

Mayflower Pipeline Incident Response

Post-Construction Sheen Monitoring Monthly Report #7: October 2015

Mayflower, Arkansas

Period: 10/01/2015 through 10/31/2015

Monitoring Days: 10/07/2015, 10/14/2015, and 10/28/2015

Legend:

Green Line – No Sheen

Aqua Circle – Brittle Sheen Location

Pink Circle – Non-Brittle Sheen Location

Yellow Arrow – September 2015 Additional Organoclay Placement

Observations in Inlet Channel:

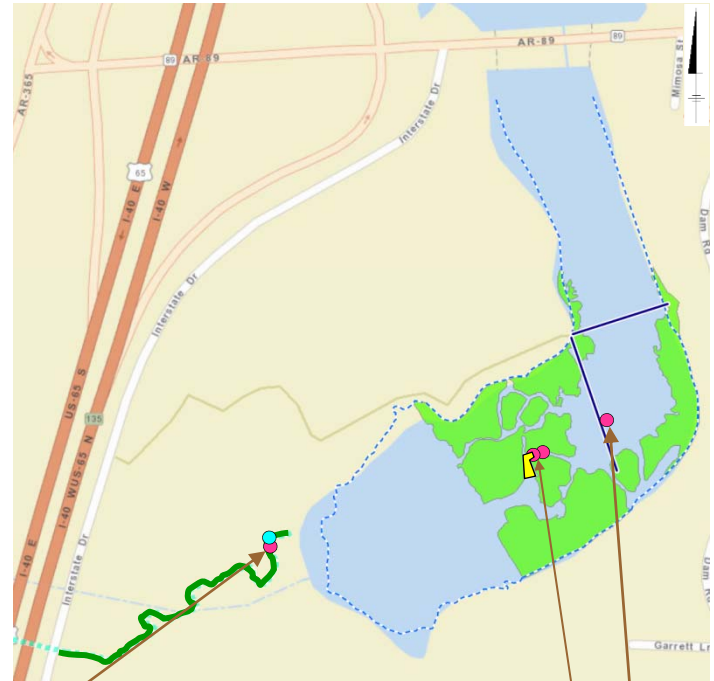
- October 7, 2015: One cover (no particular structure) of silver gray sheen observed in Inlet Channel. Sheen did not break when disturbed ("non-brittle")¹. A sheen net sample was collected and the laboratory analysis of the sample indicated a resemblance to background anthropogenic sources; the sample did not resemble the crude oil from the Pegasus Pipeline.
- October 14, 2015: One patch of silver gray sheen observed in Inlet Channel. Sheen broke apart when disturbed ("brittle")².

Observations in Cove:

- October 14, 2015: One patch/streamer of non-brittle¹ silver gray sheen observed in Heavily Vegetated Area. A sheen net sample was collected and the laboratory analysis of the sample collected indicated a combination of degraded crude oil from the Pegasus Pipeline and background anthropogenic sources.
- October 28, 2015: One patch of non-brittle¹ silver gray sheen observed in Heavily Vegetated Area. A sheen net sample was collected for laboratory analysis. Laboratory results will be reported in the next monthly report.
- October 28, 2015: One patch of non-brittle¹ silver gray sheen observed downstream of Heavily Vegetated Area. A sheen sample was collected for laboratory net analysis. Laboratory results will be reported in the next monthly report.

Path Forward for November 2015:

- Continue biweekly sheen monitoring in Cove.



Cove (Summary of Observations from October 2015)



Silver Gray Sheen Cover Observation on 10/07/2015



Silver Gray Sheen Patch/Streamer Observation on 10/14/2015



Silver Gray Sheen Patch Observation on 10/28/2015

Notes:

- Non-brittle sheens are often related to anthropogenic sources, including petrogenic sources (e.g., petroleum hydrocarbons).
- Brittle sheens are often of natural biogenic origin.
- Laboratory testing is required to distinguish sheen sources (e.g., crude oil, roadway runoff, natural biogenic activity).
- Sheen color (dark/metallic/rainbow/silver gray) and structure (patches/streamers/cover) terminology reference: NOAA 2007. NOAA Open Water Oil Identification Job Aid.

Sheen Observation Form

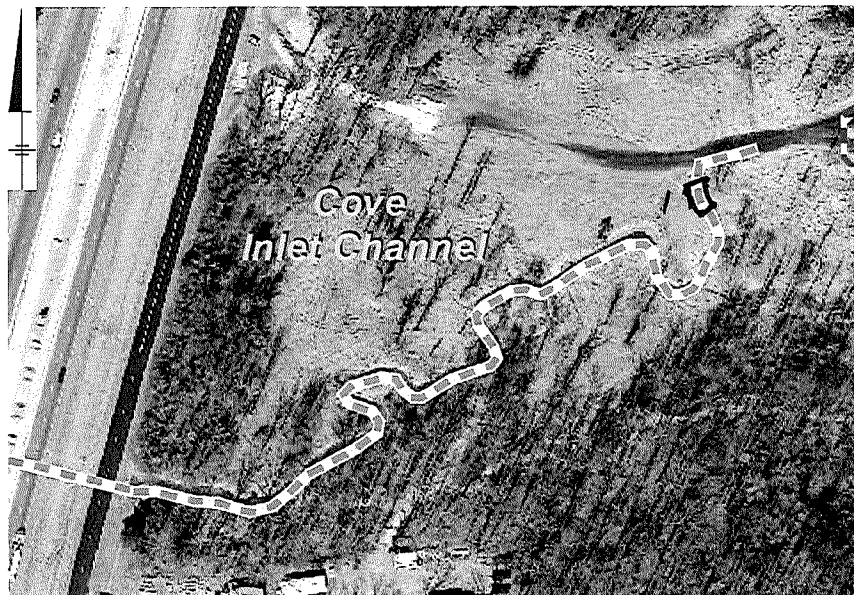
Personnel: ZAP

Date: 10/7/15

Wind Conditions: Windy/Light Breeze/Calm

Temperature: 20°F

Sky Conditions: Sun/Clouds/Part Sun/Part Clouds



| | |
|--|---|
| LOCATION: | TIME: |
| If yes, sketch on Figure 1 to show approximate location | |
| Approximate size (dimensions) | |
| Over what percentage of surface? | Trace <1% <input type="checkbox"/> 1-10% <input type="checkbox"/> |
| 11-30% <input type="checkbox"/> 31-50% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70% <input type="checkbox"/> | |
| Color of sheen: Dark / Metallic / Rainbow / Silver Gray | |
| Sheen structure: No structure / Patches / Streamers / Tar Balls / Windrows | |
| Observations when sheen is disturbed: Breaks Apart/Brittle <input checked="" type="checkbox"/> Does not Break/Non-Brittle <input type="checkbox"/> | |
| If streamers are present, what is their orientation? | |
| Is sheen blossoming? Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| If yes, what is the frequency (per 15 minutes)? | |
| Sheen origination (if noticable)? | |
| Flow Condition: | |
| Picture taken Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Action taken: | |
| Notes | |

| | |
|--|---|
| LOCATION: <u>1</u> | TIME: <u>0845</u> |
| Sketch on Figure 1 to show approximate location | |
| Approximate size (dimensions) <u>10' x 25'</u> | |
| Over what percentage of surface? | Trace <1% <input type="checkbox"/> 1-10% <input type="checkbox"/> |
| 11-30% <input type="checkbox"/> 31-50% <input checked="" type="checkbox"/> 50-70% <input type="checkbox"/> >70% <input type="checkbox"/> | |
| Color of sheen: Dark / Metallic / Rainbow / Silver Gray | |
| Sheen structure: <u>No structure</u> / Patches / Streamers / Tar Balls / Windrows | |
| Observations when sheen is disturbed: Breaks Apart/Brittle <input type="checkbox"/> Does not Break/Non-Brittle <input checked="" type="checkbox"/> | |
| If streamers are present, what is their orientation? <u>NA</u> | |
| Is sheen blossoming? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | |
| If yes, what is the frequency (per 15 minutes)? <u>NA</u> | |
| Sheen origination (if noticable)? <u>NA</u> | |
| Picture taken <u>S, 6, 7</u> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | |
| Flow Condition: <u>low flow</u> | |
| Action taken: <u>sampled sheen</u> | |
| Notes | |

| | |
|---|---|
| LOCATION: | TIME: |
| If yes, sketch on Figure 1 to show approximate location | |
| Approximate size (dimensions) | |
| Over what percentage of surface? | Trace <1% <input type="checkbox"/> 1-10% <input type="checkbox"/> |
| 11-30% <input type="checkbox"/> 31-50% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70% <input type="checkbox"/> | |
| Color of sheen: Dark / Metallic / Rainbow / Silver Gray | |
| Sheen structure: No structure / Patches / Streamers / Tar Balls / Windrows | |
| Observations when sheen is disturbed: Breaks Apart/Brittle <input type="checkbox"/> Does not Break/Non-Brittle <input type="checkbox"/> | |
| If streamers are present, what is their orientation? | |
| Is sheen blossoming? Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| If yes, what is the frequency (per 15 minutes)? | |
| Sheen origination (if noticable)? | |
| Picture taken Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Flow Condition: | |
| Action taken: | |
| Notes | |

Sheen Observation Form

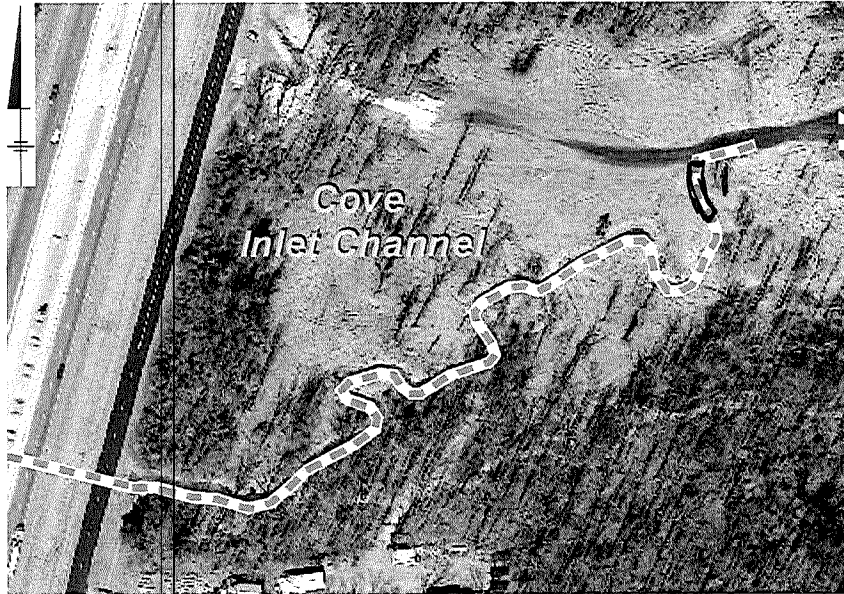
Personnel: Michael Hiers

Date: 10-14-15

Wind Conditions: Windy/Light Breeze/Calm

Temperature: 90° F

Sky Conditions: Sun/Clouds/Part Sun/Part Clouds



LOCATION:

TIME:

If yes, sketch on Figure 1 to show approximate location

Approximate size (dimensions)

Over what percentage of surface?

Trace <1% ☐

1-10% ☐

11-30% ☐

31-50% ☐

50-70% ☐

>70% ☐

Color of sheen: Dark / Metallic / Rainbow / Silver Gray

Sheen structure: No structure / Patches / Streamers / Tar Balls / Windrows

Observations when sheen is disturbed: Breaks Apart/Brittle ☐

Does not Break/Non-Brittle ☐

If streamers are present, what is their orientation?

Is sheen blossoming?

Yes ☐

No ☐

If yes, what is the frequency (per 15 minutes)?

Sheen origination (if noticable)?

Flow Condition:

Picture taken

Yes ☐

No ☐

Action taken:

Notes

LOCATION: 1

TIME: 12:23 PM

Sketch on Figure 1 to show approximate location

Approximate size (dimensions) 10 x 30'

Over what percentage of surface?

Trace <1% ☐

1-10% ☐

11-30% ☐

31-50% ☒

50-70% ☐

>70% ☐

Color of sheen: Dark / Metallic / Rainbow / Silver Gray

Sheen structure: No structure / Patches / Streamers / Tar Balls / Windrows

Observations when sheen is disturbed: Breaks Apart/Brittle ☒

Does not Break/Non-Brittle ☐

If streamers are present, what is their orientation? N/A

Is sheen blossoming?

Yes ☐

No ☒

If yes, what is the frequency (per 15 minutes)? N/A

Sheen origination (if noticable)? N/A

Picture taken 14, 15, 16

Yes ☒

No ☐

Flow Condition: Low

Action taken: None

Notes

LOCATION:

TIME:

If yes, sketch on Figure 1 to show approximate location

Approximate size (dimensions)

Over what percentage of surface?

Trace <1% ☐

1-10% ☐

11-30% ☐

31-50% ☐

50-70% ☐

>70% ☐

Color of sheen: Dark / Metallic / Rainbow / Silver Gray

Sheen structure: No structure / Patches / Streamers / Tar Balls / Windrows

Observations when sheen is disturbed: Breaks Apart/Brittle ☐

Does not Break/Non-Brittle ☐

If streamers are present, what is their orientation?

Is sheen blossoming?

Yes ☐

No ☐

If yes, what is the frequency (per 15 minutes)?

Sheen origination (if noticable)?

Picture taken

Yes ☐

No ☐

Flow Condition:

Action taken:

Notes

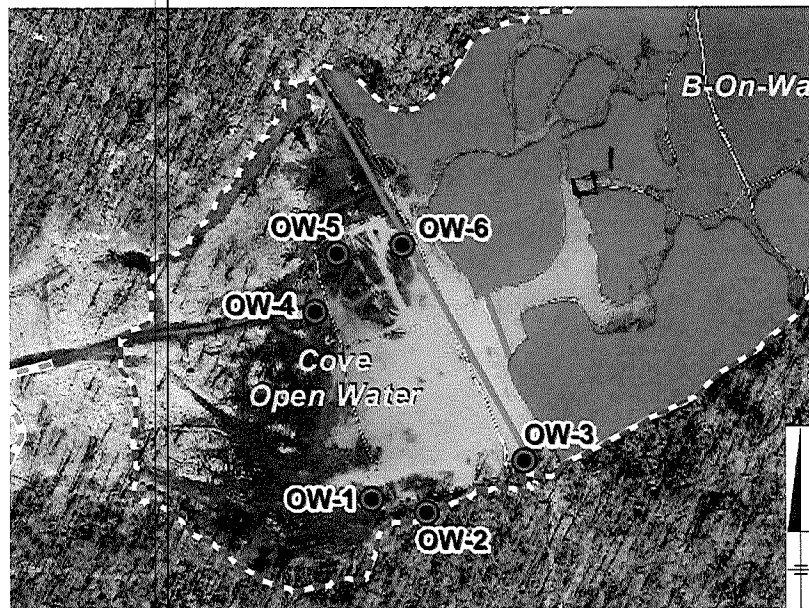
Sheen Observation Form

Personnel: Michael Hiers

Date: 10-14-15

Wind Conditions: Windy/Light Breeze/Calm

Temperature: 90°F Sky Conditions: Sun/Clouds/Part Sun/Part Clouds



LOCATION:

TIME:

If yes, sketch on Figure 1 to show approximate location

Approximate size (dimensions)

Over what percentage of surface?

Trace <1% ☐

1-10% ☐

11-30% ☐

31-50% ☐

50-70% ☐

>70% ☐

Color of sheen: Dark / Metallic / Rainbow / Silver Gray

Sheen structure: No structure / Patches / Streamers / Tar Balls / Windrows

Observations when sheen is disturbed: Breaks Apart/Brittle ☐

Does not Break/Non-Brittle ☐

If streamers are present, what is their orientation?

Is sheen blossoming?

Yes ☐

No ☐

If yes, what is the frequency (per 15 minutes)?

Sheen origination (if noticable)?

Flow Condition:

Picture taken

Yes ☐

No ☐

Action taken:

Notes

LOCATION: 1

TIME: 10:59 AM

Sketch on Figure 1 to show approximate location

Approximate size (dimensions) 15x15'

Over what percentage of surface?

Trace <1% ☒

1-10% ☐

11-30% ☐

31-50% ☐

50-70% ☐

>70% ☐

Color of sheen: Dark / Metallic / Rainbow / Silver Gray

Sheen structure: No structure / Patches / Streamers / Tar Balls / Windrows

Observations when sheen is disturbed: Breaks Apart/Brittle ☐

Does not Break/Non-Brittle ☒

If streamers are present, what is their orientation? N/A

Is sheen blossoming?

Yes ☐

No ☒

If yes, what is the frequency (per 15 minutes)?

Sheen origination (if noticable)? N/A

Picture taken 8/12

Yes ☒

No ☐

Flow Condition: Low

Action taken: Sampled

Notes

LOCATION:

TIME:

If yes, sketch on Figure 1 to show approximate location

Approximate size (dimensions)

Over what percentage of surface?

Trace <1% ☐

1-10% ☐

11-30% ☐

31-50% ☐

50-70% ☐

>70% ☐

Color of sheen: Dark / Metallic / Rainbow / Silver Gray

Sheen structure: No structure / Patches / Streamers / Tar Balls / Windrows

Observations when sheen is disturbed: Breaks Apart/Brittle ☐

Does not Break/Non-Brittle ☐

If streamers are present, what is their orientation?

Is sheen blossoming?

Yes ☐

No ☐

If yes, what is the frequency (per 15 minutes)?

Sheen origination (if noticable)?

Picture taken

Yes ☐

No ☐

Flow Condition:

Action taken:

Notes

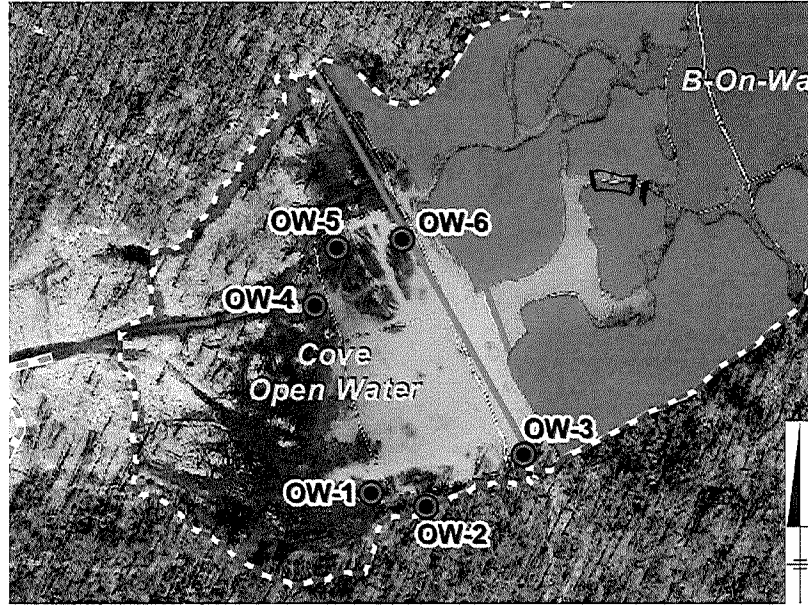
Sheen Observation Form

Personnel: M. Hiers

Date: 10-28-2015

Wind Conditions: Windy/Light Breeze/Calm

Temperature: 68°F Sky Conditions: Sun/Clouds/Part Sun/Part Clouds



LOCATION:

TIME:

If yes, sketch on Figure 1 to show approximate location

Approximate size (dimensions)

Over what percentage of surface?

Trace <1% ☐

1-10% ☐

11-30% ☐

31-50% ☐

50-70% ☐

>70% ☐

Color of sheen: Dark / Metallic / Rainbow / Silver Gray

Sheen structure: No structure / Patches / Streamers / Tar Balls / Windrows

Observations when sheen is disturbed: Breaks Apart/Brittle ☐

Does not Break/Non-Brittle ☐

If streamers are present, what is their orientation?

Is sheen blossoming?

Yes ☐

No ☐

If yes, what is the frequency (per 15 minutes)?

Sheen origination (if noticable)?

Flow Condition:

Picture taken

Yes ☐

No ☐

Action taken:

Notes

LOCATION:

TIME: 11:25 AM

Sketch on Figure 1 to show approximate location

Approximate size (dimensions) 10' x 30'

Over what percentage of surface?

Trace <1% ☒

1-10% ☐

11-30% ☐

31-50% ☐

50-70% ☐

>70% ☐

Color of sheen: Dark / Metallic / Rainbow / Silver Gray

Sheen structure: No structure / Patches / Streamers / Tar Balls / Windrows

Observations when sheen is disturbed: Breaks Apart/Brittle ☐

Does not Break/Non-Brittle ☒

If streamers are present, what is their orientation? N/A

Is sheen blossoming?

Yes ☐

No ☒

If yes, what is the frequency (per 15 minutes)? N/A

Sheen origination (if noticable)? N/A

Picture taken

DSC 22, 23

Yes ☒

No ☐

Flow Condition: Calm

Action taken: Sampled

Notes

LOCATION:

TIME:

If yes, sketch on Figure 1 to show approximate location

Approximate size (dimensions)

Over what percentage of surface?

Trace <1% ☐

1-10% ☐

11-30% ☐

31-50% ☐

50-70% ☐

>70% ☐

Color of sheen: Dark / Metallic / Rainbow / Silver Gray

Sheen structure: No structure / Patches / Streamers / Tar Balls / Windrows

Observations when sheen is disturbed: Breaks Apart/Brittle ☐

Does not Break/Non-Brittle ☐

If streamers are present, what is their orientation?

Is sheen blossoming?

Yes ☐

No ☐

If yes, what is the frequency (per 15 minutes)?

Sheen origination (if noticable)?

Picture taken

Yes ☐

No ☐

Flow Condition:

Action taken:

Notes

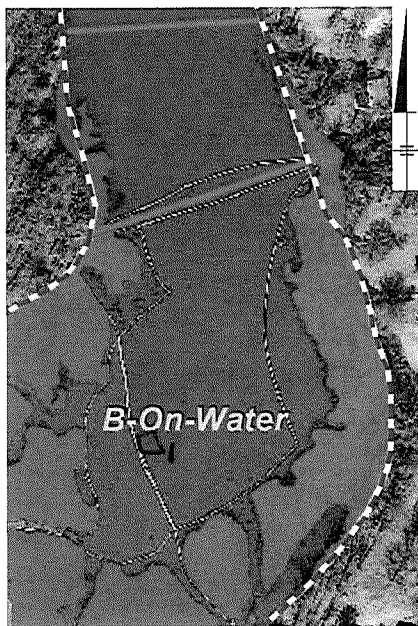
Sheen Observation Form

Personnel: M. Hiers

Date: 10-28-2015

Wind Conditions: Windy/Light Breeze/Calm

Temperature: 68°F Sky Conditions: Sun/Clouds/Part Sun/Part Clouds



LOCATION:

TIME:

If yes, sketch on Figure 1 to show approximate location

Approximate size (dimensions)

Over what percentage of surface?

Trace <1% ☐

1-10% ☐

11-30% ☐

31-50% ☐

50-70% ☐

>70% ☐

Color of sheen: Dark / Metallic / Rainbow / Silver Gray

Sheen structure: No structure / Patches / Streamers / Tar Balls / Windrows

Observations when sheen is disturbed: Breaks Apart/Brittle ☐

Does not Break/Non-Brittle ☐

If streamers are present, what is their orientation?

Is sheen blossoming?

Yes ☐

No ☐

If yes, what is the frequency (per 15 minutes)?

Sheen origination (if noticable)?

Flow Condition:

Picture taken

Yes ☐

No ☐

Action taken:

Notes

LOCATION: 1

TIME: 11:07 AM

Sketch on Figure 1 to show approximate location

Approximate size (dimensions) 10x15'

Over what percentage of surface?

Trace <1% ☒

1-10% ☐

11-30% ☐

31-50% ☐

50-70% ☐

>70% ☐

Color of sheen: Dark / Metallic / Rainbow / Silver Gray

Sheen structure: No structure / Patches / Streamers / Tar Balls / Windrows

Observations when sheen is disturbed: Breaks Apart/Brittle ☐

Does not Break/Non-Brittle ☒

If streamers are present, what is their orientation? N/A

Is sheen blossoming?

Yes ☐

No ☒

If yes, what is the frequency (per 15 minutes)? N/A

Sheen origination (if noticable)?

mh

Picture taken

DSC 18, 18, 19, 20, 21

Yes ☒

No ☐

Flow Condition: Calm

Action taken: Sampled

Notes

LOCATION:

TIME:

If yes, sketch on Figure 1 to show approximate location

Approximate size (dimensions)

Over what percentage of surface?

Trace <1% ☐

1-10% ☐

11-30% ☐

31-50% ☐

50-70% ☐

>70% ☐

Color of sheen: Dark / Metallic / Rainbow / Silver Gray

Sheen structure: No structure / Patches / Streamers / Tar Balls / Windrows

Observations when sheen is disturbed: Breaks Apart/Brittle ☐

Does not Break/Non-Brittle ☐

If streamers are present, what is their orientation?

Is sheen blossoming?

Yes ☐

No ☐

If yes, what is the frequency (per 15 minutes)?

Sheen origination (if noticable)?

Picture taken

Yes ☐

No ☐

Flow Condition:

Action taken:

Notes