CP VR Exercise

Instructor Version

Canadian Pacific Railway

11207619 | Commercial Yard - Large Fire (2.4) | 03/26/21

Table of Contents

TIMELINE OBJECTIVES - INSTRUCTOR GUIDE

Please Fill This Page

- Participant Name: _____
- Organization: _____
- Title/Position: _____
- Exercise Role: **Facilitator** ☐ **Instructor** ☐ **Evaluator** ☐ **Sim Cell** ☐ **Other** ☐
- Date and Location: _____

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TIMELINE OBJECTIVES - INSTRUCTOR GUIDE

Incident Update #1 – Time : _____

CP Instructor Updates

- Canadian Pacific (CP) report of unplanned emergency stop at _____hrs. for a east bound CP freight train at Mile post _____
- Local Police contacted by CPPS
- CPPS is reporting Train Crew starts walking back for assessment

Additional Info (if required)

- Train Crew looks for air leaks on braking system
- Train Crew performs basic inspection, if possible
- All communications by Train Crew are by radio

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INSTRUCTOR PROMPTS

Incident Update #1

- Was any action required by local police? **Yes** ☐ **No** ☐
  - If yes, what actions? _____
- Was any action required by local fire? **Yes** ☐ **No** ☐
  - If yes, what actions? _____
- Are any roads blocked? **Yes** ☐ **No** ☐
  - If yes, does it affect the response? _____
- Other Information?
  - _____

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TIMELINE OBJECTIVES - INSTRUCTOR GUIDE

Incident Update #2 – Time : _____

CP Instructor Updates

- CPPS confirms to Local Police that the train has derailed
- Local 911 receiving numerous calls from citizens with odour complaints
- Any additional questions that should be asked?

Additional Info (if requested)

- Odours are described as a unpleasant sweet chemical odour similar to glue
- Report by CPPS from Train Crew notes approximately ten cars involved
- *CPPS only calls Local Police, Fire would be contacted by Local Police.*

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INSTRUCTOR PROMPTS

Incident Update #2

- Given the new information:
  - Was any new actions required by local police? **Yes** ☐ **No** ☐
    - If yes, what action? _____
  - Was any new actions required by local fire? **Yes** ☐ **No** ☐
    - If yes, what action? _____
- Have First Responders established communication with CP? **Yes** ☐ **No** ☐
- Has emergency services requested paperwork? **Yes** ☐ **No** ☐
- What primary and secondary resources are being activated? (If required)
  - Eg. Hydro, Public Works, EMS, etc.
  - _____

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INSTRUCTOR PROMPTS

Incident Update #2

Other Information not covered

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TIMELINE OBJECTIVES - INSTRUCTOR GUIDE

Incident Update #3 – Time : _____

CP Instructor Updates

- Fire department arriving on Site
  - Approximate response time

  _____
- CP Train Crew meets with First Responders*
- **Initiate virtual reality scene assessment**

Additional Info (if required)

- CP mobilizing assets
- CP Notifications
- Distribute ***Inject 1 – Example CP Notification***
- Walk closer than personnel normally would to investigate the placards

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INSTRUCTOR PROMPTS

Incident Update #3

- Did fire department ask train crew to see train consist information? **Yes** ☐ **No** ☐
  - Once requested, distribute ***Inject #2 – Train Consist***
- Would first responders enter zone to identify potential leaks or assess from distance? _____
- Did first responders identify car marking numbers? **Yes** ☐ **No** ☐
  - If yes, what are they? _____ _____ _____ _____ _____ _____
  - Was AskRail used to identify commodities? (Optional) **Yes** ☐ **No** ☐
- Would you contact CANUTEC and/or CHEMTREC? **Yes** ☐ **No** ☐

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INSTRUCTOR PROMPTS

Incident Update #3 Cont.

- Did first responders identify car damage? **Yes** ☐ **No** ☐
  - If yes, where is the damage? _____
- Did first responders identify active leaks? **Yes** ☐ **No** ☐
  - If yes, what cars? _____ _____
- Did first responders identify placards on cars? **Yes** ☐ **No** ☐
  - If yes, what are they? _____ _____ _____
- What are the air readings in the initial assessment area?
  - LEL _____ O2_____ H2S_____ CO_____ VOC_____

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TIMELINE OBJECTIVES - INSTRUCTOR GUIDE

Incident Update #4 – Time : _____

CP Instructor Updates	Additional Info (if required)
• **Initial VR Assessment completed** • Car marking numbers identified by first responders • What are the DGs on Site? _____ _____ _____	• Shipper was notified by CP ▪ Product Waybills emailed to First Responders / IC ▪ Distribute ***Inject 3 – Product Waybills*** • CP Activates product ERAP (if asked) • DGs on Site ▪ Crude Oil (Sweet) ▪ Crude Oil (Sour)

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INSTRUCTOR PROMPTS

Incident Update #4

- Has FD evaluated Incident Command structure and setup? **Yes** ☐ **No** ☐
  - Eg. IC or Unified Command
  - If yes, what type? _____ If no, why? _____
- Has a provincial/state team been notified? **Yes** ☐ **No** ☐
- Has mutual aid been activated? **Yes** ☐ **No** ☐
  - If no, why/when would you? _____
- Did an evacuation occur? **Yes** ☐ **No** ☐
  - Who would handle this task? _____
- Did shelter in place occur? **Yes** ☐ **No** ☐
  - If yes, how is this information distributed? _____

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INSTRUCTOR PROMPTS

Incident Update #4

Fire Department - Other Information not covered

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INSTRUCTOR PROMPTS

Incident Update #4

Police - Other Information not covered

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INSTRUCTOR PROMPTS

Incident Update #4

EMS - Other Information not covered

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TIMELINE OBJECTIVES - INSTRUCTOR GUIDE

Incident Update #5 – Time : _____

CP Instructor Updates

- SDSs from shipper are received by CP/First Responders
- CP DGO or sentinel arrives on-Site
- Additional Scene assessment with First Responders
- ***Re-enter VR Scenario***
- Begin detailed damage assessment with First Responders

Additional Info (if required)

- Distribute ***Inject 4 – Product SDS***
- Distribute ***Inject 5 – Blank CP Damage Assessment Forms***
- *Cast to iPad*

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INSTRUCTOR PROMPTS

Incident Update #5

- Were product leaks identified and estimated? **Yes** ☐ **No** ☐
  - Where are any identified leaks located? _____
- Was significant damage identified? **Yes** ☐ **No** ☐
  - If yes, where? (Jacket or Car Damage) _____
- Exclusion zone for SCBAs established? **Yes** ☐ **No** ☐
  - 200 m / 650'? 800 m / 2,600'? Based on ERG? _____

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INSTRUCTOR PROMPTS

Incident Update #5

- Any relevant receptors for air quality concerns? **Yes** ☐ **No** ☐
  - Eg. hospitals, long-term care facilities, group homes, schools, prisons, public event areas, etc.
  - If yes, which receptors? _____
  - If yes, how do you approach these?_____

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TIMELINE OBJECTIVES - INSTRUCTOR GUIDE

Incident Update #6 – Time : _____

CP Instructor Updates

- CP and First Responders create initial Site map
- Complete damage assessment forms with First Responders
- Air monitoring plan initiated
- Deployment of UAV, if not already deployed
- Determine active leaks and estimated volumes (if not completed)

Additional Info (if required)

- After hand map sketched distribute ***Inject 6 – UAV Arial Imagery***

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INSTRUCTOR PROMPTS

Incident Update #6

- Is there a plan for stopping active leaks? **Yes** ☐ **No** ☐
  - With your current training could you stop a leak? **Yes** ☐ **No** ☐
- Is there a plan for product containment? **Yes** ☐ **No** ☐ **N/A** ☐
- Do you have any supplies to contain/control a large release? **Yes** ☐ **No** ☐ **N/A** ☐
- Is there a plan for protection of environmental receptors?
  - Waterways? **Yes** ☐ **No** ☐ **N/A** ☐ If yes, what? _____
  - Public? **Yes** ☐ **No** ☐ **N/A** ☐ If yes, what? _____
  - Storm drains? **Yes** ☐ **No** ☐ **N/A** ☐ If yes, what? _____
  - Infrastructure / properties? **Yes** ☐ **No** ☐ **N/A** ☐ If yes, what? _____

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TIMELINE OBJECTIVES - INSTRUCTOR GUIDE

Incident Update #7 – Time : _____

CP Instructor Updates

- Continued scene stabilization
- Public information officer coordinating with appropriate parties
- Air monitoring plan complete
- ***Share AR Scenario (IPAD / USDZ File)***

Additional Info (if required)

- Distribute ***Inject 7 – Air Monitoring Plan***

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INSTRUCTOR PROMPTS

Incident Update #7

- Has anyone asked CP to clear rail cars blocking roads? **Yes** ☐ **No** ☐ **N/A** ☐
- How would you communicate with CP? _____
- Has a communication plan for the public been established? **Yes** ☐ **No** ☐
  - If yes, was CP Media Relations consulted and what is the communication plan?
    _____
- Additional receptors to consider based on GIS Package? (If available) **Yes** ☐ **No** ☐
  - If yes, what are the receptors? _____
- What are the action levels for worker air monitoring? (if Hazmat team has capability)
  _____
- What are the action levels for the Site perimeter? (if Hazmat team has capability)
  _____

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TIMELINE OBJECTIVES - INSTRUCTOR GUIDE

Incident Update #8 – Time : _____

CP Instructor Updates

- Discretion of Instructor
- Any other relevant items to test or identify as part of Scenario

Additional Info (if required)

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INSTRUCTOR PROMPTS

Incident Update #8

- Discussion of any other response related items
  - Possible concerns are?

    _____

    _____

    _____

    _____
- If no additional concerns, move to next Incident Update

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TIMELINE OBJECTIVES - INSTRUCTOR GUIDE

Incident Update #9 – Time : _____

CP Instructor Updates

- Imagery Shared from Site

Additional Info (if required)

- Distribute ***Inject 8 – Imagery from Site***

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INSTRUCTOR PROMPTS

Incident Update #9

- Does the imagery identify any additional concerns or Site controls needed that were not previously identified? **Yes** ☐ **No** ☐
  - Eg. blockades, fencing, decon, traffic control
- If yes, what are the additional concerns?

_____

_____

_____

_____

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TIMELINE OBJECTIVES - INSTRUCTOR GUIDE

Incident Update #10 – Time : _____

CP Instructor Updates

- Air monitoring consultant arrives conducting perimeter air monitoring
- CP provides initial air monitoring data from Site
- Perimeter air monitoring data shows that at a distance of 200 m (650') concentrations are below action levels

Additional Info (if required)

- Distribute ***Inject 9 – Air Monitoring Memo***

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INSTRUCTOR PROMPTS

Incident Update #10

- Can evacuations or shelter in place be scaled back? **Yes** ☐ **No** ☐
  - What distance should be maintained? _____
- What resources are required for Site hazmat work? Eg. Waste removal, Product storage, Vac Trucks
  - _____
- How long should air monitoring at perimeter stay in place?
  - _____
- Is data collected and distributed to the wider community? **Yes** ☐ **No** ☐

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TIMELINE OBJECTIVES - INSTRUCTOR GUIDE

Incident Update #11 – Time : _____

CP Instructor Updates

- CP assets, hazmat contractors, and heavy equipment arriving on Site
- CP is plugging, patching and capping cars as needed if not already complete

Additional Info (if required)

- Could involve more permanent solutions to initial controls

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INSTRUCTOR PROMPTS

Incident Update #11

- What is the effect on the area?
  - Transportation _____
  - Residential Access _____
  - Media _____
  - Public Concerns _____
  - Etc. _____

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INSTRUCTOR PROMPTS

Incident Update #11

- Is Incident Command organized for next OP? **Yes** ☐ **No** ☐
  - If yes, IC or Unified Command? _____
- What are some long term cleanup goals/activities?
  - _____
- Are there specific Site controls that need to be implemented?
  - _____

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TIMELINE OBJECTIVES - INSTRUCTOR GUIDE

Objectives for Next Operational Period

CP Objectives

- Site Safety
- Site Stabilization
- Product Transfers
- Continuity of Business
- Remediation
- Restoration
- Site Closure

First Responder Objectives

- Staffing requirements?
- Involvement during remaining phases?
- Restoring Local Institutions
  - Schools, Hospitals, etc.
- Local residents allowed to return
- Longer term road closures
- Any other disruptions to community?

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INSTRUCTOR PROMPTS

Next Operational Period

What are the Departments / Municipalities Objectives

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NEXT STEPS

What information, training and resources may help improve?

- Information – Eg. AskRail Applications, documents from CP (ICP & Forms)

_____

- Training – Eg. RR101, FLBR, SERTC, HAZMAT: Awareness, HAZ TECH, 1081

_____

- Resources – Eg. specialized equipment (midland kits)

_____

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Inject 1
Example CP Notification

Scott Croome, CPR

Subject: FW: [2421 - NEW] CPPS Service Alert

From: CP Alerting Services <CP_Alert@cpr.ca<mailto:CP_Alert@cpr.ca>>
Time:
To: Scott Croome <Scott_Croome@cpr.ca<mailto:Scott_Croome@cpr.ca>>
Subject: [2421 - NEW] CPPS Service Alert

Subject: Collision Train Inv

Location -
Date of occurrence:
Time of occurrence:

Call source: RTC
Type of Incident: Collision Train Inv
Train #:

DGs involved, leak spills, waterways: Yes

Injuries: Unknown

Emergency Services Informed: Yes

Other CP Personnel Advised: ESR

Name: scott lavery

Adjacent To or On First Nations Land: No

Current situation/Incident description: Police communications have been notified train has derailed. PCPPS en rte.

Communications Officer: D502/H105

Inject 2
Train Consist

CANADIAN PACIFIC RAILWAY

```
    ########################################################################
    #                                                                      #
    #    K   K  EEEEE  Y   Y        TTTTT  RRRR    AAA   IIIII  N   N    #
    #    K  K   E       Y Y           T    R   R  A   A    I    NN  N    #
    #    KKK    EEE      Y            T    RRRR   AAAAA    I    N N N    #
    #    K  K   E        Y            T    R  R   A   A    I    N  NN    #
    #    K   K  EEEEE    Y            T    R   R  A   A  IIIII  N   N    #
    #                                                                      #
    ########################################################################
```

THIS TRAIN CONTAINS THE FOLLOWING "KEY-TRAIN" HAZARDOUS MATERIALS LOADS:

		SET-OUT/PICK-UP			
CRUDE OIL Legacy DOT111 Tank Cars 0 (CRU)					
CRUDE OIL CPC1232 Tank Cars or other 103 (CRU)					
POISON INHALATION HAZARD Tank Cars 0 (PIH)					
POISON INHALATION HAZARD NonTank Cars 0 (PIH)					
CLASS 7 (SNF / HLRW) 0 (RAD)					
HAZARDOUS MATERIALS (HAZ,FG,XA,ESC) 0					
TOTAL: 103					

POSITIVE CHAIN OF CUSTODY RULES APPLICABLE ONLY IN THE UNITED STATES
THIS SECTION MUST BE FILLED OUT AND FAXED TO CSF WITH CREW PAPERWORK
IF ANY ALERT LOADS HAVE BEEN DELIVERED /LIFTED/INTERCHANGED

EQUIPMENT ON BUILT TRAIN:

SEQ	INIT	NUMBER	CP EMPLOYEE NAME	CONTACT-EMPL NAME	DATE/TIME/TRACK
NIL					

EQUIPMENT ON WORK ORDER TO LIFT/PULL:

TRK	INIT	NUMBER	CP EMPLOYEE NAME	CONTACT-EMPL NAME	DATE/TIME/TRACK
NIL					

UNPLANNED WORK:

INIT	NUMBER	CP EMPLOYEE NAME	CONTACT-EMPL NAME	DATE/TIME/TRACK

CMRM MESSAGE KEY

PIH = POISON/ TOXIC INHALATION
XA = CLASS 1.1 OR 1.2 EXPLOSIVES
RAD = CLASS 7 SNF / HLRW
FG = CLASS 2. FLAMMABLE GAS
ESC = ENVIRONMENTAL SENSITIVE CHEMICALS
HAZ = OTHER HAZARDOUS MATERIALS
CRU = CRUDE OIL

CARS IN THIS CONSIST COUNT FROM HEAD TO REAR

OUTBOUND WHEEL REPORT FOR TRAIN 516316EA20

PRINTED: OCT 21 2020 0648EDT

CLASS CODES IN THIS TRAIN

CLASS CODE	HEAD CAR	REAR CAR	LOADS	EMPTIES	TONS	LENGTH
UNIT	CP 008633	CP 008633	0	1	210	74
4925CR1	CP 384914	SOO 076503	105	0	14491	6245
UNIT	CP 008019	CP 008019	0	1	213	74
SBU	BNQ 090771	BNQ 090771	0	1	0	0

****

```
                AAR  L
SEQ INIT NUMBER TYPE E CMDTY TON CLASSCD CONSIGNE LTH FDOL     TIME/TRACK

000 CP  E008633 D127 E E         UNIT              74          NO WAYBILL
                ENGINE ASSIGNED BY LOCOMOTIVE MANAGEMENT SYSTEM
                  PLTF

001 CP   384914 C113 L PEBBL 124 4925CR1 STROUD C  59 4925BNSF _________________
                  Buffer Car Service

002 CBTX 734027 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                  **** UN1267 ****
 CRU              Dangerous
 CRU              Key Train Load

003 CBTX 734028 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                  **** UN1267 ****
 CRU              Dangerous
 CRU              Key Train Load

004 CBTX 734029 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                  **** UN1267 ****
 CRU              Dangerous
 CRU              Key Train Load

005 CBTX 734025 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                  **** UN1267 ****
 CRU              Dangerous
 CRU              Key Train Load

006 CBTX 734030 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                  **** UN1267 ****
 CRU              Dangerous
 CRU              Key Train Load

007 CBTX 734031 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                  **** UN1267 ****
 CRU              Dangerous
 CRU              Key Train Load

008 CBTX 734038 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                  **** UN1267 ****
 CRU              Dangerous
 CRU              Key Train Load

009 CBTX 734037 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                  **** UN1267 ****
 CRU              Dangerous
 CRU              Key Train Load
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010 CBTX 734034 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

011 CBTX 734036 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

012 CBTX 734042 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

013 CBTX 734041 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

014 CBTX 734035 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

015 CBTX 734033 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

016 CBTX 734048 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

017 CBTX 734047 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

018 CBTX 734046 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

019 CBTX 734044 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

020 CBTX 734040 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

021 CBTX 734045 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
```

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 CRU             Key Train Load

022 CBTX 734043 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

023 CBTX 734054 T177 L PETRO 137 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

024 CBTX 734050 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

025 CBTX 734052 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

026 CBTX 734053 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

027 CBTX 734051 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

028 CBTX 734056 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

029 CBTX 734055 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

030 CBTX 734058 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

031 CBTX 734059 T177 L PETRO 137 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

032 CBTX 734049 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

033 CBTX 733976 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
```

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                2000 FEET FROM THE LEAD LOCOMOTIVE
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

034 CBTX 734006 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

035 CBTX 734004 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

036 CBTX 734011 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

037 CBTX 734020 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

038 CBTX 734018 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

039 CBTX 734016 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

040 CBTX 734015 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

041 CBTX 733995 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

042 CBTX 734002 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

043 CBTX 734009 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

044 CBTX 734003 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
```

```
 CRU             Key Train Load

045 CBTX 734001 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

046 CBTX 734008 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

047 CBTX 734005 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

048 CBTX 734007 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

049 CBTX 734013 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

050 CBTX 734019 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

051 CBTX 734017 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

052 CBTX 734010 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

053 CBTX 734012 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 GROSS TONS MID-POINT INDICATOR TOTAL 14491 MID-POINT  7246
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

054 CBTX 734021 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

055 CBTX 734026 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load
```

056 CBTX 734039 T177 L PETRO 139 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

057 CBTX 734032 T177 L PETRO 139 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

058 CBTX 734070 T177 L PETRO 139 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

059 CBTX 734065 T177 L PETRO 139 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

060 CBTX 734068 T177 L PETRO 139 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

061 CBTX 734073 T177 L PETRO 139 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

062 CBTX 734071 T177 L PETRO 139 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

063 CBTX 734072 T177 L PETRO 139 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

064 CBTX 734063 T177 L PETRO 139 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

065 CBTX 734064 T177 L PETRO 139 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

066 CBTX 734060 T177 L PETRO 138 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

067 CBTX 734062 T177 L PETRO 139 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous

```
 CRU             Key Train Load

068 CBTX 734066 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

069 CBTX 734067 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

070 CBTX 734069 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

071 CBTX 734088 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

                 2000 FEET FROM TAIL END OF THE TRAIN
072 CBTX 734089 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

073 CBTX 734090 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

074 CBTX 734093 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

075 CBTX 734094 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

076 CBTX 734091 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

077 CBTX 734083 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load

078 CBTX 734078 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                 **** UN1267 ****
 CRU             Dangerous
 CRU             Key Train Load
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079 CBTX 734080 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load
080 CBTX 734079 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

081 CBTX 734077 T177 L PETRO 139 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

082 CBTX 734074 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

083 CBTX 734075 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

084 CBTX 734061 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

085 CBTX 734076 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

086 CBTX 734084 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

087 CBTX 734085 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

088 CBTX 734086 T177 L PETRO 137 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

089 CBTX 734087 T177 L PETRO 137 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load

090 CBTX 734082 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                **** UN1267 ****
 CRU            Dangerous
 CRU            Key Train Load
```

091 CBTX 734092 T177 L PETRO 138 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

092 CBTX 734110 T177 L PETRO 139 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

093 CBTX 734108 T177 L PETRO 138 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

094 CBTX 734096 T177 L PETRO 138 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

095 CBTX 734098 T177 L PETRO 137 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

096 CBTX 734097 T177 L PETRO 138 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

097 CBTX 734099 T177 L PETRO 138 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

098 CBTX 734100 T177 L PETRO 139 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

099 CBTX 734106 T177 L PETRO 139 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

100 CBTX 734105 T177 L PETRO 139 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load
101 CBTX 734103 T177 L PETRO 138 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous
CRU Key Train Load

102 CBTX 734104 T177 L PETRO 138 4925CR1 STROUD C 60 4925BNSF _____
**** UN1267 ****
CRU Dangerous

```
 CRU              Key Train Load

103 CBTX 734102 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                  **** UN1267 ****
 CRU              Dangerous
 CRU              Key Train Load

104 CBTX 734101 T177 L PETRO 138 4925CR1 STROUD C  60 4925BNSF _________________
                  **** UN1267 ****
 CRU              Dangerous
 CRU              Key Train Load

105 SOO  076503 C313 L PEBBL 124 4925CR1 STROUD C  58 4925BNSF _________________
                  Buffer Car Service
000 CP  E008019 D127 E E         UNIT              74          NO WAYBILL
                ENGINE ASSIGNED BY LOCOMOTIVE MANAGEMENT SYSTEM
                  PLTF
000 BNQ X090771 M970 E E         SBU                           NO WAYBILL



              LOADS   EMPTIES   CONTENTS    TARE     E.G.T.     LENGTH
TRAIN TOTALS:  105        0        9782     4709      14491       6392
               TONNAGE TOTALS DO  N O T  INCLUDE OPERATIVE LOCOMOTIVES

TRAIN LENGTH EXCLUDING LEAD AND REMOTE LOCOMOTIVES  6245 FEET
TRAIN LENGTH INCLUDING LOCOMOTIVES                  6392 FEET
AVERAGE WEIGHT PER CAR                               139 TONS
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Inject 3
Product Waybills

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#
COMPRESSED WAYBILLS  051620    6674-5200  5247
-------------------------------------------------------------------------------


**************************** DANGEROUS COMMODITIES ****************************


|                                                    PAGE   1 OF  1             |
|-------------------------------------------------------------------------------|
|CBTX734027                WB 828776 10/20/20  NET MASS   83892 KG 002 FM ENG.|
|CBTX734028                WB 828776 10/20/20  NET MASS   84405 KG 003 FM ENG.|
|CBTX734029                WB 828776 10/20/20  NET MASS   84461 KG 004 FM ENG.|
|CBTX734025                WB 828776 10/20/20  NET MASS   84410 KG 005 FM ENG.|
|CBTX734030                WB 828776 10/20/20  NET MASS   84625 KG 006 FM ENG.|
|CBTX734031                WB 828776 10/20/20  NET MASS   84566 KG 007 FM ENG.|
|CBTX734038                WB 828776 10/20/20  NET MASS   84874 KG 008 FM ENG.|
|CBTX734037                WB 828776 10/20/20  NET MASS   84646 KG 009 FM ENG.|
|CBTX734034                WB 828776 10/20/20  NET MASS   84464 KG 010 FM ENG.|
|CBTX734036                WB 828776 10/20/20  NET MASS   84852 KG 011 FM ENG.|
|CBTX734042                WB 828776 10/20/20  NET MASS   84635 KG 012 FM ENG.|
|CBTX734041                WB 828776 10/20/20  NET MASS   84821 KG 013 FM ENG.|
|                                                                               |
|CANADIAN PACIFIC                                                               |
|7550 OGDEN DALE ROAD SE                                                        |
|CALGARY        AB                                                              |
|T2C4X9         CA                                                              |
|                                                                               |
|SHIPMENT DESTINATION :                          SHIPMENT ORIGIN :              |
|                                                                               |
|                                                                               |
|TO:                                             FROM:                          |
|                                                                               |
|925 N ELDRIDGE PKWY                             423051 RANGE RD 92             |
|HOUSTON             TX                          HARDISTY            AB         |
|77079               US                          T0B1V0              CA         |
|                                                                               |
|12 TANK CARS                          STCC 4910165                             |
|UN 1267                               EMERGENCY 24-HOUR NUMBER 8005559999      |
|PETROLEUM CRUDE OIL                   CONTRACT HOLDER: CCN223105               |
|CLASS 3                               EMERGENCY 24-HOUR NUMBER 8005559999      |
|PG  I                                 CONTRACT HOLDER: CCN223105               |
|TN: (SHD CRUDE)                       ERAP NO 2-1933-067                       |
|                                      ERAP PHONE 8005559999                    |
|BROKER: CHARTER BROKERAGE LLC                                                  |
|                                                                               |
|I HEREBY DECLARE THAT THE CONTENTS OF THIS CONSIGNMENT ARE FULLY AND           |
|ACCURATELY DESCRIBED ABOVE BY THE PROPER SHIPPING NAME,AND ARE CLASSIFIED,     |
|PACKAGED, MARKED AND LABELLED/PLACARDED, AND ARE IN ALL RESPECTS IN PROPER     |
|CONDITION FOR TRANSPORT ACCORIDING TO APPLICABLE  INTERNATIONAL AND NATIONAL   |
|GOVERNMENT REGULATIONS.                                                        |
|CLAYTON GATES                                                                  |
|-------------------------------------------------------------------------------|
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********** DANGEROUS COMMODITIES **********

PAGE 1 OF 1
CBTX734035 WB 828776 10/20/20 NET MASS 84674 KG 014 FM ENG.
CBTX734033 WB 828776 10/20/20 NET MASS 85194 KG 015 FM ENG.
CBTX734048 WB 828776 10/20/20 NET MASS 84475 KG 016 FM ENG.
CBTX734047 WB 828776 10/20/20 NET MASS 84552 KG 017 FM ENG.
CBTX734046 WB 828776 10/20/20 NET MASS 84591 KG 018 FM ENG.
CBTX734044 WB 828776 10/20/20 NET MASS 84366 KG 019 FM ENG.
CBTX734040 WB 828776 10/20/20 NET MASS 84043 KG 020 FM ENG.
CBTX734045 WB 828776 10/20/20 NET MASS 84304 KG 021 FM ENG.
CBTX734043 WB 828776 10/20/20 NET MASS 84430 KG 022 FM ENG.
CBTX734054 WB 828776 10/20/20 NET MASS 83706 KG 023 FM ENG.
CBTX734050 WB 828776 10/20/20 NET MASS 84057 KG 024 FM ENG.
CBTX734052 WB 828776 10/20/20 NET MASS 84317 KG 025 FM ENG.
CANADIAN PACIFIC
7550 OGDEN DALE ROAD SE
CALGARY AB
T2C4X9 CA
SHIPMENT DESTINATION : SHIPMENT ORIGIN :
STROUD OK ROSYTH AB
TO: FROM:
CONOCOPHILLIPS CO CONOCOPHILLIPS COMPANY
925 N ELDRIDGE PKWY 423051 RANGE RD 92
HOUSTON TX HARDISTY AB
77079 US T0B1V0 CA
12 TANK CARS STCC 4910165
UN 1267 EMERGENCY 24-HOUR NUMBER 8005559999
PETROLEUM CRUDE OIL CONTRACT HOLDER: CCN223105
CLASS 3 EMERGENCY 24-HOUR NUMBER 8005559999
PG I CONTRACT HOLDER: CCN223105
TN: (SHD CRUDE) ERAP NO 2-1933-067
ERAP PHONE 8005559999
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CLAYTON GATES

********** DANGEROUS COMMODITIES **********

PAGE 1 OF 1
CBTX734053 WB 828776 10/20/20 NET MASS 84548 KG 026 FM ENG.
CBTX734051 WB 828776 10/20/20 NET MASS 84586 KG 027 FM ENG.
CBTX734056 WB 828776 10/20/20 NET MASS 84010 KG 028 FM ENG.
CBTX734055 WB 828776 10/20/20 NET MASS 84290 KG 029 FM ENG.
CBTX734058 WB 828776 10/20/20 NET MASS 84395 KG 030 FM ENG.
CBTX734059 WB 828776 10/20/20 NET MASS 84028 KG 031 FM ENG.
CBTX734049 WB 828776 10/20/20 NET MASS 84510 KG 032 FM ENG.
CBTX733976 WB 828776 10/20/20 NET MASS 84346 KG 033 FM ENG.
CBTX734006 WB 828776 10/20/20 NET MASS 84434 KG 034 FM ENG.
CBTX734004 WB 828776 10/20/20 NET MASS 84654 KG 035 FM ENG.
CBTX734011 WB 828776 10/20/20 NET MASS 84290 KG 036 FM ENG.
CBTX734020 WB 828776 10/20/20 NET MASS 84277 KG 037 FM ENG.
CANADIAN PACIFIC
7550 OGDEN DALE ROAD SE
CALGARY AB
T2C4X9 CA
SHIPMENT DESTINATION : SHIPMENT ORIGIN :
STROUD OK ROSYTH AB
TO: FROM:
CONOCOPHILLIPS CO CONOCOPHILLIPS COMPANY
925 N ELDRIDGE PKWY 423051 RANGE RD 92
HOUSTON TX HARDISTY AB
77079 US T0B1V0 CA
12 TANK CARS STCC 4910165
UN 1267 EMERGENCY 24-HOUR NUMBER 8005559999
PETROLEUM CRUDE OIL CONTRACT HOLDER: CCN223105
CLASS 3 EMERGENCY 24-HOUR NUMBER 8005559999
PG I CONTRACT HOLDER: CCN223105
TN: (SHD CRUDE) ERAP NO 2-1933-067
ERAP PHONE 8005559999
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CLAYTON GATES

********** DANGEROUS COMMODITIES **********

PAGE 1 OF 1
CBTX734018 WB 828776 10/20/20 NET MASS 84440 KG 038 FM ENG.
CBTX734016 WB 828776 10/20/20 NET MASS 84312 KG 039 FM ENG.
CBTX734015 WB 828776 10/20/20 NET MASS 84202 KG 040 FM ENG.
CBTX733995 WB 828776 10/20/20 NET MASS 84366 KG 041 FM ENG.
CBTX734002 WB 828776 10/20/20 NET MASS 84230 KG 042 FM ENG.
CBTX734009 WB 828776 10/20/20 NET MASS 85012 KG 043 FM ENG.
CBTX734003 WB 828776 10/20/20 NET MASS 84595 KG 044 FM ENG.
CBTX734001 WB 828776 10/20/20 NET MASS 84472 KG 045 FM ENG.
CBTX734008 WB 828776 10/20/20 NET MASS 84988 KG 046 FM ENG.
CBTX734005 WB 828776 10/20/20 NET MASS 84929 KG 047 FM ENG.
CBTX734007 WB 828776 10/20/20 NET MASS 85021 KG 048 FM ENG.
CBTX734013 WB 828776 10/20/20 NET MASS 84792 KG 049 FM ENG.
CANADIAN PACIFIC
7550 OGDEN DALE ROAD SE
CALGARY AB
T2C4X9 CA
SHIPMENT DESTINATION : SHIPMENT ORIGIN :
STROUD OK ROSYTH AB
TO: FROM:
CONOCOPHILLIPS CO CONOCOPHILLIPS COMPANY
925 N ELDRIDGE PKWY 423051 RANGE RD 92
HOUSTON TX HARDISTY AB
77079 US T0B1V0 CA
12 TANK CARS STCC 4910165
UN 1267 EMERGENCY 24-HOUR NUMBER 8005559999
PETROLEUM CRUDE OIL CONTRACT HOLDER: CCN223105
CLASS 3 EMERGENCY 24-HOUR NUMBER 8005559999
PG I CONTRACT HOLDER: CCN223105
TN: (SHD CRUDE) ERAP NO 2-1933-067
ERAP PHONE 8005559999
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CLAYTON GATES

********** DANGEROUS COMMODITIES **********

PAGE 1 OF 1
CBTX734019 WB 828776 10/20/20 NET MASS 84619 KG 050 FM ENG.
CBTX734017 WB 828776 10/20/20 NET MASS 84884 KG 051 FM ENG.
CBTX734010 WB 828776 10/20/20 NET MASS 84312 KG 052 FM ENG.
CBTX734012 WB 828776 10/20/20 NET MASS 84695 KG 053 FM ENG.
CBTX734021 WB 828776 10/20/20 NET MASS 85128 KG 054 FM ENG.
CBTX734026 WB 828776 10/20/20 NET MASS 84181 KG 055 FM ENG.
CBTX734039 WB 828776 10/20/20 NET MASS 85114 KG 056 FM ENG.
CBTX734032 WB 828776 10/20/20 NET MASS 84915 KG 057 FM ENG.
CBTX734070 WB 828776 10/20/20 NET MASS 84951 KG 058 FM ENG.
CBTX734065 WB 828776 10/20/20 NET MASS 84974 KG 059 FM ENG.
CBTX734068 WB 828776 10/20/20 NET MASS 84996 KG 060 FM ENG.
CBTX734073 WB 828776 10/20/20 NET MASS 85045 KG 061 FM ENG.
CANADIAN PACIFIC
7550 OGDEN DALE ROAD SE
CALGARY AB
T2C4X9 CA
SHIPMENT DESTINATION : SHIPMENT ORIGIN :
STROUD OK ROSYTH AB
TO: FROM:
CONOCOPHILLIPS CO CONOCOPHILLIPS COMPANY
925 N ELDRIDGE PKWY 423051 RANGE RD 92
HOUSTON TX HARDISTY AB
77079 US T0B1V0 CA
12 TANK CARS STCC 4910165
UN 1267 EMERGENCY 24-HOUR NUMBER 8005559999
PETROLEUM CRUDE OIL CONTRACT HOLDER: CCN223105
CLASS 3 EMERGENCY 24-HOUR NUMBER 8005559999
PG I CONTRACT HOLDER: CCN223105
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ERAP PHONE 8005559999
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CLAYTON GATES

********** DANGEROUS COMMODITIES **********

PAGE 1 OF 1
CBTX734071 WB 828776 10/20/20 NET MASS 85041 KG 062 FM ENG.
CBTX734072 WB 828776 10/20/20 NET MASS 84972 KG 063 FM ENG.
CBTX734063 WB 828776 10/20/20 NET MASS 84835 KG 064 FM ENG.
CBTX734064 WB 828776 10/20/20 NET MASS 84967 KG 065 FM ENG.
CBTX734060 WB 828776 10/20/20 NET MASS 84483 KG 066 FM ENG.
CBTX734062 WB 828776 10/20/20 NET MASS 84929 KG 067 FM ENG.
CBTX734066 WB 828776 10/20/20 NET MASS 84939 KG 068 FM ENG.
CBTX734067 WB 828776 10/20/20 NET MASS 84923 KG 069 FM ENG.
CBTX734069 WB 828776 10/20/20 NET MASS 84660 KG 070 FM ENG.
CBTX734088 WB 828776 10/20/20 NET MASS 84933 KG 071 FM ENG.
CBTX734089 WB 828776 10/20/20 NET MASS 84301 KG 072 FM ENG.
CBTX734090 WB 828776 10/20/20 NET MASS 84597 KG 073 FM ENG.
CANADIAN PACIFIC
7550 OGDEN DALE ROAD SE
CALGARY AB
T2C4X9 CA
SHIPMENT DESTINATION : SHIPMENT ORIGIN :
STROUD OK ROSYTH AB
TO: FROM:
CONOCOPHILLIPS CO CONOCOPHILLIPS COMPANY
925 N ELDRIDGE PKWY 423051 RANGE RD 92
HOUSTON TX HARDISTY AB
77079 US T0B1V0 CA
12 TANK CARS STCC 4910165
UN 1267 EMERGENCY 24-HOUR NUMBER 8005559999
PETROLEUM CRUDE OIL CONTRACT HOLDER: CCN223105
CLASS 3 EMERGENCY 24-HOUR NUMBER 8005559999
PG I CONTRACT HOLDER: CCN223105
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ERAP PHONE 8005559999
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CLAYTON GATES

********** DANGEROUS COMMODITIES **********

			PAGE 1 OF 1		
CBTX734093	WB 828776 10/20/20	NET MASS	84918 KG	074 FM ENG.	
CBTX734094	WB 828776 10/20/20	NET MASS	84130 KG	075 FM ENG.	
CBTX734091	WB 828776 10/20/20	NET MASS	84967 KG	076 FM ENG.	
CBTX734083	WB 828776 10/20/20	NET MASS	84269 KG	077 FM ENG.	
CBTX734078	WB 828776 10/20/20	NET MASS	84943 KG	078 FM ENG.	
CBTX734080	WB 828776 10/20/20	NET MASS	84419 KG	079 FM ENG.	
CBTX734079	WB 828776 10/20/20	NET MASS	84876 KG	080 FM ENG.	
CBTX734077	WB 828776 10/20/20	NET MASS	84951 KG	081 FM ENG.	
CBTX734074	WB 828776 10/20/20	NET MASS	84377 KG	082 FM ENG.	
CBTX734075	WB 828776 10/20/20	NET MASS	84642 KG	083 FM ENG.	
CBTX734061	WB 828776 10/20/20	NET MASS	84741 KG	084 FM ENG.	
CBTX734076	WB 828776 10/20/20	NET MASS	84668 KG	085 FM ENG.	

CANADIAN PACIFIC
7550 OGDEN DALE ROAD SE
CALGARY AB
T2C4X9 CA

SHIPMENT DESTINATION :		SHIPMENT ORIGIN :	
STROUD	OK	ROSYTH	AB

TO:	FROM:
CONOCOPHILLIPS CO	CONOCOPHILLIPS COMPANY
925 N ELDRIDGE PKWY	423051 RANGE RD 92
HOUSTON TX	HARDISTY AB
77079 US	T0B1V0 CA

12 TANK CARS	STCC 4910165
UN 1267	EMERGENCY 24-HOUR NUMBER 8005559999
PETROLEUM CRUDE OIL	CONTRACT HOLDER: CCN223105
CLASS 3	EMERGENCY 24-HOUR NUMBER 8005559999
PG I	CONTRACT HOLDER: CCN223105
TN: (SHD CRUDE)	ERAP NO 2-1933-067
	ERAP PHONE 8005559999

BROKER: CHARTER BROKERAGE LLC

I HEREBY DECLARE THAT THE CONTENTS OF THIS CONSIGNMENT ARE FULLY AND ACCURATELY DESCRIBED ABOVE BY THE PROPER SHIPPING NAME,AND ARE CLASSIFIED, PACKAGED, MARKED AND LABELLED/PLACARDED, AND ARE IN ALL RESPECTS IN PROPER CONDITION FOR TRANSPORT ACCORIDING TO APPLICABLE INTERNATIONAL AND NATIONAL GOVERNMENT REGULATIONS.
CLAYTON GATES

If interested in a full scale exercise, contact your local DGO/HMO

********** DANGEROUS COMMODITIES **********

PAGE 1 OF 1
CBTX734084 WB 828776 10/20/20 NET MASS 84122 KG 086 FM ENG.
CBTX734085 WB 828776 10/20/20 NET MASS 84332 KG 087 FM ENG.
CBTX734086 WB 828776 10/20/20 NET MASS 83658 KG 088 FM ENG.
CBTX734087 WB 828776 10/20/20 NET MASS 83640 KG 089 FM ENG.
CBTX734082 WB 828776 10/20/20 NET MASS 84171 KG 090 FM ENG.
CBTX734092 WB 828776 10/20/20 NET MASS 83853 KG 091 FM ENG.
CBTX734110 WB 828776 10/20/20 NET MASS 84817 KG 092 FM ENG.
CBTX734108 WB 828776 10/20/20 NET MASS 84059 KG 093 FM ENG.
CBTX734096 WB 828776 10/20/20 NET MASS 84216 KG 094 FM ENG.
CBTX734098 WB 828776 10/20/20 NET MASS 83696 KG 095 FM ENG.
CBTX734097 WB 828776 10/20/20 NET MASS 84314 KG 096 FM ENG.
CBTX734099 WB 828776 10/20/20 NET MASS 84155 KG 097 FM ENG.
CANADIAN PACIFIC
7550 OGDEN DALE ROAD SE
CALGARY AB
T2C4X9 CA
SHIPMENT DESTINATION : SHIPMENT ORIGIN :
STROUD OK ROSYTH AB
TO: FROM:
CONOCOPHILLIPS CO CONOCOPHILLIPS COMPANY
925 N ELDRIDGE PKWY 423051 RANGE RD 92
HOUSTON TX HARDISTY AB
77079 US T0B1V0 CA
12 TANK CARS STCC 4910165
UN 1267 EMERGENCY 24-HOUR NUMBER 8005559999
PETROLEUM CRUDE OIL CONTRACT HOLDER: CCN223105
CLASS 3 EMERGENCY 24-HOUR NUMBER 8005559999
PG I CONTRACT HOLDER: CCN223105
TN: (SHD CRUDE) ERAP NO 2-1933-067
ERAP PHONE 8005559999
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CLAYTON GATES

********** DANGEROUS COMMODITIES **********

PAGE 1 OF 1
CBTX734100 WB 828776 10/20/20 NET MASS 84869 KG 098 FM ENG.
CBTX734106 WB 828776 10/20/20 NET MASS 84880 KG 099 FM ENG.
CBTX734105 WB 828776 10/20/20 NET MASS 84977 KG 100 FM ENG.
CBTX734103 WB 828776 10/20/20 NET MASS 84517 KG 101 FM ENG.
CBTX734104 WB 828776 10/20/20 NET MASS 84605 KG 102 FM ENG.
CBTX734102 WB 828776 10/20/20 NET MASS 84287 KG 103 FM ENG.
CBTX734101 WB 828776 10/20/20 NET MASS 84479 KG 104 FM ENG.
CANADIAN PACIFIC
7550 OGDEN DALE ROAD SE
CALGARY AB
T2C4X9 CA
SHIPMENT DESTINATION : SHIPMENT ORIGIN :
STROUD OK ROSYTH AB
TO: FROM:
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CLAYTON GATES

Inject 4
Safety Data Sheets (SDS)

SAFETY DATA SHEET

SECTION 1 IDENTIFICATION

PRODUCT

Product Name: **CRUDE OIL, SOUR**
Product Description: Petroleum Crude Oil
SDS Number: 3277

Intended Use: Feedstock

COMPANY IDENTIFICATION

Supplier: **Imperial Oil - Crude Oil Supply & Marketing**
P.O. Box 2480, Station M
Calgary, ALBERTA T2P 3M9 Canada

24 Hour Emergency Telephone	1-866-232-9563
Transportation Emergency Phone Number	1-866-232-9563
Supplier General Contact	1-800-567-3776

SECTION 2 HAZARD IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines.

This product has been classified in accordance with hazard criteria of the Hazardous Products Regulations (HPR) SOR/2015-17 and the SDS contains all the information required by the HPR SOR/2015-17.

CLASSIFICATION:

Flammable Liquids — Category 2
Eye Irritation — Category 2A
Carcinogenicity — Category 1B
Specific Target Organ Toxicity — Single Exposure (Central Nervous System) — Category 3
Specific Target Organ Toxicity — Repeated Exposure — Category 2
Aspiration Hazard — Category 1

LABEL:
Pictogram:

Signal Word: Danger

Hazard Statements:
H225: Highly flammable liquid and vapour. H304: May be fatal if swallowed and enters airways. H319: Causes serious eye irritation. H336: May cause drowsiness or dizziness. H350: May cause cancer. H373: May cause damage to organs through prolonged or repeated exposure. Blood, Liver, Spleen, Thymus

Precautionary Statements:
P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P233: Keep container tightly closed. P240: Ground and bond container and receiving equipment. P241: Use explosion-proof electrical, ventilating and lighting equipment. P242: Use non-sparking tools. P243: Take action to prevent static discharges. P260: Do not breathe mist / vapours. P264: Wash skin thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P273: Avoid release to the environment. P280: Wear protective gloves/protective clothing/eye protection/face protection.P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P308 + P313: IF exposed or concerned: Get medical advice/attention. P312: Call a POISON CENTER or doctor/physician if you feel unwell. P331: Do NOT induce vomiting. P337 + P313: If eye irritation persists: Get medical advice/attention. P370 + P378: In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish. P391: Collect spillage.P403 + P235: Store in a well-ventilated place. Keep cool. P405: Store locked up.P501: Dispose of contents and container in accordance with local regulations.

Contains: Petroleum

Other hazard information:

Health Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

Physical Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

PHYSICAL / CHEMICAL HAZARDS

Material can accumulate static charges which may cause an ignition. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited.

HEALTH HAZARDS

Hydrogen sulphide, a highly toxic gas, is expected to be present. Signs and symptoms of overexposure to hydrogen sulphide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odour does not provide a reliable indicator of the presence of hazardous levels in the atmosphere. Repeated exposure may cause skin dryness or cracking. May be irritating to nose, throat, and lungs. May cause central nervous system depression. Exposure to benzene is associated with cancer (acute myeloid leukaemia and myelodysplastic syndrome), damage to the blood-producing system, and serious blood disorders (see Section 11).

ENVIRONMENTAL HAZARDS

Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

NFPA Hazard ID:	Health:	2	Flammability:	3	Reactivity:	0
HMIS Hazard ID:	Health:	2*	Flammability:	3	Reactivity:	0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a complex substance.

Hazardous Substance(s) or Complex Substance(s) in Hazardous product

Name	CAS#	Concentration*	GHS Hazard Codes
Petroleum	8002-05-9	100%	H225, H304, H336, H350(1B), H319(2A), H373, H401, H411

Hazardous Constituent(s) Contained in Complex Substance(s)

Name	CAS#	Concentration*	GHS Hazard Codes
benzene	71-43-2	1 - 5%	H225, H303, H304, H340(1B), H350(1A), H315, H319(2A), H372, H401, H412
cyclohexane	110-82-7	1 - 5%	H225, H304, H336, H315, H400(M factor 1), H410(M factor 1)
ethylbenzene	100-41-4	0.1 - 1%	H225, H304, H332, H373, H401, H412
hydrogen sulphide	7783-06-4	> 0.005 %	H220, H280, H330(2), H400(M factor 1)
n-hexane	110-54-3	1 - 5%	H225, H304, H336, H361(F), H315, H373, H401, H411
naphthalene	91-20-3	1 - 5%	H228(2), H302, H351, H400(M factor 1), H410(M factor 1)
toluene	108-88-3	1 - 5%	H225, H304, H336, H361(D), H315, H373, H401, H412
xylene	1330-20-7	1 - 5%	H226, H303, H304, H312, H332, H335, H315, H320(2B), H373, H401, H412

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4 FIRST-AID MEASURES

INHALATION

Immediately remove from further exposure. Get immediate medical assistance. For those providing

assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

SKIN CONTACT

Remove contaminated clothing. Dry wipe exposed skin and cleanse with waterless hand cleaner and follow by washing thoroughly with soap and water. For those providing assistance, avoid further skin contact to yourself or others. Wear impervious gloves. Launder contaminated clothing separately before reuse. Discard contaminated articles that cannot be laundered. For hot product: Immediately immerse in or flush affected area with large amounts of cold water to dissipate heat. Cover with clean cotton sheeting or gauze and get prompt medical attention.

EYE CONTACT

Flush thoroughly with water for at least 15 minutes. Get medical assistance.

INGESTION

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately. This material, or a component, may be associated with cardiac sensitization following very high exposures (well above occupational exposure limits) or with concurrent exposure to high stress levels or heart-stimulating substances like epinephrine. Administration of such substances should be avoided.

SECTION 5 FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapours and to protect personnel attempting to stop a leak. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Highly flammable. Vapour is flammable and heavier than air. Vapour may travel across the ground and reach remote ignition sources, causing a flashback fire danger. Exposure to fire can generate toxic fumes. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Hydrogen sulphide, Incomplete combustion products, Oxides of carbon, Smoke, Fume, Sulphur oxides

FLAMMABILITY PROPERTIES

Flash Point [Method]: <21°C (70°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D

Autoignition Temperature: N/D

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor and, when applicable, H2S, or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Chemical goggles are recommended if splashes or contact with eyes is possible. Work gloves that are resistant to aromatic hydrocarbons are recommended. If contact with hot product is possible or anticipated, gloves should be heat-resistant and thermally insulated. Note: gloves made of PVA are not water-resistant, and are not suitable for emergency use. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic and, if necessary, heat resistant and thermal insulated material is recommended.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces.

Water Spill: Stop leak if you can do so without risk. Eliminate sources of ignition. Warn other shipping. If the Flash Point exceeds the Ambient Temperature by 10 deg C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

H2S is present. Avoid all personal contact. Crude oils can contain trace levels of natural impurities including heavy metals, such as mercury, nickel or lead, as well as naturally occurring radioactive material. As the impurity content may concentrate during refining/processing, process operations, including equipment, materials and products should be evaluated to identify and manage any potential risks to health, safety or the environment or regulatory concerns.

Prevent exposure to ignition sources, for example use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapour may be evolved from heated or agitated material. Use only with adequate ventilation. Do not enter storage areas or confined spaces unless adequately ventilated. The toxic and olfactory (sense of smell) fatigue properties of hydrogen sulfide require that air monitoring alarms and respiratory protection be used where the concentration might be expected to reach a harmful level, such as in an enclosed space, heated transport vessel, or in a spill or leak situation.

Material may contain trace amounts of naturally occurring radioactive material (NORM), which will accumulate in process equipment and storage vessels. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100x10E-12 Siemens per meter) and is considered a semiconductive, static accumulator if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semiconductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, anti-static additives and filtration can greatly influence the conductivity of a liquid.

STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. The type of container used to store the material may affect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Storage containers should be earthed and bonded. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Substance Name	Form	Limit/Standard			Note	Source
benzene		STEL	1 ppm			Supplier
benzene		TWA	0.5 ppm			Supplier
benzene		STEL	2.5 ppm		Skin	ACGIH
benzene		TWA	0.5 ppm		Skin	ACGIH
cyclohexane		TWA	100 ppm			ACGIH

ethylbenzene		TWA	20 ppm			ACGIH
hydrogen sulphide		STEL	14 mg/m3	10 ppm		Supplier
hydrogen sulphide		TWA	7 mg/m3	5 ppm		Supplier
hydrogen sulphide		STEL	5 ppm			ACGIH
hydrogen sulphide		TWA	1 ppm			ACGIH
n-hexane		TWA	50 ppm		Skin	ACGIH
naphthalene		TWA	10 ppm		Skin	ACGIH
toluene		TWA	20 ppm			ACGIH
xylene		STEL	150 ppm			ACGIH
xylene		TWA	100 ppm			ACGIH

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Use explosion-proof ventilation equipment to stay below exposure limits.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

Positive-pressure, air-supplied respirator in areas where H2S vapours may accumulate.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended. If contact with forearms is likely wear gauntlet style gloves.

Eye Protection: Chemical goggles are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or

manufacturer data. The types of clothing to be considered for this material include:
Chemical/oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practise good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Colour: Dark Brown
Odour: Rotten Egg
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.661 - 1.013
Flammability (Solid, Gas): N/A
Flash Point [Method]: <21°C (70°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: N/D
Boiling Point / Range: 32°C (90°F) - 37°C (99°F)
Decomposition Temperature: N/D
Vapour Density (Air = 1): N/D
Vapour Pressure: 0 kPa (0 mm Hg) at 20°C - 106.4 kPa (800 mm Hg) at 20ºC
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Solubility in Water: Negligible
Viscosity: >0.42 cSt (0.42 mm2/sec) at 40ºC
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -73°C (-100°F) - 48°C (118°F)

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Avoid heat, sparks, open flames and other ignition sources.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: No end point data for material.	Not determined.
Irritation: No end point data for material.	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs.
Ingestion	
Acute Toxicity (Rat): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401
Skin	
Acute Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 402
Skin Corrosion/Irritation: Data available.	May dry the skin leading to discomfort and dermatitis. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 404
Eye	
Serious Eye Damage/Irritation: Data available.	Irritating and will injure eye tissue. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 405
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: Data available.	Not expected to be a skin sensitizer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 406
Aspiration: Data available.	May be fatal if swallowed and enters airways. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: Data available.	Not expected to be a germ cell mutagen. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 471 474 479
Carcinogenicity: Data available.	Caused cancer in laboratory animals. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 451
Reproductive Toxicity: Data available.	Not expected to be a reproductive toxicant. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 414 421
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	

Single Exposure: Data available.	May cause drowsiness or dizziness. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401 402
Repeated Exposure: Data available.	Concentrated, prolonged or deliberate exposure may cause organ damage. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 411

TOXICITY FOR SUBSTANCES

NAME	ACUTE TOXICITY
ethylbenzene	Inhalation Lethality: 4 hour(s) LC50 17.8 mg/l (Vapour) (Rat); Oral Lethality: LD 50 3.5 g/kg (Rat)
hydrogen sulphide	Inhalation Lethality: 4 hour(s) LC50 444 ppm (Gas) (Rat)
naphthalene	Inhalation Lethality: 4 hour(s) LC50 > 0.4 mg/l (Max attainable vapor conc.) (Rat); Oral Lethality: LD 50 533 mg/kg (Mouse)

OTHER INFORMATION

For the product itself:

Target Organs Repeated Exposure: Blood, Liver, Spleen, Thymus

Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema. Exposure to this material, or one of its components, in situations where there is the potential for high levels, such as in confined spaces or with abuse, may result in abnormal heart rhythm (arrhythmia). High-level exposure to hydrocarbons (above occupational exposure limits) may initiate arrhythmia in a worker that is undergoing stress or is taking a heart-stimulating substance such as epinephrine, a nasal decongestant, or an asthma or cardiovascular drug.
Crude oil: Contains polycyclic aromatic compounds (PACs). Prolonged and / or repeated exposure by skin or inhalation of certain PACs may cause cancer of the skin, lung, and of other sites of the body. In animal studies, some crudes produced skin tumors in mice, while other crudes produced no tumors. Developmental studies of crude oil in lab animals showed reduced fetal weight and increased fetal resorptions at maternally toxic levels. Repeated dermal exposure to crude oils in rats resulted in toxicity to the blood, liver, thymus, and bone marrow.

Contains:
BENZENE: Caused cancer (acute myeloid leukemia and myelodysplastic syndrome), damage to the blood-producing system, and serious blood disorders in human studies. Caused genetic effects and effects on the immune system in laboratory animal and some human studies. Caused toxicity to the fetus and cancer in laboratory animal studies. HYDROGEN SULPHIDE: Chronic health effects due to repeated exposures to low levels of H2S have not been established. High level (700 ppm) acute exposure can result in sudden death. High concentrations will lead to cardiopulmonary arrest due to nervous system toxicity and pulmonary edema. Lower levels (150 ppm) may overwhelm sense of smell, eliminating warning of exposure. Symptoms of overexposure to H2S include headache, fatigue, insomnia, irritability, and gastrointestinal problems. Repeated exposures to approximately 25 ppm will irritate mucous membranes and the respiratory system and have been implicated in some eye damage. NAPHTHALENE: Exposure to high concentrations of naphthalene may cause destruction of red blood cells, anemia, and cataracts. Naphthalene caused cancer in laboratory animal studies, but the relevance of these findings to humans is uncertain.
N-HEXANE: Prolonged and/or repeated exposures to n-Hexane can cause progressive and potentially irreversible damage to the peripheral nervous system (e.g. fingers, feet, arms, legs, etc.). Simultaneous exposure to Methyl Ethyl Ketone (MEK) or Methyl Isobutyl Ketone (MIBK) and n-Hexane can potentiate the risk of adverse effects from n-Hexane on the peripheral nervous system. n-Hexane has been shown to cause testicular damage at high doses in male rats. The relevance of this effect for humans is unknown. TOLUENE : Concentrated, prolonged or deliberate inhalation may cause brain and nervous system damage. Prolonged and repeated exposure of pregnant animals (> 1500 ppm)

have been reported to cause adverse fetal developmental effects. ETHYLBENZENE: Caused cancer in laboratory animal studies. The relevance of these findings to humans is uncertain.

CMR Status:

Chemical Name	CAS Number	List Citations
benzene	71-43-2	1, 4, 5
cyclohexane	110-82-7	4
ethylbenzene	100-41-4	3, 4
hydrogen sulphide	7783-06-4	4
n-hexane	110-54-3	4
naphthalene	91-20-3	3, 4
toluene	108-88-3	4
xylene	1330-20-7	4

--REGULATORY LISTS SEARCHED--

1 = IARC 1
2 = IARC 2A
3 = IARC 2B
4 = ACGIH ALL
5 = ACGIH A1
6 = ACGIH A2

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data for the material, components of the material, or for similar materials, through the application of bridging principals.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

More volatile component -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

Less volatile component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Low molecular wt. component -- Expected to be inherently biodegradable
High molecular wt. component -- Expected to biodegrade slowly.

Photolysis:

More water soluble component -- Expected to degrade at a moderate rate in water when exposed to sunlight.

Atmospheric Oxidation:

More volatile component -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL

Components -- Has the potential to bioaccumulate.

ECOLOGICAL DATA

Ecotoxicity

Test	Duration	Organism Type	Test Results
Aquatic - Acute Toxicity	48 hour(s)	Invertebrate	EC50 10 - 100 mg/l: data for similar materials

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (TDG)

Proper Shipping Name: PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC
Hazard Class & Division: 3 (6.1)
UN Number: 3494
Packing Group: I
Special Provisions: 106, 150

Footnote: If shipped over water, product TDG classification as shown below for SEA (IMDG).

LAND (DOT)

Proper Shipping Name: PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC
Hazard Class & Division: 3
ID Number: 3494
Packing Group: I

Marine Pollutant: No
ERG Number: 131
Label(s): 3 (6.1)
Transport Document Name: UN3494, PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC, 3 (6.1), PG I

SEA (IMDG)

Proper Shipping Name: PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC
Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 3494
Packing Group: I
Marine Pollutant: Yes
Label(s): 3 (6.1)
Transport Document Name: UN3494, PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC, 3 (6.1), PG I, (21°C c.c.), MARINE POLLUTANT

AIR (IATA)

Proper Shipping Name: PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC
Hazard Class & Division: 3
UN Number: 3494
Packing Group: I
Label(s) / Mark(s): 3 (6.1)
Transportation Limitations: CARGO AIRCRAFT ONLY
Transport Document Name: UN3494, PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC, 3, PG I, (6.1)

SECTION 15 REGULATORY INFORMATION

CEPA: All components of this product are either on the Domestic Substance List (DSL) or are exempt.

Listed or exempt from listing/notification on the following chemical inventories (May contain substance(s) subject to notification to the EPA Active TSCA inventory prior to import to USA): AICS, DSL, ENCS, IECSC, KECI, PICCS, TSCA

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
benzene	71-43-2	6
cyclohexane	110-82-7	6
n-hexane	110-54-3	6
naphthalene	91-20-3	6

toluene	108-88-3	6
xylene	1330-20-7	6

--REGULATORY LISTS SEARCHED--

1 = TSCA 4	3 = TSCA 5e	5 = TSCA 12b
2 = TSCA 5a2	4 = TSCA 6	6 = NPRI

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
H220: Extremely flammable gas; Flammable Gas, Cat 1
H225: Highly flammable liquid and vapor; Flammable Liquid, Cat 2
H226: Flammable liquid and vapour; Flammable Liquid, Cat 3
H280: Contains gas under pressure; may explode if heated; Pressurized Gas
H302: Harmful if swallowed; Acute Tox Oral, Cat 4
H303: May be harmful if swallowed; Acute Tox Oral, Cat 5
H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
H312: Harmful in contact with skin; Acute Tox Dermal, Cat 4
H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
H319(2A): Causes serious eye irritation; Serious Eye Damage/Irr, Cat 2A
H320(2B): Causes eye irritation; Serious Eye Damage/Irr, Cat 2B
H330(2): Fatal if inhaled; Acute Tox Inh, Cat 2
H332: Harmful if inhaled; Acute Tox Inh, Cat 4
H335: May cause respiratory irritation; Target Organ Single, Resp Irr
H336: May cause drowsiness or dizziness; Target Organ Single, Narcotic
H340(1B): May cause genetic defects; Germ Cell Mutagenicity, Cat 1B
H350(1A): May cause cancer; Carcinogenicity, Cat 1A
H350(1B): May cause cancer; Carcinogenicity, Cat 1B
H351: Suspected of causing cancer; GHS Carcinogenicity, Cat 2
H361(D): Suspected of damaging the unborn child; Repro Tox, Cat 2 (Develop)
H361(F): Suspected of damaging fertility; Repro Tox, Cat 2 (Fertility)
H372: Causes damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 1
H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
H401: Toxic to aquatic life; Acute Env Tox, Cat 2
H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1
H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2
H412: Harmful to aquatic life with long lasting effects; Chronic Env Tox, Cat 3

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Updates made in accordance with implementation of GHS requirements.

THIS SDS COVERS THE FOLLOWING MATERIALS: BONNIE GLEN SOUR | BOUNDARY LAKE | BP SOUR HEAVY | CENTRAL ALBERTA | CONVENTIONAL HEAVY | DRAYTON VALLEY SOUR | EDMONTON HIGH SOUR | EDMONTON LOW SOUR | ELBOW CENTRAL ALBERTA | FOSTERTON HVY |

HARDISTY LT | LLOYD GIBSON | LT SOUR BLEND <LSB> | MACKAY RIVER HEAVY | MEDIUM SOUR BLEND | MID-SASK LT | MIDALE | MILK RIVER SOUR | MIXED SOUR BLEND | MOOSE JAW TOPS (MJT) | NEXUS HEAVY SOUR | NEXUS LIGHT SOUR | ONT. SOUR | PEACE HEAVY | PEACE SOUR | PREMIUM CONVENTIONAL HEAVY | RANGELAND LT SOUR | REDWATER | SEAL HEAVY | VIRDEN LT | VIRDEN MED | WASKADA SOUR | WEST TEXAS/NEW MEXICO SOUR | WESTSPUR LT | WESTSPUR MIDALE

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SAFETY DATA SHEET

SECTION 1 IDENTIFICATION

PRODUCT

Product Name: **CRUDE OIL, SWEET**
Product Description: Petroleum Crude Oil
SDS Number: 21341

Intended Use: Feedstock

COMPANY IDENTIFICATION

Supplier: **Imperial Oil - Crude Oil Supply & Marketing**
P.O. Box 2480, Station M
Calgary, ALBERTA T2P 3M9 Canada

24 Hour Emergency Telephone	1-866-232-9563
Transportation Emergency Phone Number	1-866-232-9563
Supplier General Contact	1-800-567-3776

SECTION 2 HAZARD IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines.

This product has been classified in accordance with hazard criteria of the Hazardous Products Regulations (HPR) SOR/2015-17 and the SDS contains all the information required by the HPR SOR/2015-17.

CLASSIFICATION:

Flammable Liquids — Category 2
Eye Irritation — Category 2A
Carcinogenicity — Category 1B
Specific Target Organ Toxicity — Single Exposure (Central Nervous System) — Category 3
Specific Target Organ Toxicity — Repeated Exposure — Category 2
Aspiration Hazard — Category 1

LABEL:
Pictogram:

Signal Word: Danger

Hazard Statements:
H225: Highly flammable liquid and vapour. H304: May be fatal if swallowed and enters airways. H319: Causes serious eye irritation. H336: May cause drowsiness or dizziness. H350: May cause cancer. H373: May cause damage to organs through prolonged or repeated exposure. Blood, Liver, Spleen, Thymus

Precautionary Statements:
P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P233: Keep container tightly closed. P240: Ground and bond container and receiving equipment. P241: Use explosion-proof electrical, ventilating and lighting equipment. P242: Use non-sparking tools. P243: Take action to prevent static discharges. P260: Do not breathe mist / vapours. P264: Wash skin thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P273: Avoid release to the environment. P280: Wear protective gloves/protective clothing/eye protection/face protection.P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P308 + P313: IF exposed or concerned: Get medical advice/attention. P312: Call a POISON CENTER or doctor/physician if you feel unwell. P331: Do NOT induce vomiting. P337 + P313: If eye irritation persists: Get medical advice/attention. P370 + P378: In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish. P391: Collect spillage.P403 + P235: Store in a well-ventilated place. Keep cool. P405: Store locked up.P501: Dispose of contents and container in accordance with local regulations.

Contains: PETROLEUM CRUDE OIL

Other hazard information:

Health Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

Physical Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

PHYSICAL / CHEMICAL HAZARDS

Material can accumulate static charges which may cause an ignition. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited.

HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Hydrogen sulphide, a highly toxic gas, is expected to be present. Signs and symptoms of overexposure to hydrogen sulphide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odour does not provide a reliable indicator of the presence of hazardous levels in the atmosphere. Repeated exposure may cause skin dryness or cracking. May be irritating to the skin, nose, throat, and lungs. May cause central nervous system depression. Exposure to benzene is associated with cancer (acute myeloid leukaemia and myelodysplastic syndrome), damage to the blood-producing system, and

serious blood disorders (see Section 11).

ENVIRONMENTAL HAZARDS

Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

NFPA Hazard ID:	Health:	2	Flammability:	3	Reactivity:	0
HMIS Hazard ID:	Health:	2*	Flammability:	3	Reactivity:	0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a complex substance.

Hazardous Substance(s) or Complex Substance(s) in Hazardous product

Name	CAS#	Concentration*	GHS Hazard Codes
PETROLEUM CRUDE OIL	8002-05-9	100%	H225, H304, H336, H350(1B), H319(2A), H373, H401, H411

Hazardous Constituent(s) Contained in Complex Substance(s)

Name	CAS#	Concentration*	GHS Hazard Codes
Benzene	71-43-2	0.1 - < 1%	H225, H303, H304, H340(1B), H350(1A), H315, H319(2A), H372, H401
CYCLOHEXANE	110-82-7	1 - < 5%	H225, H304, H336, H315, H400(M factor 1), H410(M factor 1)
HYDROGEN SULPHIDE	7783-06-4	0.002 - 0.005%	H220, H280, H330(2), H400(M factor 1)
n-Hexane	110-54-3	1 - < 5%	H225, H304, H336, H361(F), H315, H373, H401, H411
Naphthalene	91-20-3	1 - < 5%	H228(2), H302, H351, H400(M factor 1), H410(M factor 1)
Toluene	108-88-3	1 - < 5%	H225, H304, H336, H361(D), H315, H373, H401, H412
XYLENES	1330-20-7	1 - < 5%	H226, H303, H304, H312, H332, H335, H315, H320(2B), H373, H401, H412

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4 FIRST-AID MEASURES

INHALATION

Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental

oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

SKIN CONTACT

Remove contaminated clothing. Dry wipe exposed skin and cleanse with waterless hand cleaner and follow by washing thoroughly with soap and water. For those providing assistance, avoid further skin contact to yourself or others. Wear impervious gloves. Launder contaminated clothing separately before reuse. Discard contaminated articles that cannot be laundered. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury. For hot product: Immediately immerse in or flush affected area with large amounts of cold water to dissipate heat. Cover with clean cotton sheeting or gauze and get prompt medical attention.

EYE CONTACT

Flush thoroughly with water for at least 15 minutes. Get medical assistance.

INGESTION

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately. This material, or a component, may be associated with cardiac sensitization following very high exposures (well above occupational exposure limits) or with concurrent exposure to high stress levels or heart-stimulating substances like epinephrine. Administration of such substances should be avoided.

SECTION 5 FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapours and to protect personnel attempting to stop a leak. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Extremely Flammable. Vapour is flammable and heavier than air. Vapour may travel across the ground and reach remote ignition sources, causing a flashback fire danger. Exposure to fire can generate toxic fumes. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Hydrogen sulphide, Incomplete combustion products, Oxides of carbon, Smoke, Fume, Sulphur oxides

FLAMMABILITY PROPERTIES

Flash Point [Method]: -20°C (-4°F) - 35°C (95°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: N/D

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor and, when applicable, H2S, or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Chemical goggles are recommended if splashes or contact with eyes is possible. Work gloves that are resistant to aromatic hydrocarbons are recommended. If contact with hot product is possible or anticipated, gloves should be heat-resistant and thermally insulated. Note: gloves made of PVA are not water-resistant, and are not suitable for emergency use. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic and, if necessary, heat resistant and thermal insulated material is recommended.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces.

Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. Do not confine in area of spill. Advise occupants and shipping in downwind areas of fire and explosion hazard and warn them to stay clear. Warn other shipping. Allow liquid to evaporate from the surface. Remove from the surface by skimming or with suitable absorbents. If permitted by regulatory authorities, the use of suitable dispersants should be considered where permitted in local oil spill contingency plans. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Use booms as a barrier to protect shorelines. Use containment booms when the ambient temperature is below the flash point of the material. Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

H2S is present. Avoid all personal contact. Crude oils can contain trace levels of natural impurities including heavy metals, such as mercury, nickel or lead, as well as naturally occurring radioactive material. As the impurity content may concentrate during refining/processing, process operations, including equipment, materials and products should be evaluated to identify and manage any potential risks to health, safety or the environment or regulatory concerns.

Prevent exposure to ignition sources, for example use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapour may be evolved from heated or agitated material. Use only with adequate ventilation. Do not enter storage areas or confined spaces unless adequately ventilated. The toxic and olfactory (sense of smell) fatigue properties of hydrogen sulfide require that air monitoring alarms and respiratory protection be used where the concentration might be expected to reach a harmful level, such as in an enclosed space, heated transport vessel, or in a spill or leak situation.

Material may contain trace amounts of naturally occurring radioactive material (NORM), which will accumulate in process equipment and storage vessels. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100x10E-12 Siemens per meter) and is considered a semiconductive, static accumulator if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semiconductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, anti-static additives and filtration can greatly influence the conductivity of a liquid.

STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. The type of container used to store the material may affect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Storage containers should be earthed and bonded. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Substance Name	Form	Limit/Standard			Note	Source
Benzene		STEL	1 ppm			Supplier
Benzene		TWA	0.5 ppm			Supplier

Benzene		STEL	2.5 ppm		Skin	ACGIH
Benzene		TWA	0.5 ppm		Skin	ACGIH
CYCLOHEXANE		TWA	100 ppm			ACGIH
HYDROGEN SULPHIDE		STEL	14 mg/m3	10 ppm		Supplier
HYDROGEN SULPHIDE		TWA	7 mg/m3	5 ppm		Supplier
HYDROGEN SULPHIDE		STEL	5 ppm			ACGIH
HYDROGEN SULPHIDE		TWA	1 ppm			ACGIH
n-Hexane		TWA	50 ppm		Skin	ACGIH
Naphthalene		TWA	10 ppm		Skin	ACGIH
Toluene		TWA	20 ppm			ACGIH
XYLENES		STEL	150 ppm			ACGIH
XYLENES		TWA	100 ppm			ACGIH

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Use explosion-proof ventilation equipment to stay below exposure limits.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

Positive-pressure, air-supplied respirator in areas where H2S vapours may accumulate.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended. If contact with forearms is likely wear gauntlet style gloves.

Eye Protection: Chemical goggles are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:
Chemical/oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practise good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Colour: Dark Brown
Odour: Rotten Egg
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.661 - 1.013
Flammability (Solid, Gas): N/A
Flash Point [Method]: -20°C (-4°F) - 35°C (95°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: N/D
Boiling Point / Range: >= 20°C (68°F)
Decomposition Temperature: N/D
Vapour Density (Air = 1): N/D
Vapour Pressure: 0 kPa (0 mm Hg) at 20°C - 106.4 kPa (800 mm Hg) at 20ºC
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Solubility in Water: Negligible
Viscosity: <7 cSt (7 mm2/sec) at 40ºC
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: < 32°C (90°F)

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Avoid heat, sparks, open flames and other ignition sources.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: No end point data for material.	Not determined.
Irritation: No end point data for material.	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs.
Ingestion	
Acute Toxicity (Rat): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401
Skin	
Acute Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 402
Skin Corrosion/Irritation: Data available.	May dry the skin leading to discomfort and dermatitis. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 404
Eye	
Serious Eye Damage/Irritation: Data available.	Irritating and will injure eye tissue. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 405
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: Data available.	Not expected to be a skin sensitizer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 406
Aspiration: Data available.	May be fatal if swallowed and enters airways. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: Data available.	Not expected to be a germ cell mutagen. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 471 474 479
Carcinogenicity: Data available.	Caused cancer in laboratory animals. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 451
Reproductive Toxicity: Data available.	Not expected to be a reproductive toxicant. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 414 421

Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: Data available.	May cause drowsiness or dizziness. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401 402
Repeated Exposure: Data available.	Concentrated, prolonged or deliberate exposure may cause organ damage. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 411

TOXICITY FOR SUBSTANCES

NAME	ACUTE TOXICITY
HYDROGEN SULPHIDE	Inhalation Lethality: 4 hour(s) LC50 444 ppm (Gas) (Rat)
Naphthalene	Inhalation Lethality: 4 hour(s) LC50 > 0.4 mg/l (Max attainable vapor conc.) (Rat); Oral Lethality: LD 50 533 mg/kg (Mouse)

OTHER INFORMATION

For the product itself:

Target Organs Repeated Exposure: Blood, Liver, Spleen, Thymus

Vapour/aerosol concentrations above recommended exposure levels are irritating to the eyes and respiratory tract, may cause headaches, dizziness, anaesthesia, drowsiness, unconsciousness and other central nervous system effects including death. May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion and blurred vision) and/or damage. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema. Exposure to this material, or one of its components, in situations where there is the potential for high levels, such as in confined spaces or with abuse, may result in abnormal heart rhythm (arrhythmia). High-level exposure to hydrocarbons (above occupational exposure limits) may initiate arrhythmia in a worker that is undergoing stress or is taking a heart-stimulating substance such as epinephrine, a nasal decongestant, or an asthma or cardiovascular drug.
Crude oil: Contains polycyclic aromatic compounds (PACs). Prolonged and / or repeated exposure by skin or inhalation of certain PACs may cause cancer of the skin, lung, and of other sites of the body. In animal studies, some crudes produced skin tumors in mice, while other crudes produced no tumors. Developmental studies of crude oil in lab animals showed reduced fetal weight and increased fetal resorptions at maternally toxic levels. Repeated dermal exposure to crude oils in rats resulted in toxicity to the blood, liver, thymus, and bone marrow.

Contains:

BENZENE: Caused cancer (acute myeloid leukemia and myelodysplastic syndrome), damage to the blood-producing system, and serious blood disorders in human studies. Caused genetic effects and effects on the immune system in laboratory animal and some human studies. Caused toxicity to the fetus and cancer in laboratory animal studies.
Crude oil: Contains polycyclic aromatic compounds (PACs). Prolonged and / or repeated exposure by skin or inhalation of certain PACs may cause cancer of the skin, lung, and of other sites of the body. In animal studies, some crudes produced skin tumors in mice, while other crudes produced no tumors. Developmental studies of crude oil in lab animals showed reduced fetal weight and increased fetal resorptions at maternally toxic levels. Repeated dermal exposure to crude oils in rats resulted in toxicity to the blood, liver, thymus, and bone marrow.
HYDROGEN SULPHIDE: Chronic health effects due to repeated exposures to low levels of H2S have not been established. High level (700 ppm) acute exposure can result in sudden death. High concentrations will lead to cardiopulmonary arrest due to nervous system toxicity and pulmonary edema. Lower levels (150 ppm) may overwhelm sense of smell, eliminating warning of exposure. Symptoms of overexposure to H2S include headache, fatigue, insomnia, irritability, and gastrointestinal problems. Repeated exposures to approximately 25 ppm will irritate mucous membranes and the respiratory system and have been implicated in some eye damage. NAPHTHALENE: Exposure to high concentrations of naphthalene may cause destruction of red blood cells, anemia, and cataracts. Naphthalene

caused cancer in laboratory animal studies, but the relevance of these findings to humans is uncertain.
N-HEXANE: Prolonged and/or repeated exposures to n-Hexane can cause progressive and potentially irreversible damage to the peripheral nervous system (e.g. fingers, feet, arms, legs, etc.). Simultaneous exposure to Methyl Ethyl Ketone (MEK) or Methyl Isobutyl Ketone (MIBK) and n-Hexane can potentiate the risk of adverse effects from n-Hexane on the peripheral nervous system. n-Hexane has been shown to cause testicular damage at high doses in male rats. The relevance of this effect for humans is unknown. TOLUENE : Concentrated, prolonged or deliberate inhalation may cause brain and nervous system damage. Prolonged and repeated exposure of pregnant animals (> 1500 ppm) have been reported to cause adverse fetal developmental effects. ETHYLBENZENE: Caused cancer in laboratory animal studies. The relevance of these findings to humans is uncertain.

CMR Status:

Chemical Name	CAS Number	List Citations
Benzene	71-43-2	1, 4, 5
CYCLOHEXANE	110-82-7	4
ETHYL BENZENE	100-41-4	3, 4
HYDROGEN SULPHIDE	7783-06-4	4
n-Hexane	110-54-3	4
Naphthalene	91-20-3	3, 4
Toluene	108-88-3	4
XYLENES	1330-20-7	4

--REGULATORY LISTS SEARCHED--

1 = IARC 1
2 = IARC 2A
3 = IARC 2B
4 = ACGIH ALL
5 = ACGIH A1
6 = ACGIH A2

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data for the material, components of the material, or for similar materials, through the application of bridging principals.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

More volatile component -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

Less volatile component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Low molecular wt. component -- Expected to be inherently biodegradable

High molecular wt. component -- Expected to biodegrade slowly.

Photolysis:

More water soluble component -- Expected to degrade at a moderate rate in water when exposed to sunlight.

Atmospheric Oxidation:

More volatile component -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL

Components -- Has the potential to bioaccumulate.

ECOLOGICAL DATA

Ecotoxicity

Test	Duration	Organism Type	Test Results
Aquatic - Acute Toxicity	48 hour(s)	Invertebrate	EC50 10 - 100 mg/l: data for similar materials

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (TDG)

Proper Shipping Name: PETROLEUM CRUDE OIL
Hazard Class & Division: 3
UN Number: 1267
Packing Group: I
Special Provisions: 92,106,150

LAND (DOT)

Proper Shipping Name: PETROLEUM CRUDE OIL
Hazard Class & Division: 3
ID Number: 1267
Packing Group: I
ERG Number: 128
Label(s): 3
Transport Document Name: UN1267, PETROLEUM CRUDE OIL, 3, PG I

SEA (IMDG)

Proper Shipping Name: PETROLEUM CRUDE OIL
Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 1267
Packing Group: I
Marine Pollutant: Yes
Label(s): 3
Transport Document Name:

AIR (IATA)

Proper Shipping Name: PETROLEUM CRUDE OIL
Hazard Class & Division: 3
UN Number: 1267
Packing Group: I
Label(s) / Mark(s): 3
Transport Document Name: UN1267, PETROLEUM CRUDE OIL, 3, PG I

SECTION 15 REGULATORY INFORMATION

CEPA: All components of this product are either on the Domestic Substance List (DSL) or are exempt.

Listed or exempt from listing/notification on the following chemical inventories (May contain substance(s) subject to notification to the EPA Active TSCA inventory prior to import to USA): AICS, DSL, ENCS, IECSC, KECI, PICCS, TSCA

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
CYCLOHEXANE	110-82-7	6
n-Hexane	110-54-3	6
Naphthalene	91-20-3	6
Toluene	108-88-3	6

XYLENES	1330-20-7	6

--REGULATORY LISTS SEARCHED--

1 = TSCA 4	3 = TSCA 5e	5 = TSCA 12b
2 = TSCA 5a2	4 = TSCA 6	6 = NPRI

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
H220: Extremely flammable gas; Flammable Gas, Cat 1
H225: Highly flammable liquid and vapor; Flammable Liquid, Cat 2
H226: Flammable liquid and vapour; Flammable Liquid, Cat 3
H280: Contains gas under pressure; may explode if heated; Pressurized Gas
H302: Harmful if swallowed; Acute Tox Oral, Cat 4
H303: May be harmful if swallowed; Acute Tox Oral, Cat 5
H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
H312: Harmful in contact with skin; Acute Tox Dermal, Cat 4
H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
H319(2A): Causes serious eye irritation; Serious Eye Damage/Irr, Cat 2A
H320(2B): Causes eye irritation; Serious Eye Damage/Irr, Cat 2B
H330(2): Fatal if inhaled; Acute Tox Inh, Cat 2
H332: Harmful if inhaled; Acute Tox Inh, Cat 4
H335: May cause respiratory irritation; Target Organ Single, Resp Irr
H336: May cause drowsiness or dizziness; Target Organ Single, Narcotic
H340(1B): May cause genetic defects; Germ Cell Mutagenicity, Cat 1B
H350(1A): May cause cancer; Carcinogenicity, Cat 1A
H350(1B): May cause cancer; Carcinogenicity, Cat 1B
H351: Suspected of causing cancer; GHS Carcinogenicity, Cat 2
H361(D): Suspected of damaging the unborn child; Repro Tox, Cat 2 (Develop)
H361(F): Suspected of damaging fertility; Repro Tox, Cat 2 (Fertility)
H372: Causes damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 1
H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
H401: Toxic to aquatic life; Acute Env Tox, Cat 2
H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1
H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2
H412: Harmful to aquatic life with long lasting effects; Chronic Env Tox, Cat 3

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Updates made in accordance with implementation of GHS requirements.

THIS SDS COVERS THE FOLLOWING MATERIALS: BAKKEN SASKATCHEWAN | BC LT | BONNIE GLEN SWEET | DRAYTON VALLEY SWEET | GIBSONS MIXED BLEND SWEET-HARDISTY | KOCH SWEET BLEND | MIXED BLEND SWEET | NEXUS SWEET | NORMAN WELLS | ONT. SWEET | PEACE SWEET | RAINBOW | RANGELAND LT SWEET | SWAN HILLS | TERRA NOVA | WTI LIGHT

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Inject 5
CP Damage Assessment Forms

Tank Car Damage and Inspection Form

Completed By: _____ Waybill # _____

Date: _____ Time: _____

Car Number _____

Type of Car: ☐ Low Pressure ☐ Cryogenic ☐ Pressure ☐ Other

Specification #: _____ ☐ Picture Taken

Capacity: _____ ☐ Picture Taken

UN #: _____ ☐ Picture Taken

Jacketed: ☐ Y ☐ N

Insulated: ☐ Y ☐ N

Material: _____

Test Pressure: _____ ☐ Picture Taken

Build Date _____ ☐ Picture Taken

Construction Materials: _____

Type: _____

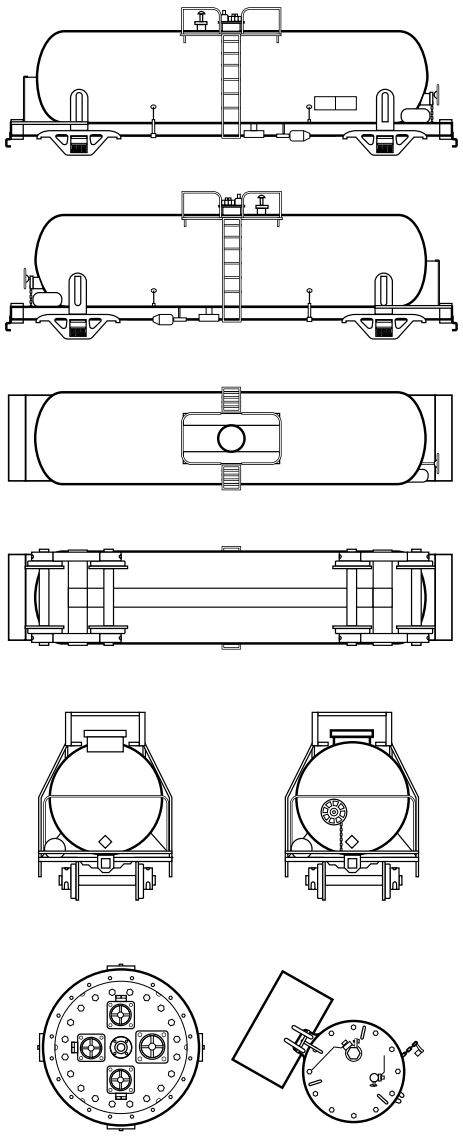
Thickness: _____

Fitting/Damage

Fitting	Damaged	Leaking	Picture Taken	Comments
Liquid Valve	☐	☐	☐	
Vapour Valve	☐	☐	☐	
BOV	☐	☐	☐	
PRD (1)	☐	☐	☐	PressureRating
PRD (2)	☐	☐	☐	PressureRating
VRV	☐	☐	☐	
Gauge	☐	☐	☐	
Manway	☐	☐	☐	
Fill Hole	☐	☐	☐	
Sample Line	☐	☐	☐	
Thermo Well	☐	☐	☐	

Car Diagram

Indicate location and severity of damage (punctures, cracks, scores, gouges, wheel burns, dents, rail burns, underframe and leaks) on the appropriate diagrams(s).



Picture Taken
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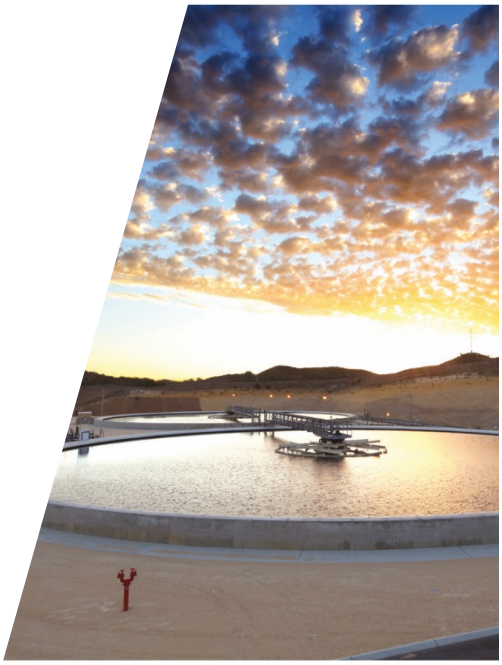
Inject 6
UAV Arial Imagery

Inject 7
Air Monitoring Plan



Air Monitoring Plan

Canadian Pacific Railway
Release Exercise

Canadian Pacific Railway

Table of Contents

Table Index

1. Introduction and Objectives

GHD was notified of a Canadian Pacific Railway (CP) freight train derailment at approximately 09:00 EST (Site). This Air Monitoring Plan (AMP) was prepared to address response activities for the derailment. According to the United Nations (UN) number and chemical information provided by CP representatives, the products involved in the derailment are ethanol, styrene, and methyl ethyl ketone (MEK). In addition, benzene may be present in ethanol. These four compounds will be the constituents of interest (COI) based on the provided Safety Data Sheets (SDS).

To help ensure that CP and contracted employees working at the Site are adequately protected from exposure to potential air contaminants, GHD has developed this air monitoring plan (AMP).

The elements of the AMP include:

- Air monitoring for benzene, ethanol, combustible gases measured as lower explosive limit (LEL), MEK, and styrene, at the derailment Site.
- Establish and implement procedures to ensure an appropriate response to elevated levels of each COI. This may include identifying areas requiring respiratory protection, or arranging for a timely evacuation of the Site in the event that hazardous concentrations are detected.
- Communicate the hazards associated with exposures to COIs to affected workers, members of the neighboring community, and other potential receptors.
- Provide recommendations for controlling Site exposures, respiratory protection and other personal protective equipment (PPE) to on-Site personnel.

2. Occupational Exposure Limits and Guidelines

Railroads are regulated by Federal occupational health and safety legislation. The Labour Code references threshold limit values (TLVs) recommended by the American Conference of Governmental Industrial Hygienists (ACGIH) as occupational exposure Limits (OELs). ACGIH recommends TLVs based on time weight average (TWA) exposures, short term exposure limits (STEL), and ceiling exposures.

The TLV-TWA is based on a conventional 8-hour workday and a 40-hour workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, for a working lifetime without adverse effect.

The TLV-STEL is a 15-minute TWA concentration that nearly all workers can be exposed to continuously for a short period of time without suffering adverse effects. A worker can be exposed up to 4 times a day with a minimum of 60 minutes between each exposure.

The TLV-Ceiling is a maximum concentration that should never be exceeded.

Additionally, the National Institute of Occupational Safety and Health (NIOSH) has established immediately dangerous to life and health (IDLH) limits for various chemicals indicating

concentrations of various COIs that may cause death or immediate or delayed permanent adverse effects or prevent escape from a toxic environment.

Table 1 summarizes ACGIH TLVs and NIOSH IDLH levels for the COIs.

Table 1 Occupational Exposure Limits and Guidelines

COIs	ACGIH Guidelines		NIOSH - IDLH	Units
	TWA	STEL		
Benzene	0.5	2.5	500	ppm
Ethanol	NE	1,000	3,300	ppm
Methyl Ethyl Ketone	200	300	3,000	ppm
Styrene	20	40	700	ppm

Notes:
COI – Constituent of Interest
STEL – Short-term exposure limit
TWA – Time-weighted average
NE – Not established
ppm – parts per million
ACGIH – American Conference of Governmental Industrial Hygienists
NIOSH – National Institute of Occupational Safety and Health
IDLH – Immediately dangerous to life and health

2.1 Combustible Gases measured as LEL

In addition to the exposure limits, chemicals may have a flammable range. The flammable range has a LEL and upper explosive limit (UEL). The LEL is the lowest percentage of vapours required to create an explosive atmosphere, below which the vapour mixture would be too lean to ignite. The UEL is the maximum percentage of vapours required to create an explosive atmosphere, above which the mixture would be too rich to ignite. If the COI vapours are within the explosive range, an adequate supply of oxygen is present, and an ignition source is introduced, an explosion or fire will occur. With operations involving flammable gases or vapors it is critical that concentrations do not exceed the LEL to prevent a flash fire or explosion.

In gas/vapor detection systems, the amount of a particular gas/vapor present in an atmosphere is measured as a percentage of the LEL. For comparison, an instrument reading of 0% LEL indicates an atmosphere free of a combustible gas/vapor; while a measurement of 100% LEL denotes an atmosphere that is at the LEL for that gas/vapor. The relationship between the percentage of LEL and percentage of the gas/vapor by volume differs among combustible gases/vapors. NIOSH has established a safety factor to prevent workers from entering an explosive atmosphere. NIOSH considers an environment to be hazardous if a combustible gas/vapor is detected at 10% of its established LEL.

Calibration of a combustible gas/vapor detection systems is typically completed using methane gas. Different chemicals will not correspond directly to the methane calibration curve and will therefore provide a biased high or low measurements. For this reason the combustible gases measured as LEL action level is conservatively selected.

3. Action Levels

3.1 Worker Action Levels and Description of Action

Action levels have been established to facilitate a timely and appropriate response to the detection of airborne hazards associated with benzene, ethanol, combustible gases measured as LEL, MEK, and styrene. Action levels have been set at levels lower than the established exposure limits and guidelines to ensure that if these levels are detected, they are effectively communicated to appropriate Site personnel and/or off-Site receptors so that appropriate action can be taken.

The Site-specific action levels for the Site are listed in Table 2.

Table 2 Real-Time Air Monitoring Action Levels

COIs	Action Level [1]	Description of Action
Benzene	<0.5 ppm	Action Level 1 – No action required.
	≥0.5 ppm	Action Level 2 – Communicate air monitoring reading to Site officials. Confirm air monitoring reading with a duplicate instrument. If confirmatory air monitoring indicates benzene concentrations above the action level recommend initiating SWA. If air monitoring readings continue to indicate benzene concentrations above the action levels consult with a GHD CIH/ROH, Toxicologist, or qualified individuals to recommend a course of action that maintains operational effectiveness and reduces potential exposures to acceptable levels.
Combustible gases as LEL (measured as methane) [2]	<1 %	Action Level 1 – No action required.
	≥1 %	Action Level 2 – Communicate air monitoring reading to Site officials. Confirm air monitoring reading with a duplicate instrument. If confirmatory air monitoring indicates combustible gases concentrations above the action level recommend initiating SWA. If air monitoring readings continue to indicate combustible gases concentrations above the action limit consult with a GHD CIH/ROH, Toxicologist, or qualified individuals to recommend a course of action that maintains operational effectiveness and reduces potential exposures to acceptable levels.
Ethanol	<500 ppm	Action Level 1 – No action required.
	≥500 ppm	Action Level 2 – Communicate air monitoring reading to Site officials. Confirm air monitoring reading with a duplicate instrument. If confirmatory air monitoring indicates ethanol concentrations above the action level recommend initiating SWA. If air monitoring readings continue to indicate ethanol concentrations above the action limit consult with a GHD CIH/ROH, Toxicologist, or qualified individuals to recommend a course of action that maintains operational effectiveness and reduces potential exposures to acceptable levels.
MEK	<100 ppm	Action Level 1 – No action required.
	≥100 ppm	Action Level 2 – Communicate air monitoring reading to Site officials. Confirm air monitoring reading with a duplicate instrument. If confirmatory air monitoring indicates MEK concentrations above the action level recommend initiating SWA. If air monitoring readings continue to indicate MEK concentrations above the action limit consult with a GHD CIH/ROH, Toxicologist, or qualified individuals to recommend a course of action that maintains operational effectiveness and reduces potential exposures to acceptable levels.

Table 2 Real-Time Air Monitoring Action Levels Continued

COIs	Action Level [1]	Description of Action
Styrene	<10 ppm	Action Level 1 – No action required.
	≥10 ppm	Action Level 2 – Communicate air monitoring reading to Site officials. Confirm air monitoring reading with a duplicate instrument. If confirmatory air monitoring indicates styrene concentrations above the action level recommend initiating SWA. If air monitoring readings continue to indicate styrene concentrations above the action limit consult with a GHD CIH/ROH, Toxicologist, or other sufficiently qualified individuals to recommend a course of action that maintains operational effectiveness and reduces potential exposures to acceptable levels.

Notes:
1 – Action levels are based on a one minute average.
COI – Chemical of interest
ppm – parts per million
SWA – Stop work authority
CIH – Certified Industrial Hygienist
ROH – Registered Occupational Hygienist

3.2 Instrument Correction Factors

If electrochemical sensors for COIs are not available, and a photoionization detector (PID) must be used for air monitoring and gas detection, correction factors must be applied. All chemicals have individual ionization potentials, for a PID to measure a chemical the voltage of the lamp must be greater than the ionization potential of the chemical. A PID can be equipped with three different lamps; 9.8 electron-volts (eV), 10.6 eV, and 11.7 eV.

A PID does not respond to all chemicals in the same way, so correction factors need to be applied to the PID measurements to determine the correct concentration of the COI in the air. Correction factors are specific to each chemical and each lamp.

Correction factors for the COIs on Site are provided in Table 3.

Table 3 Correction Factors for COI

COIs	Ionization Potential	Correction Factor for 10.6 eV Lamp
Benzene	9.25	0.47
Ethanol	10.47	7.9
MEK	9.51	0.8
Styrene	8.43	0.43

Notes:
COI – Constituent of interest
eV – electron-volts

3.3 Assessment of Action Levels

This AMP is intended to address potential airborne hazards associated with the identified COIs at concentrations that may require modification of work practices and/or control measures to mitigate potential worker exposures.

Some indicators of the need to reassess work practices are:

- Change in weather conditions (i.e., during high wind conditions)

- Temperature extremes
- Change in qualitative levels of chemicals as observed by field personnel
- Change in work scope, which affects the degree of contact with areas of potentially-elevated chemical presence

If airborne concentrations of COI listed in Table 2 are detected above an action level, it is recommended that SWA be implemented and Site personnel are notified. A GHD CIH and/or ROH should be notified and after reviewing the change in conditions, appropriate actions will be recommended and implemented.

4. Community Exposure

4.1 Community Action Levels

Community monitoring will be conducted using real-time air monitoring techniques described below in Section 5. The community action levels will be the same as the worker action levels listed in Section 3 as they are more conservative than the ambient air quality criteria and protective of human health. If detectable concentrations of a COI is present at the perimeter of the work Site, integrated air sampling will be conducted to aid in quantification of the COI, if required. The concentrations listed by the AEGLs are intended to be used in an emergency situation.

Monitoring of properties potentially impacted will be conducted using real-time air monitoring techniques described below, on an as-needed basis, as determined by Site personnel. Additionally, many of the standards or guidelines are intended to protect the general public and sensitive community members from lifetime exposures to each COI. Emergency exposures are generally much shorter and therefore different community standards are warranted for action levels at community locations.

The above action levels in Table 2 should provide adequate control to prevent off-Site migration of COIs. However, if work area air monitoring data indicates that the surrounding community may be impacted, then appropriate community action levels and responses will be developed and this AMP will be revised.

4.2 Assessment of Action Levels

This AMP is intended to address potential airborne hazards associated with the identified COIs at concentrations that may require modification of work practices and/or control measures to mitigate potential worker exposures.

Some indicators of the need for re-assessment are:

- Change in weather conditions (i.e., during high wind conditions)
- Temperature extremes
- Change in qualitative levels of chemicals as observed by field personnel
- Change in work scope, which affects the degree of contact with areas of potentially-elevated chemical presence

If airborne concentrations of any COI listed in Table 2 are detected above an action level, it is recommended that SWA be implemented and Site personnel are notified. A GHD CIH and/or ROH should be notified and after reviewing the change in conditions, appropriate actions will be recommended and implemented.

5. Real-Time Air Monitoring Instrumentation and Implementation

5.1 Real-Time Air Monitoring Instrumentation

Table 4 summarizes the air monitoring instruments that will be used on Site, detection methods, and instrument detection limits.

Table 4 Real-Time Air Monitoring Instrumentation

Instrument	Detection Method	COI	Instrument Detection Limit
AreaRAE and MultiRAE	Catalytic Bead Sensor	Combustible Gases	1%
	Electrochemical Sensor	Oxygen	0.1%
	Electrochemical Sensor	Hydrogen Sulphide	0.1 ppm
	Electrochemical Sensor	Carbon Monoxide	0.1 ppm
	PID	Benzene, Ethanol, MEK, Styrene	0.1
Piston Hand Pump with Colorimetric Detection Tubes	Acid-base reaction resulting in color change	Benzene, Ethanol, MEK, Styrene	Variable
Notes: ppm – Parts per million PID – Photoionization detector N/A – Not applicable			

Instruments will be calibrated and operated in general accordance with the manufacturer's specifications or applicable test/method specifications.

5.2 Real-Time Air Monitoring Implementation

Real-time air monitoring for COI will be performed at the following locations:

- Worker Site
- Site perimeter
- Potential off-Site receptors in the surrounding community.

Air sampling instrumentation, as outlined in Table 5, will be placed at the abovementioned locations and will monitor and log concentrations of the COIs, as required.

Using radio telemetry, continuously logged readings for each AreaRAE will be transmitted to a single host computer at the Site, allowing GHD personnel to simultaneously monitor the airborne

concentrations at AreaRAE stations from a central location. If airborne concentrations of COI listed in Table 2 are detected above action levels, it is recommended that SWA be implemented and designated Site personnel, GHD personnel, and GHD CIH/ROH be notified, and appropriate actions will be recommended and implemented, as required.

MultiRAE monitors will be used to monitor the airborne concentrations of COIs at the abovementioned locations. If airborne concentrations of the COIs listed in Table 2 are detected above the Site-specific Action Level, it is recommended that designated Site personnel, GHD personnel, and GHD CIH/ROH be notified and appropriate actions will be taken to assist the health and safety of the potentially affected individuals.

6. Integrated Air Sampling

Based on Site conditions, integrated air sampling may be used to characterize potential exposures to COIs and qualify results of air monitoring instrumentation. Personal and/or area air samples may be collected from the breathing zones of on-Site workers, or in breathing zone height in works areas to evaluate potential exposures to COIs.

A similar exposure group (SEG) analysis will be conducted prior to integrated air sampling to determine the number of samples that should be collected to represent the various job tasks conducted during the project. SEGs are groups of workers having the same general exposure profile because of the similarities and frequency of the tasks they perform, the materials or processes in which they work, and the similarity of the way they perform the tasks. GHD personnel will identify and continuously observe work activities with potential for exposures to determine SEGs.

The air samples will be shipped, under a chain-of-custody protocol, to a laboratory that is accredited by the American Industrial Hygiene Association's Laboratory Accreditation Program (AIHA) or Canadian Association for Laboratory Accreditation Inc. (CALA) for analysis.

Samples will be collected and analyzed in accordance with established analytical methods. Field blanks will be collected and provided to the laboratory for quality control purposes.

The integrated air sampling methods for the COIs are summarized in Table 5.

Table 5 Integrated Air Sampling Media

COI	Sample Media
Benzene	3M 3520
Ethanol	3M 3520
MEK	3M 3520
Styrene	3M 3520

7. Respiratory Protection Plan

7.1 Respiratory Protection

This AMP is intended to address potential airborne hazards associated with the COIs at concentrations that might require the use respiratory protection.

If airborne concentrations of the COI listed in Table 3, are detected above the action levels established, SWA will be implemented and designated Site personnel, GHD personnel, GHD CIH/ROH, and affected workers will be notified.

Site personnel needing respiratory protection are required to have fit-tested respiratory protection available.

Respirator usage will be upgraded or downgraded based upon a change in Site conditions and/or the review of the results of ongoing air monitoring efforts. After reviewing the change in conditions, appropriate actions will be taken.

7.2 Reassessment of Respiratory Protection

When a significant change occurs, they will be documented and subsequently re-assessed. Some indicators of the need for reassessment are:

- Change in weather conditions (i.e., during high wind conditions)
- Temperature extremes or individual medical considerations limit the effectiveness of personal protective equipment (PPE)
- Change in qualitative levels of chemicals as observed by Site personnel
- Change in work scope, which affects the degree of contact with areas of potentially-elevated chemical presence
- Any changes in level of physical changes noted by Site personnel

All proposed changes to respiratory protection, as well as other PPE requirements, will be reviewed by designated Site personnel, GHD personnel, and GHD CIH/ROH, for approval, prior to implementation.

8. Quality Assurance/Quality Control (QA/QC) and Reporting

Real-time data collected will be stored in an on-Site electronic archive. Manually-collected real-time data and integrated sampling information will be reviewed to ensure accuracy and completeness. The manually-collected monitoring/sampling data will be entered into an electronic database (spreadsheet or equivalent), and will undergo a quality assurance and quality control (QA/QC) review. Data entry forms and field notes will be kept on-Site and retained for reference upon completion of the project. If necessary, full laboratory analysis data packages will be provided, and associated data validation processes will be arranged.

During the project, interim reporting of results may be required. This may include data summaries, maps, or other presentations of preliminary monitoring and sampling results. For example, a data summary will be provided to CP every 24 hours, once data have undergone an initial QA/QC. Such reporting will be considered preliminary, as a final QA/QC of the data will not be complete. At the completion of the project, a report will be prepared in which data collected through real-time monitoring and integrated sampling analyses will be compiled, summarized, and reported to CP. Data contained in the final report will have been through QA/QC processes, reviewed by a CIH/ROH, and will be considered final.

As additional information becomes available, this AMP may be revised as necessary and appropriate to meet the objectives as previously stated.

about GHD

GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

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Inject 8
Imagery from Site

Inject 9
Air Monitoring Memo

Memorandum

To:	Canadian Pacific, DGO	Ref. No.:	11205945
From:	GHD/aj/1	Tel:	519-884-0510

Subject: Summary of Air Monitoring/Sampling Results for OP1

The purpose of this memorandum is to provide Canadian Pacific Railway (CP) Site management a summary of the air monitoring activities, results, and observations from the air monitoring being performed at the release Site. This summary memorandum summarizes the AreaRAE air monitoring data collected from operation period 1 (OP1) and the manually logged data from the same period recorded from within the Site work area. Real-time air monitoring was used as a screening tool to quickly indicate the presence of airborne concentrations of Compounds of Interest (COI) for the purpose of evaluating conditions at the perimeter of the Site. All air monitoring activities were conducted in accordance with the Air Monitoring Plan.

Manually Logged Real-time Data

The purpose of the manually logged data was to characterize (in real time) potential vapors and gases related to the release. Data was collected using handheld monitoring instruments equipped with a PID (10.6 eV lamp) for monitoring volatile organic compounds (VOCs) and chemical specific electrochemical sensors specific for carbon monoxide (CO), hydrogen sulfide (H_2S), and flammability (LEL). The data collected using these instruments was logged into an electronic handheld data collection device and stored in a secure GHD database. Manually logged VOC data is summarized in Attachment 1.

AreaRAE Real-time Data

GHD personnel deployed five (5) AreaRAE 5 gas monitors in order to continuously monitor work area and perimeter locations. During this operational period GHD has collected approximately 2,520 AreaRAE real-time readings in the work zone and perimeter areas using the real-time air monitoring instruments. No perimeter action level exceedances were noted during the reporting period. AreaRAE data is summarized in Attachment 2.

Next Operational Period

Site activities during the next operational period will include heavy equipment operations, remedial excavation, product recovery, environmental monitoring, and Site management activities. Air monitoring will continue to be conducted in accordance with the approved Air Monitoring Plan.

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Attachment 1

Manually Logged Real-Time Data Summary							
Monitoring Period– OP1							
WORK AREA MONITORING							
Parameter	Number of Readings Collected	Number of Detectable Readings	Detectable Reading Minimum	Detectable Reading Average	Detectable Reading Maximum	Units	Comments
VOC	34	10	0.1	1.02	90*	ppm	*The maximum detected readings were collected within the active work area at the source zone, workers donning respiratory protection
Notes: VOC = Volatile Organic Compounds ppm = Parts Per Million							

Attachment 2

Unit ID: 292-504501						
Location Description: AreaRAE North ~200m from Site						
Monitoring Period: OP1						
Parameter	Monitoring Period Summary		Detected Measurements Summary			
	Total # of Readings	TWA Concentration	Total # of Detections	Average Concentration of Detections	Total # of Readings Above Action Level	Maximum Airborne Concentration
VOCs	510	0.0 ppm	0	0.0 ppm	0	0.0 ppm
CO	510	0.0 ppm	0	0.0 ppm	0	0.0 ppm
H2S	510	0.0 ppm	0	0.0 ppm	0	0.0 ppm
LEL	510	0%	0	0%	0	0%

Unit ID: 292-504503						
Location Description: AreaRAE South ~200m from Site						
Monitoring Period: OP1						
Parameter	Monitoring Period Summary		Detected Measurements Summary			
	Total # of Readings	TWA Concentration	Total # of Detections	Average Concentration of Detections	Total # of Readings Above Action Level	Maximum Airborne Concentration
VOCs	526	0.00 ppm	0	0.0 ppm	0	0.0 ppm
CO	526	0.00 ppm	0	0.0 ppm	0	0.0 ppm
H2S	526	0.00 ppm	0	0.0 ppm	0	0.0 ppm
LEL	526	0 %	0	0%	0	0%

Attachment 2

Unit ID: 292-504504						
Location Description: AreaRAE West ~ 200m from Site						
Monitoring Period: OP1						
Parameter	Monitoring Period Summary		Detected Measurements Summary			
	Total # of Readings	TWA Concentration	Total # of Detections	Average Concentration of Detections	Total # of Readings Above Action Level	Maximum Airborne Concentration
VOCs	498	0.0 ppm	0	0.0 ppm	0	0.0 ppm
CO	498	0.0 ppm	0	0.0 ppm	0	0.0 ppm
H2S	498	0.0 ppm	0	0.0 ppm	0	0.0 ppm
LEL	498	0%	0	0%	0	0%

Unit ID: W01A00000457						
Location Description: AreaRAE East ~ 200m from Site						
Monitoring Period: OP1						
Parameter	Monitoring Period Summary		Detected Measurements Summary			
	Total # of Readings	TWA Concentration	Total # of Detections	Average Concentration of Detections	Total # of Readings Above Action Level	Maximum Airborne Concentration
VOCs	519	0.3 ppm	94	0.3 ppm	0	1.9 ppm
CO	519	0.00 ppm	0	0.0 ppm	0	0.0 ppm
H2S	519	0.00 ppm	0	0.0 ppm	0	0.0 ppm
LEL	519	0%	0	0%	0	0%

Unit ID: 292-504502						
Location Description: AreaRAE at the work Site						
Monitoring Period: OP1						
Parameter	Monitoring Period Summary		Detected Measurements Summary			
	Total # of Readings	TWA Concentration	Total # of Detections	Average Concentration of Detections	Total # of Readings Above Action Level	Maximum Airborne Concentration
VOCs	467	1.7 ppm	411	1.7 ppm	8	29.9 ppm
CO	467	0.0 ppm	0	0.0 ppm	0	0 ppm
H2S	467	0.0 ppm	0	0.0 ppm	0	0.0 ppm
LEL	467	0%	0	0%	0	0%