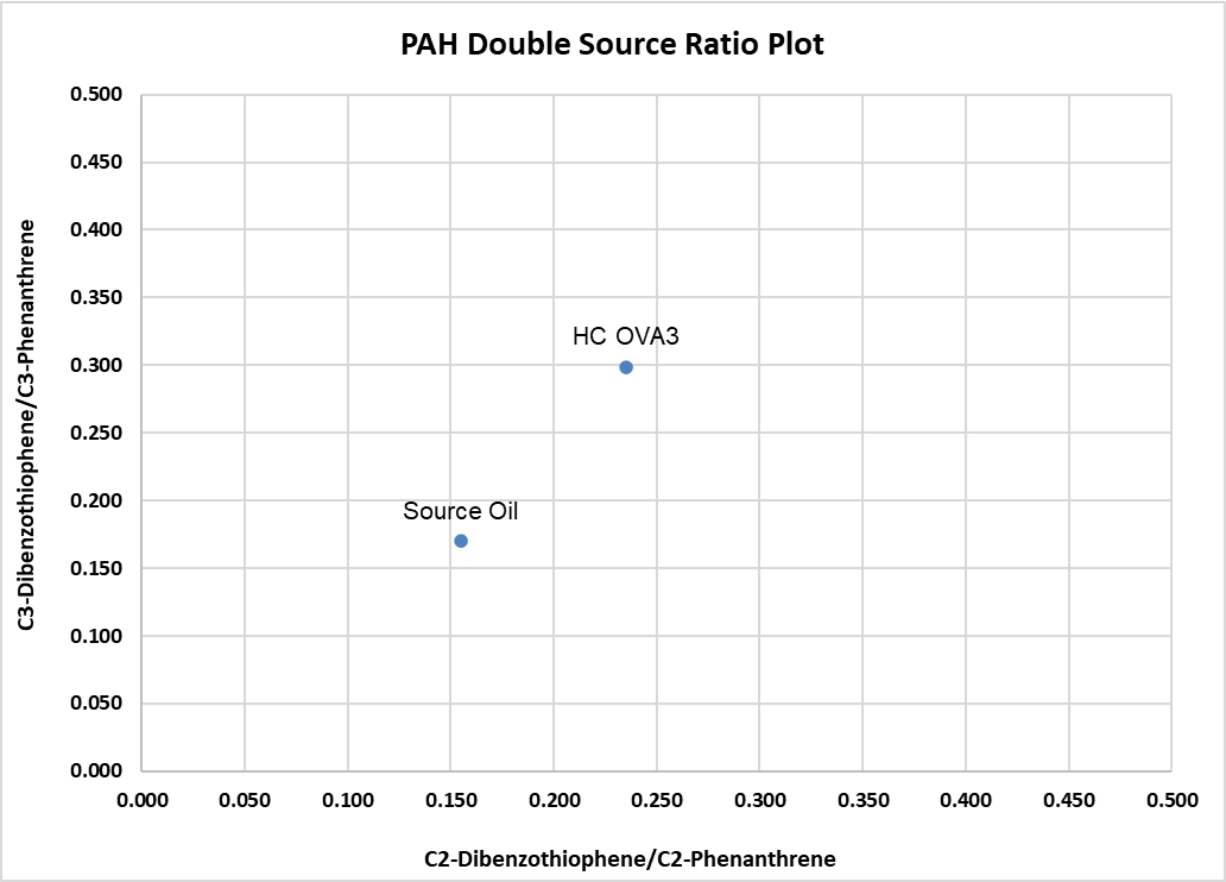


Figure 3. PAH Double Source Ratio Plot

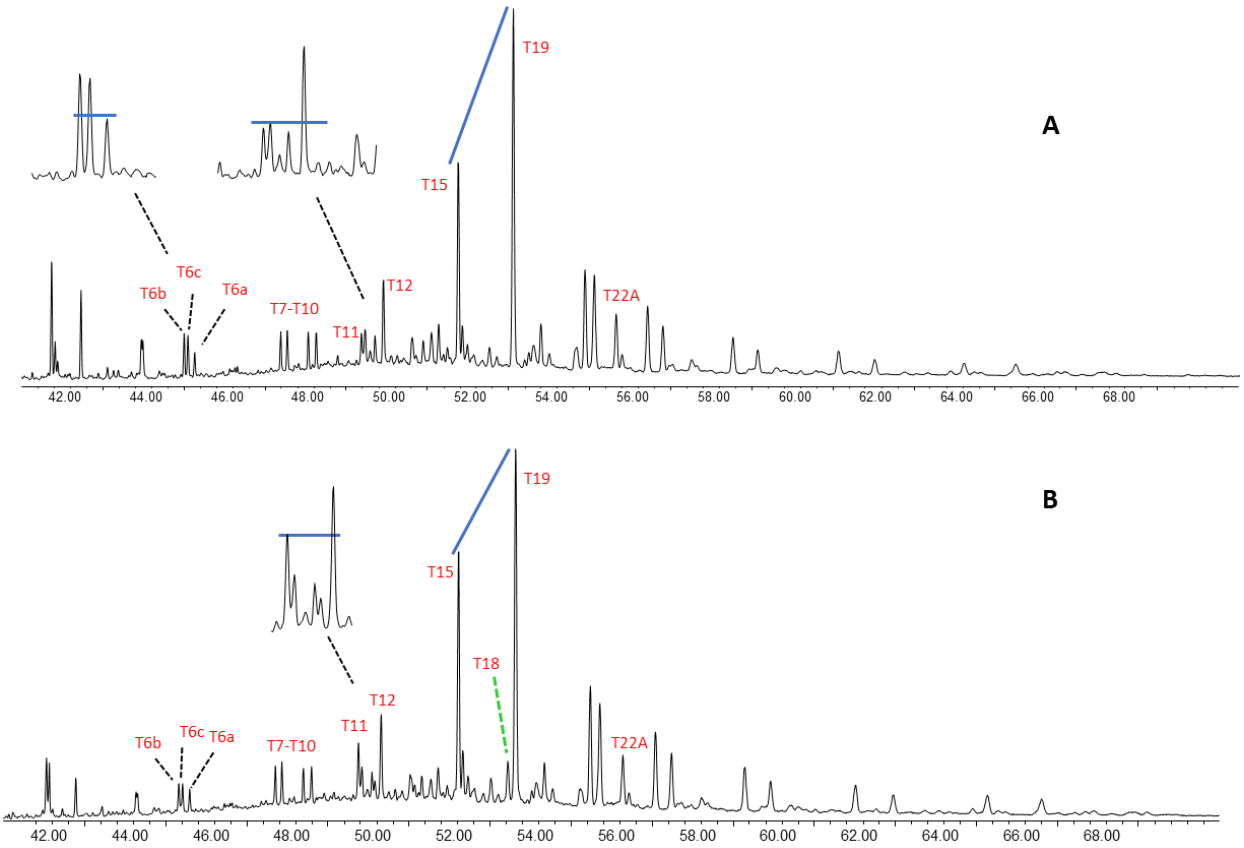


Figure 4. Biomarker m/z 191 Triterpane Fingerprint Traces

A) Ship's Tanks Composite Sample
B) HC OVA 03AGO2023

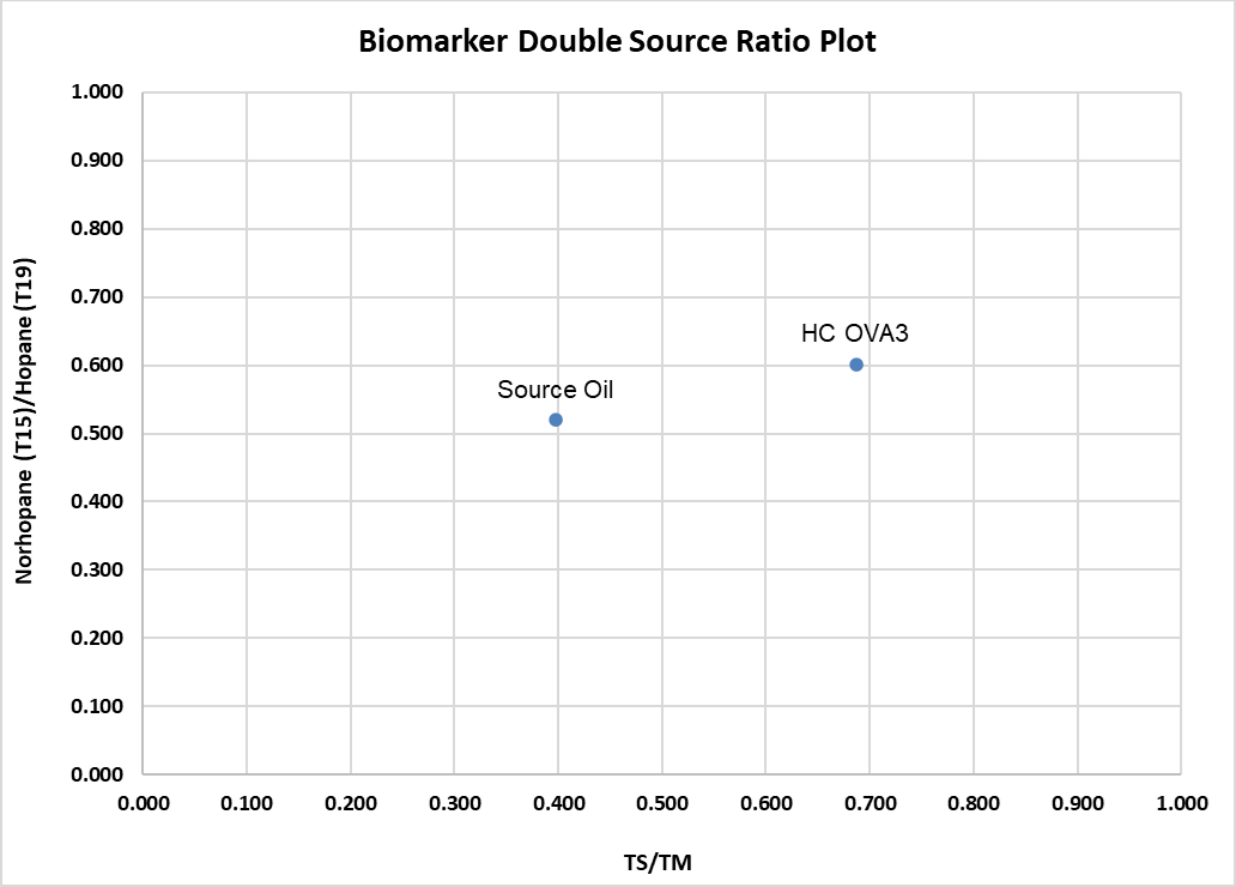


Figure 5. Biomarker Double Source Ratio Plot

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 OVA 03AGO2023	L2346275-01	08/03/2023	Oil	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

8/10/23 L2346275 Nº 007229

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

CERPER CERTIFICACIONES DEL PERU S.A.

EXPEDIENTE: EXMA-10547-2023
HS: 23006017
JOB NUMBER: 23LM0023134656O

SOLICITANTE: REFINERIA LA PAMPILLA S.A.A
PERSONA DE CONTACTO: CARLOS TORRES
LUGAR: PLAYA DEL OVALO | Distrito: HUARAL | Provincia: AUCALLAMA | Departamento: LIMA

NORMA:
1 SMEWW – APHA – AWWA - WEF. 23rd Ed. 2017. Collection and preservation of samples. Part 9060 A-B ( ) 1060 B-C ( ) 10200 B ( ) 10300 B ( ) 10500 B ( ) 10700 B ( )
2 Instrucción 8556 / Toma de muestras de sedimentos ( )
3 NTP 214.003 – 1997 (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 2019) 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: ( )

PARÁMETROS DE ANÁLISIS EN EL LABORATORIO

PARÁMETROS DE CAMP

FINGER PRINT

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 OVA 03A602023	03.08.23	8:44	*	0255334	8744678	18L	02
						Total de Envases	02

pH (Unidades de pH) | Temperatura Ambiental (°C) | Temperatura (°C) | Oxigeno Disuelto (mg/L) | Conductividad µS/cm ( ) mS/cm ( ) | Salinidad (UPS) | Cloro residual mg Cl_2/L Libre ( ) Total ( ) | Turbiedad (UNT) | Caudal (m³/s) | Transparencia cm ( ) m ( )

(1) Matriz (s)
AC = Agua para uso y consumo humano:
AN = Agua Natural:
AP = Agua de proceso:
ASAL = Agua Salina:
AR = Agua Residual:
SM = Sedimento:
SU = Suelo
Otro * 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	S/N 85E051691	4		
2			5		
3			6		

Observaciones: Se procedió a llegar al punto de muestreo indicado y denominado por el representante del Cliente quien estuvo presente durante el Muestreo. Se Realizó el procedimiento de Caracterización de las Muestras, la cual es Hidrocarburo impregnado en piedras coloración oscura (negro) olor a hidrocarburos. La muestra este ubicada en la zona Norte de playa del Ovalo. La muestra fue premitida en campo Nº precintos: 0203921, 0203922. Se tomaron coordenadas en SI

Responsable de la toma de muestra:
Firma:
Inspector Cerper: Ing. Joel Gutierrez
Inspector Cliente: FRANCO MMA
Hora de inicio: 7:50 Hora de término: 9:30

Representante del cliente
Firma:
Nombre: CARLOS TORRES YACHACHIN
DNI: 48001656
Cargo: SUPERVISOR PLAYA

Rec: 8/10/23 11:49
Recepción de muestras
Nombre: Juan Vidal A.
Fecha: 04-08-2023 Hora: 4:23 PM

intertek
LAB COPY ONLY
RECEIVED

Attachment 2

Analytical Data

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OVA 03AGO2023
Lab ID	L2346275-01
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821896
Date Collected	8/3/2023
Date Received	8/10/2023
Date Prepped	8/30/2023
Date Analyzed	9/3/2023
Sample Size(wet)	0.00599 g
% Solid	100
File ID	F1709012367
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	167

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)		U	167
SHC	C10	DECANE (C10)		U	167
SHC	C11	UNDECANE	3.17	J	167
SHC	C12	DODECANE (C12)	5.51	J	167
SHC	C13	TRIDECANE	3.84	J	167
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	5.18	J	167
SHC	C14	TETRADECANE (C14)	12.5	J	167
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	5.68	J	167
SHC	C15	PENTADECANE (C15)	15.0	J	167
SHC	C16	HEXADECANE (C16)	15.0	J	167
SHC	1650	NORPRISTANE (1650)	59.3	J	167
SHC	C17	HEPTADECANE (C17)	17.9	J	167
SHC	Pr	PRISTANE	189		167
SHC	C18	OCTADECANE (C18)		U	167
SHC	Ph	PHYTANE	219		167
SHC	C19	NONADECANE (C19)	44.7	J	167
SHC	C20	EICOSANE (C20)	53.4	J	167
SHC	C21	HENEICOSANE (C21)	44.7	J	167
SHC	C22	DOCOSANE (C22)	71.1	J	167
SHC	C23	TRICOSANE (C23)	39.2	J	167
SHC	C24	TETRACOSANE (C24)	135	J	167
SHC	C25	PENTACOSANE (C25)	202		167
SHC	C26	HEXACOSANE (C26)	291		167
SHC	C27	HEPTACOSANE (C27)	294		167
SHC	C28	OCTACOSANE (C28)	314		167
SHC	C29	NONACOSANE (C29)	452		167
SHC	C30	TRIACONTANE (C30)	366		167
SHC	C31	HENTATRIACONTANE (C31)	349		167
SHC	C32	DOTRIACONTANE (C32)	180		167
SHC	C33	TRITRIACONTANE (C33)	471		167
SHC	C34	TETRATRIACONTANE (C34)	386		167
SHC	C35	PENTATRIACONTANE (C35)	360		167
SHC	C36	HEXATRIACONTANE (C36)	136	J	167
SHC	C37	HEPTATRIACONTANE (C37)	106	J	167
SHC	C38	OCTATRIACONTANE (C38)	111	J	167
SHC	C39	NONATRIACONTANE (C39)		U	167
SHC	C40	TETRACONTANE (C40)	130	J	167
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	446000		5510
SHC	TSH	TOTAL SATURATED HYDROCARBONS	5090	J	167

Surrogates (% Recovery)	
O-TERPHENYL	99
D50-TETRACOSANE	101

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821896-1
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821896
Date Collected	NA
Date Received	8/30/2023
Date Prepped	8/30/2023
Date Analyzed	9/3/2023
Sample Size(wet)	0.00526 g
% Solid	100
File ID	F1709012359
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	190

Class	Abbrev	Analytes	Result	SSRL
SHC	C9	NONANE (C9)	2.47 J	190
SHC	C10	DECANE (C10)	U	190
SHC	C11	UNDECANE	U	190
SHC	C12	DODECANE (C12)	U	190
SHC	C13	TRIDECANE	U	190
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	U	190
SHC	C14	TETRADECANE (C14)	U	190
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	U	190
SHC	C15	PENTADECANE (C15)	U	190
SHC	C16	HEXADECANE (C16)	U	190
SHC	1650	NORPRISTANE (1650)	U	190
SHC	C17	HEPTADECANE (C17)	U	190
SHC	Pr	PRISTANE	U	190
SHC	C18	OCTADECANE (C18)	U	190
SHC	Ph	PHYTANE	U	190
SHC	C19	NONADECANE (C19)	U	190
SHC	C20	EICOSANE (C20)	U	190
SHC	C21	HENEICOSANE (C21)	U	190
SHC	C22	DOCOSANE (C22)	U	190
SHC	C23	TRICOSANE (C23)	U	190
SHC	C24	TETRACOSANE (C24)	U	190
SHC	C25	PENTACOSANE (C25)	U	190
SHC	C26	HEXACOSANE (C26)	U	190
SHC	C27	HEPTACOSANE (C27)	U	190
SHC	C28	OCTACOSANE (C28)	U	190
SHC	C29	NONACOSANE (C29)	2.09 J	190
SHC	C30	TRIACONTANE (C30)	U	190
SHC	C31	HENTATRIACONTANE (C31)	U	190
SHC	C32	DOTRIACONTANE (C32)	U	190
SHC	C33	TRITRIACONTANE (C33)	U	190
SHC	C34	TETRATRIACONTANE (C34)	U	190
SHC	C35	PENTATRIACONTANE (C35)	U	190
SHC	C36	HEXATRIACONTANE (C36)	U	190
SHC	C37	HEPTATRIACONTANE (C37)	U	190
SHC	C38	OCTATRIACONTANE (C38)	U	190
SHC	C39	NONATRIACONTANE (C39)	U	190
SHC	C40	TETRACONTANE (C40)	U	190
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	U	6270
SHC	TSH	TOTAL SATURATED HYDROCARBONS	4.56 J	190

Surrogates (% Recovery)	
O-TERPHENYL	99
D50-TETRACOSANE	102

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1821896-2
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821896
Date Collected	NA
Date Received	8/30/2023
Date Prepped	8/30/2023
Date Analyzed	9/3/2023
Sample Size(wet)	0.00526 g
% Solid	100
File ID	F1709012361
Units	%
Final Volume	1
Dilution	1
Reporting Limit	190

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	NONANE (C9)	3560	190	94	3800	50	130
SHC	C10	DECANE (C10)	3480	190	92	3800	50	130
SHC	C12	DODECANE (C12)	3520	190	93	3800	50	130
SHC	C14	TETRADECANE (C14)	3510	190	92	3800	50	130
SHC	C16	HEXADECANE (C16)	3890	190	102	3800	50	130
SHC	C18	OCTADECANE (C18)	4060	190	107	3800	50	130
SHC	C19	NONADECANE (C19)	3680	190	97	3800	50	130
SHC	C20	EICOSANE (C20)	3690	190	97	3800	50	130
SHC	C22	DOCOSANE (C22)	3710	190	98	3800	50	130
SHC	C24	TETRACOSANE (C24)	3880	190	102	3800	50	130
SHC	C26	HEXACOSANE (C26)	3840	190	101	3800	50	130
SHC	C28	OCTACOSANE (C28)	3790	190	100	3800	50	130
SHC	C30	TRIACONTANE (C30)	3810	190	100	3800	50	130
SHC	C36	HEXATRIACONTANE (C36)	3460	190	91	3800	50	130

Surrogates (% Recovery)	
O-TERPHENYL	99
D50-TETRACOSANE	102

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1821896-3
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821896
Date Collected	NA
Date Received	8/30/2023
Date Prepped	8/30/2023
Date Analyzed	9/3/2023
Sample Size(wet)	0.00526 g
% Solid	100
File ID	F1709012363
Units	%
Final Volume	1
Dilution	1
Reporting Limit	190

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
SHC	C9	NONANE (C9)	3510	190	92	3800	50	130	2	30
SHC	C10	DECANE (C10)	3500	190	92	3800	50	130	0	30
SHC	C12	DODECANE (C12)	3550	190	93	3800	50	130	0	30
SHC	C14	TETRADECANE (C14)	3540	190	93	3800	50	130	1	30
SHC	C16	HEXADECANE (C16)	3920	190	103	3800	50	130	1	30
SHC	C18	OCTADECANE (C18)	4090	190	108	3800	50	130	1	30
SHC	C19	NONADECANE (C19)	3710	190	98	3800	50	130	1	30
SHC	C20	EICOSANE (C20)	3710	190	98	3800	50	130	1	30
SHC	C22	DOCOSANE (C22)	3720	190	98	3800	50	130	0	30
SHC	C24	TETRACOSANE (C24)	3890	190	102	3800	50	130	0	30
SHC	C26	HEXACOSANE (C26)	3850	190	101	3800	50	130	0	30
SHC	C28	OCTACOSANE (C28)	3790	190	100	3800	50	130	0	30
SHC	C30	TRIACONTANE (C30)	3810	190	100	3800	50	130	0	30
SHC	C36	HEXATRIACONTANE (C36)	3480	190	91	3800	50	130	0	30

Surrogates (% Recovery)	
O-TERPHENYL	99
D50-TETRACOSANE	102

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 OVA 03AGO2023
Lab ID	L2346275-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821896
Date Collected	8/3/2023
Date Received	8/10/2023
Date Prepped	8/30/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00599 g
% Solid	100
File ID	F1408302350
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	0.835

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN	0.378	J	0.835
2	D1	C1-DECALINS		U	1.67
2	D2	C2-DECALINS		U	1.67
2	D3	C3-DECALINS		U	1.67
2	D4	C4-DECALINS		U	1.67
S	BT0	BENZOTHIOPHENE		U	1.67
2	BT1	C1-BENZO(B)THIOPHENES	1.49	J	1.67
2	BT2	C2-BENZO(B)THIOPHENES		U	1.67
2	BT3	C3-BENZO(B)THIOPHENES	3.51		1.67
2	BT4	C4-BENZO(B)THIOPHENES	7.14		1.67
A	N0	NAPHTHALENE	1.31	J	1.67
2	N1	C1-NAPHTHALENES	1.14	JB	1.67
2	N2	C2-NAPHTHALENES	7.54		1.67
2	N3	C3-NAPHTHALENES	29.8		1.67
2	N4	C4-NAPHTHALENES	62.4		1.67
2	B	BIPHENYL	0.435	J	1.67
3	DF	DIBENZOFURAN	0.189	J	1.67
3	AY	ACENAPHTHYLENE	0.982	J	1.67
3	AE	ACENAPHTHENE	0.467	J	1.67
3	F0	FLUORENE	1.71		1.67
3	F1	C1-FLUORENES	17.0		1.67
3	F2	C2-FLUORENES	72.3		1.67
3	F3	C3-FLUORENES	140		1.67
3	A0	ANTHRACENE	3.70		1.67
3	P0	PHENANTHRENE	29.2		1.67
3	PA1	C1-PHENANTHRENES/ANTHRACENES	167		1.67
3	PA2	C2-PHENANTHRENES/ANTHRACENES	442		1.67
3	PA3	C3-PHENANTHRENES/ANTHRACENES	422		1.67
3	PA4	C4-PHENANTHRENES/ANTHRACENES	261		1.67
3	RET	RETENE		U	1.67
3	DBT0	DIBENZOTHIOPHENE	3.71		1.67
3	DBT1	C1-DIBENZOTHIOPHENES	41.6		1.67
3	DBT2	C2-DIBENZOTHIOPHENES	104		1.67
3	DBT3	C3-DIBENZOTHIOPHENES	126		1.67
3	DBT4	C4-DIBENZOTHIOPHENES	82.0		1.67
4	BF	BENZO(B)FLUORENE	8.99		1.67
4	FL0	FLUORANTHENE	4.96		1.67
4	PY0	PYRENE	38.8		1.67
4	FP1	C1-FLUORANTHENES/PYRENES	166		1.67
4	FP2	C2-FLUORANTHENES/PYRENES	300		1.67
4	FP3	C3-FLUORANTHENES/PYRENES	374		1.67
4	FP4	C4-FLUORANTHENES/PYRENES	337		1.67
4	NBT0	NAPHTHOBENZOTHIOPHENE	27.8		1.67
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	110		1.67
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	196		1.67
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	171		1.67
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	112		1.67
4	BA0	BENZ(A)ANTHRACENE	28.2		1.67
4	C0	CHRYSENE/TRIPHENYLENE	75.5		1.67
4	BC1	C1-CHRYSENES	279		1.67
4	BC2	C2-CHRYSENES	492		1.67
4	BC3	C3-CHRYSENES	554		1.67
4	BC4	C4-CHRYSENES	325		1.67
5	BBF	BENZO(B)FLUORANTHENE	14.9		1.67

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OVA 03AGO2023
Lab ID	L2346275-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821896
Date Collected	8/3/2023
Date Received	8/10/2023
Date Prepped	8/30/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00599 g
% Solid	100
File ID	F1408302350
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	0.835

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE	4.00		1.67
5	BAF	BENZO(A)FLUORANTHENE		U	1.67
5	BEP	BENZO(E)PYRENE	40.3		1.67
5	BAP	BENZO(A)PYRENE	18.5		1.67
5	PER	PERYLENE	8.34		1.67
6	IND	INDENO(1,2,3-CD)PYRENE	5.21		1.67
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	5.81		1.67
6	GHI	BENZO(GHI)PERYLENE	13.4		1.67
O	CAR	CARBAZOLE	1.04	JB	1.67
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	13.6		1.67
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	17.4		1.67
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	3.60		1.67
3	3MP	3-METHYLPHENANTHRENE (3MP)	36.8		1.67
3	2MP	2-METHYLPHENANTHRENE (2MP)	49.8		1.67
3	2MA	2-METHYLANTHRACENE (2MA)	7.82		1.67
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	40.6		1.67
3	1MP	1-METHYLPHENANTHRENE (1MP)	26.8		1.67
A	1MN	1-METHYLNAPHTHALENE	0.610	JB	1.67
A	2MN	2-METHYLNAPHTHALENE	0.805	JB	1.67
2	26DMN	2,6-DIMETHYLNAPHTHALENE	5.51		1.67
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	4.48		1.67
H30	T19	HOPANE (T19)	477		1.67
t23	T4	C23 TRICYCLIC TERPANE (T4)	57.3		1.67
t24	T5	C24 TRICYCLIC TERPANE (T5)	34.6		1.67
t25	T6	C25 TRICYCLIC TERPANE (T6)	34.1		1.67
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	20.1		1.67
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	25.9		1.67
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	25.1		1.67
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	35.0		1.67
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	38.6		1.67
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	29.0		1.67
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	35.2		1.67
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	61.4		1.67
t30S	T11a	C30 TRICYCLIC TERPANE-22S	34.4		1.67
t30R	T11b	C30 TRICYCLIC TERPANE-22R	26.2		1.67
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	89.4		1.67
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	30.7		1.67
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	23.6		1.67
H29	T15	30-NORHOPANE (T15)	287		1.67
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	60.2		1.67
X	X	17A(H)-DIAHOPANE (X)	31.5		1.67
M29	T17	30-NORMORETANE (T17)	36.4		1.67
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	55.3		1.67
M30	T20	MORETANE (T20)	58.9		1.67
H31S	T21	30-HOMOHOPANE-22S (T21)	171		1.67
H31R	T22	30-HOMOHOPANE-22R (T22)	164		1.67
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	72.7		1.67
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	126		1.67
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	91.2		1.67
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	93.7		1.67
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	58.1		1.67
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	64.2		1.67
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	44.1		1.67
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	48.1		1.67

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OVA 03AGO2023
Lab ID	L2346275-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821896
Date Collected	8/3/2023
Date Received	8/10/2023
Date Prepped	8/30/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00599 g
% Solid	100
File ID	F1408302350
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	0.835

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	52.7	1.67
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	35.5	1.67
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	19.9	1.67
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	13.8	1.67
aa27S	S12	17A(H)20SC27/C29DIA	61.0	1.67
aa27R	S17	17A(H)20RC27/C29DIA	74.9	1.67
d29R	S18	UNKNOWN STERANE (S18)	11.6	1.67
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	5.94	1.67
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	36.2	1.67
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	39.6	1.67
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	41.0	1.67
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	48.5	1.67
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	48.2	1.67
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	44.2	1.67
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	36.8	1.67
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	46.8	1.67
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	67.1	1.67
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	44.7	1.67
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	62.0	1.67
SC28TAS	TAS02	C28,20S TAS	55.9	1.67
RC27TAS	TAS03	C27,20R TAS	60.5	1.67
RC28TAS	TAS04	C28,20R TAS	36.2	1.67

Surrogates (% Recovery)	
NAPHTHALENE-D8	85
PHENANTHRENE-D10	101
BENZO(A)PYRENE-D12	99
5B(H)CHOLANE	91

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821896-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821896
Date Collected	NA
Date Received	8/30/2023
Date Prepped	8/30/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00526 g
% Solid	100
File ID	F1408302347
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	0.95

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN		U	0.950
2	D1	C1-DECALINS		U	1.90
2	D2	C2-DECALINS		U	1.90
2	D3	C3-DECALINS		U	1.90
2	D4	C4-DECALINS		U	1.90
S	BT0	BENZOTHIOPHENE		U	1.90
2	BT1	C1-BENZO(B)THIOPHENES		U	1.90
2	BT2	C2-BENZO(B)THIOPHENES		U	1.90
2	BT3	C3-BENZO(B)THIOPHENES		U	1.90
2	BT4	C4-BENZO(B)THIOPHENES		U	1.90
A	N0	NAPHTHALENE	0.103	J	1.90
2	N1	C1-NAPHTHALENES	0.394	J	1.90
2	N2	C2-NAPHTHALENES		U	1.90
2	N3	C3-NAPHTHALENES		U	1.90
2	N4	C4-NAPHTHALENES		U	1.90
2	B	BIPHENYL		U	1.90
3	DF	DIBENZOFURAN		U	1.90
3	AY	ACENAPHTHYLENE		U	1.90
3	AE	ACENAPHTHENE		U	1.90
3	F0	FLUORENE	0.0728	J	1.90
3	F1	C1-FLUORENES		U	1.90
3	F2	C2-FLUORENES		U	1.90
3	F3	C3-FLUORENES		U	1.90
3	A0	ANTHRACENE		U	1.90
3	P0	PHENANTHRENE	0.210	J	1.90
3	PA1	C1-PHENANTHRENES/ANTHRACENES		U	1.90
3	PA2	C2-PHENANTHRENES/ANTHRACENES		U	1.90
3	PA3	C3-PHENANTHRENES/ANTHRACENES		U	1.90
3	PA4	C4-PHENANTHRENES/ANTHRACENES		U	1.90
3	RET	RETENE		U	1.90
3	DBT0	DIBENZOTHIOPHENE	0.130	J	1.90
3	DBT1	C1-DIBENZOTHIOPHENES		U	1.90
3	DBT2	C2-DIBENZOTHIOPHENES		U	1.90
3	DBT3	C3-DIBENZOTHIOPHENES		U	1.90
3	DBT4	C4-DIBENZOTHIOPHENES		U	1.90
4	BF	BENZO(B)FLUORENE		U	1.90
4	FL0	FLUORANTHENE	0.113	J	1.90
4	PY0	PYRENE	0.110	J	1.90
4	FP1	C1-FLUORANTHENES/PYRENES		U	1.90
4	FP2	C2-FLUORANTHENES/PYRENES		U	1.90
4	FP3	C3-FLUORANTHENES/PYRENES		U	1.90
4	FP4	C4-FLUORANTHENES/PYRENES		U	1.90
4	NBT0	NAPHTHOBENZOTHIOPHENE	0.0705	J	1.90
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES		U	1.90
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES		U	1.90
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES		U	1.90
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES		U	1.90
4	BA0	BENZ(A)ANTHRACENE		U	1.90
4	C0	CHRYSENE/TRIPHENYLENE	0.0779	J	1.90
4	BC1	C1-CHRYSENES		U	1.90
4	BC2	C2-CHRYSENES		U	1.90
4	BC3	C3-CHRYSENES		U	1.90
4	BC4	C4-CHRYSENES		U	1.90
5	BBF	BENZO(B)FLUORANTHENE		U	1.90

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821896-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821896
Date Collected	NA
Date Received	8/30/2023
Date Prepped	8/30/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00526 g
% Solid	100
File ID	F1408302347
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	0.95

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE		U	1.90
5	BAF	BENZO(A)FLUORANTHENE		U	1.90
5	BEP	BENZO(E)PYRENE		U	1.90
5	BAP	BENZO(A)PYRENE		U	1.90
5	PER	PERYLENE		U	1.90
6	IND	INDENO(1,2,3-CD)PYRENE		U	1.90
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE		U	1.90
6	GHI	BENZO(GHI)PERYLENE		U	1.90
O	CAR	CARBAZOLE	0.124	J	1.90
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)		U	1.90
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)		U	1.90
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)		U	1.90
3	3MP	3-METHYLPHENANTHRENE (3MP)		U	1.90
3	2MP	2-METHYLPHENANTHRENE (2MP)		U	1.90
3	2MA	2-METHYLANTHRACENE (2MA)		U	1.90
3	9MP	9/4-METHYLPHENANTHRENE (9MP)		U	1.90
3	1MP	1-METHYLPHENANTHRENE (1MP)		U	1.90
A	1MN	1-METHYLNAPHTHALENE	0.165	J	1.90
A	2MN	2-METHYLNAPHTHALENE	0.218	J	1.90
2	26DMN	2,6-DIMETHYLNAPHTHALENE	0.308	J	1.90
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE		U	1.90
H30	T19	HOPANE (T19)		U	1.90
t23	T4	C23 TRICYCLIC TERPANE (T4)		U	1.90
t24	T5	C24 TRICYCLIC TERPANE (T5)		U	1.90
t25	T6	C25 TRICYCLIC TERPANE (T6)		U	1.90
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)		U	1.90
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)		U	1.90
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)		U	1.90
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)		U	1.90
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)		U	1.90
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)		U	1.90
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)		U	1.90
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)		U	1.90
t30S	T11a	C30 TRICYCLIC TERPANE-22S		U	1.90
t30R	T11b	C30 TRICYCLIC TERPANE-22R		U	1.90
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)		U	1.90
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)		U	1.90
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)		U	1.90
H29	T15	30-NORHOPANE (T15)		U	1.90
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)		U	1.90
X	X	17A(H)-DIAHOPANE (X)		U	1.90
M29	T17	30-NORMORETANE (T17)		U	1.90
OL	T18	18A(H)&18B(H)-OLEANANES (T18)		U	1.90
M30	T20	MORETANE (T20)		U	1.90
H31S	T21	30-HOMOHOPANE-22S (T21)		U	1.90
H31R	T22	30-HOMOHOPANE-22R (T22)		U	1.90
T22A	T22A	GAMMACERANE/C32-DIAHOPANE		U	1.90
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)		U	1.90
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)		U	1.90
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)		U	1.90
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)		U	1.90
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)		U	1.90
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)		U	1.90
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)		U	1.90

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821896-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821896
Date Collected	NA
Date Received	8/30/2023
Date Prepped	8/30/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00526 g
% Solid	100
File ID	F1408302347
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	0.95

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	U	1.90
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	U	1.90
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	U	1.90
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	U	1.90
aa27S	S12	17A(H)20SC27/C29DIA	U	1.90
aa27R	S17	17A(H)20RC27/C29DIA	U	1.90
d29R	S18	UNKNOWN STERANE (S18)	U	1.90
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	U	1.90
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	U	1.90
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	U	1.90
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	U	1.90
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	U	1.90
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	U	1.90
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	U	1.90
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	U	1.90
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	U	1.90
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	U	1.90
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	U	1.90
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	U	1.90
SC28TAS	TAS02	C28,20S TAS	U	1.90
RC27TAS	TAS03	C27,20R TAS	U	1.90
RC28TAS	TAS04	C28,20R TAS	U	1.90

Surrogates (% Recovery)	
NAPHTHALENE-D8	90
PHENANTHRENE-D10	97
BENZO(A)PYRENE-D12	97
5B(H)CHOLANE	88

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1821896-2
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821896
Date Collected	NA
Date Received	8/30/2023
Date Prepped	8/30/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00526 g
% Solid	100
File ID	F1408302348
Units	%
Final Volume	1
Dilution	1
Reporting Limit	1.9

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
A	N0	NAPHTHALENE	201	1.90	106	190	50	130
3	AY	ACENAPHTHYLENE	166	1.90	88	190	50	130
3	AE	ACENAPHTHENE	176	1.90	92	190	50	130
3	F0	FLUORENE	185	1.90	97	190	50	130
3	A0	ANTHRACENE	199	1.90	105	190	50	130
3	P0	PHENANTHRENE	187	1.90	98	190	50	130
4	FL0	FLUORANTHENE	165	1.90	87	190	50	130
4	PY0	PYRENE	175	1.90	92	190	50	130
4	BA0	BENZ(A)ANTHRACENE	181	1.90	95	190	50	130
4	C0	CHRYSENE/TRIPHENYLENE	174	1.90	92	190	50	130
5	BBF	BENZO(B)FLUORANTHENE	179	1.90	94	190	50	130
5	BJKF	BENZO(J)+(K)FLUORANTHENE	187	1.90	98	190	50	130
5	BAP	BENZO(A)PYRENE	168	1.90	88	190	50	130
6	IND	INDENO(1,2,3-CD)PYRENE	161	1.90	85	190	50	130
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	175	1.90	92	190	50	130
6	GHI	BENZO(GHI)PERYLENE	166	1.90	87	190	50	130
A	2MN	2-METHYLNAPHTHALENE	164	1.90	86	190	50	130

Surrogates (% Recovery)	
NAPHTHALENE-D8	92
PHENANTHRENE-D10	99
BENZO(A)PYRENE-D12	95
5B(H)CHOLANE	84

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1821896-3
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821896
Date Collected	NA
Date Received	8/30/2023
Date Prepped	8/30/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00526 g
% Solid	100
File ID	F1408302349
Units	%
Final Volume	1
Dilution	1
Reporting Limit	1.9

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
A	N0	NAPHTHALENE	204	1.90	107	190	50	130	1	30
3	AY	ACENAPHTHYLENE	170	1.90	89	190	50	130	1	30
3	AE	ACENAPHTHENE	178	1.90	93	190	50	130	1	30
3	F0	FLUORENE	189	1.90	100	190	50	130	3	30
3	A0	ANTHRACENE	203	1.90	107	190	50	130	2	30
3	P0	PHENANTHRENE	192	1.90	101	190	50	130	3	30
4	FL0	FLUORANTHENE	168	1.90	88	190	50	130	1	30
4	PY0	PYRENE	178	1.90	94	190	50	130	2	30
4	BA0	BENZ(A)ANTHRACENE	182	1.90	96	190	50	130	1	30
4	C0	CHRYSENE/TRIPHENYLENE	176	1.90	92	190	50	130	0	30
5	BBF	BENZO(B)FLUORANTHENE	180	1.90	94	190	50	130	0	30
5	BJKF	BENZO(J)+(K)FLUORANTHENE	189	1.90	99	190	50	130	1	30
5	BAP	BENZO(A)PYRENE	169	1.90	89	190	50	130	1	30
6	IND	INDENO(1,2,3-CD)PYRENE	167	1.90	88	190	50	130	3	30
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	174	1.90	92	190	50	130	0	30
6	GHI	BENZO(GHI)PERYLENE	166	1.90	87	190	50	130	0	30
A	2MN	2-METHYLNAPHTHALENE	166	1.90	87	190	50	130	1	30

Surrogates (% Recovery)	
NAPHTHALENE-D8	92
PHENANTHRENE-D10	101
BENZO(A)PYRENE-D12	95
5B(H)CHOLANE	83

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1822426-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1822426-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	8/31/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F1408302316
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	425	1.94	89	477.66	65	135
2	D1	C1-DECALINS	684	1.94	90	760.39	65	135
2	D2	C2-DECALINS	636	1.94	94	675.98	65	135
2	D3	C3-DECALINS	338	1.94	92	366.46	65	135
2	D4	C4-DECALINS	299	1.94	82	362.78	65	135
S	BT0	BENZOTHIOPHENE	4.82	1.94	84	5.75	65	135
2	BT1	C1-BENZO(B)THIOPHENES	26.4	1.94	88	29.96	65	135
2	BT2	C2-BENZO(B)THIOPHENES	43.2	1.94	85	50.93	65	135
2	BT3	C3-BENZO(B)THIOPHENES	95.7	1.94	93	103.18	65	135
2	BT4	C4-BENZO(B)THIOPHENES	85.6	1.94	94	90.8	65	135
A	N0	NAPHTHALENE	545	1.94	96	565.56	65	135
2	N1	C1-NAPHTHALENES	1150	1.94	95	1208.32	65	135
2	N2	C2-NAPHTHALENES	1370	1.94	94	1450.37	65	135
2	N3	C3-NAPHTHALENES	979	1.94	93	1052.74	65	135
2	N4	C4-NAPHTHALENES	536	1.94	92	583.65	65	135
2	B	BIPHENYL	138	1.94	95	145.7	65	135
3	DF	DIBENZOFURAN	51.9	1.94	104	49.63	65	135
3	AY	ACENAPHTHYLENE	5.88	1.94	85	6.91	65	135
3	AE	ACENAPHTHENE	15.4	1.94	84	18.35	65	135
3	F0	FLUORENE	61.0	1.94	86	70.69	65	135
3	F1	C1-FLUORENES	144	1.94	88	162.7	65	135
3	F2	C2-FLUORENES	208	1.94	83	251.87	65	135
3	F3	C3-FLUORENES	219	1.94	90	242.29	65	135
3	P0	PHENANTHRENE	183	1.94	97	188.41	65	135
3	PA1	C1-PHENANTHRENES/ANTHRACENES	364	1.94	94	388.12	65	135
3	PA2	C2-PHENANTHRENES/ANTHRACENES	408	1.94	94	434.38	65	135
3	PA3	C3-PHENANTHRENES/ANTHRACENES	283	1.94	92	308.67	65	135
3	PA4	C4-PHENANTHRENES/ANTHRACENES	127	1.94	98	129.94	65	135
3	DBT0	DIBENZOTHIOPHENE	122	1.94	93	130.56	65	135
3	DBT1	C1-DIBENZOTHIOPHENES	295	1.94	107	275.34	65	135
3	DBT2	C2-DIBENZOTHIOPHENES	362	1.94	98	369.42	65	135
3	DBT3	C3-DIBENZOTHIOPHENES	318	1.94	92	345.39	65	135
3	DBT4	C4-DIBENZOTHIOPHENES	178	1.94	92	193.51	65	135
4	FL0	FLUORANTHENE	3.26	1.94	86	3.77	65	135
4	PY0	PYRENE	11.6	1.94	100	11.65	65	135
4	FP1	C1-FLUORANTHENES/PYRENES	50.6	1.94	93	54.43	65	135
4	FP2	C2-FLUORANTHENES/PYRENES	84.7	1.94	95	89.07	65	135
4	FP3	C3-FLUORANTHENES/PYRENES	103	1.94	94	109.78	65	135
4	FP4	C4-FLUORANTHENES/PYRENES	91.5	1.94	94	97.22	65	135
4	NBT0	NAPHTHOBENZOTHIOPHENE	35.8	1.94	91	39.13	65	135
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	97.7	1.94	92	106.13	65	135
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	140	1.94	93	150.09	65	135
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	107	1.94	89	120.77	65	135
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	76.0	1.94	89	85.38	65	135
4	BA0	BENZ(A)ANTHRACENE	2.18	1.94	96	2.28	65	135
4	C0	CHRYSENE/TRIPHENYLENE	36.8	1.94	100	36.66	65	135
4	BC1	C1-CHRYSENES	60.7	1.94	94	64.59	65	135
4	BC2	C2-CHRYSENES	85.4	1.94	98	87.41	65	135
4	BC3	C3-CHRYSENES	104	1.94	103	101.29	65	135
4	BC4	C4-CHRYSENES	65.7	1.94	104	63.42	65	135
5	BBF	BENZO(B)FLUORANTHENE	5.73	1.94	106	5.4	65	135
5	BEP	BENZO(E)PYRENE	9.4	1.94	95	9.88	65	135
5	BAP	BENZO(A)PYRENE	1.81	1.94	89	2.03	65	135
5	PER	PERYLENE	3.18	1.94	95	3.34	65	135
6	GHI	BENZO(GHI)PERYLENE	3.26	1.94	91	3.59	65	135
O	CAR	CARBAZOLE	4.01	1.94	66	6.09	65	135
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	145	1.94	110	131.38	65	135
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	104	1.94	106	98.05	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1822426-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1822426-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	8/31/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F1408302316
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)	40.1	1.94	99	40.36	65	135
3	3MP	3-METHYLPHENANTHRENE (3MP)	74.5	1.94	94	79.32	65	135
3	2MA	2-METHYLANTHRACENE (2MA)	2.57	1.94	86	3	65	135
3	1MP	1-METHYLPHENANTHRENE (1MP)	79.8	1.94	91	87.93	65	135
A	1MN	1-METHYLNAPHTHALENE	743	1.94	94	793.54	65	135
A	2MN	2-METHYLNAPHTHALENE	956	1.94	88	1087.89	65	135
2	26DMN	2,6-DIMETHYLNAPHTHALENE	573	1.94	90	635.33	65	135
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	137	1.94	93	147.12	65	135
H30	T19	HOPANE (T19)	157	1.94	97	161.24	65	135
t23	T4	C23 TRICYCLIC TERPANE (T4)	69.2	1.94	99	69.8	65	135
t24	T5	C24 TRICYCLIC TERPANE (T5)	35.8	1.94	85	42.1	65	135
t25	T6	C25 TRICYCLIC TERPANE (T6)	35.7	1.94	88	40.4	65	135
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	12.6	1.94	89	14.2	65	135
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	15.4	1.94	94	16.3	65	135
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	12.5	1.94	86	14.6	65	135
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	17.4	1.94	107	16.2	65	135
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	16.6	1.94	94	17.6	65	135
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	16.8	1.94	88	19.2	65	135
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	21.8	1.94	104	21	65	135
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	27.7	1.94	98	28.3	65	135
t30S	T11a	C30 TRICYCLIC TERPANE-22S	15.5	1.94	101	15.3	65	135
t30R	T11b	C30 TRICYCLIC TERPANE-22R	16.8	1.94	110	15.2	65	135
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	33.2	1.94	96	34.4	65	135
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	6.26	1.94	89	7	65	135
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	7.79	1.94	96	8.1	65	135
H29	T15	30-NORHOPANE (T15)	88.1	1.94	97	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)	13.2	1.94	102	13	65	135
M29	T17	30-NORMORETANE (T17)	12.9	1.94	115	11.2	65	135
M30	T20	MORETANE (T20)	16.6	1.94	102	16.3	65	135
H31S	T21	30-HOMOHOPANE-22S (T21)	65.4	1.94	97	67.6	65	135
H31R	T22	30-HOMOHOPANE-22R (T22)	58.1	1.94	100	58.3	65	135
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	48.1	1.94	98	48.9	65	135
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	34.5	1.94	97	35.6	65	135
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	38.3	1.94	99	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)	26.8	1.94	96	27.9	65	135
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	19.8	1.94	100	19.8	65	135
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	27.9	1.94	97	28.8	65	135
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	23.9	1.94	107	22.3	65	135
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	44.8	1.94	93	48.1	65	135
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	22.5	1.94	90	25.1	65	135
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	20.7	1.94	84	24.8	65	135
aa27S	S12	17A(H)20SC27/C29DIA	58.5	1.94	98	59.74	65	135
aa27R	S17	17A(H)20RC27/C29DIA	68.8	1.94	96	71.55	65	135
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	4.7	1.94	124	3.8	65	135
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	33.9	1.94	103	33	65	135
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	33.4	1.94	104	32.2	65	135
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	47.0	1.94	91	51.7	65	135
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	33.7	1.94	93	36.1	65	135
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	36.9	1.94	96	38.4	65	135
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	38.5	1.94	97	39.7	65	135
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	41.5	1.94	101	41	65	135
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	53.1	1.94	103	51.7	65	135
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	56.3	1.94	103	54.6	65	135
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	35.6	1.94	93	38.2	65	135
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	288	1.94	100	289.3	65	135
SC28TAS	TAS02	C28,20S TAS	182	1.94	100	182.5	65	135
RC27TAS	TAS03	C27,20R TAS	177	1.94	100	177.1	65	135
RC28TAS	TAS04	C28,20R TAS	150	1.94	101	148.1	65	135

List of Potential Qualifiers

A: Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B: The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C: Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D: Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E: Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F: The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum

G: The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H: The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I: The lower value for the two columns has been reported due to obvious interference.

J: Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

J: Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

J: Estimated value. The Target analyte concentration is below the Limit of Quantitation (LOQ), but above the Detection Limit (DL). This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

M: Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND: Not detected at the Limit of Quantitation (LOQ) for the sample.

ND: Not detected at the Limit of Detection (LOD) for the sample.

ND: Not detected at the reporting limit (RL) for the sample.

ND: Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ: Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P: The RPD between the results for the two columns exceeds the method-specified criteria.

Q: The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R: Analytical results are from sample re-analysis.

RE: Analytical results are from sample re-extraction.

S: Analytical results are from modified screening analysis.

U: Not detected at the reported detection limit for the sample.

V: The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z: The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

HC OVA_2 03AGO2023

To: Refinería La Pampilla S.A.A.

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

Date: September 14, 2023

Subject: Chemical Fingerprinting of samples collected in Ventanilla, Peru

This memorandum summarizes the results of forensic chemical analysis conducted on one (1) sample that was collected by Repsol contractors on August 3, 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 OVA_2 03AGO2023" was shipped to Alpha Analytical Labs in Mansfield, MA under chain of custody and arrived at a temperature of 22.8°C on August 10, 2023 with a DHL Tracking # 1507452811 (Seal number 0203923).

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 OVA_2 03AGO2023 (HC OVA_2) are shown in Figures 1A and1B respectively.

GC/FID Analysis

The GC/FID chromatogram for the HC OVA_2 sample (Figure 1B), contains a broad C_{15}-C_{44} range material consisting of resolved n-alkanes and an unresolved complex mixture (UCM) which appears as a "hump" in the chromatogram. The sample is significantly weathered in the light alkane range (C_{10}-C_{15}) relative to the source oil sample due to both evaporation and biodegradation. In addition, there is a relative increase in the UCM compared to the source oil (Figure 1A). The petroleum GC/FID signature is consistent with a moderately weathered crude or heavy fuel oil.

GC/MS Alkylated PAH and Biomarker Analysis

The PAH and biomarker molecular chemistry was evaluated to determine if there was evidence for a chemical linkage between the source oil and the HC OVA_2 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 OVA_2 sample are provided in Figures 2A and 2B respectively. The PAH histogram for the HC OVA_2 sample (Figure 2B) shows this sample is moderately weathered as indicated by the lack of decalins and relatively lower proportion of naphthalenes and fluorenes compared to the source oil. Elevated fluoranthenes/pyrenes, napthobenzothiophenes, and chrysenes relative to the source oil are also observed in this sample.

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 OVA_2 sample plot away from each other indicating a different oil source.

The biomarker triterpene m/z 191 ion traces for the source oil and the HC OVA_2 sample are presented in Figures 4A and 4B respectively. The biomarker traces for HC OVA_2 show differences in the proportions of TS and TM (T11 and T12)[2] and the presence of oleanane (T18) which is absent in the source oil. These differences indicate the HC OVA_2 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 HC OVA_2 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.

Conclusion

The HC OVA_2 03AGO2023 sample consists of a moderately weathered crude or heavy oil. The PAH and biomarker analysis indicate the petroleum detected in the source oil and HC OVA_2 03AGO2023 sample are chemically different and were derived from a different source of petroleum.

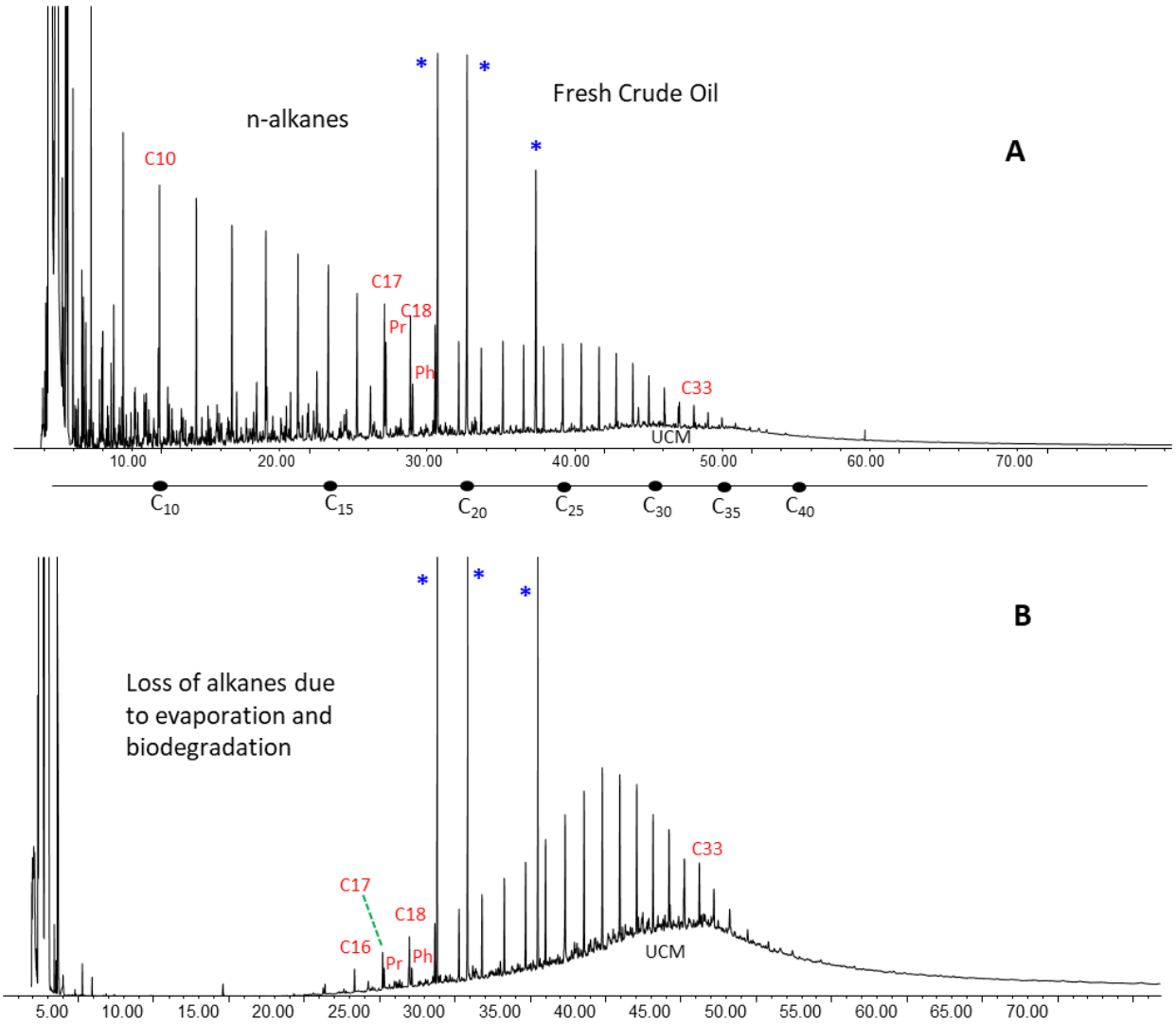


Figure 1. GC/FID "fingerprints" for the field samples.
Carbon ranges annotated below the x-axis analysis time scale.

A) Ship's Tanks Composite Sample
B) HC OVA_2 03AGO2023
'*': Laboratory-added Internal Standard

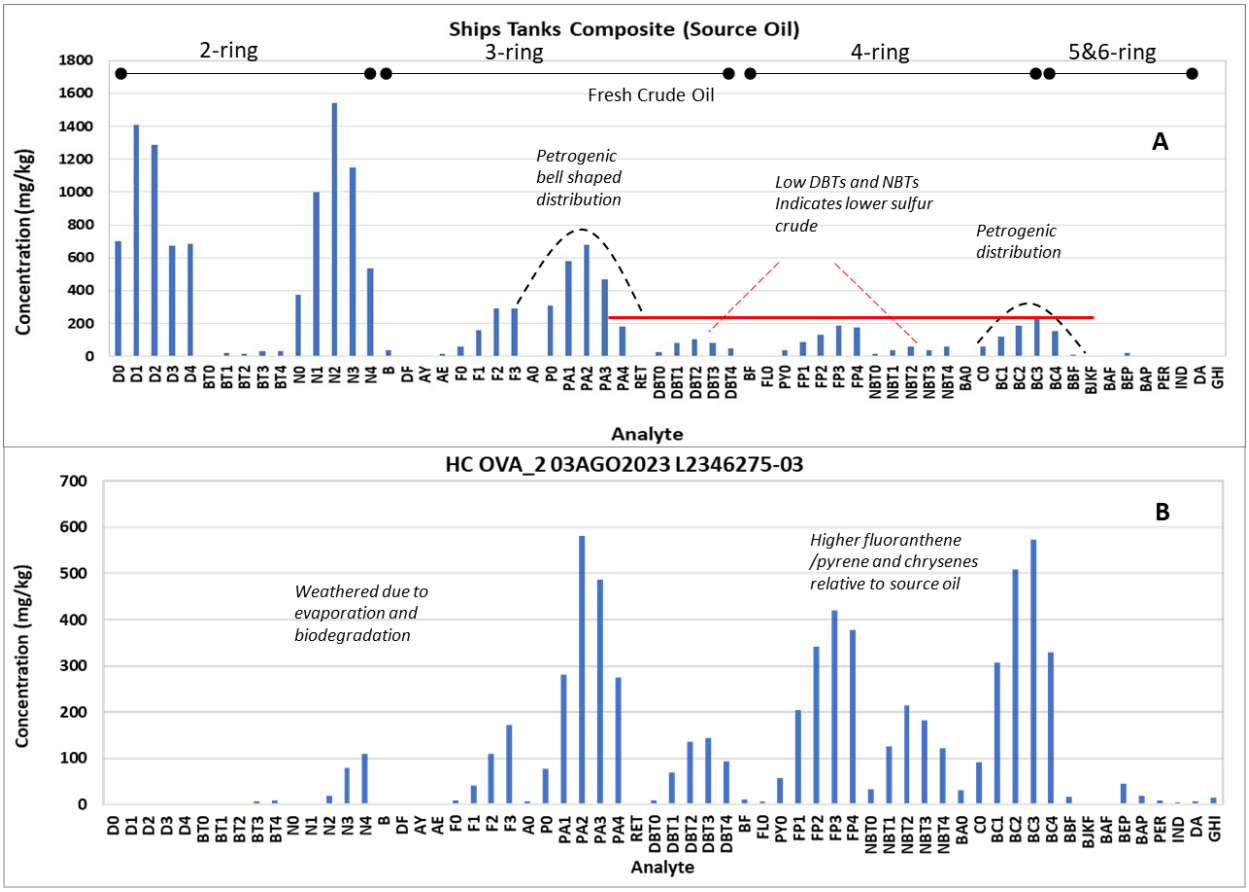


Figure 2. PAH Histograms

A) Ship's Tanks Composite Sample
B) HC OVA_2 03AGO2023

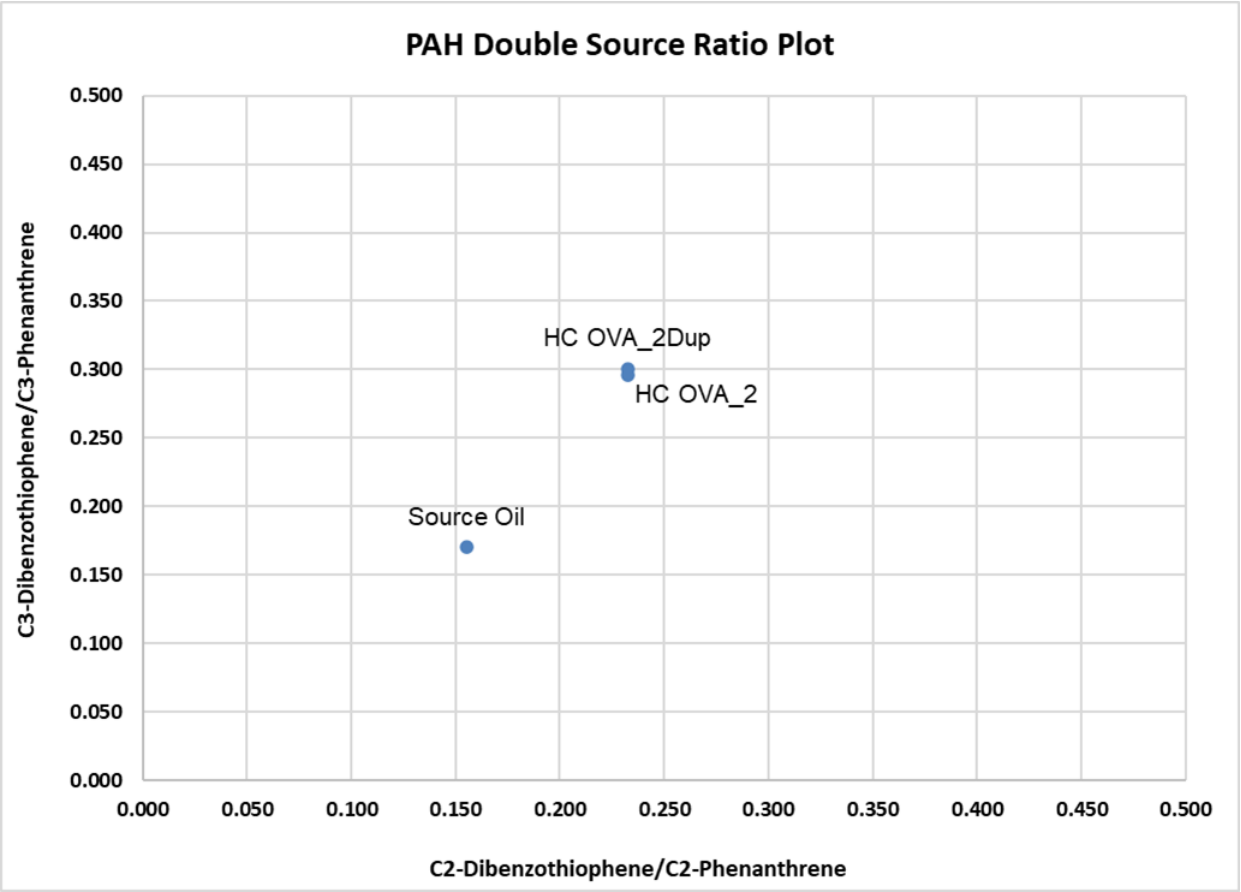


Figure 3. PAH Double Source Ratio Plot

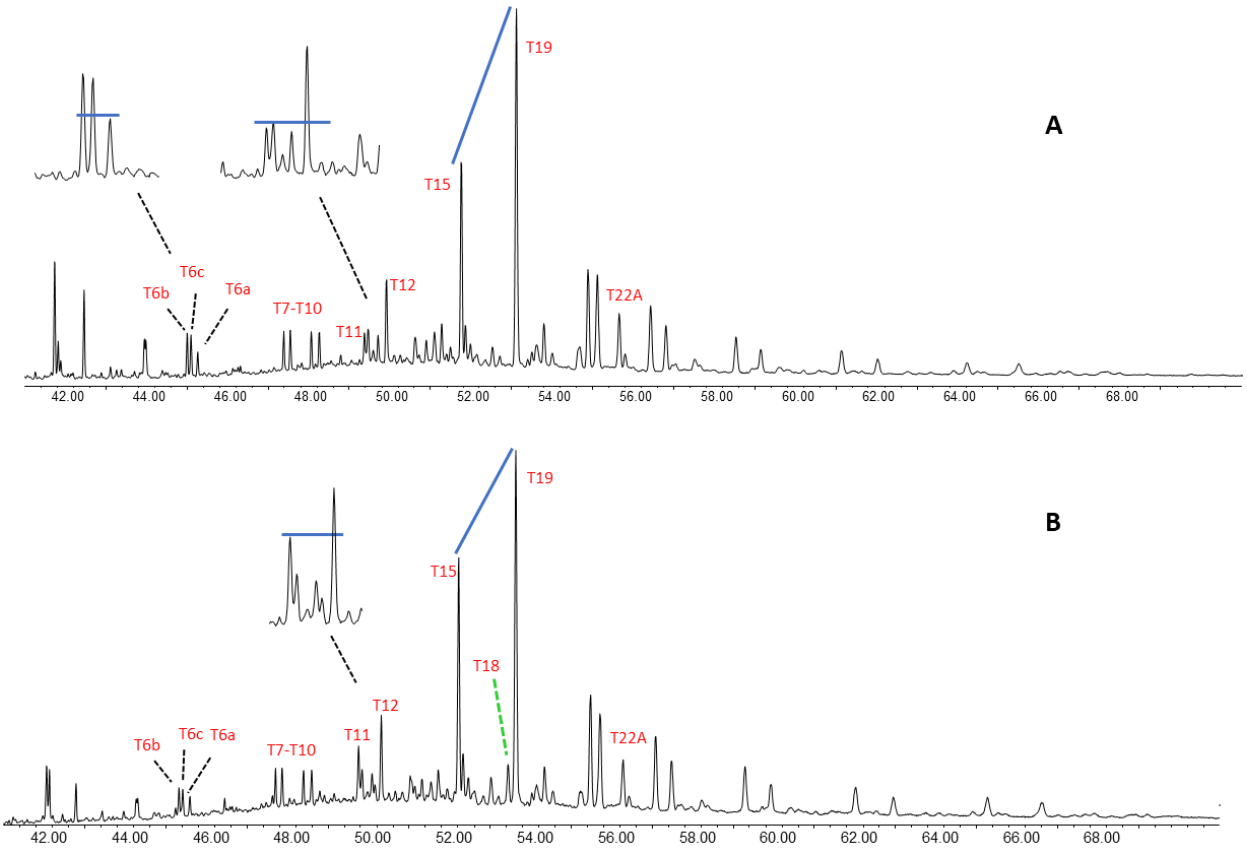


Figure 4. Biomarker m/z 191 Triterpane Fingerprint Traces

A) Ship's Tanks Composite Sample
B) HC OVA_2 03AGO2023

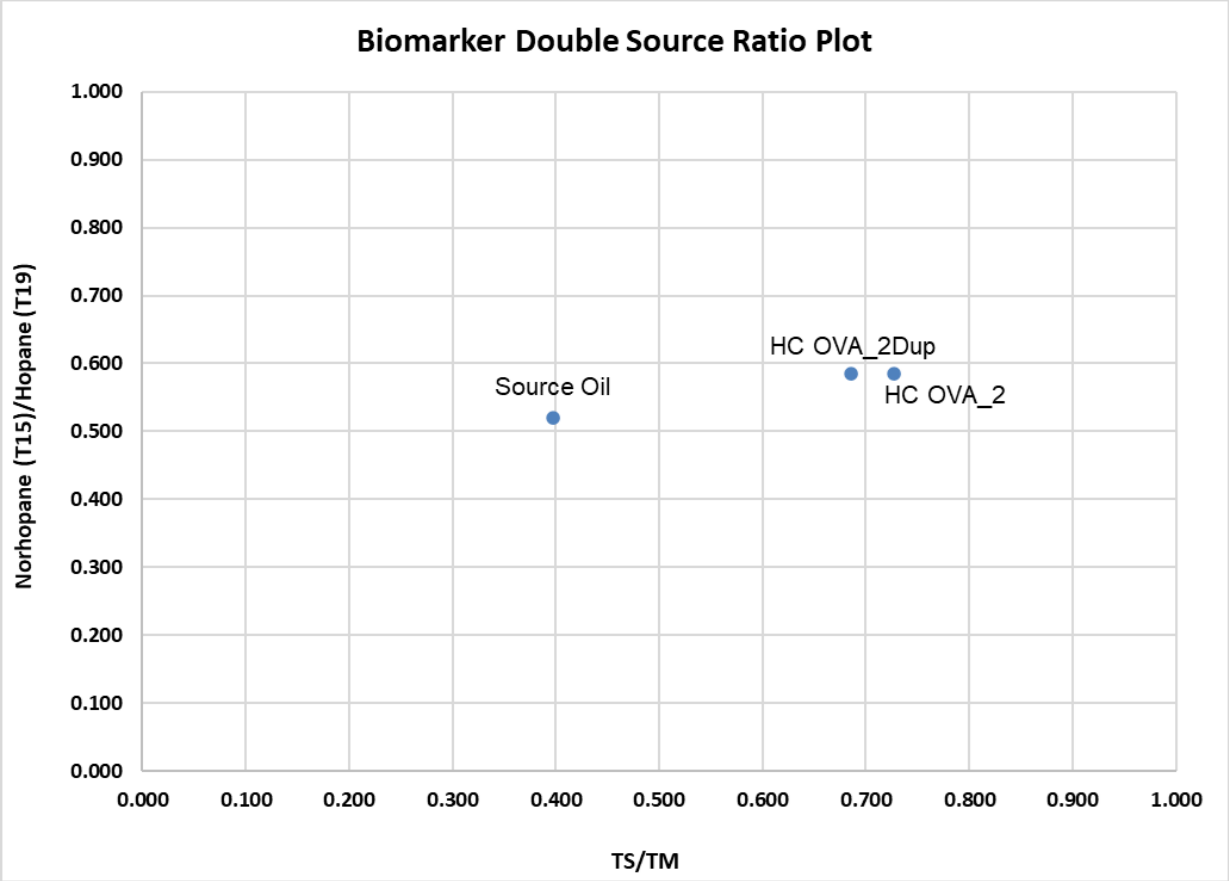


Figure 5. Biomarker Double Source Ratio Plot

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 OVA_2 03AGO2023	L2346275-03	08/03/2023	Oil	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

8/10/23 L2346275 Nº 007230

CERPER CERTIFICACIONES DEL PERU S.A.

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

EXPEDIENTE: EXPA - 10547 - 2023

SOLICITANTE: REFINERIA LA PAMPILLA S.A.A. | PERSONA DE CONTACTO: CARLOS TORRES. | HS: 23006017

LUGAR: PLAYA DEL OVALO | Distrito: HUARAL | Provincia: HUACALLANA | Departamento: LIMA | JOB NUMBER: 23LM0023134656O

NORMA:

1 SMEWW – APHA – AWWA – WEF. 23rd Ed. 2017. Collection and preservation of samples. Part 9060 A-B ( ) 1060 B-C ( ) 10200 B ( ) 10300 B ( ) 10500 B ( ) 10710 B ( )
2 Instrucción 4054-Toma de muestras de sedimentos ( )
3 NTP 214.003 - 1987 (Revisada el 2016) Agua Potable. Toma de muestra. ITEM 4.4 ( ) ITEM 4.5 ( )
4 R.M N° 371-2020-PRODUCE. Protocolo para el Monitoreo de efluentes de los establecimientos industriales pesqueros de consumo humano directo e indirecto ( )
5 R.J N° 010-2016-ANA. Protocolo nacional para el monitoreo de la calidad en 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 R.M 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 R.M N° 085-2014-MINAM. Guía para el muestreo de suelos ( )
10 Protocolo de muestreo de calidad de agua sub sector hidrocarburos DGAAE-EM ( )
11 Otros ( )

PARÁMETROS DE ANÁLISIS EN EL LABORATORIO	PARÁMETROS DE CAMP
FINGER PAINT	pH (Unidades de pH) · Temperatura Ambiental (°C) · Temperatura (°C) · Oxigeno Disuelto (mg/L) · Conductividad uS/cm ( ) mS/cm ( ) · Salinidad (UPS) · Cloro residual mg Cl_2/L Libre ( ) Total ( ) · Turbiedad (UNT) · Caudal (m³/s) · Transparencia cm ( ) m ( )

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 OVA_2 03A602023	03.08.23	11:08	*	0255302	8744307	18L	01
						Total de Envases	01

(1) Matriz (s)
AC = Agua para uso y consumo humano:
AN = Agua Natural:
AP = Agua de proceso:
ASAL = Agua Salina:
AR = Agua Residual:
SM = Sedimento:
SU = Suelo
Otro * Restos de 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	SINGSE051691	4		
2			5		
3			6		

Observaciones: Se procedio a llegar al Punto de Muestreo indicado y denominado por el Representante del Cliente, quien estuvo presente durante el muestreo. Se realizó el procedimiento de caracterización de la muestra, la cual presenta una coloración oscura (negra) y olor a Hidrocarburos. La Muestra fue precintada en campo Nº precinto: 020394. La muestra estuvo ubicada en la parte Centro de la PLAYA DEL OVALO. Las coordenadas se tomaron en sitio.

Responsable de la toma de muestra:
Firma:
Inspector Cerper: Ing. Joe Gutierrez
Inspector Cerper de apoyo: FRANCO NIMA
Hora de inicio: 10:30 Hora de término: 12:30

Representante del cliente
Rec: 8/10/23 11:49
Firma:
Nombre: CARLOS TORRES YACHACHI'U
DNI: 48001656
Cargo: SUPERVISOR PLAYA

Recepción de muestras
Nombre: Jesus Victor A.
Fecha: 04-08-2023 Hora: 8:50 PM

intertek
LAB. CALLAO PERU
RECEIVED

Attachment 2

Analytical Data

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OVA_2 03AGO2023
Lab ID	L2346275-03
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821896
Date Collected	8/3/2023
Date Received	8/10/2023
Date Prepped	8/30/2023
Date Analyzed	9/3/2023
Sample Size(wet)	0.00452 g
% Solid	100
File ID	F1709012369
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	221

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)	6.19	JB	221
SHC	C10	DECANE (C10)		U	221
SHC	C11	UNDECANE	3.32	J	221
SHC	C12	DODECANE (C12)	5.53	J	221
SHC	C13	TRIDECANE	5.31	J	221
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	6.19	J	221
SHC	C14	TETRADECANE (C14)	34.7	J	221
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	48.0	J	221
SHC	C15	PENTADECANE (C15)	166	J	221
SHC	C16	HEXADECANE (C16)	342		221
SHC	1650	NORPRISTANE (1650)	203	J	221
SHC	C17	HEPTADECANE (C17)	552		221
SHC	Pr	PRISTANE	458		221
SHC	C18	OCTADECANE (C18)	974		221
SHC	Ph	PHYTANE	404		221
SHC	C19	NONADECANE (C19)	831		221
SHC	C20	EICOSANE (C20)	1040		221
SHC	C21	HENEICOSANE (C21)	1120		221
SHC	C22	DOCOSANE (C22)	1370		221
SHC	C23	TRICOSANE (C23)	1530		221
SHC	C24	TETRACOSANE (C24)	1810		221
SHC	C25	PENTACOSANE (C25)	2980		221
SHC	C26	HEXACOSANE (C26)	2480		221
SHC	C27	HEPTACOSANE (C27)	2760		221
SHC	C28	OCTACOSANE (C28)	2400		221
SHC	C29	NONACOSANE (C29)	2290		221
SHC	C30	TRIACONTANE (C30)	1830		221
SHC	C31	HENTATRIACONTANE (C31)	1500		221
SHC	C32	DOTRIACONTANE (C32)	1070		221
SHC	C33	TRITRIACONTANE (C33)	1000		221
SHC	C34	TETRATRIACONTANE (C34)	786		221
SHC	C35	PENTATRIACONTANE (C35)	629		221
SHC	C36	HEXATRIACONTANE (C36)	298		221
SHC	C37	HEPTATRIACONTANE (C37)	217	J	221
SHC	C38	OCTATRIACONTANE (C38)	185	J	221
SHC	C39	NONATRIACONTANE (C39)		U	221
SHC	C40	TETRACONTANE (C40)	109	J	221
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	558000		7300
SHC	TSH	TOTAL SATURATED HYDROCARBONS	31400	J	221

Surrogates (% Recovery)	
O-TERPHENYL	97
D50-TETRACOSANE	99

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821896-1
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821896
Date Collected	NA
Date Received	8/30/2023
Date Prepped	8/30/2023
Date Analyzed	9/3/2023
Sample Size(wet)	0.00526 g
% Solid	100
File ID	F1709012359
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	190

Class	Abbrev	Analytes	Result	SSRL
SHC	C9	NONANE (C9)	2.47 J	190
SHC	C10	DECANE (C10)	U	190
SHC	C11	UNDECANE	U	190
SHC	C12	DODECANE (C12)	U	190
SHC	C13	TRIDECANE	U	190
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	U	190
SHC	C14	TETRADECANE (C14)	U	190
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	U	190
SHC	C15	PENTADECANE (C15)	U	190
SHC	C16	HEXADECANE (C16)	U	190
SHC	1650	NORPRISTANE (1650)	U	190
SHC	C17	HEPTADECANE (C17)	U	190
SHC	Pr	PRISTANE	U	190
SHC	C18	OCTADECANE (C18)	U	190
SHC	Ph	PHYTANE	U	190
SHC	C19	NONADECANE (C19)	U	190
SHC	C20	EICOSANE (C20)	U	190
SHC	C21	HENEICOSANE (C21)	U	190
SHC	C22	DOCOSANE (C22)	U	190
SHC	C23	TRICOSANE (C23)	U	190
SHC	C24	TETRACOSANE (C24)	U	190
SHC	C25	PENTACOSANE (C25)	U	190
SHC	C26	HEXACOSANE (C26)	U	190
SHC	C27	HEPTACOSANE (C27)	U	190
SHC	C28	OCTACOSANE (C28)	U	190
SHC	C29	NONACOSANE (C29)	2.09 J	190
SHC	C30	TRIACONTANE (C30)	U	190
SHC	C31	HENTATRIACONTANE (C31)	U	190
SHC	C32	DOTRIACONTANE (C32)	U	190
SHC	C33	TRITRIACONTANE (C33)	U	190
SHC	C34	TETRATRIACONTANE (C34)	U	190
SHC	C35	PENTATRIACONTANE (C35)	U	190
SHC	C36	HEXATRIACONTANE (C36)	U	190
SHC	C37	HEPTATRIACONTANE (C37)	U	190
SHC	C38	OCTATRIACONTANE (C38)	U	190
SHC	C39	NONATRIACONTANE (C39)	U	190
SHC	C40	TETRACONTANE (C40)	U	190
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	U	6270
SHC	TSH	TOTAL SATURATED HYDROCARBONS	4.56 J	190

Surrogates (% Recovery)	
O-TERPHENYL	99
D50-TETRACOSANE	102

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1821896-2
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821896
Date Collected	NA
Date Received	8/30/2023
Date Prepped	8/30/2023
Date Analyzed	9/3/2023
Sample Size(wet)	0.00526 g
% Solid	100
File ID	F1709012361
Units	%
Final Volume	1
Dilution	1
Reporting Limit	190

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	NONANE (C9)	3560	190	94	3800	50	130
SHC	C10	DECANE (C10)	3480	190	92	3800	50	130
SHC	C12	DODECANE (C12)	3520	190	93	3800	50	130
SHC	C14	TETRADECANE (C14)	3510	190	92	3800	50	130
SHC	C16	HEXADECANE (C16)	3890	190	102	3800	50	130
SHC	C18	OCTADECANE (C18)	4060	190	107	3800	50	130
SHC	C19	NONADECANE (C19)	3680	190	97	3800	50	130
SHC	C20	EICOSANE (C20)	3690	190	97	3800	50	130
SHC	C22	DOCOSANE (C22)	3710	190	98	3800	50	130
SHC	C24	TETRACOSANE (C24)	3880	190	102	3800	50	130
SHC	C26	HEXACOSANE (C26)	3840	190	101	3800	50	130
SHC	C28	OCTACOSANE (C28)	3790	190	100	3800	50	130
SHC	C30	TRIACONTANE (C30)	3810	190	100	3800	50	130
SHC	C36	HEXATRIACONTANE (C36)	3460	190	91	3800	50	130

Surrogates (% Recovery)	
O-TERPHENYL	99
D50-TETRACOSANE	102

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1821896-3
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821896
Date Collected	NA
Date Received	8/30/2023
Date Prepped	8/30/2023
Date Analyzed	9/3/2023
Sample Size(wet)	0.00526 g
% Solid	100
File ID	F1709012363
Units	%
Final Volume	1
Dilution	1
Reporting Limit	190

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
SHC	C9	NONANE (C9)	3510	190	92	3800	50	130	2	30
SHC	C10	DECANE (C10)	3500	190	92	3800	50	130	0	30
SHC	C12	DODECANE (C12)	3550	190	93	3800	50	130	0	30
SHC	C14	TETRADECANE (C14)	3540	190	93	3800	50	130	1	30
SHC	C16	HEXADECANE (C16)	3920	190	103	3800	50	130	1	30
SHC	C18	OCTADECANE (C18)	4090	190	108	3800	50	130	1	30
SHC	C19	NONADECANE (C19)	3710	190	98	3800	50	130	1	30
SHC	C20	EICOSANE (C20)	3710	190	98	3800	50	130	1	30
SHC	C22	DOCOSANE (C22)	3720	190	98	3800	50	130	0	30
SHC	C24	TETRACOSANE (C24)	3890	190	102	3800	50	130	0	30
SHC	C26	HEXACOSANE (C26)	3850	190	101	3800	50	130	0	30
SHC	C28	OCTACOSANE (C28)	3790	190	100	3800	50	130	0	30
SHC	C30	TRIACONTANE (C30)	3810	190	100	3800	50	130	0	30
SHC	C36	HEXATRIACONTANE (C36)	3480	190	91	3800	50	130	0	30

Surrogates (% Recovery)	
O-TERPHENYL	99
D50-TETRACOSANE	102

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OVA_2 03AGO2023	Duplicate Sample
Lab ID	L2346275-03	WG1821896-4
Matrix	SOLID	SOLID
Matrix Description		
Reference Method	8015D(M)	8015D(M)
Batch ID	WG1821896	WG1821896
Date Collected	8/3/2023	NA
Date Received	8/10/2023	8/30/2023
Date Prepped	8/30/2023	8/30/2023
Date Analyzed	9/3/2023	9/3/2023
Sample Size(wet)	0.00452 g	0.00417 g
% Solid	100	100
File ID	F1709012369	F1709012371
Units	mg/kg	mg/kg
Final Volume	1	1
Dilution	1	1
Reporting Limit	221	240

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
SHC	C9	NONANE (C9)	6.19	JB	221	7.43	JB	240		30	NC
SHC	C10	DECANE (C10)		U	221		U	240		30	NC
SHC	C11	UNDECANE	3.32	J	221	3.84	J	240		30	NC
SHC	C12	DODECANE (C12)	5.53	J	221	3.60	J	240		30	NC
SHC	C13	TRIDECANE	5.31	J	221	5.28	J	240		30	NC
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	6.19	J	221	7.19	J	240		30	NC
SHC	C14	TETRADECANE (C14)	34.7	J	221	36.0	J	240		30	NC
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	48.0	J	221	47.0	J	240		30	NC
SHC	C15	PENTADECANE (C15)	166	J	221	174	J	240		30	NC
SHC	C16	HEXADECANE (C16)	342		221	369		240	8	30	
SHC	1650	NORPRISTANE (1650)	203	J	221	198	J	240		30	NC
SHC	C17	HEPTADECANE (C17)	552		221	598		240	8	30	
SHC	Pr	PRISTANE	458		221	459		240	0	30	
SHC	C18	OCTADECANE (C18)	974		221	1070		240	9	30	
SHC	Ph	PHYTANE	404		221	406		240	0	30	
SHC	C19	NONADECANE (C19)	831		221	930		240	11	30	
SHC	C20	EICOSANE (C20)	1040		221	1140		240	9	30	
SHC	C21	HENEICOSANE (C21)	1120		221	1240		240	10	30	
SHC	C22	DOCOSANE (C22)	1370		221	1490		240	8	30	
SHC	C23	TRICOSANE (C23)	1530		221	1670		240	9	30	
SHC	C24	TETRACOSANE (C24)	1810		221	1960		240	8	30	
SHC	C25	PENTACOSANE (C25)	2980		221	3100		240	4	30	
SHC	C26	HEXACOSANE (C26)	2480		221	2590		240	4	30	
SHC	C27	HEPTACOSANE (C27)	2760		221	2810		240	2	30	
SHC	C28	OCTACOSANE (C28)	2400		221	2460		240	2	30	
SHC	C29	NONACOSANE (C29)	2290		221	2330		240	2	30	
SHC	C30	TRIACONTANE (C30)	1830		221	1840		240	1	30	
SHC	C31	HENTATRIACONTANE (C31)	1500		221	1510		240	1	30	
SHC	C32	DOTRIACONTANE (C32)	1070		221	1110		240	4	30	
SHC	C33	TRITRIACONTANE (C33)	1000		221	1030		240	3	30	
SHC	C34	TETRATRIACONTANE (C34)	786		221	716		240	9	30	
SHC	C35	PENTATRIACONTANE (C35)	629		221	619		240	2	30	
SHC	C36	HEXATRIACONTANE (C36)	298		221	321		240	7	30	
SHC	C37	HEPTATRIACONTANE (C37)	217	J	221	228	J	240		30	NC
SHC	C38	OCTATRIACONTANE (C38)	185	J	221	161	J	240		30	NC
SHC	C39	NONATRIACONTANE (C39)		U	221	109	J	240		30	X
SHC	C40	TETRACONTANE (C40)	109	J	221	89.0	J	240		30	NC
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	558000		7300	576000		7910	3	30	
SHC	TSH	TOTAL SATURATED HYDROCARBONS	31400	J	221	32800	J	240		30	NC

Surrogates (% Recovery)		
O-TERPHENYL	97	99
D50-TETRACOSANE	99	100

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 OVA_2 03AGO2023
Lab ID	L2346275-03
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821896
Date Collected	8/3/2023
Date Received	8/10/2023
Date Prepped	8/30/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00452 g
% Solid	100
File ID	F1408302351
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.11

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN	U		1.11
2	D1	C1-DECALINS	U		2.21
2	D2	C2-DECALINS	U		2.21
2	D3	C3-DECALINS	U		2.21
2	D4	C4-DECALINS	U		2.21
S	BT0	BENZOTHIOPHENE	U		2.21
2	BT1	C1-BENZO(B)THIOPHENES	U		2.21
2	BT2	C2-BENZO(B)THIOPHENES	1.78	J	2.21
2	BT3	C3-BENZO(B)THIOPHENES	6.07		2.21
2	BT4	C4-BENZO(B)THIOPHENES	8.58		2.21
A	N0	NAPHTHALENE	1.28	J	2.21
2	N1	C1-NAPHTHALENES	1.90	JB	2.21
2	N2	C2-NAPHTHALENES	19.1		2.21
2	N3	C3-NAPHTHALENES	79.8		2.21
2	N4	C4-NAPHTHALENES	110		2.21
2	B	BIPHENYL	0.997	J	2.21
3	DF	DIBENZOFURAN	0.793	J	2.21
3	AY	ACENAPHTHYLENE	1.24	J	2.21
3	AE	ACENAPHTHENE	2.18	J	2.21
3	F0	FLUORENE	9.11		2.21
3	F1	C1-FLUORENES	40.6		2.21
3	F2	C2-FLUORENES	110		2.21
3	F3	C3-FLUORENES	172		2.21
3	A0	ANTHRACENE	7.37		2.21
3	P0	PHENANTHRENE	77.3		2.21
3	PA1	C1-PHENANTHRENES/ANTHRACENES	281		2.21
3	PA2	C2-PHENANTHRENES/ANTHRACENES	581		2.21
3	PA3	C3-PHENANTHRENES/ANTHRACENES	486		2.21
3	PA4	C4-PHENANTHRENES/ANTHRACENES	275		2.21
3	RET	RETENE	U		2.21
3	DBT0	DIBENZOTHIOPHENE	9.52		2.21
3	DBT1	C1-DIBENZOTHIOPHENES	68.8		2.21
3	DBT2	C2-DIBENZOTHIOPHENES	135		2.21
3	DBT3	C3-DIBENZOTHIOPHENES	144		2.21
3	DBT4	C4-DIBENZOTHIOPHENES	92.7		2.21
4	BF	BENZO(B)FLUORENE	11.8		2.21
4	FL0	FLUORANTHENE	7.64		2.21
4	PY0	PYRENE	57.2		2.21
4	FP1	C1-FLUORANTHENES/PYRENES	204		2.21
4	FP2	C2-FLUORANTHENES/PYRENES	341		2.21
4	FP3	C3-FLUORANTHENES/PYRENES	421		2.21
4	FP4	C4-FLUORANTHENES/PYRENES	378		2.21
4	NBT0	NAPHTHOBENZOTHIOPHENE	34.0		2.21
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	125		2.21
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	214		2.21
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	183		2.21
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	122		2.21
4	BA0	BENZ(A)ANTHRACENE	31.3		2.21
4	C0	CHRYSENE/TRIPHENYLENE	91.9		2.21
4	BC1	C1-CHRYSENES	307		2.21
4	BC2	C2-CHRYSENES	509		2.21
4	BC3	C3-CHRYSENES	574		2.21
4	BC4	C4-CHRYSENES	330		2.21
5	BBF	BENZO(B)FLUORANTHENE	16.6		2.21

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OVA_2 03AGO2023
Lab ID	L2346275-03
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821896
Date Collected	8/3/2023
Date Received	8/10/2023
Date Prepped	8/30/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00452 g
% Solid	100
File ID	F1408302351
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.11

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE	3.52		2.21
5	BAF	BENZO(A)FLUORANTHENE		U	2.21
5	BEP	BENZO(E)PYRENE	45.1		2.21
5	BAP	BENZO(A)PYRENE	19.4		2.21
5	PER	PERYLENE	9.16		2.21
6	IND	INDENO(1,2,3-CD)PYRENE	4.83		2.21
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	6.39		2.21
6	GHI	BENZO(GHI)PERYLENE	14.2		2.21
O	CAR	CARBAZOLE	1.45	J	2.21
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	24.4		2.21
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	31.8		2.21
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	6.49		2.21
3	3MP	3-METHYLPHENANTHRENE (3MP)	67.0		2.21
3	2MP	2-METHYLPHENANTHRENE (2MP)	87.1		2.21
3	2MA	2-METHYLANTHRACENE (2MA)	10.0		2.21
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	64.9		2.21
3	1MP	1-METHYLPHENANTHRENE (1MP)	44.0		2.21
A	1MN	1-METHYLNAPHTHALENE	1.18	JB	2.21
A	2MN	2-METHYLNAPHTHALENE	1.19	JB	2.21
2	26DMN	2,6-DIMETHYLNAPHTHALENE	6.92		2.21
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	13.0		2.21
H30	T19	HOPANE (T19)	509		2.21
t23	T4	C23 TRICYCLIC TERPANE (T4)	58.2		2.21
t24	T5	C24 TRICYCLIC TERPANE (T5)	36.6		2.21
t25	T6	C25 TRICYCLIC TERPANE (T6)	32.9		2.21
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	19.0		2.21
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	26.0		2.21
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	27.6		2.21
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	34.0		2.21
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	38.4		2.21
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	31.2		2.21
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	36.2		2.21
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	67.1		2.21
t30S	T11a	C30 TRICYCLIC TERPANE-22S	35.9		2.21
t30R	T11b	C30 TRICYCLIC TERPANE-22R	36.6		2.21
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	92.3		2.21
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	25.1		2.21
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	25.5		2.21
H29	T15	30-NORHOPANE (T15)	298		2.21
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	61.4		2.21
X	X	17A(H)-DIAHOPANE (X)	32.9		2.21
M29	T17	30-NORMORETANE (T17)	42.5		2.21
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	63.8		2.21
M30	T20	MORETANE (T20)	65.4		2.21
H31S	T21	30-HOMOHOPANE-22S (T21)	174		2.21
H31R	T22	30-HOMOHOPANE-22R (T22)	171		2.21
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	76.6		2.21
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	130		2.21
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	90.0		2.21
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	95.7		2.21
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	62.1		2.21
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	67.0		2.21
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	46.0		2.21
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	49.2		2.21

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OVA_2 03AGO2023
Lab ID	L2346275-03
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821896
Date Collected	8/3/2023
Date Received	8/10/2023
Date Prepped	8/30/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00452 g
% Solid	100
File ID	F1408302351
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.11

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	53.3	2.21
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	38.2	2.21
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	20.5	2.21
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	11.8	2.21
aa27S	S12	17A(H)20SC27/C29DIA	65.3	2.21
aa27R	S17	17A(H)20RC27/C29DIA	80.2	2.21
d29R	S18	UNKNOWN STERANE (S18)	13.1	2.21
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	6.73	2.21
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	37.5	2.21
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	39.2	2.21
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	45.5	2.21
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	51.5	2.21
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	50.7	2.21
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	45.8	2.21
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	39.8	2.21
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	52.9	2.21
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	75.1	2.21
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	41.6	2.21
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	58.8	2.21
SC28TAS	TAS02	C28,20S TAS	58.2	2.21
RC27TAS	TAS03	C27,20R TAS	60.8	2.21
RC28TAS	TAS04	C28,20R TAS	39.3	2.21

Surrogates (% Recovery)	
NAPHTHALENE-D8	81
PHENANTHRENE-D10	101
BENZO(A)PYRENE-D12	98
5B(H)CHOLANE	89

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821896-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821896
Date Collected	NA
Date Received	8/30/2023
Date Prepped	8/30/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00526 g
% Solid	100
File ID	F1408302347
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	0.95

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN		U	0.950
2	D1	C1-DECALINS		U	1.90
2	D2	C2-DECALINS		U	1.90
2	D3	C3-DECALINS		U	1.90
2	D4	C4-DECALINS		U	1.90
S	BT0	BENZOTHIOPHENE		U	1.90
2	BT1	C1-BENZO(B)THIOPHENES		U	1.90
2	BT2	C2-BENZO(B)THIOPHENES		U	1.90
2	BT3	C3-BENZO(B)THIOPHENES		U	1.90
2	BT4	C4-BENZO(B)THIOPHENES		U	1.90
A	N0	NAPHTHALENE	0.103	J	1.90
2	N1	C1-NAPHTHALENES	0.394	J	1.90
2	N2	C2-NAPHTHALENES		U	1.90
2	N3	C3-NAPHTHALENES		U	1.90
2	N4	C4-NAPHTHALENES		U	1.90
2	B	BIPHENYL		U	1.90
3	DF	DIBENZOFURAN		U	1.90
3	AY	ACENAPHTHYLENE		U	1.90
3	AE	ACENAPHTHENE		U	1.90
3	F0	FLUORENE	0.0728	J	1.90
3	F1	C1-FLUORENES		U	1.90
3	F2	C2-FLUORENES		U	1.90
3	F3	C3-FLUORENES		U	1.90
3	A0	ANTHRACENE		U	1.90
3	P0	PHENANTHRENE	0.210	J	1.90
3	PA1	C1-PHENANTHRENES/ANTHRACENES		U	1.90
3	PA2	C2-PHENANTHRENES/ANTHRACENES		U	1.90
3	PA3	C3-PHENANTHRENES/ANTHRACENES		U	1.90
3	PA4	C4-PHENANTHRENES/ANTHRACENES		U	1.90
3	RET	RETENE		U	1.90
3	DBT0	DIBENZOTHIOPHENE	0.130	J	1.90
3	DBT1	C1-DIBENZOTHIOPHENES		U	1.90
3	DBT2	C2-DIBENZOTHIOPHENES		U	1.90
3	DBT3	C3-DIBENZOTHIOPHENES		U	1.90
3	DBT4	C4-DIBENZOTHIOPHENES		U	1.90
4	BF	BENZO(B)FLUORENE		U	1.90
4	FL0	FLUORANTHENE	0.113	J	1.90
4	PY0	PYRENE	0.110	J	1.90
4	FP1	C1-FLUORANTHENES/PYRENES		U	1.90
4	FP2	C2-FLUORANTHENES/PYRENES		U	1.90
4	FP3	C3-FLUORANTHENES/PYRENES		U	1.90
4	FP4	C4-FLUORANTHENES/PYRENES		U	1.90
4	NBT0	NAPHTHOBENZOTHIOPHENE	0.0705	J	1.90
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES		U	1.90
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES		U	1.90
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES		U	1.90
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES		U	1.90
4	BA0	BENZ(A)ANTHRACENE		U	1.90
4	C0	CHRYSENE/TRIPHENYLENE	0.0779	J	1.90
4	BC1	C1-CHRYSENES		U	1.90
4	BC2	C2-CHRYSENES		U	1.90
4	BC3	C3-CHRYSENES		U	1.90
4	BC4	C4-CHRYSENES		U	1.90
5	BBF	BENZO(B)FLUORANTHENE		U	1.90

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821896-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821896
Date Collected	NA
Date Received	8/30/2023
Date Prepped	8/30/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00526 g
% Solid	100
File ID	F1408302347
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	0.95

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE		U	1.90
5	BAF	BENZO(A)FLUORANTHENE		U	1.90
5	BEP	BENZO(E)PYRENE		U	1.90
5	BAP	BENZO(A)PYRENE		U	1.90
5	PER	PERYLENE		U	1.90
6	IND	INDENO(1,2,3-CD)PYRENE		U	1.90
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE		U	1.90
6	GHI	BENZO(GHI)PERYLENE		U	1.90
O	CAR	CARBAZOLE	0.124	J	1.90
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)		U	1.90
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)		U	1.90
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)		U	1.90
3	3MP	3-METHYLPHENANTHRENE (3MP)		U	1.90
3	2MP	2-METHYLPHENANTHRENE (2MP)		U	1.90
3	2MA	2-METHYLANTHRACENE (2MA)		U	1.90
3	9MP	9/4-METHYLPHENANTHRENE (9MP)		U	1.90
3	1MP	1-METHYLPHENANTHRENE (1MP)		U	1.90
A	1MN	1-METHYLNAPHTHALENE	0.165	J	1.90
A	2MN	2-METHYLNAPHTHALENE	0.218	J	1.90
2	26DMN	2,6-DIMETHYLNAPHTHALENE	0.308	J	1.90
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE		U	1.90
H30	T19	HOPANE (T19)		U	1.90
t23	T4	C23 TRICYCLIC TERPANE (T4)		U	1.90
t24	T5	C24 TRICYCLIC TERPANE (T5)		U	1.90
t25	T6	C25 TRICYCLIC TERPANE (T6)		U	1.90
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)		U	1.90
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)		U	1.90
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)		U	1.90
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)		U	1.90
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)		U	1.90
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)		U	1.90
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)		U	1.90
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)		U	1.90
t30S	T11a	C30 TRICYCLIC TERPANE-22S		U	1.90
t30R	T11b	C30 TRICYCLIC TERPANE-22R		U	1.90
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)		U	1.90
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)		U	1.90
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)		U	1.90
H29	T15	30-NORHOPANE (T15)		U	1.90
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)		U	1.90
X	X	17A(H)-DIAHOPANE (X)		U	1.90
M29	T17	30-NORMORETANE (T17)		U	1.90
OL	T18	18A(H)&18B(H)-OLEANANES (T18)		U	1.90
M30	T20	MORETANE (T20)		U	1.90
H31S	T21	30-HOMOHOPANE-22S (T21)		U	1.90
H31R	T22	30-HOMOHOPANE-22R (T22)		U	1.90
T22A	T22A	GAMMACERANE/C32-DIAHOPANE		U	1.90
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)		U	1.90
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)		U	1.90
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)		U	1.90
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)		U	1.90
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)		U	1.90
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)		U	1.90
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)		U	1.90

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821896-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821896
Date Collected	NA
Date Received	8/30/2023
Date Prepped	8/30/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00526 g
% Solid	100
File ID	F1408302347
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	0.95

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	U	1.90
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	U	1.90
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	U	1.90
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	U	1.90
aa27S	S12	17A(H)20SC27/C29DIA	U	1.90
aa27R	S17	17A(H)20RC27/C29DIA	U	1.90
d29R	S18	UNKNOWN STERANE (S18)	U	1.90
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	U	1.90
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	U	1.90
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	U	1.90
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	U	1.90
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	U	1.90
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	U	1.90
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	U	1.90
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	U	1.90
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	U	1.90
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	U	1.90
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	U	1.90
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	U	1.90
SC28TAS	TAS02	C28,20S TAS	U	1.90
RC27TAS	TAS03	C27,20R TAS	U	1.90
RC28TAS	TAS04	C28,20R TAS	U	1.90

Surrogates (% Recovery)	
NAPHTHALENE-D8	90
PHENANTHRENE-D10	97
BENZO(A)PYRENE-D12	97
5B(H)CHOLANE	88

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1821896-2
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821896
Date Collected	NA
Date Received	8/30/2023
Date Prepped	8/30/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00526 g
% Solid	100
File ID	F1408302348
Units	%
Final Volume	1
Dilution	1
Reporting Limit	1.9

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
A	N0	NAPHTHALENE	201	1.90	106	190	50	130
3	AY	ACENAPHTHYLENE	166	1.90	88	190	50	130
3	AE	ACENAPHTHENE	176	1.90	92	190	50	130
3	F0	FLUORENE	185	1.90	97	190	50	130
3	A0	ANTHRACENE	199	1.90	105	190	50	130
3	P0	PHENANTHRENE	187	1.90	98	190	50	130
4	FL0	FLUORANTHENE	165	1.90	87	190	50	130
4	PY0	PYRENE	175	1.90	92	190	50	130
4	BA0	BENZ(A)ANTHRACENE	181	1.90	95	190	50	130
4	C0	CHRYSENE/TRIPHENYLENE	174	1.90	92	190	50	130
5	BBF	BENZO(B)FLUORANTHENE	179	1.90	94	190	50	130
5	BJKF	BENZO(J)+(K)FLUORANTHENE	187	1.90	98	190	50	130
5	BAP	BENZO(A)PYRENE	168	1.90	88	190	50	130
6	IND	INDENO(1,2,3-CD)PYRENE	161	1.90	85	190	50	130
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	175	1.90	92	190	50	130
6	GHI	BENZO(GHI)PERYLENE	166	1.90	87	190	50	130
A	2MN	2-METHYLNAPHTHALENE	164	1.90	86	190	50	130

Surrogates (% Recovery)	
NAPHTHALENE-D8	92
PHENANTHRENE-D10	99
BENZO(A)PYRENE-D12	95
5B(H)CHOLANE	84

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1821896-3
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821896
Date Collected	NA
Date Received	8/30/2023
Date Prepped	8/30/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00526 g
% Solid	100
File ID	F1408302349
Units	%
Final Volume	1
Dilution	1
Reporting Limit	1.9

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
A	N0	NAPHTHALENE	204	1.90	107	190	50	130	1	30
3	AY	ACENAPHTHYLENE	170	1.90	89	190	50	130	1	30
3	AE	ACENAPHTHENE	178	1.90	93	190	50	130	1	30
3	F0	FLUORENE	189	1.90	100	190	50	130	3	30
3	A0	ANTHRACENE	203	1.90	107	190	50	130	2	30
3	P0	PHENANTHRENE	192	1.90	101	190	50	130	3	30
4	FL0	FLUORANTHENE	168	1.90	88	190	50	130	1	30
4	PY0	PYRENE	178	1.90	94	190	50	130	2	30
4	BA0	BENZ(A)ANTHRACENE	182	1.90	96	190	50	130	1	30
4	C0	CHRYSENE/TRIPHENYLENE	176	1.90	92	190	50	130	0	30
5	BBF	BENZO(B)FLUORANTHENE	180	1.90	94	190	50	130	0	30
5	BJKF	BENZO(J)+(K)FLUORANTHENE	189	1.90	99	190	50	130	1	30
5	BAP	BENZO(A)PYRENE	169	1.90	89	190	50	130	1	30
6	IND	INDENO(1,2,3-CD)PYRENE	167	1.90	88	190	50	130	3	30
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	174	1.90	92	190	50	130	0	30
6	GHI	BENZO(GHI)PERYLENE	166	1.90	87	190	50	130	0	30
A	2MN	2-METHYLNAPHTHALENE	166	1.90	87	190	50	130	1	30

Surrogates (% Recovery)	
NAPHTHALENE-D8	92
PHENANTHRENE-D10	101
BENZO(A)PYRENE-D12	95
5B(H)CHOLANE	83

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OVA_2 03AGO2023		Duplicate Sample		
Lab ID	L2346275-03		WG1821896-4		
Matrix	SOLID		SOLID		
Matrix Description					
Reference Method	8270E-SIM(M)		8270E-SIM(M)		
Batch ID	WG1821896		WG1821896		
Date Collected	8/3/2023		NA		
Date Received	8/10/2023		8/30/2023		
Date Prepped	8/30/2023		8/30/2023		
Date Analyzed	9/2/2023		9/2/2023		
Sample Size(wet)	0.00452	g	0.00417	g	
% Solid	100		100		
File ID	F1408302351		F1408302352		
Units	mg/kg		mg/kg		
Final Volume	1		1		
Dilution	1		1		
Reporting Limit	1.11		1.2		

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
2	D0	CIS/TRANS-DECALIN		U	1.11		U	1.20		30	NC
2	D1	C1-DECALINS		U	2.21		U	2.40		30	NC
2	D2	C2-DECALINS		U	2.21		U	2.40		30	NC
2	D3	C3-DECALINS		U	2.21		U	2.40		30	NC
2	D4	C4-DECALINS		U	2.21		U	2.40		30	NC
S	BT0	BENZOTHIOPHENE		U	2.21		U	2.40		30	NC
2	BT1	C1-BENZO(B)THIOPHENES		U	2.21		U	2.40		30	NC
2	BT2	C2-BENZO(B)THIOPHENES	1.78	J	2.21	1.74	J	2.40		30	NC
2	BT3	C3-BENZO(B)THIOPHENES	6.07		2.21	6.43		2.40	6	30	
2	BT4	C4-BENZO(B)THIOPHENES	8.58		2.21	9.87		2.40	14	30	
A	N0	NAPHTHALENE	1.28	J	2.21	1.12	J	2.40		30	NC
2	N1	C1-NAPHTHALENES	1.90	JB	2.21	1.87	JB	2.40		30	NC
2	N2	C2-NAPHTHALENES	19.1		2.21	17.8		2.40	7	30	
2	N3	C3-NAPHTHALENES	79.8		2.21	75.4		2.40	6	30	
2	N4	C4-NAPHTHALENES	110		2.21	107		2.40	3	30	
2	B	BIPHENYL	0.997	J	2.21	1.12	J	2.40		30	NC
3	DF	DIBENZOFURAN	0.793	J	2.21	0.704	J	2.40		30	NC
3	AY	ACENAPHTHYLENE	1.24	J	2.21	1.07	J	2.40		30	NC
3	AE	ACENAPHTHENE	2.18	J	2.21	2.26	J	2.40		30	NC
3	F0	FLUORENE	9.11		2.21	7.71		2.40	17	30	
3	F1	C1-FLUORENES	40.6		2.21	39.4		2.40	3	30	
3	F2	C2-FLUORENES	110		2.21	110		2.40	0	30	
3	F3	C3-FLUORENES	172		2.21	168		2.40	2	30	
3	A0	ANTHRACENE	7.37		2.21	7.28		2.40	1	30	
3	P0	PHENANTHRENE	77.3		2.21	78.0		2.40	1	30	
3	PA1	C1-PHENANTHRENES/ANTHRACENES	281		2.21	280		2.40	0	30	
3	PA2	C2-PHENANTHRENES/ANTHRACENES	581		2.21	576		2.40	1	30	
3	PA3	C3-PHENANTHRENES/ANTHRACENES	486		2.21	486		2.40	0	30	
3	PA4	C4-PHENANTHRENES/ANTHRACENES	275		2.21	279		2.40	1	30	
3	RET	RETENE		U	2.21		U	2.40		30	NC
3	DBT0	DIBENZOTHIOPHENE	9.52		2.21	9.20		2.40	3	30	
3	DBT1	C1-DIBENZOTHIOPHENES	68.8		2.21	68.0		2.40	1	30	
3	DBT2	C2-DIBENZOTHIOPHENES	135		2.21	134		2.40	1	30	
3	DBT3	C3-DIBENZOTHIOPHENES	144		2.21	146		2.40	1	30	
3	DBT4	C4-DIBENZOTHIOPHENES	92.7		2.21	91.0		2.40	2	30	
4	BF	BENZO(B)FLUORENE	11.8		2.21	10.6		2.40	11	30	
4	FL0	FLUORANTHENE	7.64		2.21	7.68		2.40	1	30	
4	PY0	PYRENE	57.2		2.21	56.6		2.40	1	30	
4	FP1	C1-FLUORANTHENES/PYRENES	204		2.21	202		2.40	1	30	
4	FP2	C2-FLUORANTHENES/PYRENES	341		2.21	341		2.40	0	30	
4	FP3	C3-FLUORANTHENES/PYRENES	421		2.21	424		2.40	1	30	
4	FP4	C4-FLUORANTHENES/PYRENES	378		2.21	383		2.40	1	30	
4	NBT0	NAPHTHOBENZOTHIOPHENE	34.0		2.21	33.1		2.40	3	30	
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	125		2.21	128		2.40	2	30	
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	214		2.21	219		2.40	2	30	
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	183		2.21	190		2.40	4	30	
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	122		2.21	128		2.40	5	30	
4	BA0	BENZ(A)ANTHRACENE	31.3		2.21	30.8		2.40	2	30	
4	C0	CHRYSENE/TRIPHENYLENE	91.9		2.21	88.5		2.40	4	30	
4	BC1	C1-CHRYSENES	307		2.21	306		2.40	0	30	
4	BC2	C2-CHRYSENES	509		2.21	508		2.40	0	30	
4	BC3	C3-CHRYSENES	574		2.21	577		2.40	1	30	
4	BC4	C4-CHRYSENES	330		2.21	326		2.40	1	30	
5	BBF	BENZO(B)FLUORANTHENE	16.6		2.21	16.1		2.40	3	30	
5	BJKF	BENZO(J)+(K)FLUORANTHENE	3.52		2.21	3.22		2.40	9	30	
5	BAF	BENZO(A)FLUORANTHENE		U	2.21		U	2.40		30	NC
5	BEP	BENZO(E)PYRENE	45.1		2.21	44.0		2.40	2	30	
5	BAP	BENZO(A)PYRENE	19.4		2.21	19.3		2.40	1	30	
5	PER	PERYLENE	9.16		2.21	8.51		2.40	7	30	
6	IND	INDENO(1,2,3-CD)PYRENE	4.83		2.21	4.65		2.40	4	30	
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	6.39		2.21	6.39		2.40	0	30	

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OVA_2 03AGO2023		Duplicate Sample		
Lab ID	L2346275-03		WG1821896-4		
Matrix	SOLID		SOLID		
Matrix Description					
Reference Method	8270E-SIM(M)		8270E-SIM(M)		
Batch ID	WG1821896		WG1821896		
Date Collected	8/3/2023		NA		
Date Received	8/10/2023		8/30/2023		
Date Prepped	8/30/2023		8/30/2023		
Date Analyzed	9/2/2023		9/2/2023		
Sample Size(wet)	0.00452	g	0.00417	g	
% Solid	100		100		
File ID	F1408302351		F1408302352		
Units	mg/kg		mg/kg		
Final Volume	1		1		
Dilution	1		1		
Reporting Limit	1.11		1.2		

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
6	GHI	BENZO(GHI)PERYLENE	14.2		2.21	13.9		2.40	2	30	
O	CAR	CARBAZOLE	1.45	J	2.21	1.35	J	2.40		30	NC
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	24.4		2.21	24.2		2.40	1	30	
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	31.8		2.21	31.0		2.40	3	30	
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	6.49		2.21	6.48		2.40	0	30	
3	3MP	3-METHYLPHENANTHRENE (3MP)	67.0		2.21	66.1		2.40	1	30	
3	2MP	2-METHYLPHENANTHRENE (2MP)	87.1		2.21	85.3		2.40	2	30	
3	2MA	2-METHYLANTHRACENE (2MA)	10.0		2.21	9.84		2.40	2	30	
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	64.9		2.21	64.8		2.40	0	30	
3	1MP	1-METHYLPHENANTHRENE (1MP)	44.0		2.21	47.4		2.40	7	30	
A	1MN	1-METHYLNAPHTHALENE	1.18	JB	2.21	1.20	JB	2.40		30	NC
A	2MN	2-METHYLNAPHTHALENE	1.19	JB	2.21	1.27	JB	2.40		30	NC
2	26DMN	2,6-DIMETHYLNAPHTHALENE	6.92		2.21	6.37		2.40	8	30	
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	13.0		2.21	10.2		2.40	24	30	
H30	T19	HOPANE (T19)	509		2.21	520		2.40	2	30	
t23	T4	C23 TRICYCLIC TERPANE (T4)	58.2		2.21	58.1		2.40	0	30	
t24	T5	C24 TRICYCLIC TERPANE (T5)	36.6		2.21	33.8		2.40	8	30	
t25	T6	C25 TRICYCLIC TERPANE (T6)	32.9		2.21	32.9		2.40	0	30	
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	19.0		2.21	20.1		2.40	6	30	
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	26.0		2.21	27.7		2.40	6	30	
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	27.6		2.21	27.0		2.40	2	30	
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	34.0		2.21	36.6		2.40	7	30	
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	38.4		2.21	41.8		2.40	8	30	
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	31.2		2.21	31.7		2.40	2	30	
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	36.2		2.21	36.6		2.40	1	30	
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	67.1		2.21	65.9		2.40	2	30	
t30S	T11a	C30 TRICYCLIC TERPANE-22S	35.9		2.21	36.3		2.40	1	30	
t30R	T11b	C30 TRICYCLIC TERPANE-22R	36.6		2.21	38.1		2.40	4	30	
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	92.3		2.21	96.1		2.40	4	30	
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	25.1		2.21	29.0		2.40	14	30	
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	25.5		2.21	24.4		2.40	4	30	
H29	T15	30-NORHOPANE (T15)	298		2.21	304		2.40	2	30	
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	61.4		2.21	63.2		2.40	3	30	
X	X	17A(H)-DIAHOPANE (X)	32.9		2.21	36.2		2.40	10	30	
M29	T17	30-NORMORETANE (T17)	42.5		2.21	42.4		2.40	0	30	
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	63.8		2.21	64.6		2.40	1	30	
M30	T20	MORETANE (T20)	65.4		2.21	62.9		2.40	4	30	
H31S	T21	30-HOMOHOPANE-22S (T21)	174		2.21	181		2.40	4	30	
H31R	T22	30-HOMOHOPANE-22R (T22)	171		2.21	178		2.40	4	30	
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	76.6		2.21	84.5		2.40	10	30	
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	130		2.21	132		2.40	2	30	
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	90.0		2.21	96.3		2.40	7	30	
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	95.7		2.21	91.6		2.40	4	30	
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	62.1		2.21	59.9		2.40	4	30	
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	67.0		2.21	66.2		2.40	1	30	
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	46.0		2.21	45.3		2.40	2	30	
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	49.2		2.21	52.3		2.40	6	30	
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	53.3		2.21	52.8		2.40	1	30	
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	38.2		2.21	39.8		2.40	4	30	
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	20.5		2.21	22.1		2.40	8	30	
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	11.8		2.21	13.5		2.40	13	30	
aa27S	S12	17A(H)20SC27/C29DIA	65.3		2.21	67.8		2.40	4	30	
aa27R	S17	17A(H)20RC27/C29DIA	80.2		2.21	79.4		2.40	1	30	
d29R	S18	UNKNOWN STERANE (S18)	13.1		2.21	14.0		2.40	7	30	
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	6.73		2.21	5.48		2.40	20	30	
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	37.5		2.21	37.3		2.40	1	30	
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	39.2		2.21	38.6		2.40	2	30	
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	45.5		2.21	39.6		2.40	14	30	
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	51.5		2.21	48.4		2.40	6	30	
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	50.7		2.21	51.5		2.40	2	30	
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	45.8		2.21	47.5		2.40	4	30	

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OVA_2 03AGO2023		Duplicate Sample	
Lab ID	L2346275-03		WG1821896-4	
Matrix	SOLID		SOLID	
Matrix Description				
Reference Method	8270E-SIM(M)		8270E-SIM(M)	
Batch ID	WG1821896		WG1821896	
Date Collected	8/3/2023		NA	
Date Received	8/10/2023		8/30/2023	
Date Prepped	8/30/2023		8/30/2023	
Date Analyzed	9/2/2023		9/2/2023	
Sample Size(wet)	0.00452	g	0.00417	g
% Solid	100		100	
File ID	F1408302351		F1408302352	
Units	mg/kg		mg/kg	
Final Volume	1		1	
Dilution	1		1	
Reporting Limit	1.11		1.2	

Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	RPD	RPD Limit
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	39.8	2.21	40.2	2.40	1	30
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	52.9	2.21	55.0	2.40	4	30
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	75.1	2.21	72.0	2.40	4	30
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	41.6	2.21	47.1	2.40	12	30
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	58.8	2.21	58.4	2.40	1	30
SC28TAS	TAS02	C28,20S TAS	58.2	2.21	46.6	2.40	22	30
RC27TAS	TAS03	C27,20R TAS	60.8	2.21	61.3	2.40	1	30
RC28TAS	TAS04	C28,20R TAS	39.3	2.21	38.4	2.40	2	30

Surrogates (% Recovery)		
NAPHTHALENE-D8	81	82
PHENANTHRENE-D10	101	104
BENZO(A)PYRENE-D12	98	102
5B(H)CHOLANE	89	91

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1822426-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1822426-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	8/31/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F1408302316
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	425	1.94	89	477.66	65	135
2	D1	C1-DECALINS	684	1.94	90	760.39	65	135
2	D2	C2-DECALINS	636	1.94	94	675.98	65	135
2	D3	C3-DECALINS	338	1.94	92	366.46	65	135
2	D4	C4-DECALINS	299	1.94	82	362.78	65	135
S	BT0	BENZOTHIOPHENE	4.82	1.94	84	5.75	65	135
2	BT1	C1-BENZO(B)THIOPHENES	26.4	1.94	88	29.96	65	135
2	BT2	C2-BENZO(B)THIOPHENES	43.2	1.94	85	50.93	65	135
2	BT3	C3-BENZO(B)THIOPHENES	95.7	1.94	93	103.18	65	135
2	BT4	C4-BENZO(B)THIOPHENES	85.6	1.94	94	90.8	65	135
A	N0	NAPHTHALENE	545	1.94	96	565.56	65	135
2	N1	C1-NAPHTHALENES	1150	1.94	95	1208.32	65	135
2	N2	C2-NAPHTHALENES	1370	1.94	94	1450.37	65	135
2	N3	C3-NAPHTHALENES	979	1.94	93	1052.74	65	135
2	N4	C4-NAPHTHALENES	536	1.94	92	583.65	65	135
2	B	BIPHENYL	138	1.94	95	145.7	65	135
3	DF	DIBENZOFURAN	51.9	1.94	104	49.63	65	135
3	AY	ACENAPHTHYLENE	5.88	1.94	85	6.91	65	135
3	AE	ACENAPHTHENE	15.4	1.94	84	18.35	65	135
3	F0	FLUORENE	61.0	1.94	86	70.69	65	135
3	F1	C1-FLUORENES	144	1.94	88	162.7	65	135
3	F2	C2-FLUORENES	208	1.94	83	251.87	65	135
3	F3	C3-FLUORENES	219	1.94	90	242.29	65	135
3	P0	PHENANTHRENE	183	1.94	97	188.41	65	135
3	PA1	C1-PHENANTHRENES/ANTHRACENES	364	1.94	94	388.12	65	135
3	PA2	C2-PHENANTHRENES/ANTHRACENES	408	1.94	94	434.38	65	135
3	PA3	C3-PHENANTHRENES/ANTHRACENES	283	1.94	92	308.67	65	135
3	PA4	C4-PHENANTHRENES/ANTHRACENES	127	1.94	98	129.94	65	135
3	DBT0	DIBENZOTHIOPHENE	122	1.94	93	130.56	65	135
3	DBT1	C1-DIBENZOTHIOPHENES	295	1.94	107	275.34	65	135
3	DBT2	C2-DIBENZOTHIOPHENES	362	1.94	98	369.42	65	135
3	DBT3	C3-DIBENZOTHIOPHENES	318	1.94	92	345.39	65	135
3	DBT4	C4-DIBENZOTHIOPHENES	178	1.94	92	193.51	65	135
4	FL0	FLUORANTHENE	3.26	1.94	86	3.77	65	135
4	PY0	PYRENE	11.6	1.94	100	11.65	65	135
4	FP1	C1-FLUORANTHENES/PYRENES	50.6	1.94	93	54.43	65	135
4	FP2	C2-FLUORANTHENES/PYRENES	84.7	1.94	95	89.07	65	135
4	FP3	C3-FLUORANTHENES/PYRENES	103	1.94	94	109.78	65	135
4	FP4	C4-FLUORANTHENES/PYRENES	91.5	1.94	94	97.22	65	135
4	NBT0	NAPHTHOBENZOTHIOPHENE	35.8	1.94	91	39.13	65	135
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	97.7	1.94	92	106.13	65	135
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	140	1.94	93	150.09	65	135
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	107	1.94	89	120.77	65	135
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	76.0	1.94	89	85.38	65	135
4	BA0	BENZ(A)ANTHRACENE	2.18	1.94	96	2.28	65	135
4	C0	CHRYSENE/TRIPHENYLENE	36.8	1.94	100	36.66	65	135
4	BC1	C1-CHRYSENES	60.7	1.94	94	64.59	65	135
4	BC2	C2-CHRYSENES	85.4	1.94	98	87.41	65	135
4	BC3	C3-CHRYSENES	104	1.94	103	101.29	65	135
4	BC4	C4-CHRYSENES	65.7	1.94	104	63.42	65	135
5	BBF	BENZO(B)FLUORANTHENE	5.73	1.94	106	5.4	65	135
5	BEP	BENZO(E)PYRENE	9.4	1.94	95	9.88	65	135
5	BAP	BENZO(A)PYRENE	1.81	1.94	89	2.03	65	135
5	PER	PERYLENE	3.18	1.94	95	3.34	65	135
6	GHI	BENZO(GHI)PERYLENE	3.26	1.94	91	3.59	65	135
O	CAR	CARBAZOLE	4.01	1.94	66	6.09	65	135
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	145	1.94	110	131.38	65	135
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	104	1.94	106	98.05	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1822426-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1822426-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	8/31/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F1408302316
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)	40.1	1.94	99	40.36	65	135
3	3MP	3-METHYLPHENANTHRENE (3MP)	74.5	1.94	94	79.32	65	135
3	2MA	2-METHYLANTHRACENE (2MA)	2.57	1.94	86	3	65	135
3	1MP	1-METHYLPHENANTHRENE (1MP)	79.8	1.94	91	87.93	65	135
A	1MN	1-METHYLNAPHTHALENE	743	1.94	94	793.54	65	135
A	2MN	2-METHYLNAPHTHALENE	956	1.94	88	1087.89	65	135
2	26DMN	2,6-DIMETHYLNAPHTHALENE	573	1.94	90	635.33	65	135
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	137	1.94	93	147.12	65	135
H30	T19	HOPANE (T19)	157	1.94	97	161.24	65	135
t23	T4	C23 TRICYCLIC TERPANE (T4)	69.2	1.94	99	69.8	65	135
t24	T5	C24 TRICYCLIC TERPANE (T5)	35.8	1.94	85	42.1	65	135
t25	T6	C25 TRICYCLIC TERPANE (T6)	35.7	1.94	88	40.4	65	135
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	12.6	1.94	89	14.2	65	135
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	15.4	1.94	94	16.3	65	135
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	12.5	1.94	86	14.6	65	135
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	17.4	1.94	107	16.2	65	135
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	16.6	1.94	94	17.6	65	135
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	16.8	1.94	88	19.2	65	135
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	21.8	1.94	104	21	65	135
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	27.7	1.94	98	28.3	65	135
t30S	T11a	C30 TRICYCLIC TERPANE-22S	15.5	1.94	101	15.3	65	135
t30R	T11b	C30 TRICYCLIC TERPANE-22R	16.8	1.94	110	15.2	65	135
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	33.2	1.94	96	34.4	65	135
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	6.26	1.94	89	7	65	135
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	7.79	1.94	96	8.1	65	135
H29	T15	30-NORHOPANE (T15)	88.1	1.94	97	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)	13.2	1.94	102	13	65	135
M29	T17	30-NORMORETANE (T17)	12.9	1.94	115	11.2	65	135
M30	T20	MORETANE (T20)	16.6	1.94	102	16.3	65	135
H31S	T21	30-HOMOHOPANE-22S (T21)	65.4	1.94	97	67.6	65	135
H31R	T22	30-HOMOHOPANE-22R (T22)	58.1	1.94	100	58.3	65	135
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	48.1	1.94	98	48.9	65	135
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	34.5	1.94	97	35.6	65	135
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	38.3	1.94	99	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)	26.8	1.94	96	27.9	65	135
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	19.8	1.94	100	19.8	65	135
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	27.9	1.94	97	28.8	65	135
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	23.9	1.94	107	22.3	65	135
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	44.8	1.94	93	48.1	65	135
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	22.5	1.94	90	25.1	65	135
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	20.7	1.94	84	24.8	65	135
aa27S	S12	17A(H)20SC27/C29DIA	58.5	1.94	98	59.74	65	135
aa27R	S17	17A(H)20RC27/C29DIA	68.8	1.94	96	71.55	65	135
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	4.7	1.94	124	3.8	65	135
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	33.9	1.94	103	33	65	135
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	33.4	1.94	104	32.2	65	135
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	47.0	1.94	91	51.7	65	135
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	33.7	1.94	93	36.1	65	135
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	36.9	1.94	96	38.4	65	135
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	38.5	1.94	97	39.7	65	135
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	41.5	1.94	101	41	65	135
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	53.1	1.94	103	51.7	65	135
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	56.3	1.94	103	54.6	65	135
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	35.6	1.94	93	38.2	65	135
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	288	1.94	100	289.3	65	135
SC28TAS	TAS02	C28,20S TAS	182	1.94	100	182.5	65	135
RC27TAS	TAS03	C27,20R TAS	177	1.94	100	177.1	65	135
RC28TAS	TAS04	C28,20R TAS	150	1.94	101	148.1	65	135

List of Potential Qualifiers

A: Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B: The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C: Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D: Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E: Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F: The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum

G: The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H: The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I: The lower value for the two columns has been reported due to obvious interference.

J: Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

J: Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

J: Estimated value. The Target analyte concentration is below the Limit of Quantitation (LOQ), but above the Detection Limit (DL). This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

M: Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND: Not detected at the Limit of Quantitation (LOQ) for the sample.

ND: Not detected at the Limit of Detection (LOD) for the sample.

ND: Not detected at the reporting limit (RL) for the sample.

ND: Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ: Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P: The RPD between the results for the two columns exceeds the method-specified criteria.

Q: The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R: Analytical results are from sample re-analysis.

RE: Analytical results are from sample re-extraction.

S: Analytical results are from modified screening analysis.

U: Not detected at the reported detection limit for the sample.

V: The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z: The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

HC CM 06AGO2023

To: Refinería La Pampilla S.A.A.

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

Date: September 8, 2023

Subject: Chemical Fingerprinting of samples collected in Ventanilla, Peru

This memorandum summarizes the results of forensic chemical analysis conducted on one (1) sample that was collected by Repsol contractors on August 6, 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 CM 06AGO2023" was shipped to Alpha Analytical Labs in Mansfield, MA under chain of custody and arrived at a temperature of 5.8°C on August 9, 2023 with a DHL Tracking # 4729216343 (Seal number 0203924).

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 CM 06AGO2023 (HC CM6) are shown in Figures 1A and1B respectively.

GC/FID Analysis

The GC/FID chromatogram for the HC CM6 sample (Figure 1B), contains a broad C_{15} – C_{44} range material consisting of resolved n-alkanes and an unresolved complex mixture (UCM) which appears as a "hump" in the chromatogram. This sample is significantly weathered in the light alkane range (C_{10}-C_{15}) relative to the source oil due to evaporation and biodegradation. In addition, there is a relative increase in the UCM relative to the source oil (Figure 1A). The petroleum GC/FID signature is consistent with a moderately weathered crude or heavy fuel oil.

GC/MS Alkylated PAH and Biomarker Analysis

The PAH and biomarker molecular chemistry was evaluated to determine if there was evidence for a chemical linkage between the source oil and the HC CM6 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 CM6 sample are provided in Figures 2A and 2B respectively. The PAH histogram for the HC CM6 sample (Figure 2B) shows this sample is only slightly weathered as indicated by the lower abundance of decalins compared to the source oil. It should be noted that based on the weathering displayed in the FID chromatogram (Figure 1B), one might expect a more weathered appearance of naphthalenes to phenanthrenes in this sample. Elevated napthobenzothiophenes compared to fluoranthenes/pyrenes and chrysenes relative to the source oil are also observed in this sample.

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 CM6 sample plot away from each other indicating a different oil source.

The biomarker triterpene m/z 191 ion traces for the source oil and the HC CM6 sample are presented in Figures 4A and 4B respectively. The biomarker traces for HC CM6 show differences in the proportions of TS and TM (T11 and T12)[2] and the presence of oleanane (T18) which is absent in the source oil. These differences indicate the HC CM6 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 HC CM6 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.

Conclusion

The HC CM 06AGO2023 sample consists of a moderately weathered crude or heavy oil. The PAH and biomarker analysis indicate the petroleum detected in the source oil and HC CM 06AGO2023 sample are chemically different and were derived from a different source of petroleum.

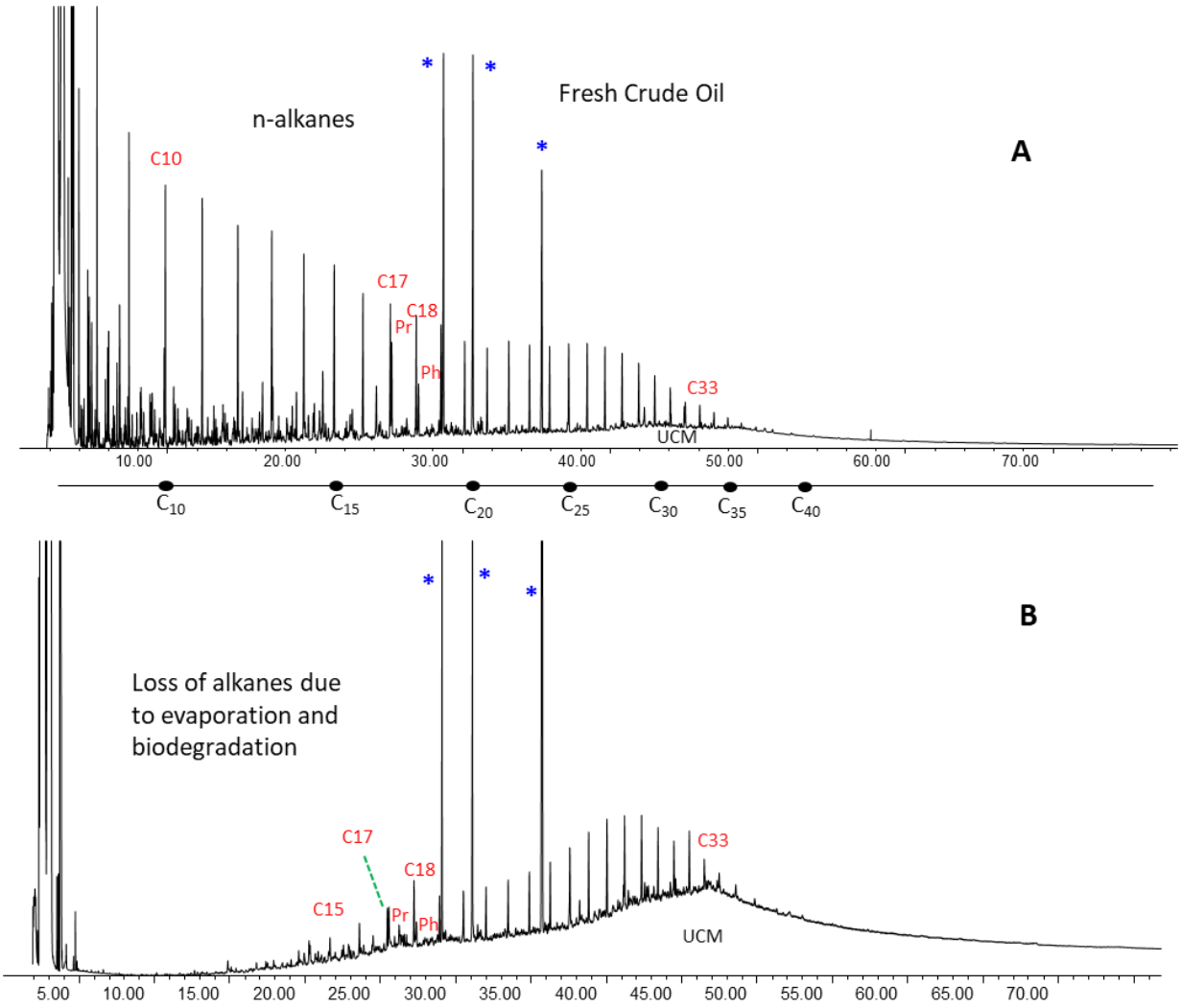


Figure 1. GC/FID "fingerprints" for the field samples.
Carbon ranges annotated below the x-axis analysis time scale.

A) Ship's Tanks Composite Sample
B) HC CM 06AGO2023
'*': Laboratory-added Internal Standard

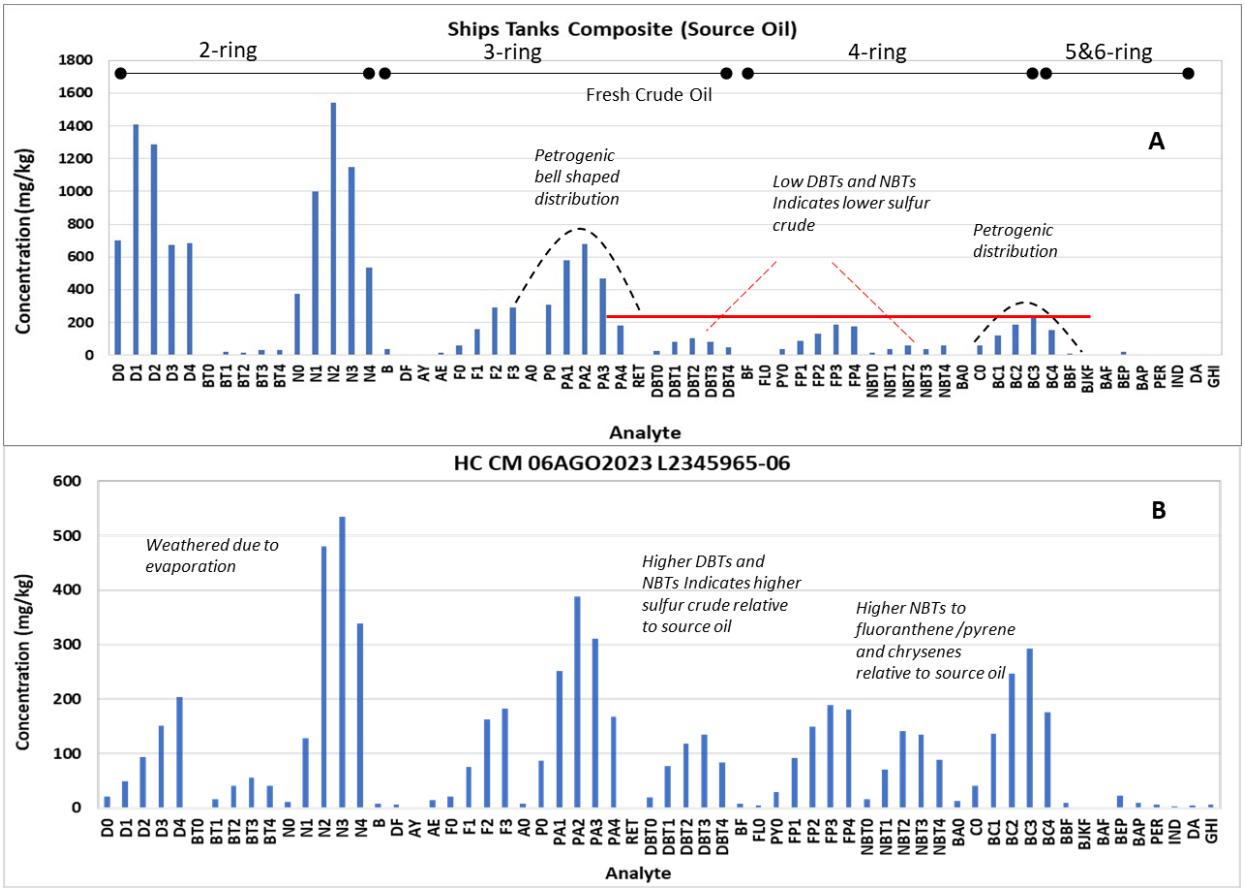


Figure 2. PAH Histograms

A) Ship's Tanks Composite Sample
B) HC CM 06AGO2023

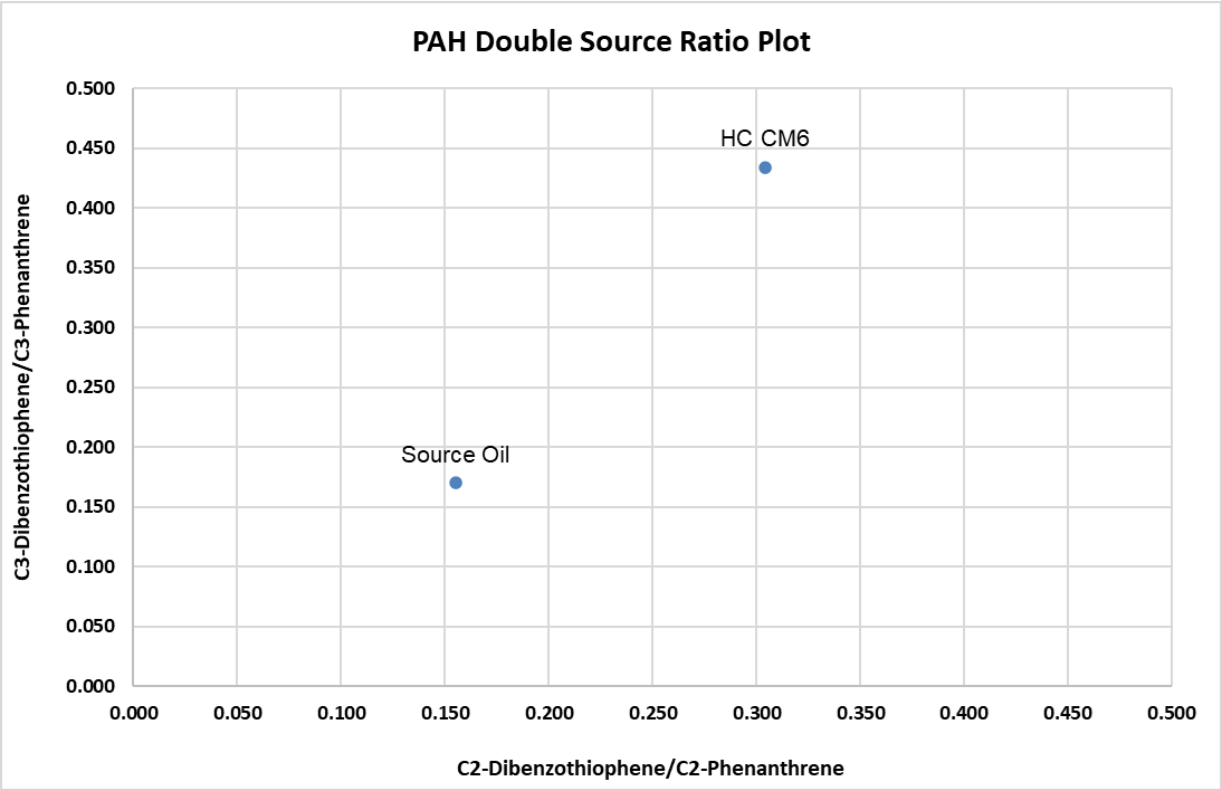


Figure 3. PAH Double Source Ratio Plot

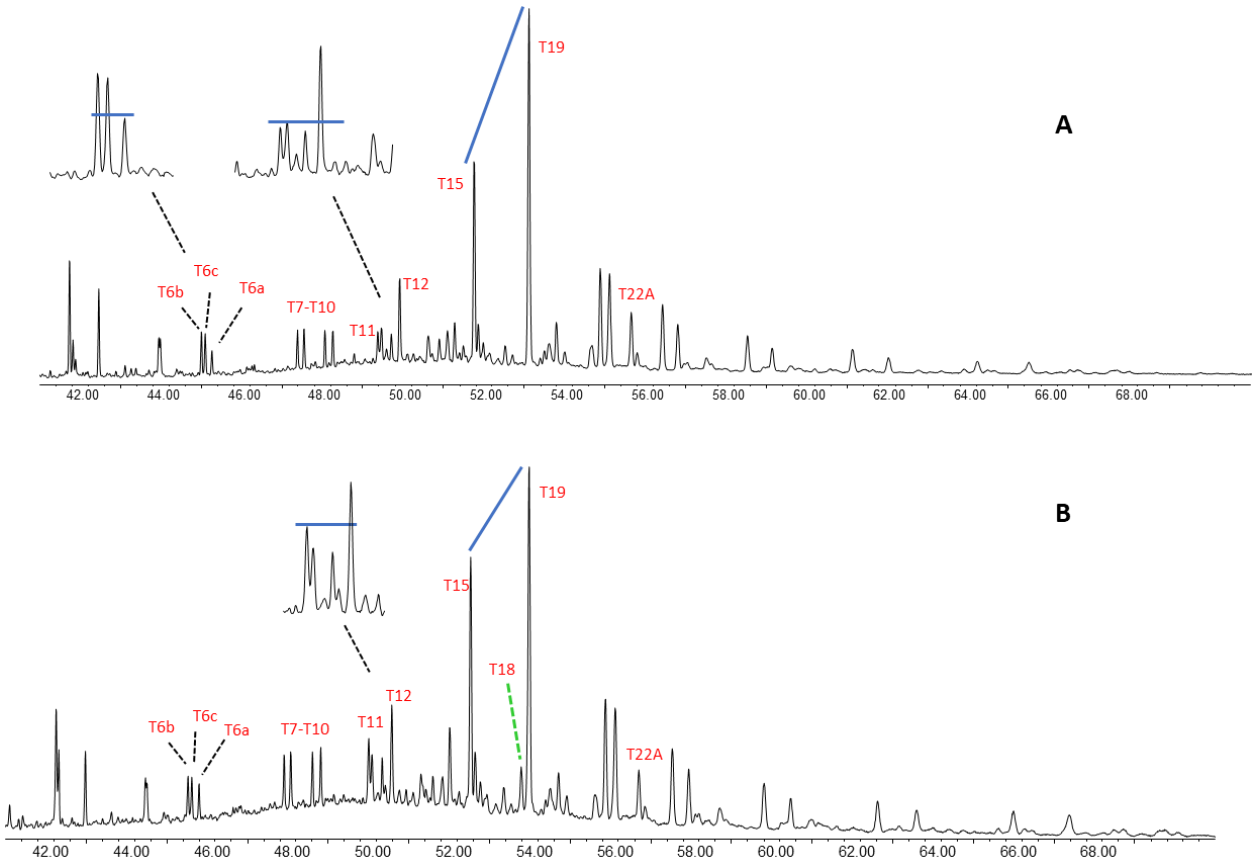


Figure 4. Biomarker m/z 191 Triterpane Fingerprint Traces

A) Ship's Tanks Composite Sample
B) HC CM 06AGO2023

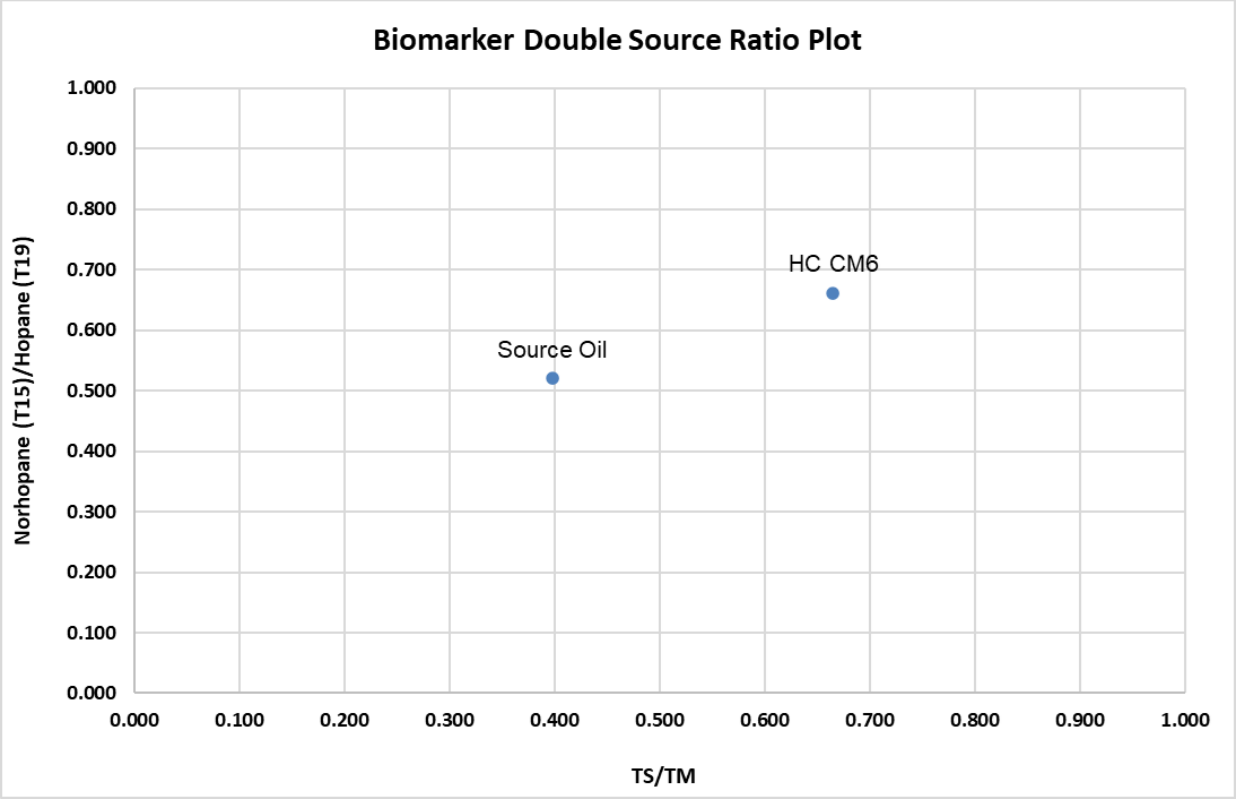


Figure 5. Biomarker Double Source Ratio Plot

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 CM 06AGO2023	L2345965-06	08/6/2023	Oil	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

8/9/23

L2345965

Nº 007232

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

CERPER CERTIFICACIONES DEL PERU S.A.

EXPEDIENTE: 10676-2023

HS: 23006017

JOB NUMBER: 23LM0023304165

SOLICITANTE: REFINERIA LA PAMPILLA S.A.A

PERSONA DE CONTACTO: Ing. Gerardo Rocinoa

LUGAR: PLAYA CHACRAYMAR | Distrito: CHANCAY | Provincia: HUARAL | Departamento: LIMA

NORMA:

- SMEWW - APHA - AWWA - Ref. 23rd Ed. 2017 Collection and preservation of samples. Part: 1060 A-B ( ) 1060 B-C ( ) 10200 B ( ) 10300 B ( ) 10400 B ( ) 10750 B ( )
- Reglamento 0400-I Toma de muestras de sedimentos ( )
- NTP 214.055 - 1967 (Revisada el 2016) Agua Potable. Toma de muestra ITEM 4.4 ( ) ITEM 4.5 ( )
- RM Nº 271-2020-PRODUCE. Protocolo para el Monitoreo de efluentes de los establecimientos industriales pesqueros de consumo humano directo e indirecto ( )
- D.S Nº 015-2015-ANA. Protocolo nacional para el monitoreo de la calidad de los recursos hídricos superficiales ( )
- NTP ISO 5667-10:2012 (Revisada el 2018) Calidad de agua. Muestreo. Parte 10 : Guía para el muestreo de aguas residuales ( )
- NTP 214.060:2016 AGUAS RESIDUALES. Protocolo de muestreo de aguas residuales no domésticas que se descargan en la red de alcantarillado ( )
- 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 ( )
- RM Nº 085-2014-MINAM. Guía para el muestreo de suelos ( )
- Protocolo de muestreo de calidad de agua sub sector hidrocarburos DGAAE-DX ( )
- Otros: ( )

PARÁMETROS DE ANÁLISIS EN EL LABORATORIO

FINGER PAINT

PARÁMETROS DE CAMPO

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 CM OGAGO2023	04.08.23	10:03	*	0858299	8712338	18L	01	✓
						Total de Envases	01	

pH (Unidades de pH) | Temperatura Ambiental (°C) | Temperatura (°C) | Oxigeno Disuelto (mg/L) | Conductividad µS/cm ( ) mS/cm ( ) | Salinidad (UPS) | Cloro residual mg Cl_2/L Libre ( ) Total ( ) | Turbiedad (UNT) | Caudal (m³/s) | Transparencia cm ( ) m ( )

intertek
07 AGO. 2023
RECEIVED

(1) Matriz (s)

AC = Agua para uso y consumo humano:
AN = Agua Natural:
AP = Agua de proceso:
ASAL = Agua Salina:
AR = Agua Residual:
SM = Sedimento:
SU = Suelo
Otro: *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	SN 65E051691	4		
2			5		
3			6		

Observaciones: Se procedió a llegar al Punto de Muestreo indicado y denominado por el Representante del cliente, quien estuvo presente durante el Muestreo. Se realizó el procedimiento de caracterización de la Matriz, la cual presenta una coloración opaca (NEGRO) y olor a Hidrocarburos. La Muestra fue precintada en campo en presencia del Representante del C. Nº 0203924. Se tomaron las coordenadas EN SITU.

Responsable de la toma de muestra:

Firma:
Inspector Cerper: Ing. Jon Gutierrez F.
Personal de apoyo: Roberto Leyva
Hora de inicio: 9:30 Hora de término: 12:00

Representante del cliente

Rec: 8/9/23 12:16

Firma:
Nombre: Zuñiga Apolo Damian Gerardo
DNI: 21839454
Cargo: Supervisor de Playa

Recepción de muestras

Nombre: Ronn Vidal A.
Fecha: 07-08-2023 Hora: 1:30 PM

intertek
07 AGO. 2023
LAB. CALEB BRETT
RECEIVED

Attachment 2

Analytical Data

Project Name: PAMPILLA 2
Project Number:

Client ID	HC CM 06AGO2023
Lab ID	L2345965-06
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821442
Date Collected	8/6/2023
Date Received	8/9/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.00479 g
% Solid	100
File ID	F18082923080
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	209

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)	14.0	J	209
SHC	C10	DECANE (C10)	33.0	J	209
SHC	C11	UNDECANE	49.1	J	209
SHC	C12	DODECANE (C12)	82.0	J	209
SHC	C13	TRIDECANE	96.4	J	209
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	86.2	J	209
SHC	C14	TETRADECANE (C14)	170	J	209
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	190	J	209
SHC	C15	PENTADECANE (C15)	334		209
SHC	C16	HEXADECANE (C16)	461		209
SHC	1650	NORPRISTANE (1650)	226		209
SHC	C17	HEPTADECANE (C17)	448		209
SHC	Pr	PRISTANE	582		209
SHC	C18	OCTADECANE (C18)	704		209
SHC	Ph	PHYTANE	352		209
SHC	C19	NONADECANE (C19)	472		209
SHC	C20	EICOSANE (C20)	546		209
SHC	C21	HENEICOSANE (C21)	551		209
SHC	C22	DOCOSANE (C22)	568		209
SHC	C23	TRICOSANE (C23)	608		209
SHC	C24	TETRACOSANE (C24)	696		209
SHC	C25	PENTACOSANE (C25)	1070	B	209
SHC	C26	HEXACOSANE (C26)	846		209
SHC	C27	HEPTACOSANE (C27)	956		209
SHC	C28	OCTACOSANE (C28)	883		209
SHC	C29	NONACOSANE (C29)	857		209
SHC	C30	TRIACONTANE (C30)	674		209
SHC	C31	HENTATRIACONTANE (C31)	561		209
SHC	C32	DOTRIACONTANE (C32)	635		209
SHC	C33	TRITRIACONTANE (C33)	302		209
SHC	C34	TETRATRIACONTANE (C34)	229		209
SHC	C35	PENTATRIACONTANE (C35)	226		209
SHC	C36	HEXATRIACONTANE (C36)	108	J	209
SHC	C37	HEPTATRIACONTANE (C37)		U	209
SHC	C38	OCTATRIACONTANE (C38)		U	209
SHC	C39	NONATRIACONTANE (C39)		U	209
SHC	C40	TETRACONTANE (C40)		U	209
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	522000		6890
SHC	TSH	TOTAL SATURATED HYDROCARBONS	14600	J	209

Surrogates (% Recovery)	
O-TERPHENYL	102
D50-TETRACOSANE	99

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821442-1
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	8/30/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F18082923012
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	240

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)	U		240
SHC	C10	DECANE (C10)	U		240
SHC	C11	UNDECANE	U		240
SHC	C12	DODECANE (C12)	U		240
SHC	C13	TRIDECANE	U		240
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	U		240
SHC	C14	TETRADECANE (C14)	U		240
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	U		240
SHC	C15	PENTADECANE (C15)	6.47	J	240
SHC	C16	HEXADECANE (C16)	U		240
SHC	1650	NORPRISTANE (1650)	U		240
SHC	C17	HEPTADECANE (C17)	U		240
SHC	Pr	PRISTANE	U		240
SHC	C18	OCTADECANE (C18)	U		240
SHC	Ph	PHYTANE	U		240
SHC	C19	NONADECANE (C19)	U		240
SHC	C20	EICOSANE (C20)	U		240
SHC	C21	HENEICOSANE (C21)	U		240
SHC	C22	DOCOSANE (C22)	U		240
SHC	C23	TRICOSANE (C23)	U		240
SHC	C24	TETRACOSANE (C24)	U		240
SHC	C25	PENTACOSANE (C25)	126	JC	240
SHC	C26	HEXACOSANE (C26)	U		240
SHC	C27	HEPTACOSANE (C27)	U		240
SHC	C28	OCTACOSANE (C28)	U		240
SHC	C29	NONACOSANE (C29)	U		240
SHC	C30	TRIACONTANE (C30)	U		240
SHC	C31	HENTATRIACONTANE (C31)	U		240
SHC	C32	DOTRIACONTANE (C32)	U		240
SHC	C33	TRITRIACONTANE (C33)	U		240
SHC	C34	TETRATRIACONTANE (C34)	U		240
SHC	C35	PENTATRIACONTANE (C35)	U		240
SHC	C36	HEXATRIACONTANE (C36)	U		240
SHC	C37	HEPTATRIACONTANE (C37)	U		240
SHC	C38	OCTATRIACONTANE (C38)	U		240
SHC	C39	NONATRIACONTANE (C39)	U		240
SHC	C40	TETRACONTANE (C40)	U		240
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	U		7910
SHC	TSH	TOTAL SATURATED HYDROCARBONS	132	J	240

Surrogates (% Recovery)	
O-TERPHENYL	105
D50-TETRACOSANE	104

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1821442-2
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	8/30/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	f18082923016
Units	%
Final Volume	1
Dilution	1
Reporting Limit	240

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	NONANE (C9)	5190	240	108	4800	50	130
SHC	C10	DECANE (C10)	4880	240	102	4800	50	130
SHC	C12	DODECANE (C12)	4910	240	102	4800	50	130
SHC	C14	TETRADECANE (C14)	4860	240	101	4800	50	130
SHC	C16	HEXADECANE (C16)	5280	240	110	4800	50	130
SHC	C18	OCTADECANE (C18)	5280	240	110	4800	50	130
SHC	C19	NONADECANE (C19)	5070	240	106	4800	50	130
SHC	C20	EICOSANE (C20)	4990	240	104	4800	50	130
SHC	C22	DOCOSANE (C22)	4980	240	104	4800	50	130
SHC	C24	TETRACOSANE (C24)	5310	240	111	4800	50	130
SHC	C26	HEXACOSANE (C26)	5000	240	104	4800	50	130
SHC	C28	OCTACOSANE (C28)	4950	240	103	4800	50	130
SHC	C30	TRIACONTANE (C30)	4980	240	104	4800	50	130
SHC	C36	HEXATRIACONTANE (C36)	4890	240	102	4800	50	130

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

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1821442-3
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	8/30/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	f18082923018
Units	%
Final Volume	1
Dilution	1
Reporting Limit	240

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
SHC	C9	NONANE (C9)	5120	240	107	4800	50	130	1	30
SHC	C10	DECANE (C10)	4820	240	100	4800	50	130	2	30
SHC	C12	DODECANE (C12)	4830	240	101	4800	50	130	1	30
SHC	C14	TETRADECANE (C14)	4760	240	99	4800	50	130	2	30
SHC	C16	HEXADECANE (C16)	5160	240	108	4800	50	130	2	30
SHC	C18	OCTADECANE (C18)	5200	240	108	4800	50	130	2	30
SHC	C19	NONADECANE (C19)	4990	240	104	4800	50	130	2	30
SHC	C20	EICOSANE (C20)	4910	240	102	4800	50	130	2	30
SHC	C22	DOCOSANE (C22)	4910	240	102	4800	50	130	2	30
SHC	C24	TETRACOSANE (C24)	5240	240	109	4800	50	130	2	30
SHC	C26	HEXACOSANE (C26)	4950	240	103	4800	50	130	1	30
SHC	C28	OCTACOSANE (C28)	4900	240	102	4800	50	130	1	30
SHC	C30	TRIACONTANE (C30)	4930	240	103	4800	50	130	1	30
SHC	C36	HEXATRIACONTANE (C36)	4810	240	100	4800	50	130	2	30

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

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1819788-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8015D(M)-A2-NFSHC
Batch ID	WG1819788-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	8/15/2023
Sample Size(wet)	0.1008 g
% Solid	100
File ID	F18081123032
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)	7100	0.992	113	6286	65	135
SHC	C10	DECANE (C10)	5440	0.992	108	5047	65	135
SHC	C11	UNDECANE	4890	0.992	104	4703	65	135
SHC	C12	DODECANE (C12)	4660	0.992	112	4155	65	135
SHC	C13	TRIDECANE	4250	0.992	105	4058	65	135
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	952	0.992	113	845	65	135
SHC	C14	TETRADECANE (C14)	3870	0.992	105	3670	65	135
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	1520	0.992	111	1367	65	135
SHC	C15	PENTADECANE (C15)	4490	0.992	123	3660	65	135
SHC	C16	HEXADECANE (C16)	3560	0.992	107	3330	65	135
SHC	1650	NORPRISTANE (1650)	1090	0.992	100	1093	65	135
SHC	C17	HEPTADECANE (C17)	3130	0.992	104	3012	65	135
SHC	Pr	PRISTANE	2470	0.992	115	2145	65	135
SHC	C18	OCTADECANE (C18)	2640	0.992	98	2700	65	135
SHC	Ph	PHYTANE	1410	0.992	116	1215	65	135
SHC	C19	NONADECANE (C19)	2670	0.992	116	2305	65	135
SHC	C20	EICOSANE (C20)	2440	0.992	104	2337	65	135
SHC	C21	HENEICOSANE (C21)	2300	0.992	112	2044	65	135
SHC	C22	DOCOSANE (C22)	2130	0.992	108	1972	65	135
SHC	C23	TRICOSANE (C23)	1940	0.992	111	1745	65	135
SHC	C24	TETRACOSANE (C24)	1900	0.992	116	1641	65	135
SHC	C25	PENTACOSANE (C25)	1840	0.992	118	1562	65	135
SHC	C26	HEXACOSANE (C26)	1490	0.992	108	1378	65	135
SHC	C27	HEPTACOSANE (C27)	1270	0.992	117	1083	65	135
SHC	C28	OCTACOSANE (C28)	842	0.992	108	776	65	135
SHC	C29	NONACOSANE (C29)	813	0.992	111	734	65	135
SHC	C30	TRIACONTANE (C30)	682	0.992	109	627	65	135
SHC	C31	HENTATRIACONTANE (C31)	572	0.992	111	514	65	135
SHC	C32	DOTRIACONTANE (C32)	605	0.992	132	458	65	135
SHC	C33	TRITRIACONTANE (C33)	341	0.992	88	388	65	135
SHC	C34	TETRATRIACONTANE (C34)	327	0.992	94	347	65	135
SHC	C35	PENTATRIACONTANE (C35)	283	0.992	102	278	65	135
SHC	C36	HEXATRIACONTANE (C36)	172	0.992	92	186	65	135
SHC	C37	HEPTATRIACONTANE (C37)	164	0.992	108	152	65	135
SHC	C38	OCTATRIACONTANE (C38)	140	0.992	107	131	65	135
SHC	C39	NONATRIACONTANE (C39)	88.7	0.992	100	89	65	135
SHC	C40	TETRACONTANE (C40)	103	0.992	112	92	65	135
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	599000	0.992	108	554993	65	135
SHC	TSH	TOTAL SATURATED HYDROCARBONS	84685	0.992	124	68122	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	HC CM 06AGO2023
Lab ID	L2345965-06
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	8/6/2023
Date Received	8/9/2023
Date Prepped	8/29/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00479 g
% Solid	100
File ID	F808312331
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.04

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN	20.8		1.04
2	D1	C1-DECALINS	48.2		2.09
2	D2	C2-DECALINS	93.2		2.09
2	D3	C3-DECALINS	151		2.09
2	D4	C4-DECALINS	204		2.09
S	BT0	BENZOTHIOPHENE	1.51	J	2.09
2	BT1	C1-BENZO(B)THIOPHENES	15.6		2.09
2	BT2	C2-BENZO(B)THIOPHENES	41.1		2.09
2	BT3	C3-BENZO(B)THIOPHENES	55.6		2.09
2	BT4	C4-BENZO(B)THIOPHENES	41.3		2.09
A	N0	NAPHTHALENE	10.6		2.09
2	N1	C1-NAPHTHALENES	128		2.09
2	N2	C2-NAPHTHALENES	481		2.09
2	N3	C3-NAPHTHALENES	534		2.09
2	N4	C4-NAPHTHALENES	338		2.09
2	B	BIPHENYL	7.82		2.09
3	DF	DIBENZOFURAN	6.82		2.09
3	AY	ACENAPHTHYLENE	1.41	J	2.09
3	AE	ACENAPHTHENE	13.6		2.09
3	F0	FLUORENE	21.1		2.09
3	F1	C1-FLUORENES	75.8		2.09
3	F2	C2-FLUORENES	162		2.09
3	F3	C3-FLUORENES	183		2.09
3	A0	ANTHRACENE	8.24		2.09
3	P0	PHENANTHRENE	86.4		2.09
3	PA1	C1-PHENANTHRENES/ANTHRACENES	252		2.09
3	PA2	C2-PHENANTHRENES/ANTHRACENES	388		2.09
3	PA3	C3-PHENANTHRENES/ANTHRACENES	311		2.09
3	PA4	C4-PHENANTHRENES/ANTHRACENES	167		2.09
3	RET	RETENE		U	2.09
3	DBT0	DIBENZOTHIOPHENE	18.8		2.09
3	DBT1	C1-DIBENZOTHIOPHENES	76.3		2.09
3	DBT2	C2-DIBENZOTHIOPHENES	118		2.09
3	DBT3	C3-DIBENZOTHIOPHENES	135		2.09
3	DBT4	C4-DIBENZOTHIOPHENES	82.7		2.09
4	BF	BENZO(B)FLUORENE	7.08		2.09
4	FL0	FLUORANTHENE	5.29		2.09
4	PY0	PYRENE	28.6		2.09
4	FP1	C1-FLUORANTHENES/PYRENES	91.1		2.09
4	FP2	C2-FLUORANTHENES/PYRENES	150		2.09
4	FP3	C3-FLUORANTHENES/PYRENES	189		2.09
4	FP4	C4-FLUORANTHENES/PYRENES	181		2.09
4	NBT0	NAPHTHOBENZOTHIOPHENE	15.8		2.09
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	70.8		2.09
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	141		2.09
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	135		2.09
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	87.8		2.09
4	BA0	BENZ(A)ANTHRACENE	13.4		2.09
4	C0	CHRYSENE/TRIPHENYLENE	40.8		2.09
4	BC1	C1-CHRYSENES	136		2.09
4	BC2	C2-CHRYSENES	247		2.09
4	BC3	C3-CHRYSENES	292		2.09
4	BC4	C4-CHRYSENES	176		2.09
5	BBF	BENZO(B)FLUORANTHENE	9.03		2.09

Project Name: PAMPILLA 2
Project Number:

Client ID	HC CM 06AGO2023
Lab ID	L2345965-06
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	8/6/2023
Date Received	8/9/2023
Date Prepped	8/29/2023
Date Analyzed	9/2/2023
Sample Size(wet)	0.00479 g
% Solid	100
File ID	F808312331
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.04

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE	1.37	J	2.09
5	BAF	BENZO(A)FLUORANTHENE		U	2.09
5	BEP	BENZO(E)PYRENE	23.4		2.09
5	BAP	BENZO(A)PYRENE	8.80		2.09
5	PER	PERYLENE	5.45		2.09
6	IND	INDENO(1,2,3-CD)PYRENE	2.79	B	2.09
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	4.45		2.09
6	GHI	BENZO(GHI)PERYLENE	6.55	B	2.09
O	CAR	CARBAZOLE	3.86		2.09
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	26.1		2.09
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	37.2		2.09
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	7.97		2.09
3	3MP	3-METHYLPHENANTHRENE (3MP)	61.8		2.09
3	2MP	2-METHYLPHENANTHRENE (2MP)	71.0		2.09
3	2MA	2-METHYLANTHRACENE (2MA)	12.6		2.09
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	57.8		2.09
3	1MP	1-METHYLPHENANTHRENE (1MP)	41.4		2.09
A	1MN	1-METHYLNAPHTHALENE	114		2.09
A	2MN	2-METHYLNAPHTHALENE	89.2		2.09
2	26DMN	2,6-DIMETHYLNAPHTHALENE	213		2.09
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	67.1		2.09
H30	T19	HOPANE (T19)	242		2.09
t23	T4	C23 TRICYCLIC TERPANE (T4)	58.3		2.09
t24	T5	C24 TRICYCLIC TERPANE (T5)	33.3		2.09
t25	T6	C25 TRICYCLIC TERPANE (T6)	36.7		2.09
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	17.4		2.09
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	20.1		2.09
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	18.7		2.09
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	25.8		2.09
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	29.3		2.09
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	23.7		2.09
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	28.1		2.09
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	36.0		2.09
t30S	T11a	C30 TRICYCLIC TERPANE-22S	27.7		2.09
t30R	T11b	C30 TRICYCLIC TERPANE-22R	23.0		2.09
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	54.1		2.09
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	21.9		2.09
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	16.3		2.09
H29	T15	30-NORHOPANE (T15)	160		2.09
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	36.8		2.09
X	X	17A(H)-DIAHOPANE (X)	16.9		2.09
M29	T17	30-NORMORETANE (T17)	22.3		2.09
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	34.0		2.09
M30	T20	MORETANE (T20)	35.3		2.09
H31S	T21	30-HOMOHOPANE-22S (T21)	92.3		2.09
H31R	T22	30-HOMOHOPANE-22R (T22)	99.9		2.09
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	37.4		2.09
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	68.9		2.09
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	49.3		2.09
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	47.8		2.09
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	29.6		2.09
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	35.4		2.09
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	26.4		2.09
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	31.7		2.09

Project Name: PAMPILLA 2
Project Number:

Client ID	HC CM 06AGO2023	
Lab ID	L2345965-06	
Matrix	SOLID	
Matrix Description		
Reference Method	8270E-SIM(M)	
Batch ID	WG1821442	
Date Collected	8/6/2023	
Date Received	8/9/2023	
Date Prepped	8/29/2023	
Date Analyzed	9/2/2023	
Sample Size(wet)	0.00479	g
% Solid	100	
File ID	F808312331	
Units	mg/kg	
Final Volume	1	
Dilution	1	
Reporting Limit	1.04	

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	37.5	2.09
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	35.5	2.09
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	19.8	2.09
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	13.7	2.09
aa27S	S12	17A(H)20SC27/C29DIA	54.2	2.09
aa27R	S17	17A(H)20RC27/C29DIA	63.8	2.09
d29R	S18	UNKNOWN STERANE (S18)	11.5	2.09
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	4.22	2.09
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	33.2	2.09
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	33.6	2.09
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	31.4	2.09
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	30.1	2.09
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	40.6	2.09
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	39.6	2.09
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	39.1	2.09
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	44.2	2.09
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	53.7	2.09
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	28.3	2.09
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	71.5	2.09
SC28TAS	TAS02	C28,20S TAS	50.4	2.09
RC27TAS	TAS03	C27,20R TAS	52.5	2.09
RC28TAS	TAS04	C28,20R TAS	36.6	2.09

Surrogates (% Recovery)	
NAPHTHALENE-D8	114
PHENANTHRENE-D10	99
BENZO(A)PYRENE-D12	120
5B(H)CHOLANE	104

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821442-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F808312315
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	2.40
2	D2	C2-DECALINS		U	2.40
2	D3	C3-DECALINS		U	2.40
2	D4	C4-DECALINS		U	2.40
S	BT0	BENZOTHIOPHENE		U	2.40
2	BT1	C1-BENZO(B)THIOPHENES		U	2.40
2	BT2	C2-BENZO(B)THIOPHENES		U	2.40
2	BT3	C3-BENZO(B)THIOPHENES		U	2.40
2	BT4	C4-BENZO(B)THIOPHENES		U	2.40
A	N0	NAPHTHALENE		U	2.40
2	N1	C1-NAPHTHALENES		U	2.40
2	N2	C2-NAPHTHALENES		U	2.40
2	N3	C3-NAPHTHALENES		U	2.40
2	N4	C4-NAPHTHALENES		U	2.40
2	B	BIPHENYL		U	2.40
3	DF	DIBENZOFURAN		U	2.40
3	AY	ACENAPHTHYLENE		U	2.40
3	AE	ACENAPHTHENE		U	2.40
3	F0	FLUORENE	0.167	J	2.40
3	F1	C1-FLUORENES		U	2.40
3	F2	C2-FLUORENES		U	2.40
3	F3	C3-FLUORENES		U	2.40
3	A0	ANTHRACENE		U	2.40
3	P0	PHENANTHRENE	0.0753	J	2.40
3	PA1	C1-PHENANTHRENES/ANTHRACENES		U	2.40
3	PA2	C2-PHENANTHRENES/ANTHRACENES		U	2.40
3	PA3	C3-PHENANTHRENES/ANTHRACENES		U	2.40
3	PA4	C4-PHENANTHRENES/ANTHRACENES		U	2.40
3	RET	RETENE		U	2.40
3	DBT0	DIBENZOTHIOPHENE	0.0962	J	2.40
3	DBT1	C1-DIBENZOTHIOPHENES	0.362	J	2.40
3	DBT2	C2-DIBENZOTHIOPHENES		U	2.40
3	DBT3	C3-DIBENZOTHIOPHENES		U	2.40
3	DBT4	C4-DIBENZOTHIOPHENES		U	2.40
4	BF	BENZO(B)FLUORENE		U	2.40
4	FL0	FLUORANTHENE	0.0693	J	2.40
4	PY0	PYRENE		U	2.40
4	FP1	C1-FLUORANTHENES/PYRENES		U	2.40
4	FP2	C2-FLUORANTHENES/PYRENES		U	2.40
4	FP3	C3-FLUORANTHENES/PYRENES		U	2.40
4	FP4	C4-FLUORANTHENES/PYRENES		U	2.40
4	NBT0	NAPHTHOBENZOTHIOPHENE		U	2.40
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES		U	2.40
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES		U	2.40
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES		U	2.40
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES		U	2.40
4	BA0	BENZ(A)ANTHRACENE	0.103	J	2.40
4	C0	CHRYSENE/TRIPHENYLENE	0.140	J	2.40
4	BC1	C1-CHRYSENES		U	2.40
4	BC2	C2-CHRYSENES		U	2.40
4	BC3	C3-CHRYSENES		U	2.40
4	BC4	C4-CHRYSENES		U	2.40
5	BBF	BENZO(B)FLUORANTHENE	0.145	J	2.40

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821442-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F808312315
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.2

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE	0.124	J	2.40
5	BAF	BENZO(A)FLUORANTHENE		U	2.40
5	BEP	BENZO(E)PYRENE	0.226	J	2.40
5	BAP	BENZO(A)PYRENE		U	2.40
5	PER	PERYLENE		U	2.40
6	IND	INDENO(1,2,3-CD)PYRENE	0.539	J	2.40
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	0.280	J	2.40
6	GHI	BENZO(GHI)PERYLENE	0.944	J	2.40
O	CAR	CARBAZOLE	0.168	J	2.40
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	0.106	J	2.40
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)		U	2.40
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	0.157	J	2.40
3	3MP	3-METHYLPHENANTHRENE (3MP)		U	2.40
3	2MP	2-METHYLPHENANTHRENE (2MP)		U	2.40
3	2MA	2-METHYLANTHRACENE (2MA)		U	2.40
3	9MP	9/4-METHYLPHENANTHRENE (9MP)		U	2.40
3	1MP	1-METHYLPHENANTHRENE (1MP)		U	2.40
A	1MN	1-METHYLNAPHTHALENE		U	2.40
A	2MN	2-METHYLNAPHTHALENE		U	2.40
2	26DMN	2,6-DIMETHYLNAPHTHALENE		U	2.40
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE		U	2.40
H30	T19	HOPANE (T19)		U	2.40
t23	T4	C23 TRICYCLIC TERPANE (T4)		U	2.40
t24	T5	C24 TRICYCLIC TERPANE (T5)		U	2.40
t25	T6	C25 TRICYCLIC TERPANE (T6)		U	2.40
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)		U	2.40
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)		U	2.40
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)		U	2.40
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)		U	2.40
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)		U	2.40
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)		U	2.40
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)		U	2.40
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)		U	2.40
t30S	T11a	C30 TRICYCLIC TERPANE-22S		U	2.40
t30R	T11b	C30 TRICYCLIC TERPANE-22R		U	2.40
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)		U	2.40
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)		U	2.40
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)		U	2.40
H29	T15	30-NORHOPANE (T15)		U	2.40
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)		U	2.40
X	X	17A(H)-DIAHOPANE (X)		U	2.40
M29	T17	30-NORMORETANE (T17)		U	2.40
OL	T18	18A(H)&18B(H)-OLEANANES (T18)		U	2.40
M30	T20	MORETANE (T20)		U	2.40
H31S	T21	30-HOMOHOPANE-22S (T21)		U	2.40
H31R	T22	30-HOMOHOPANE-22R (T22)		U	2.40
T22A	T22A	GAMMACERANE/C32-DIAHOPANE		U	2.40
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)		U	2.40
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)		U	2.40
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)		U	2.40
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)		U	2.40
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)		U	2.40
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)		U	2.40
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)		U	2.40

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1821442-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F808312315
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.2

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	U	2.40
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	U	2.40
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	U	2.40
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	U	2.40
aa27S	S12	17A(H)20SC27/C29DIA	U	2.40
aa27R	S17	17A(H)20RC27/C29DIA	U	2.40
d29R	S18	UNKNOWN STERANE (S18)	U	2.40
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	U	2.40
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	U	2.40
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	U	2.40
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	U	2.40
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	U	2.40
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	U	2.40
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	U	2.40
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	U	2.40
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	U	2.40
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	U	2.40
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	U	2.40
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	U	2.40
SC28TAS	TAS02	C28,20S TAS	U	2.40
RC27TAS	TAS03	C27,20R TAS	U	2.40
RC28TAS	TAS04	C28,20R TAS	U	2.40

Surrogates (% Recovery)	
NAPHTHALENE-D8	97
PHENANTHRENE-D10	116
BENZO(A)PYRENE-D12	122
5B(H)CHOLANE	104

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1821442-2
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F808312316
Units	%
Final Volume	1
Dilution	1
Reporting Limit	2.4

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
A	N0	NAPHTHALENE	228	2.40	95	240	50	130
3	AY	ACENAPHTHYLENE	232	2.40	97	240	50	130
3	AE	ACENAPHTHENE	243	2.40	101	240	50	130
3	F0	FLUORENE	251	2.40	104	240	50	130
3	A0	ANTHRACENE	276	2.40	115	240	50	130
3	P0	PHENANTHRENE	253	2.40	105	240	50	130
4	FL0	FLUORANTHENE	210	2.40	87	240	50	130
4	PY0	PYRENE	228	2.40	95	240	50	130
4	BA0	BENZ(A)ANTHRACENE	257	2.40	107	240	50	130
4	C0	CHRYSENE/TRIPHENYLENE	238	2.40	99	240	50	130
5	BBF	BENZO(B)FLUORANTHENE	261	2.40	109	240	50	130
5	BJKF	BENZO(J)+(K)FLUORANTHENE	258	2.40	108	240	50	130
5	BAP	BENZO(A)PYRENE	257	2.40	107	240	50	130
6	IND	INDENO(1,2,3-CD)PYRENE	283	2.40	118	240	50	130
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	292	2.40	122	240	50	130
6	GHI	BENZO(GHI)PERYLENE	252	2.40	105	240	50	130
A	2MN	2-METHYLNAPHTHALENE	226	2.40	94	240	50	130

Surrogates (% Recovery)	
NAPHTHALENE-D8	100
PHENANTHRENE-D10	111
BENZO(A)PYRENE-D12	118
5B(H)CHOLANE	101

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1821442-3
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1821442
Date Collected	NA
Date Received	8/29/2023
Date Prepped	8/29/2023
Date Analyzed	9/1/2023
Sample Size(wet)	0.00417 g
% Solid	100
File ID	F808312317
Units	%
Final Volume	1
Dilution	1
Reporting Limit	2.4

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
A	N0	NAPHTHALENE	226	2.40	94	240	50	130	1	30
3	AY	ACENAPHTHYLENE	231	2.40	96	240	50	130	1	30
3	AE	ACENAPHTHENE	242	2.40	101	240	50	130	0	30
3	F0	FLUORENE	246	2.40	102	240	50	130	2	30
3	A0	ANTHRACENE	274	2.40	114	240	50	130	1	30
3	P0	PHENANTHRENE	248	2.40	104	240	50	130	1	30
4	FL0	FLUORANTHENE	203	2.40	85	240	50	130	2	30
4	PY0	PYRENE	223	2.40	93	240	50	130	2	30
4	BA0	BENZ(A)ANTHRACENE	255	2.40	106	240	50	130	1	30
4	C0	CHRYSENE/TRIPHENYLENE	234	2.40	98	240	50	130	1	30
5	BBF	BENZO(B)FLUORANTHENE	258	2.40	108	240	50	130	1	30
5	BJKF	BENZO(J)+(K)FLUORANTHENE	254	2.40	106	240	50	130	2	30
5	BAP	BENZO(A)PYRENE	256	2.40	106	240	50	130	1	30
6	IND	INDENO(1,2,3-CD)PYRENE	275	2.40	115	240	50	130	3	30
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	290	2.40	121	240	50	130	1	30
6	GHI	BENZO(GHI)PERYLENE	250	2.40	104	240	50	130	1	30
A	2MN	2-METHYLNAPHTHALENE	226	2.40	94	240	50	130	0	30

Surrogates (% Recovery)	
NAPHTHALENE-D8	99
PHENANTHRENE-D10	110
BENZO(A)PYRENE-D12	118
5B(H)CHOLANE	101

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1819802-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1819802-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	8/24/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F808232315
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	501	1.94	105	477.66	65	135
2	D1	C1-DECALINS	814	1.94	107	760.39	65	135
2	D2	C2-DECALINS	775	1.94	115	675.98	65	135
2	D3	C3-DECALINS	430	1.94	117	366.46	65	135
2	D4	C4-DECALINS	420	1.94	116	362.78	65	135
S	BT0	BENZOTHIOPHENE	6.74	1.94	117	5.75	65	135
2	BT1	C1-BENZO(B)THIOPHENES	35.2	1.94	117	29.96	65	135
2	BT2	C2-BENZO(B)THIOPHENES	58.2	1.94	114	50.93	65	135
2	BT3	C3-BENZO(B)THIOPHENES	121	1.94	117	103.18	65	135
2	BT4	C4-BENZO(B)THIOPHENES	113	1.94	124	90.8	65	135
A	N0	NAPHTHALENE	506	1.94	90	565.56	65	135
2	N1	C1-NAPHTHALENES	1050	1.94	87	1208.32	65	135
2	N2	C2-NAPHTHALENES	1390	1.94	96	1450.37	65	135
2	N3	C3-NAPHTHALENES	1100	1.94	104	1052.74	65	135
2	N4	C4-NAPHTHALENES	690	1.94	118	583.65	65	135
2	B	BIPHENYL	146	1.94	100	145.7	65	135
3	DF	DIBENZOFURAN	59.8	1.94	120	49.63	65	135
3	AY	ACENAPHTHYLENE	7.54	1.94	109	6.91	65	135
3	AE	ACENAPHTHENE	17.0	1.94	93	18.35	65	135
3	F0	FLUORENE	77.4	1.94	109	70.69	65	135
3	F1	C1-FLUORENES	175	1.94	108	162.7	65	135
3	F2	C2-FLUORENES	282	1.94	112	251.87	65	135
3	F3	C3-FLUORENES	279	1.94	115	242.29	65	135
3	P0	PHENANTHRENE	185	1.94	98	188.41	65	135
3	PA1	C1-PHENANTHRENES/ANTHRACENES	406	1.94	105	388.12	65	135
3	PA2	C2-PHENANTHRENES/ANTHRACENES	489	1.94	112	434.38	65	135
3	PA3	C3-PHENANTHRENES/ANTHRACENES	350	1.94	113	308.67	65	135
3	PA4	C4-PHENANTHRENES/ANTHRACENES	145	1.94	112	129.94	65	135
3	DBT0	DIBENZOTHIOPHENE	123	1.94	94	130.56	65	135
3	DBT1	C1-DIBENZOTHIOPHENES	263	1.94	96	275.34	65	135
3	DBT2	C2-DIBENZOTHIOPHENES	384	1.94	104	369.42	65	135
3	DBT3	C3-DIBENZOTHIOPHENES	363	1.94	105	345.39	65	135
3	DBT4	C4-DIBENZOTHIOPHENES	208	1.94	107	193.51	65	135
4	FL0	FLUORANTHENE	4.09	1.94	108	3.77	65	135
4	PY0	PYRENE	13.1	1.94	112	11.65	65	135
4	FP1	C1-FLUORANTHENES/PYRENES	59.5	1.94	109	54.43	65	135
4	FP2	C2-FLUORANTHENES/PYRENES	101	1.94	113	89.07	65	135
4	FP3	C3-FLUORANTHENES/PYRENES	116	1.94	106	109.78	65	135
4	FP4	C4-FLUORANTHENES/PYRENES	102	1.94	105	97.22	65	135
4	NBT0	NAPHTHOBENZOTHIOPHENE	42.4	1.94	108	39.13	65	135
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	115	1.94	108	106.13	65	135
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	154	1.94	103	150.09	65	135
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	124	1.94	103	120.77	65	135
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	90.0	1.94	105	85.38	65	135
4	BA0	BENZ(A)ANTHRACENE	2.78	1.94	122	2.28	65	135
4	C0	CHRYSENE/TRIPHENYLENE	42.7	1.94	116	36.66	65	135
4	BC1	C1-CHRYSENES	69.5	1.94	108	64.59	65	135
4	BC2	C2-CHRYSENES	92.5	1.94	106	87.41	65	135
4	BC3	C3-CHRYSENES	105	1.94	104	101.29	65	135
4	BC4	C4-CHRYSENES	62.8	1.94	99	63.42	65	135
5	BBF	BENZO(B)FLUORANTHENE	6.75	1.94	125	5.4	65	135
5	BEP	BENZO(E)PYRENE	10.7	1.94	108	9.88	65	135
5	BAP	BENZO(A)PYRENE	2.19	1.94	108	2.03	65	135
5	PER	PERYLENE	3.69	1.94	110	3.34	65	135
6	GHI	BENZO(GHI)PERYLENE	4.07	1.94	113	3.59	65	135
O	CAR	CARBAZOLE	5.62	1.94	92	6.09	65	135
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	121	1.94	92	131.38	65	135
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	93.0	1.94	95	98.05	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude	
Lab ID	WG1819802-1	
Matrix	OIL	
Matrix Description	Crude Oil	
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER	
Batch ID	WG1819802-1	
Date Collected	N/A	
Date Received	N/A	
Date Prepped	N/A	
Date Analyzed	8/24/2023	
Sample Size(wet)	0.0514	g
% Solid	100	
File ID	F808232315	
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)	40.6	1.94	100	40.36	65	135
3	3MP	3-METHYLPHENANTHRENE (3MP)	84.0	1.94	106	79.32	65	135
3	2MA	2-METHYLANTHRACENE (2MA)	3.49	1.94	116	3	65	135
3	1MP	1-METHYLPHENANTHRENE (1MP)	93.2	1.94	106	87.93	65	135
A	1MN	1-METHYLNAPHTHALENE	744	1.94	94	793.54	65	135
A	2MN	2-METHYLNAPHTHALENE	902	1.94	83	1087.89	65	135
2	26DMN	2,6-DIMETHYLNAPHTHALENE	606	1.94	95	635.33	65	135
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	148	1.94	100	147.12	65	135
H30	T19	HOPANE (T19)	196	1.94	122	161.24	65	135
t23	T4	C23 TRICYCLIC TERPANE (T4)	71.0	1.94	102	69.8	65	135
t24	T5	C24 TRICYCLIC TERPANE (T5)	43.4	1.94	103	42.1	65	135
t25	T6	C25 TRICYCLIC TERPANE (T6)	44.6	1.94	110	40.4	65	135
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	17.2	1.94	121	14.2	65	135
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	19.2	1.94	118	16.3	65	135
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	15.6	1.94	107	14.6	65	135
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	21.0	1.94	130	16.2	65	135
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	22.8	1.94	130	17.6	65	135
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	21.3	1.94	111	19.2	65	135
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	26.2	1.94	125	21	65	135
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	33.0	1.94	117	28.3	65	135
t30S	T11a	C30 TRICYCLIC TERPANE-22S	17.8	1.94	116	15.3	65	135
t30R	T11b	C30 TRICYCLIC TERPANE-22R	18.2	1.94	120	15.2	65	135
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	41.5	1.94	121	34.4	65	135
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	6.96	1.94	99	7	65	135
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	9.37	1.94	116	8.1	65	135
H29	T15	30-NORHOPANE (T15)	108	1.94	119	90.7	65	135
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	27.2	1.94	117	23.3	65	135
X	X	17A(H)-DIAHOPANE (X)	15.3	1.94	118	13	65	135
M29	T17	30-NORMORETANE (T17)	13.5	1.94	120	11.2	65	135
M30	T20	MORETANE (T20)	19.4	1.94	119	16.3	65	135
H31S	T21	30-HOMOHOPANE-22S (T21)	81.7	1.94	121	67.6	65	135
H31R	T22	30-HOMOHOPANE-22R (T22)	70.9	1.94	122	58.3	65	135
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	60.4	1.94	124	48.9	65	135
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	43.5	1.94	122	35.6	65	135
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	47.8	1.94	123	38.8	65	135
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	31.2	1.94	122	25.6	65	135
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	35.4	1.94	127	27.9	65	135
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	23.8	1.94	120	19.8	65	135
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	35.6	1.94	124	28.8	65	135
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	29.7	1.94	133	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)	28.7	1.94	114	25.1	65	135
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	27.8	1.94	112	24.8	65	135
aa27S	S12	17A(H)20SC27/C29DIA	70.7	1.94	118	59.74	65	135
aa27R	S17	17A(H)20RC27/C29DIA	87.6	1.94	122	71.55	65	135
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	4.72	1.94	124	3.8	65	135
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	39.6	1.94	120	33	65	135
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	40.7	1.94	126	32.2	65	135
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	51.9	1.94	100	51.7	65	135
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	41.6	1.94	115	36.1	65	135
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	45.3	1.94	118	38.4	65	135
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	47.3	1.94	119	39.7	65	135
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	50.6	1.94	123	41	65	135
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	64.0	1.94	124	51.7	65	135
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	69.8	1.94	128	54.6	65	135
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	43.1	1.94	113	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	199	1.94	109	182.5	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude	
Lab ID	WG1819802-1	
Matrix	OIL	
Matrix Description	Crude Oil	
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER	
Batch ID	WG1819802-1	
Date Collected	N/A	
Date Received	N/A	
Date Prepped	N/A	
Date Analyzed	8/24/2023	
Sample Size(wet)	0.0514	g
% Solid	100	
File ID	F808232315	
Units	mg/kg	
Final Volume	10	
Dilution	1	
Reporting Limit	1.94	

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
RC27TAS	TAS03	C27,20R TAS	185	1.94	104	177.1	65	135
RC28TAS	TAS04	C28,20R TAS	154	1.94	104	148.1	65	135

List of Potential Qualifiers

A: Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B: The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C: Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D: Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E: Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F: The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum

G: The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H: The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I: The lower value for the two columns has been reported due to obvious interference.

J: Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

J: Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

J: Estimated value. The Target analyte concentration is below the Limit of Quantitation (LOQ), but above the Detection Limit (DL). This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

M: Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND: Not detected at the Limit of Quantitation (LOQ) for the sample.

ND: Not detected at the Limit of Detection (LOD) for the sample.

ND: Not detected at the reporting limit (RL) for the sample.

ND: Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ: Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P: The RPD between the results for the two columns exceeds the method-specified criteria.

Q: The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R: Analytical results are from sample re-analysis.

RE: Analytical results are from sample re-extraction.

S: Analytical results are from modified screening analysis.

U: Not detected at the reported detection limit for the sample.

V: The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z: The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

HC OV 11AGO2023

To: Refinería La Pampilla S.A.A.

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

Date: September 25, 2023

Subject: Chemical Fingerprinting of samples collected in Ventanilla, Peru

This memorandum summarizes the results of forensic chemical analysis conducted on one (1) sample that was collected by Repsol contractors on August 11, 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 OV 11AGO2023" was shipped to Alpha Analytical Labs in Mansfield, MA under chain of custody and arrived at a temperature of 10.2°C on August 16, 2023 with a DHL Tracking # 6600073082 (Seal number 0203929).

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 OV 11AGO2023 (HC OV11) are shown in Figures 1A and1B respectively.

GC/FID Analysis

The GC/FID chromatogram for the HC OV11 sample (Figure 1B), contains a broad C_{15} – C_{44} range material consisting of resolved n-alkanes and an unresolved complex mixture (UCM) which appears as a "hump" in the chromatogram. This sample is significantly weathered in the light alkane range (C_{10}-C_{15}) relative to the source oil sample mostly due to evaporation. In addition, there is a relative increase in the UCM relative to the source oil (Figure 1A). The petroleum GC/FID signature is consistent with a moderately weathered crude or heavy fuel oil.

GC/MS Alkylated PAH and Biomarker Analysis

The PAH and biomarker molecular chemistry was evaluated to determine if there was evidence for a chemical linkage between the source oil and the HC OV11 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 OV11 sample are provided in Figures 2A and 2B respectively. The PAH histogram for the HC OV11 sample (Figure 2B) shows this sample is weathered as indicated by the loss of decalins and reduction of naphthalenes compared to the source oil. Elevated fluoranthenes/pyrenes, napthobenzothiophenes, and chrysenes relative to the source oil are also observed in this sample.

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 OV11 sample plot away from each other indicating a different oil source.

The biomarker triterpene m/z 191 ion traces for the source oil and the HC OV11 sample are presented in Figures 4A and 4B respectively. The biomarker traces for HC OV11 show differences in the proportions of TS and TM (T11 and T12)[2] and the presence of oleanane (T18) which is absent in the source oil. These differences indicate the HC OV11 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 HC OV11 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.

Conclusion

The HC OV 11AGO2023 sample consists of a moderately weathered crude or heavy oil. The PAH and biomarker analysis indicate the petroleum detected in the source oil and HC OV 11AGO2023 sample are chemically different and were derived from a different source of petroleum.

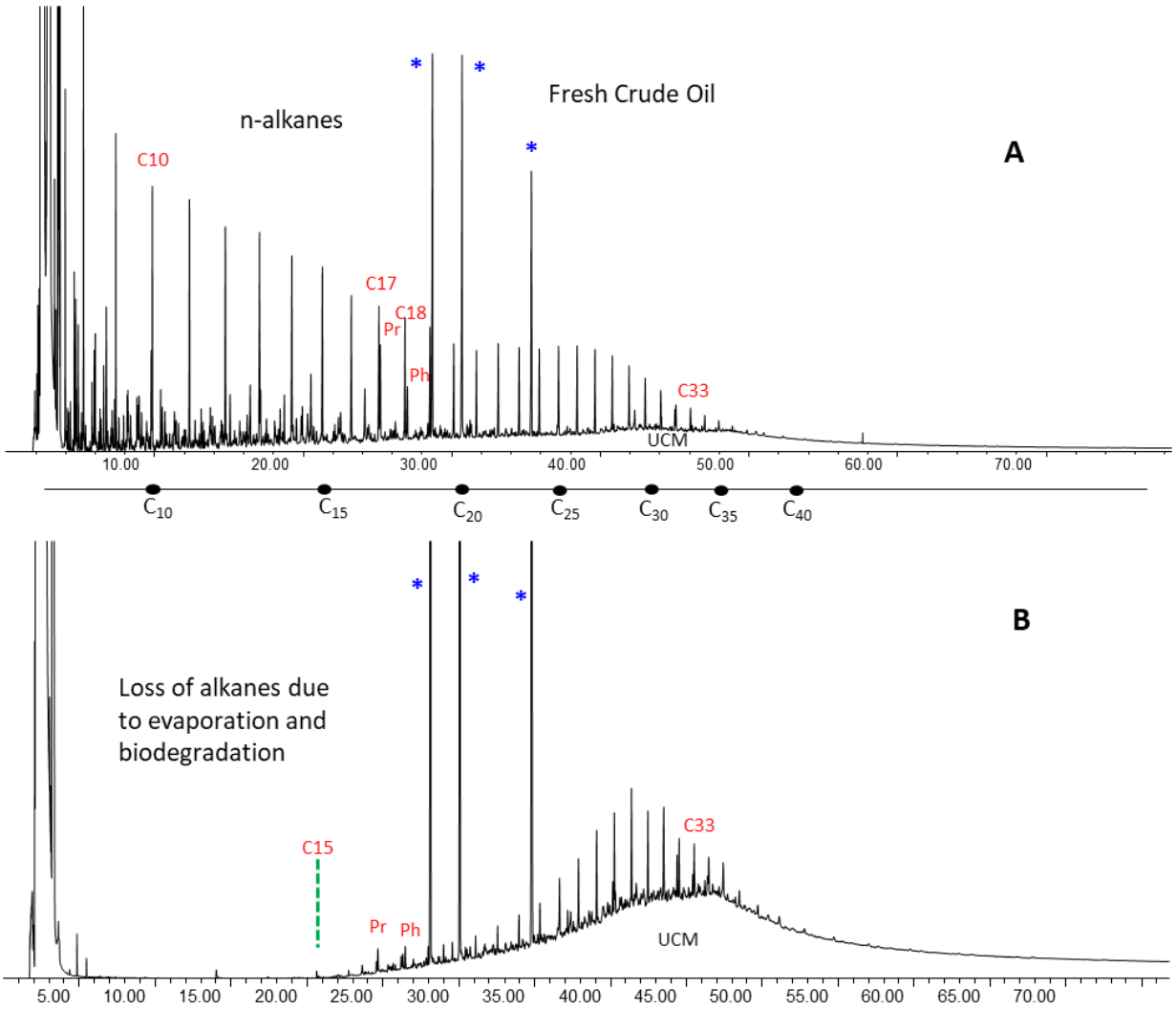


Figure 1. GC/FID "fingerprints" for the field samples.
Carbon ranges annotated below the x-axis analysis time scale.

A) Ship's Tanks Composite Sample
B) HC OV 11AGO2023
'*': Laboratory-added Internal Standard

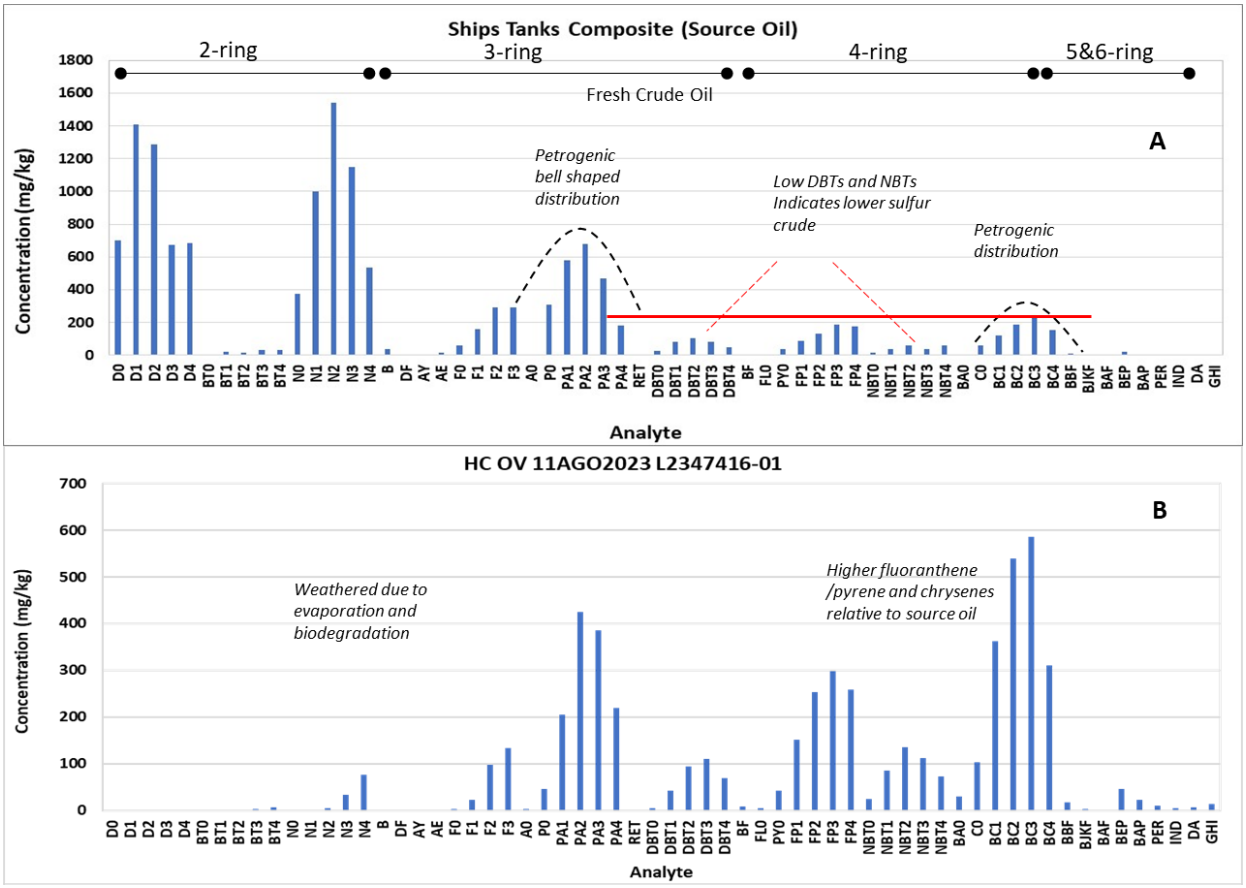


Figure 2. PAH Histograms

A) Ship's Tanks Composite Sample

B) HC OV 11AGO2023

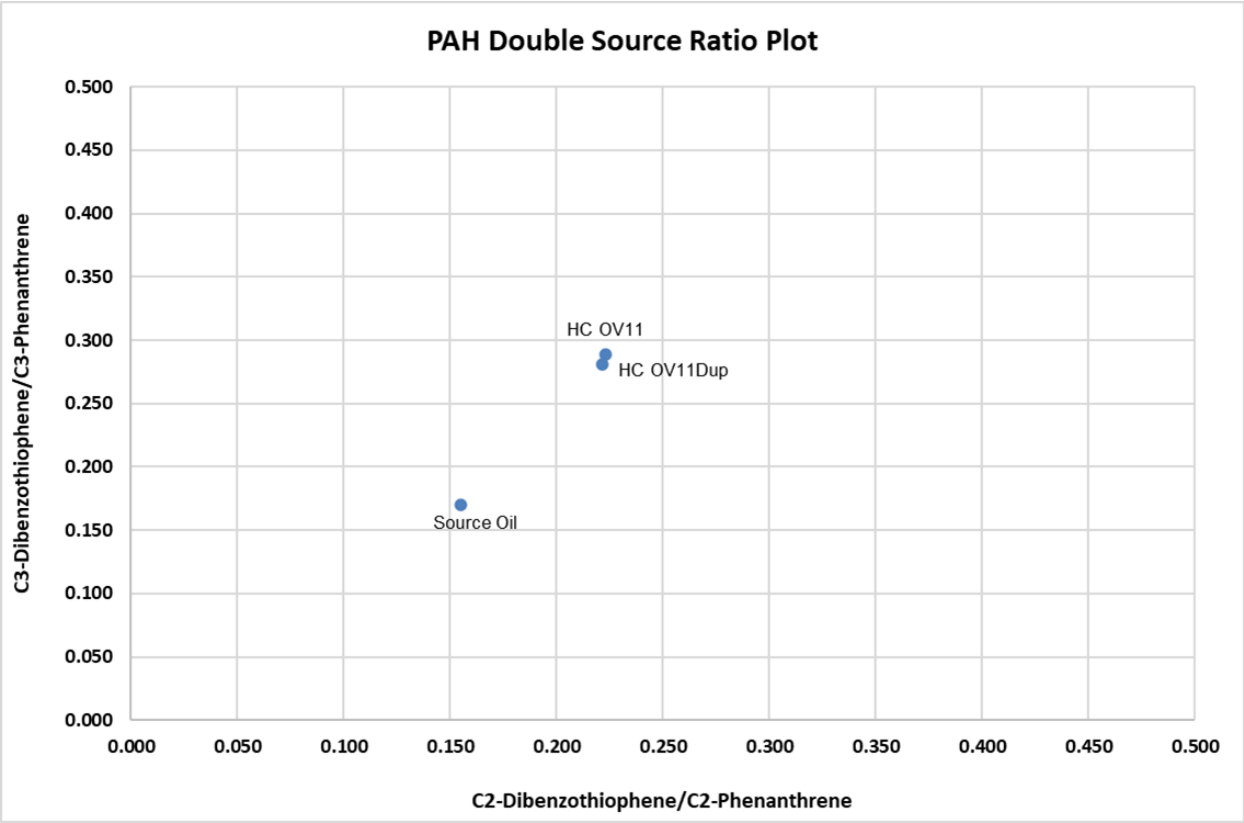


Figure 3. PAH Double Source Ratio Plot

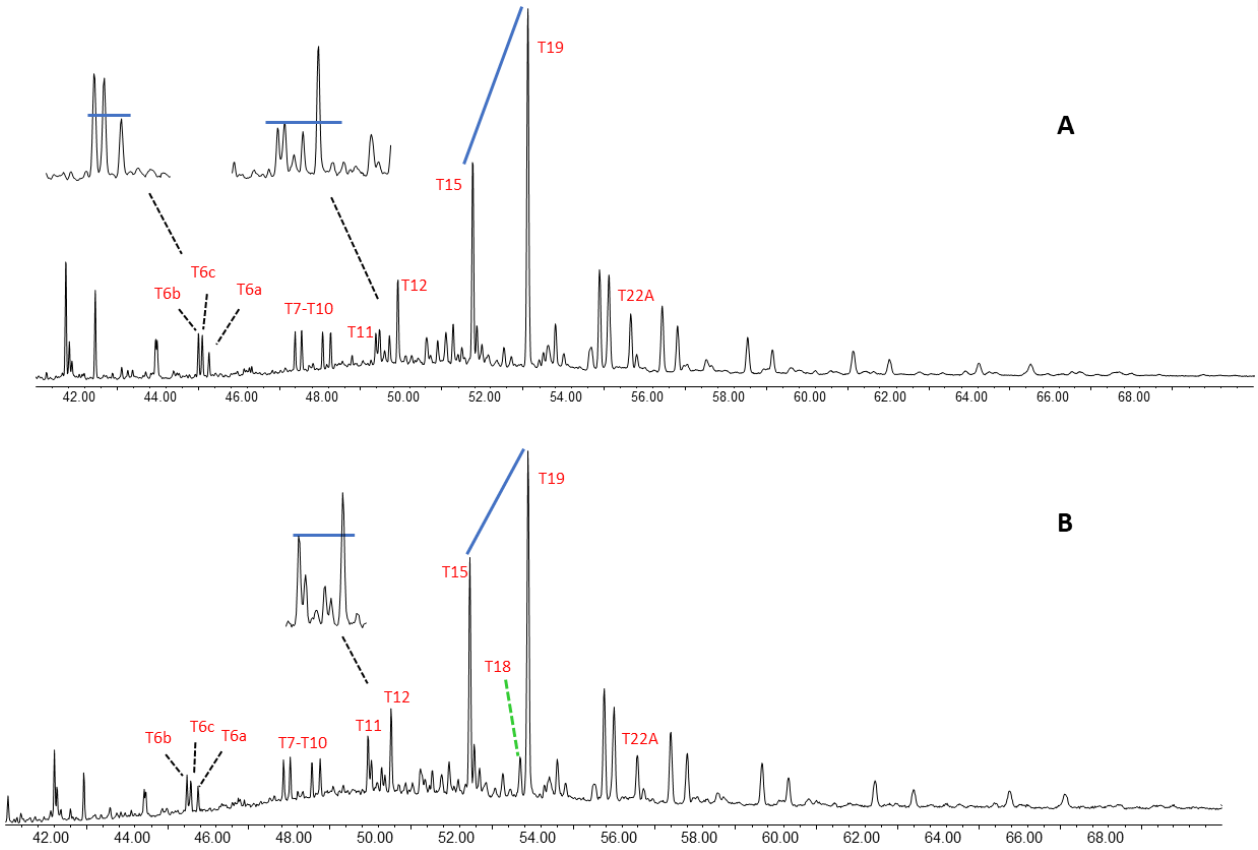


Figure 4. Biomarker m/z 191 Triterpane Fingerprint Traces

A) Ship's Tanks Composite Sample
B) HC OV 11AGO2023

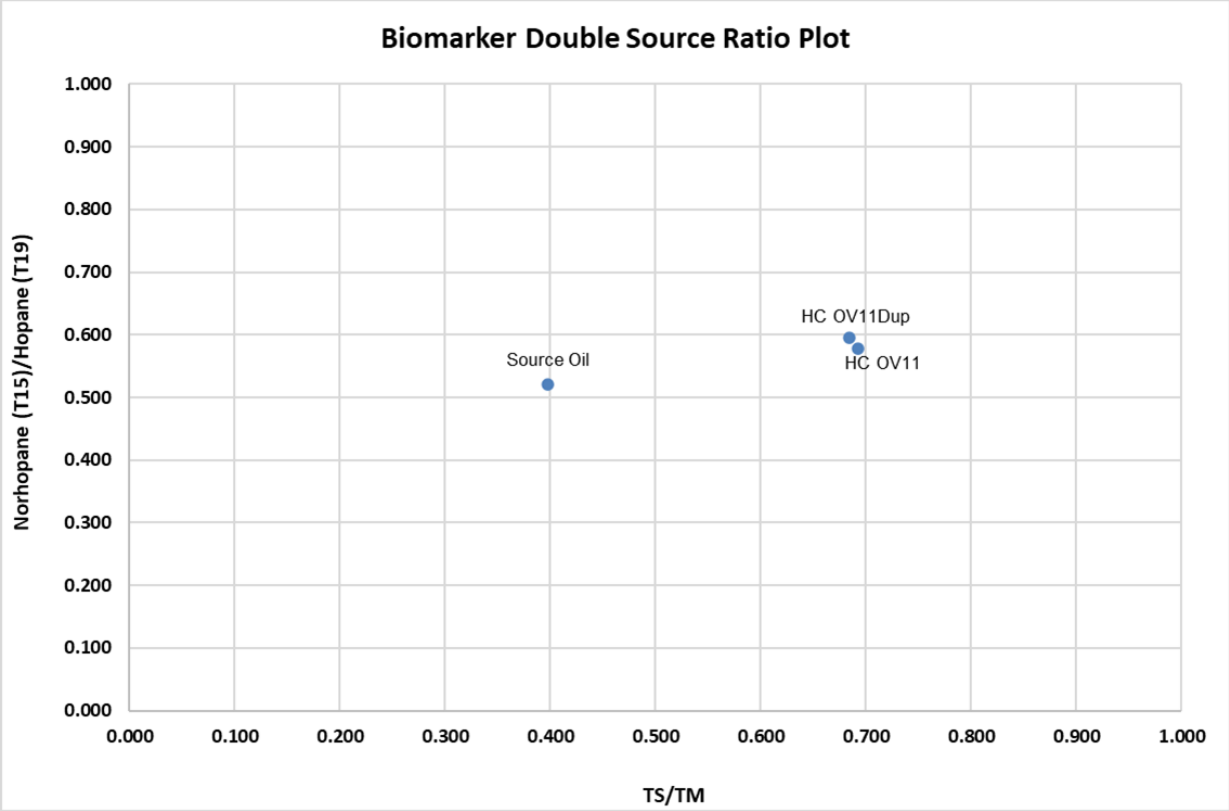


Figure 5. Biomarker Double Source Ratio Plot

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 OV 11AGO2023	L2347416-01	08/11/2023	Glob	Repsol Contractor

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

Abbrev	Analytes
C9	n-Nonane (C_9)
C10	n-Decane (C_{10})
C11	n-Undecane (C_{11})
C12	n-Dodecane (C_{12})
C13	n-Tridecane (C_{13})
1380	2,6,10 Trimethyldodecane (1380)
C14	n-Tetradecane (C_{14})
1470	2,6,10 Trimethyltridecane (1470)
C15	n-Pentadecane (C_{15})
C16	n-Hexadecane (C_{16})
1650	Norpristane (1650)
C17	n-Heptadecane (C_{17})
Pr	Pristane
C18	n-Octadecane (C_{18})
Ph	Phytane
C19	n-Nonadecane (C_{19})
C20	n-Eicosane (C_{20})
C21	n-Heneicosane (C_{21})
C22	n-Docosane (C_{22})
C23	n-Tricosane (C_{23})
C24	n-Tetracosane (C_{24})
C25	n-Pentacosane (C_{25})
C26	n-Hexacosane (C_{26})
C27	n-Heptacosane (C_{27})
C28	n-Octacosane (C_{28})
C29	n-Nonacosane (C_29)
C30	n-Triacontane (C_{30})
C31	n-Hentriacontane (C_{31})
C32	n-Dotriacontane (C_{32})
C33	n-Tritriacontane (C_{33})
C34	n-Tetratriacontane (C_{34})
C35	n-Pentatriacontane (C_{35})
C36	n-Hexatriacontane (C_{36})
C37	n-Heptatriacontane (C_{37})
C38	n-Octatriacontane (C_{38})
C39	n-Nonatriacontane (C_{39})
C40	n-Tetracontane (C_{40})
TPH	Total Petroleum Hydrocarbons (C9-C44)
TSH	Total Saturated Hydrocarbons

Table 3. PAH and alkyl-PAH Target Compound List

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

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

Table 4. Triterpane and Sterane Biomarker Target Compound List.

Abbrev	Analytes
T4	C23 Tricyclic Terpane
T5	C24 Tricyclic Terpane
T6	C25 Tricyclic Terpane
T6a	C24 Tetracyclic Terpane
T6b	C26 Tricyclic Terpane-22S
T6c	C26 Tricyclic Terpane-22R
T7	C28 Tricyclic Terpane-22S
T8	C28 Tricyclic Terpane-22R
T9	C29 Tricyclic Terpane-22S
T10	C29 Tricyclic Terpane-22R
T11	18a-22,29,30-Trisnorneohopane-TS
T11a	C30 Tricyclic Terpane-22S
T11b	C30 Tricyclic Terpane-22R
T12	17a(H)-22,29,30-Trisnorhopane-TM
T14a	17a/b,21b/a 28,30-Bisnorhopane
T14b	17a(H),21b(H)-25-Norhopane
T15	30-Norhopane
T16	18a(H)-30-Norneohopane-C29Ts
X	17a(H)-Diahopane
T17	30-Normoretane
T18	18a(H)&18b(H)-Oleananes
T19	Hopane
T20	Moretane
T21	30-Homohopane-22S
T22	30-Homohopane-22S
T22A	Gammarcerane/C32-Diahopane
T26	30,31-Bishomohopane-22S
T27	30,31-Bishomohopane-22R
T30	30,31-Trishomohopane-22S
T31	30,31-Trishomohopane-22R
T32	Tetrakishomohopane-22S
T33	Tetrakishomohopane-22R
T34	Pentakishomohopane-22S
T35	Pentakishomohopane-22R

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

Attachment 1

Chain of Custody

8/16/23

L2347446

Nº 007352

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

EXPEDIENTE: EXMA- 10970-2023
HS: 23006017
JOB NUMBER: 23LM0024034G3

SOLICITANTE: REFINERIA LA PAMPILLA S.A.A
PERSONA DE CONTACTO: Carlos Torres
LUGAR: PLAYA DEL OVALO
Distrito: HUAANL
Provincia: AUILLAMA
Departamento: LIMA

NORMA:

1. SMEWW - APHA - AWWA - WEF 23rd Ed. 2017. Collection and preservation of samples. Part 1060 A-B ( ) 1060 B-C ( ) 1020 B ( ) 1030 B ( ) 1050 B ( ) 1070 B ( )
2. Instrucción 8355-I Toma de muestras de sedimentos ( )
3. NTP 214.003 - 1997 (Revisada el 2019) 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. D.S 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 2018) Calidad de agua. Muestreo. Parte 10 - Guía para el muestreo de aguas residuales ( )
7. NTP 214.062.2016 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 ( )
10. Protocolo de muestreo de calidad de agua sub sector hidrocarburos OGAAE-EM ( )
11. Otros: ( )

PARÁMETROS DE ANÁLISIS EN EL LABORATORIO

FINGER PAINT

PARÁMETROS DE CAMP

pH (Unidades de pH) | Temperatura Ambiental (°C) | Temperatura (°C) | Oxigeno Disuelto (mg/L) | Conductividad µS/cm ( ) mS/cm ( ) | Salinidad (UPS) | Cloro residual mg Cl_2/L Libre ( ) Total ( ) | Turbiedad (UNT) | Caudal (m^3/s) | Transparencia cm ( ) m ( )

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 OV 11AG02023	11.08.23	9:00	*	0255222	8744685	18L	01
						Total de Envases	01

(1) Matriz (s)
AC = Agua para uso y consumo humano:
AN = Agua Natural:
AP = Agua de proceso:
ASAL = Agua Salina:
AR = Agua Residual:
SM = Sedimento:
SU = Suelo
Otro * 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	SNGSE051691	4		
2			5		
3			6		

Observaciones: Se Procedió a llegar al Punto de Muestreo indicado y denominado por el Representante del Cliente, quien estuvo presente durante el Muestreo. Se realizó el Procedimiento de Caracterización de la Muestra, la cual es Hidrocarburo impregnado en piedras, Coloración Oscura (negro) y olor a hidrocarburos. La Muestra estuvo ubicada en la zona Norte de PLAYA DEL OVALO. La Muestra fue Precintada en campo. N° Precinto: 0203929. Se tomaron las coordenadas ZN Sirgas

Responsable de la toma de muestra:
Firma:
Inspector Cerper: Ing. Jue Gutierrez R.
Inspectores de apoyo: Junior Chunga
Hora de inicio: 7:30 Hora de término: 11:00

Representante del cliente
Firma:
Nombre: CARLOS TORRES YACHACHIN
DNI: 48001656
Cargo: SUPERVISOR PLAYA

Rec: 8/16/23 12:30

Recepción de muestras
Nombre: Cesar Vidal A.
Fecha: 12-08-2023 Hora: 11:38 AM

intertek
LAB. CALEB BRETT
RECEIVED

Attachment 2

Analytical Data

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OV 11AGO2023
Lab ID	L2347416-01
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1825228
Date Collected	8/11/2023
Date Received	8/16/2023
Date Prepped	9/8/2023
Date Analyzed	9/10/2023
Sample Size(wet)	0.00367 g
% Solid	100
File ID	F18090823049
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	272

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)	U		272
SHC	C10	DECANE (C10)	U		272
SHC	C11	UNDECANE	U		272
SHC	C12	DODECANE (C12)	U		272
SHC	C13	TRIDECANE	U		272
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	U		272
SHC	C14	TETRADECANE (C14)	5.18	J	272
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	15.8	J	272
SHC	C15	PENTADECANE (C15)	36.5	J	272
SHC	C16	HEXADECANE (C16)	112	J	272
SHC	1650	NORPRISTANE (1650)	173	J	272
SHC	C17	HEPTADECANE (C17)	165	J	272
SHC	Pr	PRISTANE	415		272
SHC	C18	OCTADECANE (C18)	250	J	272
SHC	Ph	PHYTANE	392		272
SHC	C19	NONADECANE (C19)	269	J	272
SHC	C20	EICOSANE (C20)	254	J	272
SHC	C21	HENEICOSANE (C21)	290		272
SHC	C22	DOCOSANE (C22)	373		272
SHC	C23	TRICOSANE (C23)	509		272
SHC	C24	TETRACOSANE (C24)	544		272
SHC	C25	PENTACOSANE (C25)	1050		272
SHC	C26	HEXACOSANE (C26)	1030		272
SHC	C27	HEPTACOSANE (C27)	1240		272
SHC	C28	OCTACOSANE (C28)	1300		272
SHC	C29	NONACOSANE (C29)	1600	B	272
SHC	C30	TRIACONTANE (C30)	1370		272
SHC	C31	HENTATRIACONTANE (C31)	1690		272
SHC	C32	DOTRIACONTANE (C32)	816		272
SHC	C33	TRITRIACONTANE (C33)	948		272
SHC	C34	TETRATRIACONTANE (C34)	614		272
SHC	C35	PENTATRIACONTANE (C35)	836		272
SHC	C36	HEXATRIACONTANE (C36)	357		272
SHC	C37	HEPTATRIACONTANE (C37)	263	J	272
SHC	C38	OCTATRIACONTANE (C38)	301		272
SHC	C39	NONATRIACONTANE (C39)	152	J	272
SHC	C40	TETRACONTANE (C40)	140	J	272
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	547000		8990
SHC	TSH	TOTAL SATURATED HYDROCARBONS	17500	J	272

Surrogates (% Recovery)	
O-TERPHENYL	103
D50-TETRACOSANE	102

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1825228-1
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1825228
Date Collected	NA
Date Received	9/8/2023
Date Prepped	9/8/2023
Date Analyzed	9/9/2023
Sample Size(wet)	0.00465 g
% Solid	100
File ID	F18090823035
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	215

Class	Abbrev	Analytes	Result	SSRL
SHC	C9	NONANE (C9)	U	215
SHC	C10	DECANE (C10)	U	215
SHC	C11	UNDECANE	U	215
SHC	C12	DODECANE (C12)	U	215
SHC	C13	TRIDECANE	U	215
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	U	215
SHC	C14	TETRADECANE (C14)	U	215
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	U	215
SHC	C15	PENTADECANE (C15)	U	215
SHC	C16	HEXADECANE (C16)	U	215
SHC	1650	NORPRISTANE (1650)	U	215
SHC	C17	HEPTADECANE (C17)	U	215
SHC	Pr	PRISTANE	U	215
SHC	C18	OCTADECANE (C18)	U	215
SHC	Ph	PHYTANE	U	215
SHC	C19	NONADECANE (C19)	U	215
SHC	C20	EICOSANE (C20)	U	215
SHC	C21	HENEICOSANE (C21)	U	215
SHC	C22	DOCOSANE (C22)	U	215
SHC	C23	TRICOSANE (C23)	U	215
SHC	C24	TETRACOSANE (C24)	U	215
SHC	C25	PENTACOSANE (C25)	U	215
SHC	C26	HEXACOSANE (C26)	U	215
SHC	C27	HEPTACOSANE (C27)	U	215
SHC	C28	OCTACOSANE (C28)	U	215
SHC	C29	NONACOSANE (C29)	187 JC	215
SHC	C30	TRIACONTANE (C30)	U	215
SHC	C31	HENTATRIACONTANE (C31)	U	215
SHC	C32	DOTRIACONTANE (C32)	U	215
SHC	C33	TRITRIACONTANE (C33)	U	215
SHC	C34	TETRATRIACONTANE (C34)	U	215
SHC	C35	PENTATRIACONTANE (C35)	U	215
SHC	C36	HEXATRIACONTANE (C36)	U	215
SHC	C37	HEPTATRIACONTANE (C37)	U	215
SHC	C38	OCTATRIACONTANE (C38)	U	215
SHC	C39	NONATRIACONTANE (C39)	U	215
SHC	C40	TETRACONTANE (C40)	U	215
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	U	7100
SHC	TSH	TOTAL SATURATED HYDROCARBONS	187 J	215

Surrogates (% Recovery)	
O-TERPHENYL	106
D50-TETRACOSANE	99

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1825228-2
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1825228
Date Collected	NA
Date Received	9/8/2023
Date Prepped	9/8/2023
Date Analyzed	9/9/2023
Sample Size(wet)	0.00465 g
% Solid	100
File ID	f18090823037
Units	%
Final Volume	1
Dilution	1
Reporting Limit	215

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	NONANE (C9)	4340	215	101	4300	50	130
SHC	C10	DECANE (C10)	4220	215	98	4300	50	130
SHC	C12	DODECANE (C12)	4270	215	99	4300	50	130
SHC	C14	TETRADECANE (C14)	4210	215	98	4300	50	130
SHC	C16	HEXADECANE (C16)	4410	215	102	4300	50	130
SHC	C18	OCTADECANE (C18)	4440	215	103	4300	50	130
SHC	C19	NONADECANE (C19)	4140	215	96	4300	50	130
SHC	C20	EICOSANE (C20)	4110	215	96	4300	50	130
SHC	C22	DOCOSANE (C22)	4060	215	94	4300	50	130
SHC	C24	TETRACOSANE (C24)	4170	215	97	4300	50	130
SHC	C26	HEXACOSANE (C26)	4050	215	94	4300	50	130
SHC	C28	OCTACOSANE (C28)	3940	215	92	4300	50	130
SHC	C30	TRIACONTANE (C30)	3870	215	90	4300	50	130
SHC	C36	HEXATRIACONTANE (C36)	3090	215	72	4300	50	130

Surrogates (% Recovery)	
O-TERPHENYL	105
D50-TETRACOSANE	99

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1825228-3
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1825228
Date Collected	NA
Date Received	9/8/2023
Date Prepped	9/8/2023
Date Analyzed	9/9/2023
Sample Size(wet)	0.00465 g
% Solid	100
File ID	f18090823039
Units	%
Final Volume	1
Dilution	1
Reporting Limit	215

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
SHC	C9	NONANE (C9)	4360	215	101	4300	50	130	0	30
SHC	C10	DECANE (C10)	4190	215	97	4300	50	130	1	30
SHC	C12	DODECANE (C12)	4100	215	95	4300	50	130	4	30
SHC	C14	TETRADECANE (C14)	4020	215	93	4300	50	130	5	30
SHC	C16	HEXADECANE (C16)	4470	215	104	4300	50	130	2	30
SHC	C18	OCTADECANE (C18)	4500	215	105	4300	50	130	2	30
SHC	C19	NONADECANE (C19)	4200	215	98	4300	50	130	2	30
SHC	C20	EICOSANE (C20)	4260	215	99	4300	50	130	3	30
SHC	C22	DOCOSANE (C22)	4120	215	96	4300	50	130	2	30
SHC	C24	TETRACOSANE (C24)	4240	215	98	4300	50	130	1	30
SHC	C26	HEXACOSANE (C26)	4120	215	96	4300	50	130	2	30
SHC	C28	OCTACOSANE (C28)	3960	215	92	4300	50	130	0	30
SHC	C30	TRIACONTANE (C30)	3960	215	92	4300	50	130	2	30
SHC	C36	HEXATRIACONTANE (C36)	3330	215	77	4300	50	130	7	30

Surrogates (% Recovery)	
O-TERPHENYL	104
D50-TETRACOSANE	99

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OV 11AGO2023	Duplicate Sample
Lab ID	L2347416-01	WG1825228-5
Matrix	SOLID	SOLID
Matrix Description		
Reference Method	8015D(M)	8015D(M)
Batch ID	WG1825228	WG1825228
Date Collected	8/11/2023	NA
Date Received	8/16/2023	9/8/2023
Date Prepped	9/8/2023	9/8/2023
Date Analyzed	9/10/2023	9/10/2023
Sample Size(wet)	0.00367 g	0.00358 g
% Solid	100	100
File ID	F18090823049	F18090823051
Units	mg/kg	mg/kg
Final Volume	1	1
Dilution	1	1
Reporting Limit	272	279

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
SHC	C9	NONANE (C9)	U		272	U		279		30	NC
SHC	C10	DECANE (C10)	U		272	U		279		30	NC
SHC	C11	UNDECANE	U		272	U		279		30	NC
SHC	C12	DODECANE (C12)	U		272	U		279		30	NC
SHC	C13	TRIDECANE	U		272	U		279		30	NC
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	U		272	U		279		30	NC
SHC	C14	TETRADECANE (C14)	5.18	J	272	9.50	J	279		30	NC
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	15.8	J	272	16.8	J	279		30	NC
SHC	C15	PENTADECANE (C15)	36.5	J	272	38.0	J	279		30	NC
SHC	C16	HEXADECANE (C16)	112	J	272	119	J	279		30	NC
SHC	1650	NORPRISTANE (1650)	173	J	272	183	J	279		30	NC
SHC	C17	HEPTADECANE (C17)	165	J	272	181	J	279		30	NC
SHC	Pr	PRISTANE	415		272	449		279	8	30	
SHC	C18	OCTADECANE (C18)	250	J	272	264	J	279		30	NC
SHC	Ph	PHYTANE	392		272	409		279	4	30	
SHC	C19	NONADECANE (C19)	269	J	272	258	J	279		30	NC
SHC	C20	EICOSANE (C20)	254	J	272	268	J	279		30	NC
SHC	C21	HENEICOSANE (C21)	290		272	304		279	5	30	
SHC	C22	DOCOSANE (C22)	373		272	398		279	6	30	
SHC	C23	TRICOSANE (C23)	509		272	530		279	4	30	
SHC	C24	TETRACOSANE (C24)	544		272	572		279	5	30	
SHC	C25	PENTACOSANE (C25)	1050		272	1110		279	6	30	
SHC	C26	HEXACOSANE (C26)	1030		272	1130		279	9	30	
SHC	C27	HEPTACOSANE (C27)	1240		272	1330		279	7	30	
SHC	C28	OCTACOSANE (C28)	1300		272	1340		279	3	30	
SHC	C29	NONACOSANE (C29)	1600	B	272	1660	B	279	4	30	
SHC	C30	TRIACONTANE (C30)	1370		272	1390		279	1	30	
SHC	C31	HENTATRIACONTANE (C31)	1690		272	1600		279	5	30	
SHC	C32	DOTRIACONTANE (C32)	816		272	814		279	0	30	
SHC	C33	TRITRIACONTANE (C33)	948		272	908		279	4	30	
SHC	C34	TETRATRIACONTANE (C34)	614		272	554		279	10	30	
SHC	C35	PENTATRIACONTANE (C35)	836		272	824		279	1	30	
SHC	C36	HEXATRIACONTANE (C36)	357		272	348		279	3	30	
SHC	C37	HEPTATRIACONTANE (C37)	263	J	272	258	J	279		30	NC
SHC	C38	OCTATRIACONTANE (C38)	301		272	302		279	0	30	
SHC	C39	NONATRIACONTANE (C39)	152	J	272	121	J	279		30	NC
SHC	C40	TETRACONTANE (C40)	140	J	272	133	J	279		30	NC
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	547000		8990	558000		9220	2	30	
SHC	TSH	TOTAL SATURATED HYDROCARBONS	17500	J	272	17800	J	279		30	NC

Surrogates (% Recovery)		
O-TERPHENYL	103	103
D50-TETRACOSANE	102	101

Project Name: PAMPILLA 2
Project Number:

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

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

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OV 11AGO2023
Lab ID	L2347416-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1825228
Date Collected	8/11/2023
Date Received	8/16/2023
Date Prepped	9/8/2023
Date Analyzed	9/13/2023
Sample Size(wet)	0.00367 g
% Solid	100
File ID	F209112331
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.36

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN		U	1.36
2	D1	C1-DECALINS		U	2.72
2	D2	C2-DECALINS		U	2.72
2	D3	C3-DECALINS		U	2.72
2	D4	C4-DECALINS		U	2.72
S	BT0	BENZOTHIOPHENE		U	2.72
2	BT1	C1-BENZO(B)THIOPHENES		U	2.72
2	BT2	C2-BENZO(B)THIOPHENES		U	2.72
2	BT3	C3-BENZO(B)THIOPHENES	3.15		2.72
2	BT4	C4-BENZO(B)THIOPHENES	6.85		2.72
A	N0	NAPHTHALENE	1.21	JB	2.72
2	N1	C1-NAPHTHALENES	1.09	JB	2.72
2	N2	C2-NAPHTHALENES	5.28	B	2.72
2	N3	C3-NAPHTHALENES	32.9		2.72
2	N4	C4-NAPHTHALENES	77.2		2.72
2	B	BIPHENYL	0.621	JB	2.72
3	DF	DIBENZOFURAN	0.334	JB	2.72
3	AY	ACENAPHTHYLENE	1.19	J	2.72
3	AE	ACENAPHTHENE	0.578	J	2.72
3	F0	FLUORENE	2.60	J	2.72
3	F1	C1-FLUORENES	22.7		2.72
3	F2	C2-FLUORENES	97.0		2.72
3	F3	C3-FLUORENES	134		2.72
3	A0	ANTHRACENE	3.95		2.72
3	P0	PHENANTHRENE	45.5		2.72
3	PA1	C1-PHENANTHRENES/ANTHRACENES	205		2.72
3	PA2	C2-PHENANTHRENES/ANTHRACENES	424		2.72
3	PA3	C3-PHENANTHRENES/ANTHRACENES	385		2.72
3	PA4	C4-PHENANTHRENES/ANTHRACENES	219		2.72
3	RET	RETENE		U	2.72
3	DBT0	DIBENZOTHIOPHENE	5.44		2.72
3	DBT1	C1-DIBENZOTHIOPHENES	41.7		2.72
3	DBT2	C2-DIBENZOTHIOPHENES	94.6		2.72
3	DBT3	C3-DIBENZOTHIOPHENES	111		2.72
3	DBT4	C4-DIBENZOTHIOPHENES	68.9		2.72
4	BF	BENZO(B)FLUORENE	9.01		2.72
4	FL0	FLUORANTHENE	5.81		2.72
4	PY0	PYRENE	41.8		2.72
4	FP1	C1-FLUORANTHENES/PYRENES	152		2.72
4	FP2	C2-FLUORANTHENES/PYRENES	254		2.72
4	FP3	C3-FLUORANTHENES/PYRENES	298		2.72
4	FP4	C4-FLUORANTHENES/PYRENES	258		2.72
4	NBT0	NAPHTHOBENZOTHIOPHENE	25.0		2.72
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	86.2		2.72
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	135		2.72
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	113		2.72
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	72.0		2.72
4	BA0	BENZ(A)ANTHRACENE	29.4		2.72
4	C0	CHRYSENE/TRIPHENYLENE	103		2.72
4	BC1	C1-CHRYSENES	362		2.72
4	BC2	C2-CHRYSENES	539		2.72
4	BC3	C3-CHRYSENES	586		2.72
4	BC4	C4-CHRYSENES	310		2.72
5	BBF	BENZO(B)FLUORANTHENE	17.1		2.72

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OV 11AGO2023
Lab ID	L2347416-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1825228
Date Collected	8/11/2023
Date Received	8/16/2023
Date Prepped	9/8/2023
Date Analyzed	9/13/2023
Sample Size(wet)	0.00367 g
% Solid	100
File ID	F209112331
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.36

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE	3.93		2.72
5	BAF	BENZO(A)FLUORANTHENE		U	2.72
5	BEP	BENZO(E)PYRENE	46.4		2.72
5	BAP	BENZO(A)PYRENE	22.4		2.72
5	PER	PERYLENE	10.8		2.72
6	IND	INDENO(1,2,3-CD)PYRENE	4.90		2.72
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	7.06		2.72
6	GHI	BENZO(GHI)PERYLENE	13.9		2.72
O	CAR	CARBAZOLE	1.28	J	2.72
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	16.3		2.72
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	18.9		2.72
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	4.07		2.72
3	3MP	3-METHYLPHENANTHRENE (3MP)	48.0		2.72
3	2MP	2-METHYLPHENANTHRENE (2MP)	63.1		2.72
3	2MA	2-METHYLANTHRACENE (2MA)	9.13		2.72
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	47.8		2.72
3	1MP	1-METHYLPHENANTHRENE (1MP)	35.0		2.72
A	1MN	1-METHYLNAPHTHALENE	0.658	JB	2.72
A	2MN	2-METHYLNAPHTHALENE	0.657	JB	2.72
2	26DMN	2,6-DIMETHYLNAPHTHALENE	3.47		2.72
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	4.31		2.72
H30	T19	HOPANE (T19)	496		2.72
t23	T4	C23 TRICYCLIC TERPANE (T4)	66.7		2.72
t24	T5	C24 TRICYCLIC TERPANE (T5)	43.6		2.72
t25	T6	C25 TRICYCLIC TERPANE (T6)	45.4		2.72
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	22.4		2.72
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	32.9		2.72
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	33.4		2.72
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	39.9		2.72
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	41.9		2.72
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	34.1		2.72
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	36.4		2.72
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	66.9		2.72
t30S	T11a	C30 TRICYCLIC TERPANE-22S	33.1		2.72
t30R	T11b	C30 TRICYCLIC TERPANE-22R	26.9		2.72
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	96.6		2.72
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	37.2		2.72
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	26.2		2.72
H29	T15	30-NORHOPANE (T15)	287		2.72
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	54.2		2.72
X	X	17A(H)-DIAHOPANE (X)	30.0		2.72
M29	T17	30-NORMORETANE (T17)	38.9		2.72
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	62.6		2.72
M30	T20	MORETANE (T20)	57.7		2.72
H31S	T21	30-HOMOHOPANE-22S (T21)	182		2.72
H31R	T22	30-HOMOHOPANE-22R (T22)	173		2.72
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	77.3		2.72
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	128		2.72
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	94.2		2.72
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	84.9		2.72
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	58.0		2.72
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	67.6		2.72
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	47.1		2.72
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	47.2		2.72

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OV 11AGO2023
Lab ID	L2347416-01
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1825228
Date Collected	8/11/2023
Date Received	8/16/2023
Date Prepped	9/8/2023
Date Analyzed	9/13/2023
Sample Size(wet)	0.00367 g
% Solid	100
File ID	F209112331
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.36

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	53.6	2.72
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	50.1	2.72
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	30.7	2.72
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	18.5	2.72
aa27S	S12	17A(H)20SC27/C29DIA	74.2	2.72
aa27R	S17	17A(H)20RC27/C29DIA	89.3	2.72
d29R	S18	UNKNOWN STERANE (S18)	13.0	2.72
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	4.24	2.72
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	39.9	2.72
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	40.6	2.72
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	47.0	2.72
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	51.4	2.72
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	53.6	2.72
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	53.4	2.72
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	41.5	2.72
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	50.9	2.72
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	90.2	2.72
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	37.0	2.72
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	70.0	2.72
SC28TAS	TAS02	C28,20S TAS	56.2	2.72
RC27TAS	TAS03	C27,20R TAS	49.0	2.72
RC28TAS	TAS04	C28,20R TAS	44.3	2.72

Surrogates (% Recovery)	
NAPHTHALENE-D8	90
PHENANTHRENE-D10	97
BENZO(A)PYRENE-D12	103
5B(H)CHOLANE	110

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1825228-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1825228
Date Collected	NA
Date Received	9/8/2023
Date Prepped	9/8/2023
Date Analyzed	9/13/2023
Sample Size(wet)	0.00465 g
% Solid	100
File ID	F209112325
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.08

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN		U	1.08
2	D1	C1-DECALINS		U	2.15
2	D2	C2-DECALINS		U	2.15
2	D3	C3-DECALINS		U	2.15
2	D4	C4-DECALINS		U	2.15
S	BT0	BENZOTHIOPHENE		U	2.15
2	BT1	C1-BENZO(B)THIOPHENES		U	2.15
2	BT2	C2-BENZO(B)THIOPHENES		U	2.15
2	BT3	C3-BENZO(B)THIOPHENES		U	2.15
2	BT4	C4-BENZO(B)THIOPHENES		U	2.15
A	N0	NAPHTHALENE	0.306	J	2.15
2	N1	C1-NAPHTHALENES	0.451	J	2.15
2	N2	C2-NAPHTHALENES	1.10	J	2.15
2	N3	C3-NAPHTHALENES	0.892	J	2.15
2	N4	C4-NAPHTHALENES		U	2.15
2	B	BIPHENYL	0.422	J	2.15
3	DF	DIBENZOFURAN	0.109	J	2.15
3	AY	ACENAPHTHYLENE	0.101	J	2.15
3	AE	ACENAPHTHENE		U	2.15
3	F0	FLUORENE	0.174	J	2.15
3	F1	C1-FLUORENES		U	2.15
3	F2	C2-FLUORENES		U	2.15
3	F3	C3-FLUORENES		U	2.15
3	A0	ANTHRACENE	0.0871	J	2.15
3	P0	PHENANTHRENE	0.486	J	2.15
3	PA1	C1-PHENANTHRENES/ANTHRACENES	0.745	J	2.15
3	PA2	C2-PHENANTHRENES/ANTHRACENES	0.855	J	2.15
3	PA3	C3-PHENANTHRENES/ANTHRACENES	0.932	J	2.15
3	PA4	C4-PHENANTHRENES/ANTHRACENES		U	2.15
3	RET	RETENE		U	2.15
3	DBT0	DIBENZOTHIOPHENE		U	2.15
3	DBT1	C1-DIBENZOTHIOPHENES	0.290	J	2.15
3	DBT2	C2-DIBENZOTHIOPHENES		U	2.15
3	DBT3	C3-DIBENZOTHIOPHENES		U	2.15
3	DBT4	C4-DIBENZOTHIOPHENES		U	2.15
4	BF	BENZO(B)FLUORENE		U	2.15
4	FL0	FLUORANTHENE	0.108	J	2.15
4	PY0	PYRENE	0.144	J	2.15
4	FP1	C1-FLUORANTHENES/PYRENES		U	2.15
4	FP2	C2-FLUORANTHENES/PYRENES		U	2.15
4	FP3	C3-FLUORANTHENES/PYRENES		U	2.15
4	FP4	C4-FLUORANTHENES/PYRENES		U	2.15
4	NBT0	NAPHTHOBENZOTHIOPHENE		U	2.15
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES		U	2.15
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES		U	2.15
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES		U	2.15
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES		U	2.15
4	BA0	BENZ(A)ANTHRACENE		U	2.15
4	C0	CHRYSENE/TRIPHENYLENE	0.187	J	2.15
4	BC1	C1-CHRYSENES		U	2.15
4	BC2	C2-CHRYSENES		U	2.15
4	BC3	C3-CHRYSENES		U	2.15
4	BC4	C4-CHRYSENES		U	2.15
5	BBF	BENZO(B)FLUORANTHENE		U	2.15

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1825228-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1825228
Date Collected	NA
Date Received	9/8/2023
Date Prepped	9/8/2023
Date Analyzed	9/13/2023
Sample Size(wet)	0.00465 g
% Solid	100
File ID	F209112325
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.08

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE		U	2.15
5	BAF	BENZO(A)FLUORANTHENE		U	2.15
5	BEP	BENZO(E)PYRENE		U	2.15
5	BAP	BENZO(A)PYRENE		U	2.15
5	PER	PERYLENE		U	2.15
6	IND	INDENO(1,2,3-CD)PYRENE		U	2.15
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE		U	2.15
6	GHI	BENZO(GHI)PERYLENE	0.0845	J	2.15
O	CAR	CARBAZOLE		U	2.15
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	0.0940	J	2.15
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)		U	2.15
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)		U	2.15
3	3MP	3-METHYLPHENANTHRENE (3MP)	0.149	J	2.15
3	2MP	2-METHYLPHENANTHRENE (2MP)	0.162	J	2.15
3	2MA	2-METHYLANTHRACENE (2MA)		U	2.15
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	0.215	J	2.15
3	1MP	1-METHYLPHENANTHRENE (1MP)	0.133	J	2.15
A	1MN	1-METHYLNAPHTHALENE	0.301	J	2.15
A	2MN	2-METHYLNAPHTHALENE	0.307	J	2.15
2	26DMN	2,6-DIMETHYLNAPHTHALENE	0.262	J	2.15
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE		U	2.15
H30	T19	HOPANE (T19)		U	2.15
t23	T4	C23 TRICYCLIC TERPANE (T4)		U	2.15
t24	T5	C24 TRICYCLIC TERPANE (T5)		U	2.15
t25	T6	C25 TRICYCLIC TERPANE (T6)		U	2.15
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)		U	2.15
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)		U	2.15
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)		U	2.15
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)		U	2.15
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)		U	2.15
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)		U	2.15
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)		U	2.15
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)		U	2.15
t30S	T11a	C30 TRICYCLIC TERPANE-22S		U	2.15
t30R	T11b	C30 TRICYCLIC TERPANE-22R		U	2.15
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)		U	2.15
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)		U	2.15
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)		U	2.15
H29	T15	30-NORHOPANE (T15)		U	2.15
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)		U	2.15
X	X	17A(H)-DIAHOPANE (X)		U	2.15
M29	T17	30-NORMORETANE (T17)		U	2.15
OL	T18	18A(H)&18B(H)-OLEANANES (T18)		U	2.15
M30	T20	MORETANE (T20)		U	2.15
H31S	T21	30-HOMOHOPANE-22S (T21)		U	2.15
H31R	T22	30-HOMOHOPANE-22R (T22)		U	2.15
T22A	T22A	GAMMACERANE/C32-DIAHOPANE		U	2.15
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)		U	2.15
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)		U	2.15
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)		U	2.15
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)		U	2.15
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)		U	2.15
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)		U	2.15
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)		U	2.15

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1825228-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1825228
Date Collected	NA
Date Received	9/8/2023
Date Prepped	9/8/2023
Date Analyzed	9/13/2023
Sample Size(wet)	0.00465 g
% Solid	100
File ID	F209112325
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.08

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	U	2.15
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	U	2.15
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	U	2.15
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	U	2.15
aa27S	S12	17A(H)20SC27/C29DIA	U	2.15
aa27R	S17	17A(H)20RC27/C29DIA	U	2.15
d29R	S18	UNKNOWN STERANE (S18)	U	2.15
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	U	2.15
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	U	2.15
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	U	2.15
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	U	2.15
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	U	2.15
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	U	2.15
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	U	2.15
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	U	2.15
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	U	2.15
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	U	2.15
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	U	2.15
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	U	2.15
SC28TAS	TAS02	C28,20S TAS	U	2.15
RC27TAS	TAS03	C27,20R TAS	U	2.15
RC28TAS	TAS04	C28,20R TAS	U	2.15

Surrogates (% Recovery)	
NAPHTHALENE-D8	93
PHENANTHRENE-D10	105
BENZO(A)PYRENE-D12	103
5B(H)CHOLANE	110

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1825228-2
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1825228
Date Collected	NA
Date Received	9/8/2023
Date Prepped	9/8/2023
Date Analyzed	9/13/2023
Sample Size(wet)	0.00465 g
% Solid	100
File ID	F209112326
Units	%
Final Volume	1
Dilution	1
Reporting Limit	2.15

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
A	N0	NAPHTHALENE	187	2.15	87	215	50	130
3	AY	ACENAPHTHYLENE	182	2.15	84	215	50	130
3	AE	ACENAPHTHENE	198	2.15	92	215	50	130
3	F0	FLUORENE	201	2.15	94	215	50	130
3	A0	ANTHRACENE	211	2.15	98	215	50	130
3	P0	PHENANTHRENE	208	2.15	96	215	50	130
4	FL0	FLUORANTHENE	176	2.15	82	215	50	130
4	PY0	PYRENE	186	2.15	87	215	50	130
4	BA0	BENZ(A)ANTHRACENE	224	2.15	104	215	50	130
4	C0	CHRYSENE/TRIPHENYLENE	218	2.15	101	215	50	130
5	BBF	BENZO(B)FLUORANTHENE	217	2.15	101	215	50	130
5	BJKF	BENZO(J)+(K)FLUORANTHENE	218	2.15	102	215	50	130
5	BAP	BENZO(A)PYRENE	200	2.15	93	215	50	130
6	IND	INDENO(1,2,3-CD)PYRENE	195	2.15	90	215	50	130
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	198	2.15	92	215	50	130
6	GHI	BENZO(GHI)PERYLENE	199	2.15	92	215	50	130
A	2MN	2-METHYLNAPHTHALENE	183	2.15	85	215	50	130

Surrogates (% Recovery)	
NAPHTHALENE-D8	92
PHENANTHRENE-D10	103
BENZO(A)PYRENE-D12	103
5B(H)CHOLANE	104

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1825228-3
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1825228
Date Collected	NA
Date Received	9/8/2023
Date Prepped	9/8/2023
Date Analyzed	9/15/2023
Sample Size(wet)	0.00465 g
% Solid	100
File ID	F209112349
Units	%
Final Volume	1
Dilution	1
Reporting Limit	2.15

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
A	N0	NAPHTHALENE	200	2.15	93	215	50	130	7	30
3	AY	ACENAPHTHYLENE	191	2.15	89	215	50	130	6	30
3	AE	ACENAPHTHENE	206	2.15	96	215	50	130	4	30
3	F0	FLUORENE	209	2.15	97	215	50	130	3	30
3	A0	ANTHRACENE	216	2.15	101	215	50	130	3	30
3	P0	PHENANTHRENE	212	2.15	99	215	50	130	3	30
4	FL0	FLUORANTHENE	171	2.15	79	215	50	130	4	30
4	PY0	PYRENE	182	2.15	85	215	50	130	2	30
4	BA0	BENZ(A)ANTHRACENE	228	2.15	106	215	50	130	2	30
4	C0	CHRYSENE/TRIPHENYLENE	223	2.15	104	215	50	130	3	30
5	BBF	BENZO(B)FLUORANTHENE	222	2.15	103	215	50	130	2	30
5	BJKF	BENZO(J)+(K)FLUORANTHENE	228	2.15	106	215	50	130	4	30
5	BAP	BENZO(A)PYRENE	205	2.15	95	215	50	130	2	30
6	IND	INDENO(1,2,3-CD)PYRENE	189	2.15	88	215	50	130	2	30
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	188	2.15	87	215	50	130	6	30
6	GHI	BENZO(GHI)PERYLENE	200	2.15	93	215	50	130	1	30
A	2MN	2-METHYLNAPHTHALENE	195	2.15	91	215	50	130	7	30

Surrogates (% Recovery)	
NAPHTHALENE-D8	95
PHENANTHRENE-D10	102
BENZO(A)PYRENE-D12	103
5B(H)CHOLANE	104

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OV 11AGO2023		Duplicate Sample		
Lab ID	L2347416-01		WG1825228-5		
Matrix	SOLID		SOLID		
Matrix Description					
Reference Method	8270E-SIM(M)		8270E-SIM(M)		
Batch ID	WG1825228		WG1825228		
Date Collected	8/11/2023		NA		
Date Received	8/16/2023		9/8/2023		
Date Prepped	9/8/2023		9/8/2023		
Date Analyzed	9/13/2023		9/13/2023		
Sample Size(wet)	0.00367	g	0.00358	g	
% Solid	100		100		
File ID	F209112331		F209112332		
Units	mg/kg		mg/kg		
Final Volume	1		1		
Dilution	1		1		
Reporting Limit	1.36		1.4		

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
2	D0	CIS/TRANS-DECALIN	U		1.36	U		1.40		30	NC
2	D1	C1-DECALINS	U		2.72	U		2.79		30	NC
2	D2	C2-DECALINS	U		2.72	U		2.79		30	NC
2	D3	C3-DECALINS	U		2.72	U		2.79		30	NC
2	D4	C4-DECALINS	U		2.72	U		2.79		30	NC
S	BT0	BENZOTHIOPHENE	U		2.72	U		2.79		30	NC
2	BT1	C1-BENZO(B)THIOPHENES	U		2.72	U		2.79		30	NC
2	BT2	C2-BENZO(B)THIOPHENES	U		2.72	U		2.79		30	NC
2	BT3	C3-BENZO(B)THIOPHENES	3.15		2.72	3.15		2.79	0	30	
2	BT4	C4-BENZO(B)THIOPHENES	6.85		2.72	6.61		2.79	4	30	
A	N0	NAPHTHALENE	1.21	JB	2.72	1.38	JB	2.79		30	NC
2	N1	C1-NAPHTHALENES	1.09	JB	2.72	1.17	JB	2.79		30	NC
2	N2	C2-NAPHTHALENES	5.28	B	2.72	5.11	B	2.79	3	30	
2	N3	C3-NAPHTHALENES	32.9		2.72	31.9		2.79	3	30	
2	N4	C4-NAPHTHALENES	77.2		2.72	78.5		2.79	2	30	
2	B	BIPHENYL	0.621	JB	2.72	0.701	JB	2.79		30	NC
3	DF	DIBENZOFURAN	0.334	JB	2.72	0.402	JB	2.79		30	NC
3	AY	ACENAPHTHYLENE	1.19	J	2.72	1.22	J	2.79		30	NC
3	AE	ACENAPHTHENE	0.578	J	2.72	0.476	J	2.79		30	NC
3	F0	FLUORENE	2.60	J	2.72	2.59	J	2.79		30	NC
3	F1	C1-FLUORENES	22.7		2.72	22.8		2.79	0	30	
3	F2	C2-FLUORENES	97.0		2.72	98.0		2.79	1	30	
3	F3	C3-FLUORENES	134		2.72	138		2.79	3	30	
3	A0	ANTHRACENE	3.95		2.72	4.45		2.79	12	30	
3	P0	PHENANTHRENE	45.5		2.72	45.0		2.79	1	30	
3	PA1	C1-PHENANTHRENES/ANTHRACENES	205		2.72	210		2.79	2	30	
3	PA2	C2-PHENANTHRENES/ANTHRACENES	424		2.72	437		2.79	3	30	
3	PA3	C3-PHENANTHRENES/ANTHRACENES	385		2.72	395		2.79	3	30	
3	PA4	C4-PHENANTHRENES/ANTHRACENES	219		2.72	224		2.79	2	30	
3	RET	RETENE	U		2.72	U		2.79		30	NC
3	DBT0	DIBENZOTHIOPHENE	5.44		2.72	5.77		2.79	6	30	
3	DBT1	C1-DIBENZOTHIOPHENES	41.7		2.72	42.6		2.79	2	30	
3	DBT2	C2-DIBENZOTHIOPHENES	94.6		2.72	96.8		2.79	2	30	
3	DBT3	C3-DIBENZOTHIOPHENES	111		2.72	111		2.79	0	30	
3	DBT4	C4-DIBENZOTHIOPHENES	68.9		2.72	70.6		2.79	2	30	
4	BF	BENZO(B)FLUORENE	9.01		2.72	9.16		2.79	2	30	
4	FL0	FLUORANTHENE	5.81		2.72	6.01		2.79	3	30	
4	PY0	PYRENE	41.8		2.72	43.4		2.79	4	30	
4	FP1	C1-FLUORANTHENES/PYRENES	152		2.72	156		2.79	3	30	
4	FP2	C2-FLUORANTHENES/PYRENES	254		2.72	265		2.79	4	30	
4	FP3	C3-FLUORANTHENES/PYRENES	298		2.72	308		2.79	3	30	
4	FP4	C4-FLUORANTHENES/PYRENES	258		2.72	264		2.79	2	30	
4	NBT0	NAPHTHOBENZOTHIOPHENE	25.0		2.72	25.6		2.79	2	30	
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	86.2		2.72	86.3		2.79	0	30	
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	135		2.72	140		2.79	4	30	
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	113		2.72	116		2.79	3	30	
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	72.0		2.72	75.9		2.79	5	30	
4	BA0	BENZ(A)ANTHRACENE	29.4		2.72	31.1		2.79	6	30	
4	C0	CHRYSENE/TRIPHENYLENE	103		2.72	109		2.79	6	30	
4	BC1	C1-CHRYSENES	362		2.72	369		2.79	2	30	
4	BC2	C2-CHRYSENES	539		2.72	567		2.79	5	30	
4	BC3	C3-CHRYSENES	586		2.72	603		2.79	3	30	
4	BC4	C4-CHRYSENES	310		2.72	328		2.79	6	30	
5	BBF	BENZO(B)FLUORANTHENE	17.1		2.72	18.2		2.79	6	30	
5	BJKF	BENZO(J)+(K)FLUORANTHENE	3.93		2.72	3.46		2.79	13	30	
5	BAF	BENZO(A)FLUORANTHENE	U		2.72	U		2.79		30	NC
5	BEP	BENZO(E)PYRENE	46.4		2.72	48.9		2.79	5	30	
5	BAP	BENZO(A)PYRENE	22.4		2.72	24.1		2.79	7	30	
5	PER	PERYLENE	10.8		2.72	10.9		2.79	1	30	
6	IND	INDENO(1,2,3-CD)PYRENE	4.90		2.72	5.25		2.79	7	30	
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	7.06		2.72	6.93		2.79	2	30	

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OV 11AGO2023			Duplicate Sample		
Lab ID	L2347416-01			WG1825228-5		
Matrix	SOLID			SOLID		
Matrix Description						
Reference Method	8270E-SIM(M)			8270E-SIM(M)		
Batch ID	WG1825228			WG1825228		
Date Collected	8/11/2023			NA		
Date Received	8/16/2023			9/8/2023		
Date Prepped	9/8/2023			9/8/2023		
Date Analyzed	9/13/2023			9/13/2023		
Sample Size(wet)	0.00367	g		0.00358	g	
% Solid	100			100		
File ID	F209112331			F209112332		
Units	mg/kg			mg/kg		
Final Volume	1			1		
Dilution	1			1		
Reporting Limit	1.36			1.4		

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
6	GHI	BENZO(GHI)PERYLENE	13.9		2.72	15.4		2.79	10	30	
O	CAR	CARBAZOLE	1.28	J	2.72	1.51	J	2.79		30	NC
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	16.3		2.72	16.6		2.79	2	30	
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	18.9		2.72	19.6		2.79	4	30	
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	4.07		2.72	4.24		2.79	4	30	
3	3MP	3-METHYLPHENANTHRENE (3MP)	48.0		2.72	49.2		2.79	2	30	
3	2MP	2-METHYLPHENANTHRENE (2MP)	63.1		2.72	64.3		2.79	2	30	
3	2MA	2-METHYLANTHRACENE (2MA)	9.13		2.72	9.31		2.79	2	30	
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	47.8		2.72	49.6		2.79	4	30	
3	1MP	1-METHYLPHENANTHRENE (1MP)	35.0		2.72	35.6		2.79	2	30	
A	1MN	1-METHYLNAPHTHALENE	0.658	JB	2.72	0.681	JB	2.79		30	NC
A	2MN	2-METHYLNAPHTHALENE	0.657	JB	2.72	0.861	JB	2.79		30	NC
2	26DMN	2,6-DIMETHYLNAPHTHALENE	3.47		2.72	3.31		2.79	5	30	
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	4.31		2.72	4.20		2.79	3	30	
H30	T19	HOPANE (T19)	496		2.72	502		2.79	1	30	
t23	T4	C23 TRICYCLIC TERPANE (T4)	66.7		2.72	67.1		2.79	1	30	
t24	T5	C24 TRICYCLIC TERPANE (T5)	43.6		2.72	44.4		2.79	2	30	
t25	T6	C25 TRICYCLIC TERPANE (T6)	45.4		2.72	44.7		2.79	2	30	
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	22.4		2.72	23.6		2.79	5	30	
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	32.9		2.72	34.2		2.79	4	30	
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	33.4		2.72	33.2		2.79	1	30	
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	39.9		2.72	43.9		2.79	10	30	
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	41.9		2.72	43.7		2.79	4	30	
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	34.1		2.72	34.3		2.79	1	30	
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	36.4		2.72	38.4		2.79	5	30	
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	66.9		2.72	69.1		2.79	3	30	
t30S	T11a	C30 TRICYCLIC TERPANE-22S	33.1		2.72	36.5		2.79	10	30	
t30R	T11b	C30 TRICYCLIC TERPANE-22R	26.9		2.72	31.4		2.79	15	30	
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	96.6		2.72	101		2.79	4	30	
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	37.2		2.72	32.3		2.79	14	30	
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	26.2		2.72	27.6		2.79	5	30	
H29	T15	30-NORHOPANE (T15)	287		2.72	299		2.79	4	30	
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	54.2		2.72	59.4		2.79	9	30	
X	X	17A(H)-DIAHOPANE (X)	30.0		2.72	31.5		2.79	5	30	
M29	T17	30-NORMORETANE (T17)	38.9		2.72	39.7		2.79	2	30	
OL	T18	18A(H)&18B(H)-OLEANANES (T18)	62.6		2.72	64.7		2.79	3	30	
M30	T20	MORETANE (T20)	57.7		2.72	57.8		2.79	0	30	
H31S	T21	30-HOMOHOPANE-22S (T21)	182		2.72	186		2.79	2	30	
H31R	T22	30-HOMOHOPANE-22R (T22)	173		2.72	179		2.79	3	30	
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	77.3		2.72	82.1		2.79	6	30	
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	128		2.72	138		2.79	8	30	
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	94.2		2.72	97.4		2.79	3	30	
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	84.9		2.72	90.0		2.79	6	30	
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	58.0		2.72	61.2		2.79	5	30	
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	67.6		2.72	65.6		2.79	3	30	
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	47.1		2.72	44.7		2.79	5	30	
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	47.2		2.72	57.6		2.79	20	30	
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	53.6		2.72	55.1		2.79	3	30	
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	50.1		2.72	53.8		2.79	7	30	
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	30.7		2.72	28.0		2.79	9	30	
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	18.5		2.72	20.2		2.79	9	30	
aa27S	S12	17A(H)20SC27/C29DIA	74.2		2.72	77.5		2.79	4	30	
aa27R	S17	17A(H)20RC27/C29DIA	89.3		2.72	90.7		2.79	2	30	
d29R	S18	UNKNOWN STERANE (S18)	13.0		2.72	14.6		2.79	12	30	
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	4.24		2.72	6.04		2.79	35	30	Q
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	39.9		2.72	50.3		2.79	23	30	
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	40.6		2.72	43.5		2.79	7	30	
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	47.0		2.72	49.9		2.79	6	30	
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	51.4		2.72	56.8		2.79	10	30	
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	53.6		2.72	55.9		2.79	4	30	
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	53.4		2.72	49.8		2.79	7	30	

Project Name: PAMPILLA 2
Project Number:

Client ID	HC OV 11AGO2023		Duplicate Sample		
Lab ID	L2347416-01		WG1825228-5		
Matrix	SOLID		SOLID		
Matrix Description					
Reference Method	8270E-SIM(M)		8270E-SIM(M)		
Batch ID	WG1825228		WG1825228		
Date Collected	8/11/2023		NA		
Date Received	8/16/2023		9/8/2023		
Date Prepped	9/8/2023		9/8/2023		
Date Analyzed	9/13/2023		9/13/2023		
Sample Size(wet)	0.00367	g	0.00358	g	
% Solid	100		100		
File ID	F209112331		F209112332		
Units	mg/kg		mg/kg		
Final Volume	1		1		
Dilution	1		1		
Reporting Limit	1.36		1.4		

Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	RPD	RPD Limit
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	41.5	2.72	40.0	2.79	4	30
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	50.9	2.72	50.4	2.79	1	30
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	90.2	2.72	88.5	2.79	2	30
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	37.0	2.72	44.1	2.79	18	30
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	70.0	2.72	73.7	2.79	5	30
SC28TAS	TAS02	C28,20S TAS	56.2	2.72	63.5	2.79	12	30
RC27TAS	TAS03	C27,20R TAS	49.0	2.72	49.8	2.79	2	30
RC28TAS	TAS04	C28,20R TAS	44.3	2.72	44.4	2.79	0	30

Surrogates (% Recovery)		
NAPHTHALENE-D8	90	91
PHENANTHRENE-D10	97	96
BENZO(A)PYRENE-D12	103	104
5B(H)CHOLANE	110	106

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude	
Lab ID	WG1823057-1	
Matrix	OIL	
Matrix Description	Crude Oil	
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER	
Batch ID	WG1823057-1	
Date Collected	N/A	
Date Received	N/A	
Date Prepped	N/A	
Date Analyzed	9/1/2023	
Sample Size(wet)	0.0514	g
% Solid	100	
File ID	F208312314	
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	500	1.94	105	477.66	65	135
2	D1	C1-DECALINS	737	1.94	97	760.39	65	135
2	D2	C2-DECALINS	654	1.94	97	675.98	65	135
2	D3	C3-DECALINS	317	1.94	86	366.46	65	135
2	D4	C4-DECALINS	333	1.94	92	362.78	65	135
S	BT0	BENZOTHIOPHENE	7.02	1.94	122	5.75	65	135
2	BT1	C1-BENZO(B)THIOPHENES	30.5	1.94	102	29.96	65	135
2	BT2	C2-BENZO(B)THIOPHENES	55.1	1.94	108	50.93	65	135
2	BT3	C3-BENZO(B)THIOPHENES	104	1.94	101	103.18	65	135
2	BT4	C4-BENZO(B)THIOPHENES	91.2	1.94	100	90.8	65	135
A	N0	NAPHTHALENE	636	1.94	112	565.56	65	135
2	N1	C1-NAPHTHALENES	1320	1.94	109	1208.32	65	135
2	N2	C2-NAPHTHALENES	1530	1.94	105	1450.37	65	135
2	N3	C3-NAPHTHALENES	1090	1.94	104	1052.74	65	135
2	N4	C4-NAPHTHALENES	567	1.94	97	583.65	65	135
2	B	BIPHENYL	157	1.94	108	145.7	65	135
3	DF	DIBENZOFURAN	61.6	1.94	124	49.63	65	135
3	AY	ACENAPHTHYLENE	7.47	1.94	108	6.91	65	135
3	AE	ACENAPHTHENE	19.4	1.94	106	18.35	65	135
3	F0	FLUORENE	77.9	1.94	110	70.69	65	135
3	F1	C1-FLUORENES	162	1.94	100	162.7	65	135
3	F2	C2-FLUORENES	243	1.94	96	251.87	65	135
3	F3	C3-FLUORENES	218	1.94	90	242.29	65	135
3	P0	PHENANTHRENE	202	1.94	107	188.41	65	135
3	PA1	C1-PHENANTHRENES/ANTHRACENES	401	1.94	103	388.12	65	135
3	PA2	C2-PHENANTHRENES/ANTHRACENES	439	1.94	101	434.38	65	135
3	PA3	C3-PHENANTHRENES/ANTHRACENES	308	1.94	100	308.67	65	135
3	PA4	C4-PHENANTHRENES/ANTHRACENES	123	1.94	95	129.94	65	135
3	DBT0	DIBENZOTHIOPHENE	138	1.94	106	130.56	65	135
3	DBT1	C1-DIBENZOTHIOPHENES	289	1.94	105	275.34	65	135
3	DBT2	C2-DIBENZOTHIOPHENES	378	1.94	102	369.42	65	135
3	DBT3	C3-DIBENZOTHIOPHENES	340	1.94	98	345.39	65	135
3	DBT4	C4-DIBENZOTHIOPHENES	179	1.94	92	193.51	65	135
4	FL0	FLUORANTHENE	4.31	1.94	114	3.77	65	135
4	PY0	PYRENE	13.0	1.94	112	11.65	65	135
4	FP1	C1-FLUORANTHENES/PYRENES	53.8	1.94	99	54.43	65	135
4	FP2	C2-FLUORANTHENES/PYRENES	87.7	1.94	98	89.07	65	135
4	FP3	C3-FLUORANTHENES/PYRENES	107	1.94	98	109.78	65	135
4	FP4	C4-FLUORANTHENES/PYRENES	94.4	1.94	97	97.22	65	135
4	NBT0	NAPHTHOBENZOTHIOPHENE	40.4	1.94	103	39.13	65	135
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	102	1.94	96	106.13	65	135
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	140	1.94	93	150.09	65	135
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	110	1.94	91	120.77	65	135
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	72.5	1.94	85	85.38	65	135
4	BA0	BENZ(A)ANTHRACENE	2.65	1.94	116	2.28	65	135
4	C0	CHRYSENE/TRIPHENYLENE	47.0	1.94	128	36.66	65	135
4	BC1	C1-CHRYSENES	80.0	1.94	124	64.59	65	135
4	BC2	C2-CHRYSENES	99.5	1.94	114	87.41	65	135
4	BC3	C3-CHRYSENES	103	1.94	102	101.29	65	135
4	BC4	C4-CHRYSENES	71.9	1.94	113	63.42	65	135
5	BBF	BENZO(B)FLUORANTHENE	6.14	1.94	114	5.4	65	135
5	BEP	BENZO(E)PYRENE	12.0	1.94	121	9.88	65	135
5	BAP	BENZO(A)PYRENE	2.17	1.94	107	2.03	65	135
5	PER	PERYLENE	3.74	1.94	112	3.34	65	135
6	GHI	BENZO(GHI)PERYLENE	4.2	1.94	117	3.59	65	135
O	CAR	CARBAZOLE	5.59	1.94	92	6.09	65	135
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	137	1.94	104	131.38	65	135
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	105	1.94	107	98.05	65	135
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	42.7	1.94	106	40.36	65	135
3	3MP	3-METHYLPHENANTHRENE (3MP)	81.4	1.94	103	79.32	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude	
Lab ID	WG1823057-1	
Matrix	OIL	
Matrix Description	Crude Oil	
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER	
Batch ID	WG1823057-1	
Date Collected	N/A	
Date Received	N/A	
Date Prepped	N/A	
Date Analyzed	9/1/2023	
Sample Size(wet)	0.0514	g
% Solid	100	
File ID	F208312314	
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	2MA	2-METHYLANTHRACENE (2MA)	3.3	1.94	110	3	65	135
3	1MP	1-METHYLPHENANTHRENE (1MP)	90.2	1.94	102	87.93	65	135
A	1MN	1-METHYLNAPHTHALENE	879	1.94	111	793.54	65	135
A	2MN	2-METHYLNAPHTHALENE	1100	1.94	101	1087.89	65	135
2	26DMN	2,6-DIMETHYLNAPHTHALENE	676	1.94	106	635.33	65	135
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	123	1.94	84	147.12	65	135
H30	T19	HOPANE (T19)	197	1.94	122	161.24	65	135
t23	T4	C23 TRICYCLIC TERPANE (T4)	69.9	1.94	100	69.8	65	135
t24	T5	C24 TRICYCLIC TERPANE (T5)	45.5	1.94	108	42.1	65	135
t25	T6	C25 TRICYCLIC TERPANE (T6)	43.4	1.94	107	40.4	65	135
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	16.4	1.94	115	14.2	65	135
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	19.3	1.94	118	16.3	65	135
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	16.6	1.94	114	14.6	65	135
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	20.5	1.94	126	16.2	65	135
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	19.0	1.94	108	17.6	65	135
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	24.0	1.94	125	19.2	65	135
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	26.3	1.94	125	21	65	135
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	33.7	1.94	119	28.3	65	135
t30S	T11a	C30 TRICYCLIC TERPANE-22S	16.8	1.94	110	15.3	65	135
t30R	T11b	C30 TRICYCLIC TERPANE-22R	16.4	1.94	108	15.2	65	135
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	42.0	1.94	122	34.4	65	135
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	7.3	1.94	104	7	65	135
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	8.72	1.94	108	8.1	65	135
H29	T15	30-NORHOPANE (T15)	110	1.94	121	90.7	65	135
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	28.3	1.94	121	23.3	65	135
X	X	17A(H)-DIAHOPANE (X)	15.6	1.94	120	13	65	135
M29	T17	30-NORMORETANE (T17)	12.5	1.94	112	11.2	65	135
M30	T20	MORETANE (T20)	19.5	1.94	120	16.3	65	135
H31S	T21	30-HOMOHOPANE-22S (T21)	84.7	1.94	125	67.6	65	135
H31R	T22	30-HOMOHOPANE-22R (T22)	70.9	1.94	122	58.3	65	135
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	61.9	1.94	126	48.9	65	135
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	45.9	1.94	129	35.6	65	135
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	49.3	1.94	127	38.8	65	135
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	31.4	1.94	123	25.6	65	135
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	34.6	1.94	124	27.9	65	135
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	24.6	1.94	124	19.8	65	135
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	38.3	1.94	133	28.8	65	135
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	29.5	1.94	132	22.3	65	135
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	63.0	1.94	131	48.1	65	135
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	29.9	1.94	119	25.1	65	135
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	23.5	1.94	95	24.8	65	135
aa27S	S12	17A(H)20SC27/C29DIA	71.2	1.94	119	59.74	65	135
aa27R	S17	17A(H)20RC27/C29DIA	88.0	1.94	123	71.55	65	135
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	3.9	1.94	103	3.8	65	135
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	42.6	1.94	129	33	65	135
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	41.8	1.94	130	32.2	65	135
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	59.2	1.94	114	51.7	65	135
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	43.2	1.94	120	36.1	65	135
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	43.7	1.94	114	38.4	65	135
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	46.4	1.94	117	39.7	65	135
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	48.2	1.94	118	41	65	135
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	59.3	1.94	115	51.7	65	135
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	71.2	1.94	130	54.6	65	135
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	39.2	1.94	103	38.2	65	135
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	353	1.94	122	289.3	65	135
SC28TAS	TAS02	C28,20S TAS	236	1.94	129	182.5	65	135
RC27TAS	TAS03	C27,20R TAS	226	1.94	128	177.1	65	135
RC28TAS	TAS04	C28,20R TAS	191	1.94	129	148.1	65	135

List of Potential Qualifiers

A: Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B: The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C: Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D: Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E: Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F: The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum

G: The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H: The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I: The lower value for the two columns has been reported due to obvious interference.

J: Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

J: Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

J: Estimated value. The Target analyte concentration is below the Limit of Quantitation (LOQ), but above the Detection Limit (DL). This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

M: Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND: Not detected at the Limit of Quantitation (LOQ) for the sample.

ND: Not detected at the Limit of Detection (LOD) for the sample.

ND: Not detected at the reporting limit (RL) for the sample.

ND: Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ: Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P: The RPD between the results for the two columns exceeds the method-specified criteria.

Q: The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R: Analytical results are from sample re-analysis.

RE: Analytical results are from sample re-extraction.

S: Analytical results are from modified screening analysis.

U: Not detected at the reported detection limit for the sample.

V: The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z: The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

HC DEL 27AGO2023

To: Refinería La Pampilla S.A.A.

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

Date: October 11, 2023

Subject: Chemical Fingerprinting of samples collected in Ventanilla, Peru

This memorandum summarizes the results of forensic chemical analysis conducted on one (1) sample that was collected by Repsol contractors on August 27, 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 DEL 27AGO2023" was shipped to Alpha Analytical Labs in Mansfield, MA and arrived at a temperature of 26.5°C on September 8, 2023 with a DHL Tracking # 7103324546 (Seal number 200938). The sample arrived without a chain of custody however a chain of custody (Attachment 1) was supplied via email prior to sample arrival and was consistent with the sample received.

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 DEL 27AGO2023 (HC DEL27) are shown in Figures 1A and1B respectively.

GC/FID Analysis

The GC/FID chromatogram for the HC DEL27 sample (Figure 1B) indicates this samples consists of a C_{19} – C_{44} range material that has undergone significant weathering by evaporation and biodegradation as indicated by the loss of alkanes and relative increase in the UCM. There are four (4) resolved peaks identified in the chromatogram that are not alkanes and appear to be non-petroleum in nature. In addition, the presence of low level C_{14} - C_{21} alkanes is evidence that a second lighter range material may be present. The petroleum signature is consistent with a severely weathered crude or heavy oil that possibly contains a second source of lighter petroleum.

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 DEL27 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 DEL27 sample are provided in Figures 2A and 2B respectively. The PAH histogram for the HC DEL27 sample (Figure 2B) shows an abundance of naphthalenes which is likely due to the lighter C_{14} - C_{21} range material identified in the FID chromatogram (Figure 1B) and further indicates the presence of a second source of petroleum. There are differences in the proportion of fluorenes as well as a lack of naphthobenzothiophenes and chrysenes. The proportion of phenanthrenes to the sulfur containing dibenzothiophenes indicates a higher sulfur petroleum 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 DEL27 sample plot well away from each other indicating a different oil source.

The biomarker triterpene m/z 191 ion traces for the source oil and the HC DEL27 sample are presented in Figures 4A and 4B respectively. The biomarker traces for HC DEL27 show differences in the proportion of tri and tetracyclic terpane triplet (T6a, T6b, T6c)[3], TS and TM (T11 and T12), and a decrease in the tricyclic terpanes (T7-T10) and gammacerane (T22A). In addition, there is an increase in the homohopanes (T21, T22, T26, T27, T30, and T31) relative to the source oil. These differences indicate the HC DEL27 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 DEL27 sample plot away from each other indicating a different source of petroleum.

Conclusion

The HC DEL 27AGO2023 sample consists of a weathered crude or heavy oil that contains low levels of a lighter product. The PAH and biomarker analysis indicate the petroleum detected in the source oil and HC DEL 27AGO2023 sample are chemically different and were derived from a different source of petroleum.

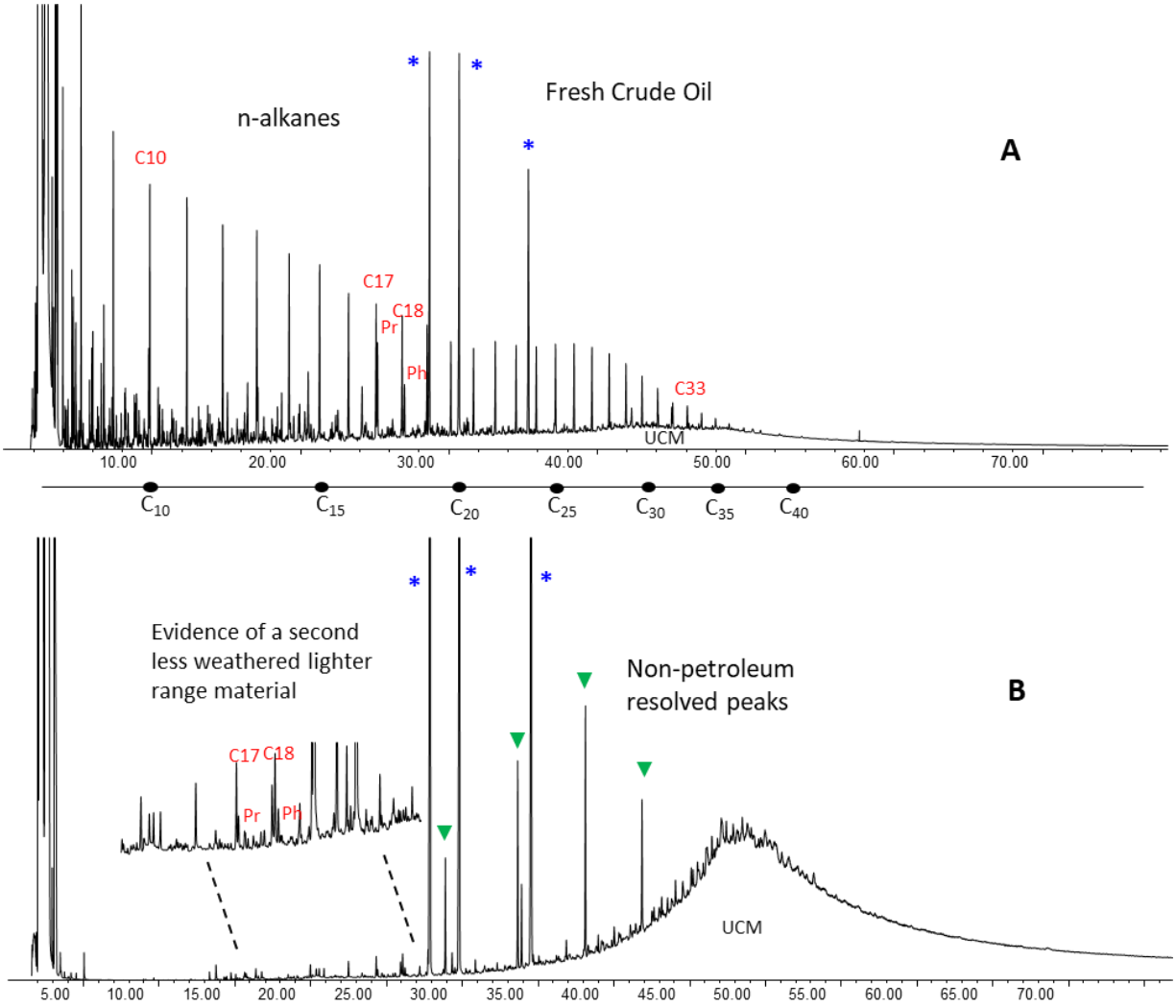


Figure 1. GC/FID "fingerprints" for the field samples.
Carbon ranges annotated below the x-axis analysis time scale.

A) Ship's Tanks Composite Sample
B) HC DEL 27AGO2023
'*': Laboratory-added Internal Standard

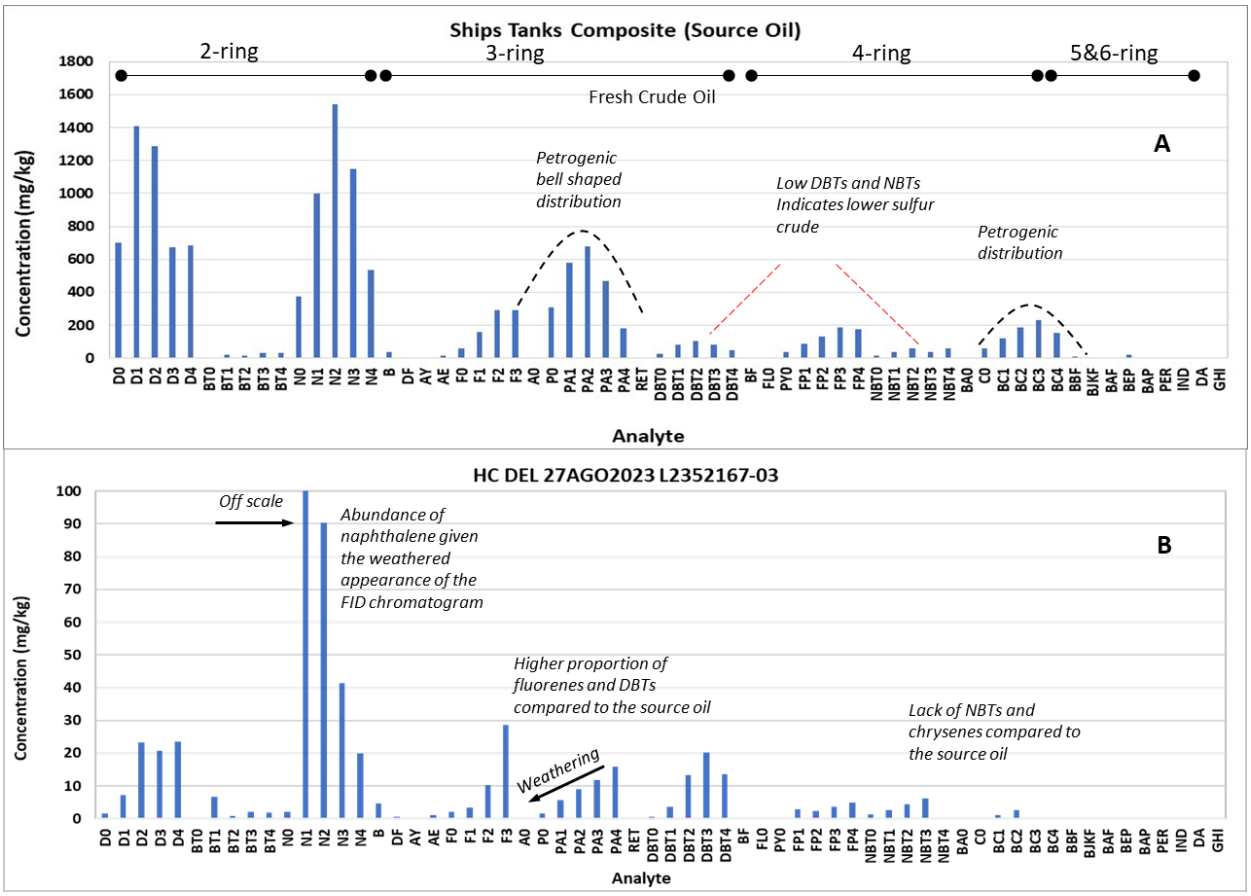


Figure 2. PAH Histograms

A) Ship's Tanks Composite Sample
B) HC DEL 27AGO2023

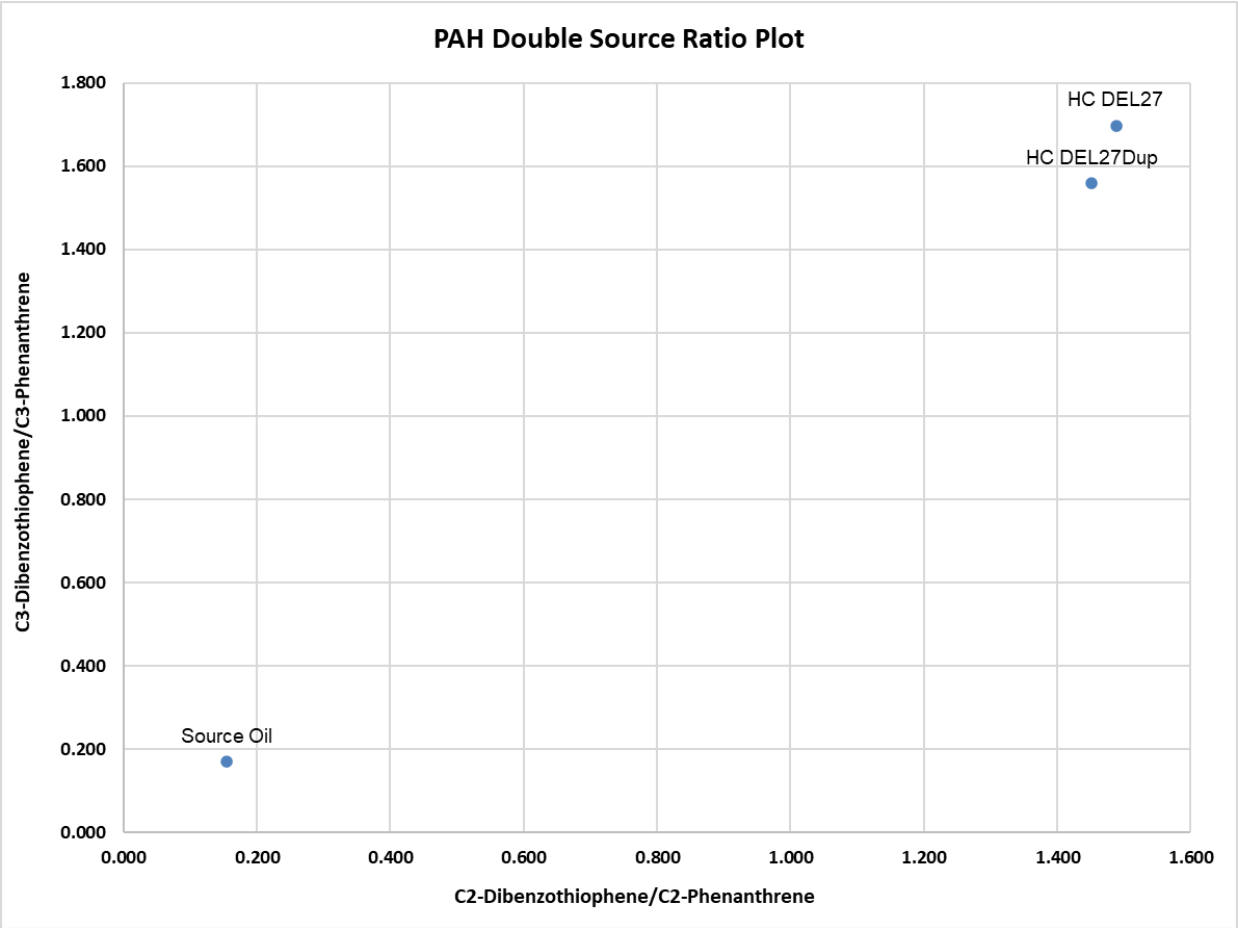


Figure 3. PAH Double Source Ratio Plot

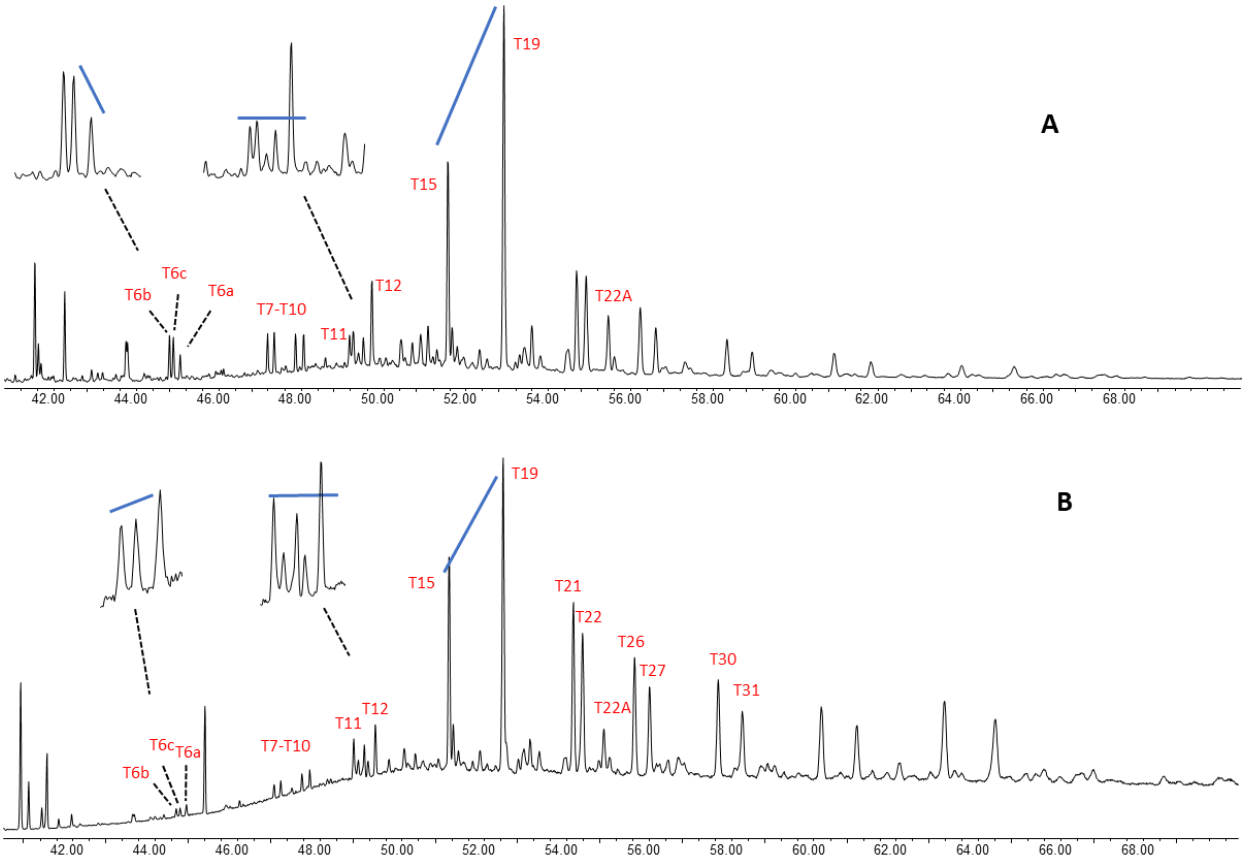


Figure 4. Biomarker m/z 191 Triterpane Fingerprint Traces

A) Ship's Tanks Composite Sample
B) HC DEL 27AGO2023

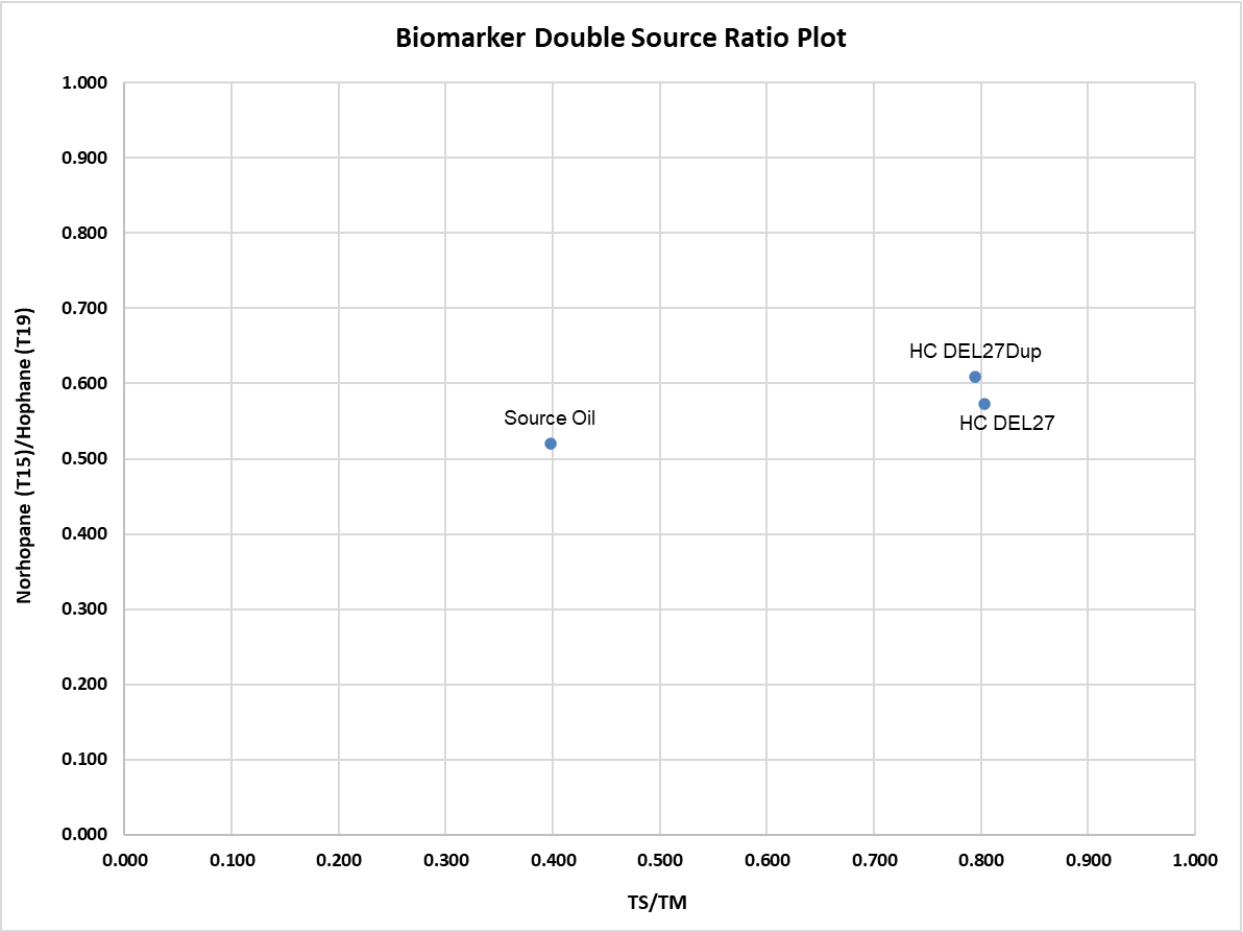


Figure 5. Biomarker Double Source Ratio Plots

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 DEL 27AGO2023	L2352167-03	08/27/2023	Oil	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

9/8/23

L2352167

Nº 007217

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.
EXPEDIENTE: 11692-2023
LUGAR: PLAYA DELFINES | Distrito: VENTANILLA | Provincia: CALLAO | Departamento:
PERSONA DE CONTACTO: Arturo Panizo A.
HS: 23006017
JOB NUMBER: 23LM0026244753

NORMA:
1 SMEWW - APHA - AWWA - WEF 23rd Ed 2017 Collection and preservation of samples. Part 9060 A-B ( ) 1060 B-C ( ) 10200 B ( ) 10300 B ( ) 10400 B ( ) 10750 B ( )
2 Instruccion 8554 Toma de muestras de sedimentos ( )
3 NTP 214.003 - 1997 (Revisada el 2016) Agua Potable. Toma de muestras ITEM 4-A ( ) ITEM 4-B ( )
4 RM Nº 271-2023-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 2017) Calidad de agua. Muestreo. Parte 10 - Guía para el muestreo de aguas residuales ( )
7 NTP 214.064:2016 AGUAS RESIDUALES. Protocolo de muestreo de aguas residuales no domésticos 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 domesticas o municipales. PTAR ( )
9 RM Nº 085-2014-MINAM. Guia para el muestreo de suelos ( )
10 Protocolo de monitoreo de calidad de agua sub sector hidrocarburos DGAAE EM ( )
11 Otros: ( )

PARÁMETROS DE ANÁLISIS EN EL LABORATORIO

PARÁMETROS DE CAMPO

FINGER PRINT

pH (Unidades de pH) | Temperatura Ambiental (°C) | Temperatura (°C) | Oxigeno Disuelto (mg/L) | Conductividad µS/cm ( ) mS/cm ( ) | Salinidad (UPS) | Cloro residual mg Cl_2/L Libre ( ) Total ( ) | Turbiedad (UNT) | Caudal (m³/s) | Transparencia cm ( ) m ( ) | Nivel freatico cm ( ) m ( ) | ORP (mV)

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.a.n.m) ZONA (17,18,19) (K,L,M)	CANTIDAD DE ENVASES
HC DEL 27AGO2023	27.08.23	11:02	*	0263166	8689425	18L	01
						Total de Envases	01

(1) Matriz (s)
AC = Agua para uso y consumo humano:
AN = Agua Natural:
AP = Agua de proceso:
ASAL = Agua Salina:
AR = Agua Residual:
SM = Sedimento:
SU = Suelo
Otro (x) RESTOS SOLIDOS DE HIDROCARBURO

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	003	4	
2		5	
3		6	

Observaciones: SE PROCEDIO A LLEGAR AL PUNTO DE MUESTREO INDICADO Y DENOMINADO POR EL REPRESENTANTE DEL CLIENTE QUIEN ESTUVO PRESENTE DURANTE EL MUESTREO. SE REALIZÓ EL PROCEDIMIENTO DE CARACTERIZACIÓN DE LA MUESTRA LA CUAL PRESENTÓ UNA COLORACIÓN AZUL VERDOSA CON OLOR A HIDROCARBURO. LA MUESTRA FUE PRECINTADA EN CAMPO CON PRECINTO Nº 200938. SE TOMARON COORDENADAS IN SITU

Responsable de la toma de muestra:
Firma:
Inspector Cerper: FRANCO HUMA
Inspectores de apoyo: JUNIOR CHONCA
Hora de inicio: 10:00 Hora de término: 16:00

Representante del cliente
Firma:
Nombre: Arturo Panizo Ayala
DNI: 42498853
Cargo: Coordinador de playas

Recepción de muestras
Nombre: noelia machuca c. LAB: CALEB BRETT
Fecha: 02.09.23 Hora: 9:00 a
intertek 07 SEP. 2023 RECEIVED

CR-CMAS Versión 06 2023-06-20

9/8/23 14:44

Attachment 2

Analytical Data

Project Name: PAMPILLA 2
Project Number:

Client ID	HC DEL 27AGO2023
Lab ID	L2352167-03
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1829653
Date Collected	8/27/2023
Date Received	9/8/2023
Date Prepped	10/4/2023
Date Analyzed	10/6/2023
Sample Size(wet)	0.00415 g
% Solid	100
File ID	F18100523041
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	241

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)		U	241
SHC	C10	DECANE (C10)	7.23	J	241
SHC	C11	UNDECANE	6.99	J	241
SHC	C12	DODECANE (C12)	21.2	J	241
SHC	C13	TRIDECANE	35.4	J	241
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	20.0	J	241
SHC	C14	TETRADECANE (C14)	71.8	J	241
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	38.1	J	241
SHC	C15	PENTADECANE (C15)	134	J	241
SHC	C16	HEXADECANE (C16)	239	J	241
SHC	1650	NORPRISTANE (1650)	77.8	J	241
SHC	C17	HEPTADECANE (C17)	265		241
SHC	Pr	PRISTANE	139	J	241
SHC	C18	OCTADECANE (C18)	317		241
SHC	Ph	PHYTANE	158	J	241
SHC	C19	NONADECANE (C19)	302		241
SHC	C20	EICOSANE (C20)	278		241
SHC	C21	HENEICOSANE (C21)	164	J	241
SHC	C22	DOCOSANE (C22)	134	J	241
SHC	C23	TRICOSANE (C23)		U	241
SHC	C24	TETRACOSANE (C24)	160	J	241
SHC	C25	PENTACOSANE (C25)	136	J	241
SHC	C26	HEXACOSANE (C26)		U	241
SHC	C27	HEPTACOSANE (C27)		U	241
SHC	C28	OCTACOSANE (C28)		U	241
SHC	C29	NONACOSANE (C29)	295	CB	241
SHC	C30	TRIACONTANE (C30)		U	241
SHC	C31	HENTATRIACONTANE (C31)	136	J	241
SHC	C32	DOTRIACONTANE (C32)		U	241
SHC	C33	TRITRIACONTANE (C33)	356		241
SHC	C34	TETRATRIACONTANE (C34)		U	241
SHC	C35	PENTATRIACONTANE (C35)	1380		241
SHC	C36	HEXATRIACONTANE (C36)		U	241
SHC	C37	HEPTATRIACONTANE (C37)		U	241
SHC	C38	OCTATRIACONTANE (C38)		U	241
SHC	C39	NONATRIACONTANE (C39)		U	241
SHC	C40	TETRACONTANE (C40)		U	241
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	604000		7950
SHC	TSH	TOTAL SATURATED HYDROCARBONS	4870	J	241

Surrogates (% Recovery)	
O-TERPHENYL	101
D50-TETRACOSANE	101

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1829653-1
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1829653
Date Collected	NA
Date Received	9/20/2023
Date Prepped	10/4/2023
Date Analyzed	10/5/2023
Sample Size(wet)	0.00415 g
% Solid	100
File ID	F18100523011
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	241

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	NONANE (C9)	U		241
SHC	C10	DECANE (C10)	U		241
SHC	C11	UNDECANE	U		241
SHC	C12	DODECANE (C12)	U		241
SHC	C13	TRIDECANE	U		241
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	U		241
SHC	C14	TETRADECANE (C14)	U		241
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	U		241
SHC	C15	PENTADECANE (C15)	U		241
SHC	C16	HEXADECANE (C16)	U		241
SHC	1650	NORPRISTANE (1650)	U		241
SHC	C17	HEPTADECANE (C17)	U		241
SHC	Pr	PRISTANE	U		241
SHC	C18	OCTADECANE (C18)	U		241
SHC	Ph	PHYTANE	U		241
SHC	C19	NONADECANE (C19)	U		241
SHC	C20	EICOSANE (C20)	U		241
SHC	C21	HENEICOSANE (C21)	U		241
SHC	C22	DOCOSANE (C22)	U		241
SHC	C23	TRICOSANE (C23)	U		241
SHC	C24	TETRACOSANE (C24)	10.1	J	241
SHC	C25	PENTACOSANE (C25)	U		241
SHC	C26	HEXACOSANE (C26)	U		241
SHC	C27	HEPTACOSANE (C27)	U		241
SHC	C28	OCTACOSANE (C28)	U		241
SHC	C29	NONACOSANE (C29)	216	JC	241
SHC	C30	TRIACONTANE (C30)	U		241
SHC	C31	HENTATRIACONTANE (C31)	U		241
SHC	C32	DOTRIACONTANE (C32)	U		241
SHC	C33	TRITRIACONTANE (C33)	U		241
SHC	C34	TETRATRIACONTANE (C34)	U		241
SHC	C35	PENTATRIACONTANE (C35)	U		241
SHC	C36	HEXATRIACONTANE (C36)	U		241
SHC	C37	HEPTATRIACONTANE (C37)	U		241
SHC	C38	OCTATRIACONTANE (C38)	U		241
SHC	C39	NONATRIACONTANE (C39)	U		241
SHC	C40	TETRACONTANE (C40)	U		241
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	U		7950
SHC	TSH	TOTAL SATURATED HYDROCARBONS	226	J	241

Surrogates (% Recovery)	
O-TERPHENYL	100
D50-TETRACOSANE	98

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1829653-2
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1829653
Date Collected	NA
Date Received	9/20/2023
Date Prepped	10/4/2023
Date Analyzed	10/5/2023
Sample Size(wet)	0.00415 g
% Solid	100
File ID	f18100523015
Units	%
Final Volume	1
Dilution	1
Reporting Limit	241

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	NONANE (C9)	4880	241	101	4820	50	130
SHC	C10	DECANE (C10)	4820	241	100	4820	50	130
SHC	C12	DODECANE (C12)	4970	241	103	4820	50	130
SHC	C14	TETRADECANE (C14)	4930	241	102	4820	50	130
SHC	C16	HEXADECANE (C16)	5060	241	105	4820	50	130
SHC	C18	OCTADECANE (C18)	5240	241	109	4820	50	130
SHC	C19	NONADECANE (C19)	4870	241	101	4820	50	130
SHC	C20	EICOSANE (C20)	4990	241	104	4820	50	130
SHC	C22	DOCOSANE (C22)	4680	241	97	4820	50	130
SHC	C24	TETRACOSANE (C24)	4830	241	100	4820	50	130
SHC	C26	HEXACOSANE (C26)	4680	241	97	4820	50	130
SHC	C28	OCTACOSANE (C28)	4790	241	99	4820	50	130
SHC	C30	TRIACONTANE (C30)	4610	241	96	4820	50	130
SHC	C36	HEXATRIACONTANE (C36)	4050	241	84	4820	50	130

Surrogates (% Recovery)	
O-TERPHENYL	101
D50-TETRACOSANE	98

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1829653-3
Matrix	SOLID
Matrix Description	
Reference Method	8015D(M)
Batch ID	WG1829653
Date Collected	NA
Date Received	9/20/2023
Date Prepped	10/4/2023
Date Analyzed	10/5/2023
Sample Size(wet)	0.00415 g
% Solid	100
File ID	f18100523017
Units	%
Final Volume	1
Dilution	1
Reporting Limit	241

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
SHC	C9	NONANE (C9)	4920	241	102	4820	50	130	1	30
SHC	C10	DECANE (C10)	4880	241	101	4820	50	130	1	30
SHC	C12	DODECANE (C12)	5030	241	104	4820	50	130	1	30
SHC	C14	TETRADECANE (C14)	4990	241	104	4820	50	130	2	30
SHC	C16	HEXADECANE (C16)	5090	241	106	4820	50	130	1	30
SHC	C18	OCTADECANE (C18)	5300	241	110	4820	50	130	1	30
SHC	C19	NONADECANE (C19)	4960	241	103	4820	50	130	2	30
SHC	C20	EICOSANE (C20)	5050	241	105	4820	50	130	1	30
SHC	C22	DOCOSANE (C22)	4750	241	98	4820	50	130	1	30
SHC	C24	TETRACOSANE (C24)	4900	241	102	4820	50	130	2	30
SHC	C26	HEXACOSANE (C26)	4760	241	99	4820	50	130	2	30
SHC	C28	OCTACOSANE (C28)	4880	241	101	4820	50	130	2	30
SHC	C30	TRIACONTANE (C30)	4700	241	98	4820	50	130	2	30
SHC	C36	HEXATRIACONTANE (C36)	4120	241	85	4820	50	130	1	30

Surrogates (% Recovery)	
O-TERPHENYL	100
D50-TETRACOSANE	99

Project Name: PAMPILLA 2
Project Number:

Client ID			HC DEL 27AGO2023			Duplicate Sample			
Lab ID			L2352167-03			WG1829653-4			
Matrix			SOLID			SOLID			
Matrix Description									
Reference Method			8015D(M)			8015D(M)			
Batch ID			WG1829653			WG1829653			
Date Collected			8/27/2023			NA			
Date Received			9/8/2023			9/20/2023			
Date Prepped			10/4/2023			10/4/2023			
Date Analyzed			10/6/2023			10/6/2023			
Sample Size(wet)			0.00415 g			0.00428 g			
% Solid			100			100			
File ID			F18100523041			F18100523043			
Units			mg/kg			mg/kg			
Final Volume			1			1			
Dilution			1			1			
Reporting Limit			241			234			
Class	Abbrev	Analytes	Result	SSRL		Result	SSRL	RPD	RPD Limit
SHC	C9	NONANE (C9)	U	241		U	234		30 NC
SHC	C10	DECANE (C10)	7.23 J	241		8.18 J	234		30 NC
SHC	C11	UNDECANE	6.99 J	241		U	234		30 X
SHC	C12	DODECANE (C12)	21.2 J	241		21.3 J	234		30 NC
SHC	C13	TRIDECANE	35.4 J	241		34.1 J	234		30 NC
SHC	1380	2,6,10-TRIMETHYLDODECANE (1380)	20.0 J	241		19.4 J	234		30 NC
SHC	C14	TETRADECANE (C14)	71.8 J	241		68.2 J	234		30 NC
SHC	1470	2,6,10-TRIMETHYLTRIDECANE (1470)	38.1 J	241		41.6 J	234		30 NC
SHC	C15	PENTADECANE (C15)	134 J	241		137 J	234		30 NC
SHC	C16	HEXADECANE (C16)	239 J	241		232 J	234		30 NC
SHC	1650	NORPRISTANE (1650)	77.8 J	241		72.4 J	234		30 NC
SHC	C17	HEPTADECANE (C17)	265	241		264	234	0	30
SHC	Pr	PRISTANE	139 J	241		134 J	234		30 NC
SHC	C18	OCTADECANE (C18)	317	241		318	234	0	30
SHC	Ph	PHYTANE	158 J	241		164 J	234		30 NC
SHC	C19	NONADECANE (C19)	302	241		295	234	2	30
SHC	C20	EICOSANE (C20)	278	241		277	234	0	30
SHC	C21	HENEICOSANE (C21)	164 J	241		161 J	234		30 NC
SHC	C22	DOCOSANE (C22)	134 J	241		132 J	234		30 NC
SHC	C23	TRICOSANE (C23)	U	241		U	234		30 NC
SHC	C24	TETRACOSANE (C24)	160 J	241		145 J	234		30 NC
SHC	C25	PENTACOSANE (C25)	136 J	241		150 J	234		30 NC
SHC	C26	HEXACOSANE (C26)	U	241		U	234		30 NC
SHC	C27	HEPTACOSANE (C27)	U	241		U	234		30 NC
SHC	C28	OCTACOSANE (C28)	U	241		U	234		30 NC
SHC	C29	NONACOSANE (C29)	295 CB	241		286 CB	234	3	30
SHC	C30	TRIACONTANE (C30)	U	241		U	234		30 NC
SHC	C31	HENTATRIACONTANE (C31)	136 J	241		135 J	234		30 NC
SHC	C32	DOTRIACONTANE (C32)	U	241		U	234		30 NC
SHC	C33	TRITRIACONTANE (C33)	356	241		357	234	0	30
SHC	C34	TETRATRIACONTANE (C34)	U	241		U	234		30 NC
SHC	C35	PENTATRIACONTANE (C35)	1380	241		1300	234	6	30
SHC	C36	HEXATRIACONTANE (C36)	U	241		U	234		30 NC
SHC	C37	HEPTATRIACONTANE (C37)	U	241		U	234		30 NC
SHC	C38	OCTATRIACONTANE (C38)	U	241		U	234		30 NC
SHC	C39	NONATRIACONTANE (C39)	U	241		U	234		30 NC
SHC	C40	TETRACONTANE (C40)	U	241		U	234		30 NC
SHC	TPH	TOTAL PETROLEUM HYDROCARBONS (C9-C44)	604000	7950		656000	7710	8	30
SHC	TSH	TOTAL SATURATED HYDROCARBONS	4870 J	241		4750 J	234		30 NC

Surrogates (% Recovery)		
O-TERPHENYL	101	101
D50-TETRACOSANE	101	101

Project Name: PAMPILLA 2
Project Number:

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

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

Project Name: PAMPILLA 2
Project Number:

Client ID	HC DEL 27AGO2023
Lab ID	L2352167-03
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1829653
Date Collected	8/27/2023
Date Received	9/8/2023
Date Prepped	10/4/2023
Date Analyzed	10/7/2023
Sample Size(wet)	0.00415 g
% Solid	100
File ID	F1210052335
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.2

Class	Abbrev	Analytes	Result		SSRL
2	D0	CIS/TRANS-DECALIN	1.68		1.20
2	D1	C1-DECALINS	7.27		2.41
2	D2	C2-DECALINS	23.3		2.41
2	D3	C3-DECALINS	20.8		2.41
2	D4	C4-DECALINS	23.5		2.41
S	BT0	BENZOTHIOPHENE		U	2.41
2	BT1	C1-BENZO(B)THIOPHENES	6.77		2.41
2	BT2	C2-BENZO(B)THIOPHENES	0.901	J	2.41
2	BT3	C3-BENZO(B)THIOPHENES	2.16	J	2.41
2	BT4	C4-BENZO(B)THIOPHENES	1.90	J	2.41
A	N0	NAPHTHALENE	2.13	J	2.41
2	N1	C1-NAPHTHALENES	163		2.41
2	N2	C2-NAPHTHALENES	90.4		2.41
2	N3	C3-NAPHTHALENES	41.4		2.41
2	N4	C4-NAPHTHALENES	20.0		2.41
2	B	BIPHENYL	4.70		2.41
3	DF	DIBENZOFURAN	0.562	J	2.41
3	AY	ACENAPHTHYLENE	0.147	JB	2.41
3	AE	ACENAPHTHENE	1.22	J	2.41
3	F0	FLUORENE	2.21	J	2.41
3	F1	C1-FLUORENES	3.53		2.41
3	F2	C2-FLUORENES	10.2		2.41
3	F3	C3-FLUORENES	28.7	G	2.41
3	A0	ANTHRACENE		U	2.41
3	P0	PHENANTHRENE	1.68	J	2.41
3	PA1	C1-PHENANTHRENES/ANTHRACENES	5.76		2.41
3	PA2	C2-PHENANTHRENES/ANTHRACENES	9.00		2.41
3	PA3	C3-PHENANTHRENES/ANTHRACENES	11.9		2.41
3	PA4	C4-PHENANTHRENES/ANTHRACENES	15.9	B	2.41
3	RET	RETENE		U	2.41
3	DBT0	DIBENZOTHIOPHENE	0.683	J	2.41
3	DBT1	C1-DIBENZOTHIOPHENES	3.70		2.41
3	DBT2	C2-DIBENZOTHIOPHENES	13.4		2.41
3	DBT3	C3-DIBENZOTHIOPHENES	20.2		2.41
3	DBT4	C4-DIBENZOTHIOPHENES	13.5		2.41
4	BF	BENZO(B)FLUORENE		U	2.41
4	FL0	FLUORANTHENE	0.289	JB	2.41
4	PY0	PYRENE	0.471	JB	2.41
4	FP1	C1-FLUORANTHENES/PYRENES	2.86		2.41
4	FP2	C2-FLUORANTHENES/PYRENES	2.30	J	2.41
4	FP3	C3-FLUORANTHENES/PYRENES	3.75		2.41
4	FP4	C4-FLUORANTHENES/PYRENES	4.90		2.41
4	NBT0	NAPHTHOBENZOTHIOPHENE	1.28	J	2.41
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	2.63		2.41
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	4.49		2.41
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	6.14		2.41
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES		U	2.41
4	BA0	BENZ(A)ANTHRACENE	0.176	JB	2.41
4	C0	CHRYSENE/TRIPHENYLENE	0.323	JB	2.41
4	BC1	C1-CHRYSENES	1.07	J	2.41
4	BC2	C2-CHRYSENES	2.60		2.41
4	BC3	C3-CHRYSENES		U	2.41
4	BC4	C4-CHRYSENES		U	2.41
5	BBF	BENZO(B)FLUORANTHENE	0.367	JB	2.41

Project Name: PAMPILLA 2
Project Number:

Client ID	HC DEL 27AGO2023
Lab ID	L2352167-03
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1829653
Date Collected	8/27/2023
Date Received	9/8/2023
Date Prepped	10/4/2023
Date Analyzed	10/7/2023
Sample Size(wet)	0.00415 g
% Solid	100
File ID	F1210052335
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.2

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE		U	2.41
5	BAF	BENZO(A)FLUORANTHENE		U	2.41
5	BEP	BENZO(E)PYRENE	0.322	JB	2.41
5	BAP	BENZO(A)PYRENE	0.274	JB	2.41
5	PER	PERYLENE		U	2.41
6	IND	INDENO(1,2,3-CD)PYRENE		U	2.41
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE		U	2.41
6	GHI	BENZO(GHI)PERYLENE		U	2.41
O	CAR	CARBAZOLE	0.718	J	2.41
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	2.23	J	2.41
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)		U	2.41
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	0.772	J	2.41
3	3MP	3-METHYLPHENANTHRENE (3MP)	1.13	J	2.41
3	2MP	2-METHYLPHENANTHRENE (2MP)	1.09	J	2.41
3	2MA	2-METHYLANTHRACENE (2MA)	0.135	J	2.41
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	1.69	J	2.41
3	1MP	1-METHYLPHENANTHRENE (1MP)	1.11	J	2.41
A	1MN	1-METHYLNAPHTHALENE	93.0		2.41
A	2MN	2-METHYLNAPHTHALENE	149		2.41
2	26DMN	2,6-DIMETHYLNAPHTHALENE	40.5		2.41
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	4.77		2.41
H30	T19	HOPANE (T19)	218		2.41
t23	T4	C23 TRICYCLIC TERPANE (T4)	9.33		2.41
t24	T5	C24 TRICYCLIC TERPANE (T5)	5.42		2.41
t25	T6	C25 TRICYCLIC TERPANE (T6)	7.23		2.41
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	5.29		2.41
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	4.16		2.41
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	3.94		2.41
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	6.41		2.41
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	7.36		2.41
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	7.84		2.41
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	9.04		2.41
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	22.4		2.41
t30S	T11a	C30 TRICYCLIC TERPANE-22S	11.0		2.41
t30R	T11b	C30 TRICYCLIC TERPANE-22R	7.43		2.41
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	27.9		2.41
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	7.76		2.41
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	5.10		2.41
H29	T15	30-NORHOPANE (T15)	125		2.41
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	25.0		2.41
X	X	17A(H)-DIAHOPANE (X)	13.2		2.41
M29	T17	30-NORMORETANE (T17)	14.9		2.41
OL	T18	18A(H)&18B(H)-OLEANANES (T18)		U	2.41
M30	T20	MORETANE (T20)	23.9		2.41
H31S	T21	30-HOMOHOPANE-22S (T21)	117		2.41
H31R	T22	30-HOMOHOPANE-22R (T22)	112		2.41
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	32.5		2.41
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	94.8		2.41
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	71.8		2.41
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	87.4		2.41
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	67.5		2.41
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	78.9		2.41
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	60.7		2.41
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	96.7		2.41

Project Name: PAMPILLA 2
Project Number:

Client ID	HC DEL 27AGO2023
Lab ID	L2352167-03
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1829653
Date Collected	8/27/2023
Date Received	9/8/2023
Date Prepped	10/4/2023
Date Analyzed	10/7/2023
Sample Size(wet)	0.00415 g
% Solid	100
File ID	F1210052335
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.2

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	94.0	2.41
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	21.8	2.41
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	14.4	2.41
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	12.7	2.41
aa27S	S12	17A(H)20SC27/C29DIA	47.8	2.41
aa27R	S17	17A(H)20RC27/C29DIA	57.7	2.41
d29R	S18	UNKNOWN STERANE (S18)	12.0	2.41
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	3.15	2.41
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	22.7	2.41
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	27.2	2.41
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	31.2	2.41
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	50.6	2.41
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	45.5	2.41
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	38.8	2.41
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	40.3	2.41
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	66.4	2.41
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	73.8	2.41
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	50.8	2.41
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	7.74	2.41
SC28TAS	TAS02	C28,20S TAS	10.4	2.41
RC27TAS	TAS03	C27,20R TAS	11.1	2.41
RC28TAS	TAS04	C28,20R TAS	2.50	2.41

Surrogates (% Recovery)	
NAPHTHALENE-D8	95
PHENANTHRENE-D10	96
BENZO(A)PYRENE-D12	96
5B(H)CHOLANE	88

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1829653-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1829653
Date Collected	NA
Date Received	9/20/2023
Date Prepped	10/4/2023
Date Analyzed	10/7/2023
Sample Size(wet)	0.00415 g
% Solid	100
File ID	F1210052333
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	2.41
2	D2	C2-DECALINS		U	2.41
2	D3	C3-DECALINS		U	2.41
2	D4	C4-DECALINS		U	2.41
S	BT0	BENZOTHIOPHENE		U	2.41
2	BT1	C1-BENZO(B)THIOPHENES		U	2.41
2	BT2	C2-BENZO(B)THIOPHENES		U	2.41
2	BT3	C3-BENZO(B)THIOPHENES		U	2.41
2	BT4	C4-BENZO(B)THIOPHENES		U	2.41
A	N0	NAPHTHALENE	0.196	J	2.41
2	N1	C1-NAPHTHALENES		U	2.41
2	N2	C2-NAPHTHALENES		U	2.41
2	N3	C3-NAPHTHALENES		U	2.41
2	N4	C4-NAPHTHALENES		U	2.41
2	B	BIPHENYL		U	2.41
3	DF	DIBENZOFURAN		U	2.41
3	AY	ACENAPHTHYLENE	0.0576	J	2.41
3	AE	ACENAPHTHENE		U	2.41
3	F0	FLUORENE		U	2.41
3	F1	C1-FLUORENES		U	2.41
3	F2	C2-FLUORENES		U	2.41
3	F3	C3-FLUORENES		U	2.41
3	A0	ANTHRACENE		U	2.41
3	P0	PHENANTHRENE	0.143	J	2.41
3	PA1	C1-PHENANTHRENES/ANTHRACENES		U	2.41
3	PA2	C2-PHENANTHRENES/ANTHRACENES		U	2.41
3	PA3	C3-PHENANTHRENES/ANTHRACENES		U	2.41
3	PA4	C4-PHENANTHRENES/ANTHRACENES	1.81	J	2.41
3	RET	RETENE	0.562	J	2.41
3	DBT0	DIBENZOTHIOPHENE	0.0422	J	2.41
3	DBT1	C1-DIBENZOTHIOPHENES		U	2.41
3	DBT2	C2-DIBENZOTHIOPHENES		U	2.41
3	DBT3	C3-DIBENZOTHIOPHENES		U	2.41
3	DBT4	C4-DIBENZOTHIOPHENES		U	2.41
4	BF	BENZO(B)FLUORENE		U	2.41
4	FL0	FLUORANTHENE	0.129	J	2.41
4	PY0	PYRENE	0.163	J	2.41
4	FP1	C1-FLUORANTHENES/PYRENES		U	2.41
4	FP2	C2-FLUORANTHENES/PYRENES		U	2.41
4	FP3	C3-FLUORANTHENES/PYRENES		U	2.41
4	FP4	C4-FLUORANTHENES/PYRENES		U	2.41
4	NBT0	NAPHTHOBENZOTHIOPHENE		U	2.41
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES		U	2.41
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES		U	2.41
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES		U	2.41
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES		U	2.41
4	BA0	BENZ(A)ANTHRACENE	0.0940	J	2.41
4	C0	CHRYSENE/TRIPHENYLENE	0.141	J	2.41
4	BC1	C1-CHRYSENES		U	2.41
4	BC2	C2-CHRYSENES		U	2.41
4	BC3	C3-CHRYSENES		U	2.41
4	BC4	C4-CHRYSENES		U	2.41
5	BBF	BENZO(B)FLUORANTHENE	0.163	J	2.41

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1829653-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1829653
Date Collected	NA
Date Received	9/20/2023
Date Prepped	10/4/2023
Date Analyzed	10/7/2023
Sample Size(wet)	0.00415 g
% Solid	100
File ID	F1210052333
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.2

Class	Abbrev	Analytes	Result		SSRL
5	BJKF	BENZO(J)+(K)FLUORANTHENE		U	2.41
5	BAF	BENZO(A)FLUORANTHENE		U	2.41
5	BEP	BENZO(E)PYRENE	0.0901	J	2.41
5	BAP	BENZO(A)PYRENE	0.121	J	2.41
5	PER	PERYLENE		U	2.41
6	IND	INDENO(1,2,3-CD)PYRENE		U	2.41
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE		U	2.41
6	GHI	BENZO(GHI)PERYLENE		U	2.41
O	CAR	CARBAZOLE		U	2.41
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)		U	2.41
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)		U	2.41
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)		U	2.41
3	3MP	3-METHYLPHENANTHRENE (3MP)		U	2.41
3	2MP	2-METHYLPHENANTHRENE (2MP)		U	2.41
3	2MA	2-METHYLANTHRACENE (2MA)		U	2.41
3	9MP	9/4-METHYLPHENANTHRENE (9MP)		U	2.41
3	1MP	1-METHYLPHENANTHRENE (1MP)		U	2.41
A	1MN	1-METHYLNAPHTHALENE		U	2.41
A	2MN	2-METHYLNAPHTHALENE		U	2.41
2	26DMN	2,6-DIMETHYLNAPHTHALENE		U	2.41
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE		U	2.41
H30	T19	HOPANE (T19)		U	2.41
t23	T4	C23 TRICYCLIC TERPANE (T4)		U	2.41
t24	T5	C24 TRICYCLIC TERPANE (T5)		U	2.41
t25	T6	C25 TRICYCLIC TERPANE (T6)		U	2.41
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)		U	2.41
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)		U	2.41
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)		U	2.41
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)		U	2.41
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)		U	2.41
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)		U	2.41
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)		U	2.41
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)		U	2.41
t30S	T11a	C30 TRICYCLIC TERPANE-22S		U	2.41
t30R	T11b	C30 TRICYCLIC TERPANE-22R		U	2.41
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)		U	2.41
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)		U	2.41
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)		U	2.41
H29	T15	30-NORHOPANE (T15)		U	2.41
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)		U	2.41
X	X	17A(H)-DIAHOPANE (X)		U	2.41
M29	T17	30-NORMORETANE (T17)		U	2.41
OL	T18	18A(H)&18B(H)-OLEANANES (T18)		U	2.41
M30	T20	MORETANE (T20)		U	2.41
H31S	T21	30-HOMOHOPANE-22S (T21)		U	2.41
H31R	T22	30-HOMOHOPANE-22R (T22)		U	2.41
T22A	T22A	GAMMACERANE/C32-DIAHOPANE		U	2.41
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)		U	2.41
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)		U	2.41
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)		U	2.41
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)		U	2.41
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)		U	2.41
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)		U	2.41
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)		U	2.41

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Method Bl
Lab ID	WG1829653-1
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1829653
Date Collected	NA
Date Received	9/20/2023
Date Prepped	10/4/2023
Date Analyzed	10/7/2023
Sample Size(wet)	0.00415 g
% Solid	100
File ID	F1210052333
Units	mg/kg
Final Volume	1
Dilution	1
Reporting Limit	1.2

Class	Abbrev	Analytes	Result	SSRL
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	U	2.41
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	U	2.41
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	U	2.41
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	U	2.41
aa27S	S12	17A(H)20SC27/C29DIA	U	2.41
aa27R	S17	17A(H)20RC27/C29DIA	U	2.41
d29R	S18	UNKNOWN STERANE (S18)	U	2.41
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	U	2.41
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	U	2.41
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	U	2.41
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	U	2.41
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	U	2.41
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	U	2.41
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	U	2.41
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	U	2.41
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	U	2.41
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	U	2.41
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	U	2.41
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	U	2.41
SC28TAS	TAS02	C28,20S TAS	U	2.41
RC27TAS	TAS03	C27,20R TAS	U	2.41
RC28TAS	TAS04	C28,20R TAS	U	2.41

Surrogates (% Recovery)	
NAPHTHALENE-D8	96
PHENANTHRENE-D10	98
BENZO(A)PYRENE-D12	100
5B(H)CHOLANE	88

Project Name: PAMPILLA 2
Project Number:

Client ID	Laboratory Control S
Lab ID	WG1829653-2
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1829653
Date Collected	NA
Date Received	9/20/2023
Date Prepped	10/4/2023
Date Analyzed	10/7/2023
Sample Size(wet)	0.00415 g
% Solid	100
File ID	F1210052342
Units	%
Final Volume	1
Dilution	1
Reporting Limit	2.41

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit
A	N0	NAPHTHALENE	238	2.41	98	241	50	130
3	AY	ACENAPHTHYLENE	236	2.41	98	241	50	130
3	AE	ACENAPHTHENE	220	2.41	91	241	50	130
3	F0	FLUORENE	236	2.41	98	241	50	130
3	A0	ANTHRACENE	241	2.41	100	241	50	130
3	P0	PHENANTHRENE	231	2.41	96	241	50	130
4	FL0	FLUORANTHENE	179	2.41	74	241	50	130
4	PY0	PYRENE	184	2.41	76	241	50	130
4	BA0	BENZ(A)ANTHRACENE	219	2.41	91	241	50	130
4	C0	CHRYSENE/TRIPHENYLENE	214	2.41	89	241	50	130
5	BBF	BENZO(B)FLUORANTHENE	204	2.41	85	241	50	130
5	BJKF	BENZO(J)+(K)FLUORANTHENE	204	2.41	84	241	50	130
5	BAP	BENZO(A)PYRENE	210	2.41	87	241	50	130
6	IND	INDENO(1,2,3-CD)PYRENE	205	2.41	85	241	50	130
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	213	2.41	88	241	50	130
6	GHI	BENZO(GHI)PERYLENE	204	2.41	85	241	50	130
A	2MN	2-METHYLNAPHTHALENE	213	2.41	88	241	50	130

Surrogates (% Recovery)	
NAPHTHALENE-D8	96
PHENANTHRENE-D10	98
BENZO(A)PYRENE-D12	97
5B(H)CHOLANE	87

Project Name: PAMPILLA 2
Project Number:

Client ID	LCS Duplicate
Lab ID	WG1829653-3
Matrix	SOLID
Matrix Description	
Reference Method	8270E-SIM(M)
Batch ID	WG1829653
Date Collected	NA
Date Received	9/20/2023
Date Prepped	10/4/2023
Date Analyzed	10/7/2023
Sample Size(wet)	0.00415 g
% Solid	100
File ID	F1210052334
Units	%
Final Volume	1
Dilution	1
Reporting Limit	2.41

Class	Abbrev	Analytes	Result	SSRL	% REC	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
A	N0	NAPHTHALENE	252	2.41	104	241	50	130	6	30
3	AY	ACENAPHTHYLENE	240	2.41	99	241	50	130	1	30
3	AE	ACENAPHTHENE	225	2.41	94	241	50	130	3	30
3	F0	FLUORENE	242	2.41	100	241	50	130	2	30
3	A0	ANTHRACENE	250	2.41	104	241	50	130	4	30
3	P0	PHENANTHRENE	240	2.41	100	241	50	130	4	30
4	FL0	FLUORANTHENE	214	2.41	89	241	50	130	18	30
4	PY0	PYRENE	231	2.41	96	241	50	130	23	30
4	BA0	BENZ(A)ANTHRACENE	229	2.41	95	241	50	130	4	30
4	C0	CHRYSENE/TRIPHENYLENE	228	2.41	94	241	50	130	5	30
5	BBF	BENZO(B)FLUORANTHENE	214	2.41	89	241	50	130	5	30
5	BJKF	BENZO(J)+(K)FLUORANTHENE	221	2.41	92	241	50	130	9	30
5	BAP	BENZO(A)PYRENE	228	2.41	94	241	50	130	8	30
6	IND	INDENO(1,2,3-CD)PYRENE	215	2.41	89	241	50	130	5	30
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE	220	2.41	91	241	50	130	3	30
6	GHI	BENZO(GHI)PERYLENE	213	2.41	88	241	50	130	3	30
A	2MN	2-METHYLNAPHTHALENE	219	2.41	91	241	50	130	3	30

Surrogates (% Recovery)	
NAPHTHALENE-D8	98
PHENANTHRENE-D10	99
BENZO(A)PYRENE-D12	98
5B(H)CHOLANE	86

Project Name: PAMPILLA 2
Project Number:

Client ID	HC DEL 27AGO2023		Duplicate Sample		
Lab ID	L2352167-03		WG1829653-4		
Matrix	SOLID		SOLID		
Matrix Description					
Reference Method	8270E-SIM(M)		8270E-SIM(M)		
Batch ID	WG1829653		WG1829653		
Date Collected	8/27/2023		NA		
Date Received	9/8/2023		9/20/2023		
Date Prepped	10/4/2023		10/4/2023		
Date Analyzed	10/7/2023		10/7/2023		
Sample Size(wet)	0.00415	g	0.00428	g	
% Solid	100		100		
File ID	F1210052335		F1210052336		
Units	mg/kg		mg/kg		
Final Volume	1		1		
Dilution	1		1		
Reporting Limit	1.2		1.17		

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
2	D0	CIS/TRANS-DECALIN	1.68		1.20	1.64		1.17	2	30	
2	D1	C1-DECALINS	7.27		2.41	7.31		2.34	1	30	
2	D2	C2-DECALINS	23.3		2.41	22.9		2.34	2	30	
2	D3	C3-DECALINS	20.8		2.41	20.4		2.34	2	30	
2	D4	C4-DECALINS	23.5		2.41	25.1		2.34	7	30	
S	BT0	BENZOTHIOPHENE		U	2.41	0.173	J	2.34		30	X
2	BT1	C1-BENZO(B)THIOPHENES	6.77		2.41	6.70		2.34	1	30	
2	BT2	C2-BENZO(B)THIOPHENES	0.901	J	2.41	0.931	J	2.34		30	NC
2	BT3	C3-BENZO(B)THIOPHENES	2.16	J	2.41	2.22	J	2.34		30	NC
2	BT4	C4-BENZO(B)THIOPHENES	1.90	J	2.41	1.90	J	2.34		30	NC
A	N0	NAPHTHALENE	2.13	J	2.41	2.10	J	2.34		30	NC
2	N1	C1-NAPHTHALENES	163		2.41	159		2.34	2	30	
2	N2	C2-NAPHTHALENES	90.4		2.41	88.3		2.34	2	30	
2	N3	C3-NAPHTHALENES	41.4		2.41	40.5		2.34	2	30	
2	N4	C4-NAPHTHALENES	20.0		2.41	19.9		2.34	1	30	
2	B	BIPHENYL	4.70		2.41	4.64		2.34	1	30	
3	DF	DIBENZOFURAN	0.562	J	2.41	0.570	J	2.34		30	NC
3	AY	ACENAPHTHYLENE	0.147	JB	2.41	0.131	JB	2.34		30	NC
3	AE	ACENAPHTHENE	1.22	J	2.41	1.09	J	2.34		30	NC
3	F0	FLUORENE	2.21	J	2.41	2.17	J	2.34		30	NC
3	F1	C1-FLUORENES	3.53		2.41	3.60		2.34	2	30	
3	F2	C2-FLUORENES	10.2		2.41	10.6		2.34	4	30	
3	F3	C3-FLUORENES	28.7	G	2.41	28.1	G	2.34	2	30	
3	A0	ANTHRACENE		U	2.41		U	2.34		30	NC
3	P0	PHENANTHRENE	1.68	J	2.41	1.55	J	2.34		30	NC
3	PA1	C1-PHENANTHRENES/ANTHRACENES	5.76		2.41	5.35		2.34	7	30	
3	PA2	C2-PHENANTHRENES/ANTHRACENES	9.00		2.41	8.54		2.34	5	30	
3	PA3	C3-PHENANTHRENES/ANTHRACENES	11.9		2.41	12.0		2.34	1	30	
3	PA4	C4-PHENANTHRENES/ANTHRACENES	15.9	B	2.41	16.7	B	2.34	5	30	
3	RET	RETENE		U	2.41		U	2.34		30	NC
3	DBT0	DIBENZOTHIOPHENE	0.683	J	2.41	0.656	J	2.34		30	NC
3	DBT1	C1-DIBENZOTHIOPHENES	3.70		2.41	3.32		2.34	11	30	
3	DBT2	C2-DIBENZOTHIOPHENES	13.4		2.41	12.4		2.34	8	30	
3	DBT3	C3-DIBENZOTHIOPHENES	20.2		2.41	18.7		2.34	8	30	
3	DBT4	C4-DIBENZOTHIOPHENES	13.5		2.41	13.7		2.34	1	30	
4	BF	BENZO(B)FLUORENE		U	2.41		U	2.34		30	NC
4	FL0	FLUORANTHENE	0.289	JB	2.41	0.179	JB	2.34		30	NC
4	PY0	PYRENE	0.471	JB	2.41	0.400	JB	2.34		30	NC
4	FP1	C1-FLUORANTHENES/PYRENES	2.86		2.41	2.55		2.34	11	30	
4	FP2	C2-FLUORANTHENES/PYRENES	2.30	J	2.41	2.42		2.34		30	NC
4	FP3	C3-FLUORANTHENES/PYRENES	3.75		2.41	4.31		2.34	14	30	
4	FP4	C4-FLUORANTHENES/PYRENES	4.90		2.41	6.02		2.34	21	30	
4	NBT0	NAPHTHOBENZOTHIOPHENE	1.28	J	2.41	0.921	J	2.34		30	NC
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	2.63		2.41	2.87		2.34	9	30	
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	4.49		2.41	6.03		2.34	29	30	
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	6.14		2.41		U	2.34		30	X
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES		U	2.41		U	2.34		30	NC
4	BA0	BENZ(A)ANTHRACENE	0.176	JB	2.41		U	2.34		30	X
4	C0	CHRYSENE/TRIPHENYLENE	0.323	JB	2.41	0.205	JB	2.34		30	NC
4	BC1	C1-CHRYSENES	1.07	J	2.41	1.20	J	2.34		30	NC
4	BC2	C2-CHRYSENES	2.60		2.41	3.38		2.34	26	30	
4	BC3	C3-CHRYSENES		U	2.41		U	2.34		30	NC
4	BC4	C4-CHRYSENES		U	2.41		U	2.34		30	NC
5	BBF	BENZO(B)FLUORANTHENE	0.367	JB	2.41		U	2.34		30	X
5	BJKF	BENZO(J)+(K)FLUORANTHENE		U	2.41		U	2.34		30	NC
5	BAF	BENZO(A)FLUORANTHENE		U	2.41		U	2.34		30	NC
5	BEP	BENZO(E)PYRENE	0.322	JB	2.41		U	2.34		30	X
5	BAP	BENZO(A)PYRENE	0.274	JB	2.41	0.425	JB	2.34		30	NC
5	PER	PERYLENE		U	2.41		U	2.34		30	NC

Project Name: PAMPILLA 2
Project Number:

Client ID	HC DEL 27AGO2023		Duplicate Sample		
Lab ID	L2352167-03		WG1829653-4		
Matrix	SOLID		SOLID		
Matrix Description					
Reference Method	8270E-SIM(M)		8270E-SIM(M)		
Batch ID	WG1829653		WG1829653		
Date Collected	8/27/2023		NA		
Date Received	9/8/2023		9/20/2023		
Date Prepped	10/4/2023		10/4/2023		
Date Analyzed	10/7/2023		10/7/2023		
Sample Size(wet)	0.00415	g	0.00428	g	
% Solid	100		100		
File ID	F1210052335		F1210052336		
Units	mg/kg		mg/kg		
Final Volume	1		1		
Dilution	1		1		
Reporting Limit	1.2		1.17		

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
6	IND	INDENO(1,2,3-CD)PYRENE		U	2.41		U	2.34		30	NC
6	DA	DIBENZ(A,H)+(A,C)ANTHRACENE		U	2.41		U	2.34		30	NC
6	GHI	BENZO(GHI)PERYLENE		U	2.41		U	2.34		30	NC
O	CAR	CARBAZOLE	0.718	J	2.41	0.615	J	2.34		30	NC
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	2.23	J	2.41	2.16	J	2.34		30	NC
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)		U	2.41		U	2.34		30	NC
3	1DMT	1-METHYLDIBENZOTHIOPHENE(1MDT)	0.772	J	2.41	0.713	J	2.34		30	NC
3	3MP	3-METHYLPHENANTHRENE (3MP)	1.13	J	2.41	0.972	J	2.34		30	NC
3	2MP	2-METHYLPHENANTHRENE (2MP)	1.09	J	2.41	0.996	J	2.34		30	NC
3	2MA	2-METHYLANTHRACENE (2MA)	0.135	J	2.41		U	2.34		30	X
3	9MP	9/4-METHYLPHENANTHRENE (9MP)	1.69	J	2.41	1.49	J	2.34		30	NC
3	1MP	1-METHYLPHENANTHRENE (1MP)	1.11	J	2.41	0.978	J	2.34		30	NC
A	1MN	1-METHYLNAPHTHALENE	93.0		2.41	90.4		2.34	3	30	
A	2MN	2-METHYLNAPHTHALENE	149		2.41	146		2.34	2	30	
2	26DMN	2,6-DIMETHYLNAPHTHALENE	40.5		2.41	39.6		2.34	2	30	
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	4.77		2.41	3.91		2.34	20	30	
H30	T19	HOPANE (T19)	218		2.41	202		2.34	8	30	
t23	T4	C23 TRICYCLIC TERPANE (T4)	9.33		2.41	9.53		2.34	2	30	
t24	T5	C24 TRICYCLIC TERPANE (T5)	5.42		2.41	5.50		2.34	1	30	
t25	T6	C25 TRICYCLIC TERPANE (T6)	7.23		2.41	6.64		2.34	9	30	
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	5.29		2.41	4.55		2.34	15	30	
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	4.16		2.41	4.18		2.34	0	30	
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	3.94		2.41	3.62		2.34	8	30	
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	6.41		2.41	4.75		2.34	30	30	
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	7.36		2.41	8.12		2.34	10	30	
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	7.84		2.41	8.34		2.34	6	30	
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	9.04		2.41	9.70		2.34	7	30	
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	22.4		2.41	21.3		2.34	5	30	
t30S	T11a	C30 TRICYCLIC TERPANE-22S	11.0		2.41	9.32		2.34	17	30	
t30R	T11b	C30 TRICYCLIC TERPANE-22R	7.43		2.41	9.10		2.34	20	30	
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	27.9		2.41	26.8		2.34	4	30	
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	7.76		2.41	9.42		2.34	19	30	
25N	T14b	17A(H),21B(H)-25-NORHOPANE (T14B)	5.10		2.41	4.68		2.34	9	30	
H29	T15	30-NORHOPANE (T15)	125		2.41	123		2.34	2	30	
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	25.0		2.41	23.2		2.34	7	30	
X	X	17A(H)-DIAHOPANE (X)	13.2		2.41	11.9		2.34	10	30	
M29	T17	30-NORMORETANE (T17)	14.9		2.41	15.2		2.34	2	30	
OL	T18	18A(H)&18B(H)-OLEANANES (T18)		U	2.41		U	2.34		30	NC
M30	T20	MORETANE (T20)	23.9		2.41	25.1		2.34	5	30	
H31S	T21	30-HOMOHOPANE-22S (T21)	117		2.41	117		2.34	0	30	
H31R	T22	30-HOMOHOPANE-22R (T22)	112		2.41	115		2.34	3	30	
T22A	T22A	GAMMACERANE/C32-DIAHOPANE	32.5		2.41	32.9		2.34	1	30	
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	94.8		2.41	94.0		2.34	1	30	
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	71.8		2.41	73.9		2.34	3	30	
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	87.4		2.41	86.1		2.34	1	30	
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	67.5		2.41	61.3		2.34	10	30	
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	78.9		2.41	82.9		2.34	5	30	
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	60.7		2.41	62.4		2.34	3	30	
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	96.7		2.41	101		2.34	4	30	
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	94.0		2.41	103		2.34	9	30	
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	21.8		2.41	21.1		2.34	3	30	
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	14.4		2.41	13.5		2.34	6	30	
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	12.7		2.41	12.9		2.34	2	30	
aa27S	S12	17A(H)20SC27/C29DIA	47.8		2.41	46.3		2.34	3	30	
aa27R	S17	17A(H)20RC27/C29DIA	57.7		2.41	56.8		2.34	2	30	
d29R	S18	UNKNOWN STERANE (S18)	12.0		2.41	11.0		2.34	9	30	
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	3.15		2.41	3.62		2.34	14	30	
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	22.7		2.41	25.2		2.34	10	30	
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	27.2		2.41	26.2		2.34	4	30	

Project Name: PAMPILLA 2
Project Number:

Client ID	HC DEL 27AGO2023	Duplicate Sample	
Lab ID	L2352167-03	WG1829653-4	
Matrix	SOLID	SOLID	
Matrix Description			
Reference Method	8270E-SIM(M)	8270E-SIM(M)	
Batch ID	WG1829653	WG1829653	
Date Collected	8/27/2023	NA	
Date Received	9/8/2023	9/20/2023	
Date Prepped	10/4/2023	10/4/2023	
Date Analyzed	10/7/2023	10/7/2023	
Sample Size(wet)	0.00415 g	0.00428 g	
% Solid	100	100	
File ID	F1210052335	F1210052336	
Units	mg/kg	mg/kg	
Final Volume	1	1	
Dilution	1	1	
Reporting Limit	1.2	1.17	

Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	RPD	RPD Limit
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	31.2	2.41	31.6	2.34	1	30
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	50.6	2.41	50.2	2.34	1	30
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	45.5	2.41	42.1	2.34	8	30
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	38.8	2.41	40.8	2.34	5	30
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	40.3	2.41	39.7	2.34	1	30
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	66.4	2.41	65.0	2.34	2	30
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	73.8	2.41	73.3	2.34	1	30
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	50.8	2.41	49.0	2.34	4	30
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	7.74	2.41	6.86	2.34	12	30
SC28TAS	TAS02	C28,20S TAS	10.4	2.41	9.77	2.34	6	30
RC27TAS	TAS03	C27,20R TAS	11.1	2.41	11.4	2.34	3	30
RC28TAS	TAS04	C28,20R TAS	2.50	2.41	2.50	2.34	0	30

Surrogates (% Recovery)		
NAPHTHALENE-D8	95	95
PHENANTHRENE-D10	96	95
BENZO(A)PYRENE-D12	96	95
5B(H)CHOLANE	88	88

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1818635-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1818635-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	8/22/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F1208212314
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	484	1.94	101	477.66	65	135
2	D1	C1-DECALINS	784	1.94	103	760.39	65	135
2	D2	C2-DECALINS	732	1.94	108	675.98	65	135
2	D3	C3-DECALINS	437	1.94	119	366.46	65	135
2	D4	C4-DECALINS	447	1.94	123	362.78	65	135
S	BT0	BENZOTHIOPHENE	6.82	1.94	119	5.75	65	135
2	BT1	C1-BENZO(B)THIOPHENES	33.2	1.94	111	29.96	65	135
2	BT2	C2-BENZO(B)THIOPHENES	48.2	1.94	95	50.93	65	135
2	BT3	C3-BENZO(B)THIOPHENES	102	1.94	99	103.18	65	135
2	BT4	C4-BENZO(B)THIOPHENES	92.8	1.94	102	90.8	65	135
A	N0	NAPHTHALENE	583	1.94	103	565.56	65	135
2	N1	C1-NAPHTHALENES	1180	1.94	98	1208.32	65	135
2	N2	C2-NAPHTHALENES	1410	1.94	97	1450.37	65	135
2	N3	C3-NAPHTHALENES	1020	1.94	97	1052.74	65	135
2	N4	C4-NAPHTHALENES	608	1.94	104	583.65	65	135
2	B	BIPHENYL	144	1.94	99	145.7	65	135
3	DF	DIBENZOFURAN	50.2	1.94	101	49.63	65	135
3	AY	ACENAPHTHYLENE	6.48	1.94	94	6.91	65	135
3	AE	ACENAPHTHENE	16.6	1.94	90	18.35	65	135
3	F0	FLUORENE	61.2	1.94	87	70.69	65	135
3	F1	C1-FLUORENES	144	1.94	88	162.7	65	135
3	F2	C2-FLUORENES	233	1.94	92	251.87	65	135
3	F3	C3-FLUORENES	228	1.94	94	242.29	65	135
3	P0	PHENANTHRENE	162	1.94	86	188.41	65	135
3	PA1	C1-PHENANTHRENES/ANTHRACENES	327	1.94	84	388.12	65	135
3	PA2	C2-PHENANTHRENES/ANTHRACENES	412	1.94	95	434.38	65	135
3	PA3	C3-PHENANTHRENES/ANTHRACENES	300	1.94	97	308.67	65	135
3	PA4	C4-PHENANTHRENES/ANTHRACENES	132	1.94	102	129.94	65	135
3	DBT0	DIBENZOTHIOPHENE	110	1.94	84	130.56	65	135
3	DBT1	C1-DIBENZOTHIOPHENES	250	1.94	91	275.34	65	135
3	DBT2	C2-DIBENZOTHIOPHENES	314	1.94	85	369.42	65	135
3	DBT3	C3-DIBENZOTHIOPHENES	309	1.94	90	345.39	65	135
3	DBT4	C4-DIBENZOTHIOPHENES	180	1.94	93	193.51	65	135
4	FL0	FLUORANTHENE	3.13	1.94	83	3.77	65	135
4	PY0	PYRENE	9.18	1.94	79	11.65	65	135
4	FP1	C1-FLUORANTHENES/PYRENES	47.6	1.94	87	54.43	65	135
4	FP2	C2-FLUORANTHENES/PYRENES	77.6	1.94	87	89.07	65	135
4	FP3	C3-FLUORANTHENES/PYRENES	104	1.94	95	109.78	65	135
4	FP4	C4-FLUORANTHENES/PYRENES	93.8	1.94	96	97.22	65	135
4	NBT0	NAPHTHOBENZOTHIOPHENE	30.3	1.94	78	39.13	65	135
4	NBT1	C1-NAPHTHOBENZOTHIOPHENES	86.0	1.94	81	106.13	65	135
4	NBT2	C2-NAPHTHOBENZOTHIOPHENES	126	1.94	84	150.09	65	135
4	NBT3	C3-NAPHTHOBENZOTHIOPHENES	105	1.94	87	120.77	65	135
4	NBT4	C4-NAPHTHOBENZOTHIOPHENES	81.8	1.94	96	85.38	65	135
4	BA0	BENZ(A)ANTHRACENE	2.08	1.94	91	2.28	65	135
4	C0	CHRYSENE/TRIPHENYLENE	32.5	1.94	89	36.66	65	135
4	BC1	C1-CHRYSENES	60.7	1.94	94	64.59	65	135
4	BC2	C2-CHRYSENES	88.2	1.94	101	87.41	65	135
4	BC3	C3-CHRYSENES	103	1.94	102	101.29	65	135
4	BC4	C4-CHRYSENES	67.2	1.94	106	63.42	65	135
5	BBF	BENZO(B)FLUORANTHENE	4.19	1.94	78	5.4	65	135
5	BEP	BENZO(E)PYRENE	9.82	1.94	99	9.88	65	135
5	BAP	BENZO(A)PYRENE	1.85	1.94	91	2.03	65	135
5	PER	PERYLENE	3.02	1.94	90	3.34	65	135
6	GHI	BENZO(GHI)PERYLENE	3.06	1.94	85	3.59	65	135
O	CAR	CARBAZOLE	5.36	1.94	88	6.09	65	135
3	4MDT	4-METHYLDIBENZOTHIOPHENE(4MDT)	124	1.94	94	131.38	65	135
3	2DMT	2/3-METHYLDIBENZOTHIOPHENE(2MDT)	89.6	1.94	91	98.05	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1818635-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1818635-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	8/22/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F1208212314
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)	31.5	1.94	78	40.36	65	135
3	3MP	3-METHYLPHENANTHRENE (3MP)	69.0	1.94	87	79.32	65	135
3	2MA	2-METHYLANTHRACENE (2MA)	2.11	1.94	70	3	65	135
3	1MP	1-METHYLPHENANTHRENE (1MP)	74.9	1.94	85	87.93	65	135
A	1MN	1-METHYLNAPHTHALENE	795	1.94	100	793.54	65	135
A	2MN	2-METHYLNAPHTHALENE	1010	1.94	93	1087.89	65	135
2	26DMN	2,6-DIMETHYLNAPHTHALENE	598	1.94	94	635.33	65	135
2	235TMN	2,3,5-TRIMETHYLNAPHTHALENE	138	1.94	94	147.12	65	135
H30	T19	HOPANE (T19)	143	1.94	89	161.24	65	135
t23	T4	C23 TRICYCLIC TERPANE (T4)	70.1	1.94	100	69.8	65	135
t24	T5	C24 TRICYCLIC TERPANE (T5)	35.6	1.94	85	42.1	65	135
t25	T6	C25 TRICYCLIC TERPANE (T6)	33.9	1.94	84	40.4	65	135
te24	T6a	C24 TETRACYCLIC TERPANE (T6A)	13.5	1.94	95	14.2	65	135
t26S	T6b	C26 TRICYCLIC TERPANE-22S (T6B)	14.2	1.94	87	16.3	65	135
t26R	T6c	C26 TRICYCLIC TERPANE-22R (T6C)	12.2	1.94	84	14.6	65	135
t28S	T7	C28 TRICYCLIC TERPANE-22S (T7)	15.8	1.94	98	16.2	65	135
t28R	T8	C28 TRICYCLIC TERPANE-22R (T8)	15.0	1.94	85	17.6	65	135
t29S	T9	C29 TRICYCLIC TERPANE-22S (T9)	16.4	1.94	85	19.2	65	135
t29R	T10	C29 TRICYCLIC TERPANE-22R (T10)	17.7	1.94	84	21	65	135
Ts	T11	18A-22,29,30-TRISNORNEOHOPANE-TS (T11)	24.1	1.94	85	28.3	65	135
t30S	T11a	C30 TRICYCLIC TERPANE-22S	12.4	1.94	81	15.3	65	135
t30R	T11b	C30 TRICYCLIC TERPANE-22R	14.7	1.94	97	15.2	65	135
Tm	T12	17A(H)-22,29,30-TRISNORHOPANE-TM (T12)	31.4	1.94	91	34.4	65	135
BNH	T14a	17A/B,21B/A 28,30-BISNORHOPANE (T14A)	6.05	1.94	86	7	65	135
H29	T15	30-NORHOPANE (T15)	75.6	1.94	83	90.7	65	135
C29Ts	T16	18A(H)-30-NORNEOHOPANE-C29TS (T16)	18.0	1.94	77	23.3	65	135
X	X	17A(H)-DIAHOPANE (X)	10.2	1.94	78	13	65	135
M29	T17	30-NORMORETANE (T17)	10.4	1.94	93	11.2	65	135
M30	T20	MORETANE (T20)	15.0	1.94	92	16.3	65	135
H31S	T21	30-HOMOHOPANE-22S (T21)	62.0	1.94	92	67.6	65	135
H31R	T22	30-HOMOHOPANE-22R (T22)	52.5	1.94	90	58.3	65	135
H32S	T26	30,31-BISHOMOHOPANE-22S (T26)	45.4	1.94	93	48.9	65	135
H32R	T27	30,31-BISHOMOHOPANE-22R (T27)	32.4	1.94	91	35.6	65	135
H33S	T30	30,31-TRISHOMOHOPANE-22S (T30)	36.2	1.94	93	38.8	65	135
H33R	T31	30,31-TRISHOMOHOPANE-22R (T31)	23.7	1.94	93	25.6	65	135
H34S	T32	TETRAKISHOMOHOPANE-22S (T32)	26.9	1.94	96	27.9	65	135
H34R	T33	TETRAKISHOMOHOPANE-22R (T33)	18.8	1.94	95	19.8	65	135
H35S	T34	PENTAKISHOMOHOPANE-22S (T34)	28.1	1.94	98	28.8	65	135
H35R	T35	PENTAKISHOMOHOPANE-22R (T35)	21.5	1.94	96	22.3	65	135
d27S	S4	13B(H),17A(H)-20S-DIACHOLESTANE (S4)	43.4	1.94	90	48.1	65	135
d27R	S5	13B(H),17A(H)-20R-DIACHOLESTANE (S5)	24.3	1.94	97	25.1	65	135
d28S	S8	13B,17A-20S-METHYLDIACHOLESTANE (S8)	21.9	1.94	88	24.8	65	135
aa27S	S12	17A(H)20SC27/C29DIA	55.1	1.94	92	59.74	65	135
aa27R	S17	17A(H)20RC27/C29DIA	62.3	1.94	87	71.55	65	135
d29S	S19	13A,17B-20S-ETHYLDIACHOLESTANE (S19)	4.29	1.94	113	3.8	65	135
aa28S	S20	14A,17A-20S-METHYLCHOLESTANE (S20)	29.1	1.94	88	33	65	135
aa28R	S24	14A,17A-20R-METHYLCHOLESTANE (S24)	29.0	1.94	90	32.2	65	135
aa29S	S25	14A(H),17A(H)-20S-ETHYLCHOLESTANE (S25)	38.9	1.94	75	51.7	65	135
aa29R	S28	14A(H),17A(H)-20R-ETHYLCHOLESTANE (S28)	30.4	1.94	84	36.1	65	135
bb27R	S14	14B(H),17B(H)-20R-CHOLESTANE (S14)	39.5	1.94	103	38.4	65	135
bb27S	S15	14B(H),17B(H)-20S-CHOLESTANE (S15)	39.7	1.94	100	39.7	65	135
bb28R	S22	14B,17B-20R-METHYLCHOLESTANE (S22)	42.1	1.94	103	41	65	135
bb28S	S23	14B,17B-20S-METHYLCHOLESTANE (S23)	53.2	1.94	103	51.7	65	135
bb29R	S26	14B(H),17B(H)-20R-ETHYLCHOLESTANE (S26)	59.1	1.94	108	54.6	65	135
bb29S	S27	14B(H),17B(H)-20S-ETHYLCHOLESTANE (S27)	38.1	1.94	100	38.2	65	135
RC26/SC27TAS	TAS01	C26,20R+C27,20S TAS	218	1.94	75	289.3	65	135
SC28TAS	TAS02	C28,20S TAS	137	1.94	75	182.5	65	135
RC27TAS	TAS03	C27,20R TAS	138	1.94	78	177.1	65	135

Project Name: PAMPILLA 2
Project Number:

Client ID	Alaska North Slope Crude
Lab ID	WG1818635-1
Matrix	OIL
Matrix Description	Crude Oil
Reference Method	1,8270E-SIM(M)-A2-NFALKPAHBIOMARKER
Batch ID	WG1818635-1
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	8/22/2023
Sample Size(wet)	0.0514 g
% Solid	100
File ID	F1208212314
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	114	1.94	77	148.1	65	135

List of Potential Qualifiers

A: Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B: The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C: Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D: Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E: Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F: The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum

G: The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H: The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I: The lower value for the two columns has been reported due to obvious interference.

J: Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

J: Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

J: Estimated value. The Target analyte concentration is below the Limit of Quantitation (LOQ), but above the Detection Limit (DL). This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

M: Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND: Not detected at the Limit of Quantitation (LOQ) for the sample.

ND: Not detected at the Limit of Detection (LOD) for the sample.

ND: Not detected at the reporting limit (RL) for the sample.

ND: Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ: Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P: The RPD between the results for the two columns exceeds the method-specified criteria.

Q: The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R: Analytical results are from sample re-analysis.

RE: Analytical results are from sample re-extraction.

S: Analytical results are from modified screening analysis.

U: Not detected at the reported detection limit for the sample.

V: The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z: The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

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