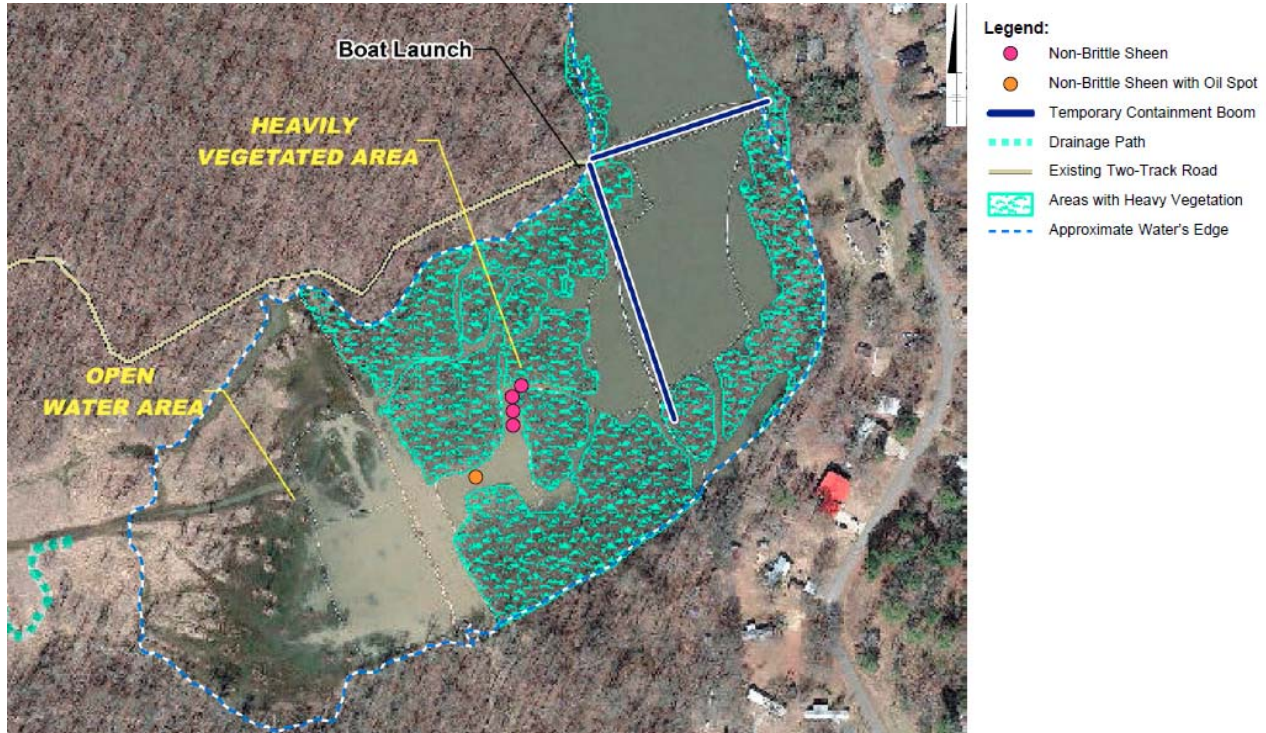


**Targeted Organoclay Placement in the Heavily Vegetated Area  
Post-Construction Maintenance Work Plan  
Mayflower Pipeline Incident Response, Mayflower, Arkansas**

As described in the Mitigation Action Completion Report (Completion Report; ARCADIS 2015), biweekly sheen monitoring was initiated at the Mayflower Pipeline Incident Response Site located in Mayflower, Arkansas (site) on April 1, 2015. The sheen monitoring activities included visual observations of the:

- Banks of the Inlet Channel via walking,
- Open Water Area during a walkthrough along the edge of the water, and
- Heavily Vegetated Area via boat.

During the biweekly sheen monitoring activities, five sheen samples were collected from the Heavily Vegetated Area between April and July 2015. The monthly reports summarizing the sheen monitoring observations and sheen sample results were provided to the Arkansas Department of Environmental Quality (ADEQ) and are included in Attachment 1 of this work plan. The sheen monitoring observations identified non-brittle sheens within the central portion of the Heavily Vegetated Area (Figure 1; as summarized from monthly sheen reports in Attachment 1). The review of the analytical results for non-brittle sheen samples collected from this area indicated that these samples resemble the crude oil from the Pegasus Pipeline release.

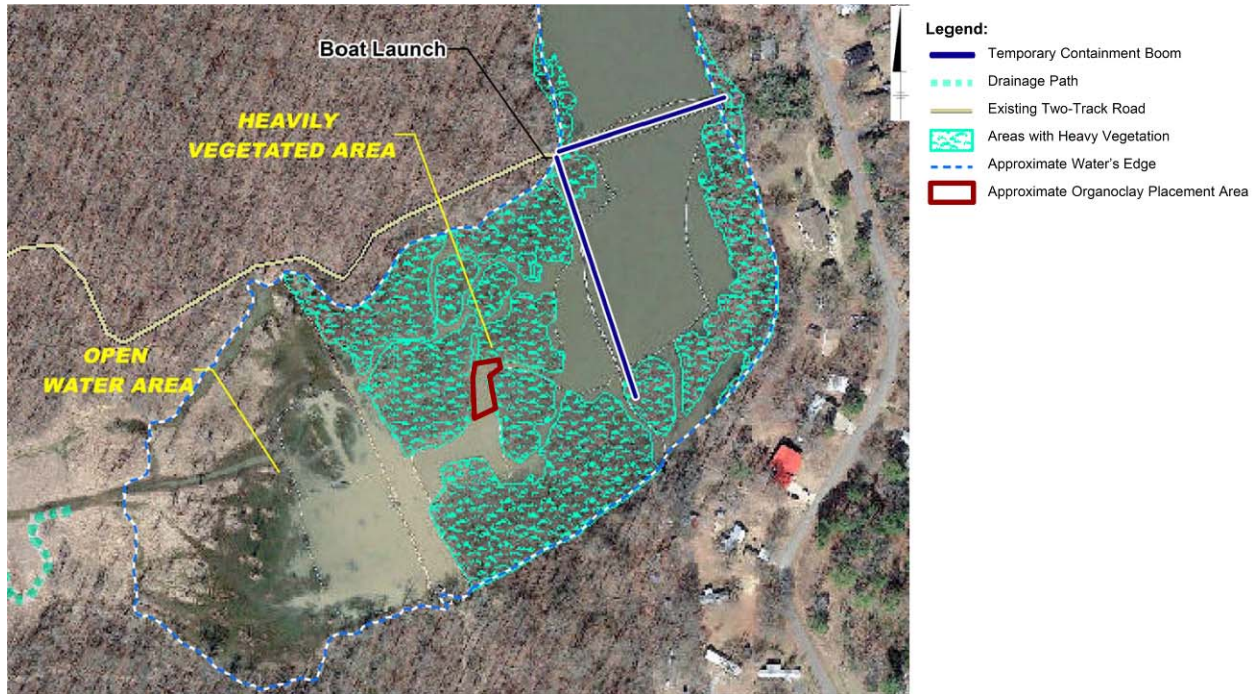


**Figure 1 Non-brittle sheen locations in Heavily Vegetated Area**

As discussed in the Completion Report (ARCADIS 2015), if monitoring results identify sheens related to crude oil from the Pegasus Pipeline release, placement of additional organoclay in target areas may be

**Targeted Organoclay Placement in the Heavily Vegetated Area  
Post-Construction Maintenance Work Plan  
Mayflower Pipeline Incident Response, Mayflower, Arkansas**

employed as a maintenance activity. Therefore, the organoclay placement is proposed in up to 3500 square feet of the natural channels where multiple crude oil-related sheens have been observed (Figure 2).



**Figure 2 Proposed Organoclay Placement Extent**

For this maintenance activity, PMFI® organoclay material (developed by CETCO™; Attachment 2) will be used as in the 2014 construction activities. The organoclay will be placed directly over the sediment surface at a target of approximately 1 pound per 10 square foot (up to 350 pounds). It is noted that the organoclay testing results summarized on the material certification provided by the vendor were in accordance with the manufacturer’s accepted values (ARCADIS 2015). The amount (weight and volume) of organoclay placed will be recorded to confirm that the target placement has been met.

It is anticipated that the organoclay placement will be completed on September 15 and 16, 2015. Organoclay will be placed manually from a boat. A biweekly sheen monitoring event will be conducted prior to the organoclay placement and two weeks following the placement.

ARCADIS. 2015. Mitigation Action Completion Report. Mayflower Pipeline Incident Response, Mayflower, Arkansas. Revision 1. April.

**Attachments**

- Attachment 1 Monthly Sheen Monitoring Reports
- Attachment 2 Product Data for PMFI® Organoclay

**Attachment 1**

Monthly Sheen Monitoring  
Reports

# Mayflower Pipeline Incident Response

## Post-Construction Sheen Monitoring Monthly Report #1: April 2015

Mayflower, Arkansas

Period: 04/06/2015 through 04/30/2015

Monitoring Days: 04/07/2015 and 04/23/2015\*

\*Biweekly sheen monitoring started on 04/06/2015.

**Legend:**

Green Line – No Sheen

Aqua Circle – Brittle Sheen Location

Pink Circle – Non-Brittle Sheen Location

Observations in Inlet Channel:

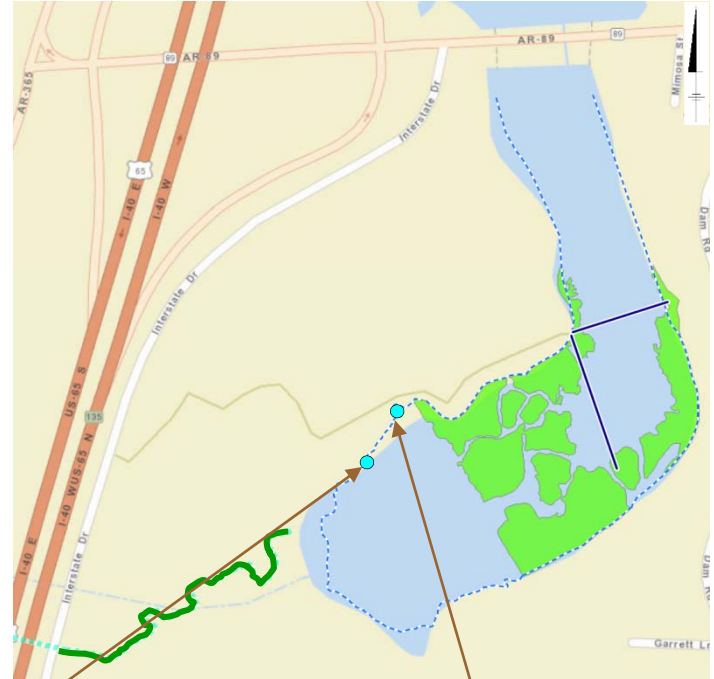
- No sheen observed.

Observations in Cove:

- Two brittle sheens observed, one silver gray and one rainbow/silver gray, in Open Water Area.
- No sheen observed in Heavily Vegetated Area.
- No sheen observed downstream of Heavily Vegetated Area.

Mitigation: None needed

Path Forward for May 2015: Continue biweekly sheen monitoring in cove.



Cove (Summary of Observations from April 2015)



Rainbow/Silver Gray Sheen Observation on 04/23/2015



Silver Gray Sheen Observation on 04/07/2015

**Notes:**

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

# Mayflower Pipeline Incident Response

## Mayflower, Arkansas

### Post-Construction Sheen Monitoring Monthly Report #2: May 2015

Period: 05/01/2015 through 05/31/2015

Monitoring Days: 05/05/2015 and 05/19/2015

#### Observations in Cove Inlet Channel:

- One brittle silver gray sheen observed.

#### Observations in Cove:

- No sheen observed in Open Water Area.
- One patch/streamer of silver gray sheen observed in Heavily Vegetated Area. Sheen did not break when disturbed ("non-brittle")<sup>2</sup>.
- No sheen observed downstream of Heavily Vegetated Area.

Mitigation: Non-brittle sheen was removed.

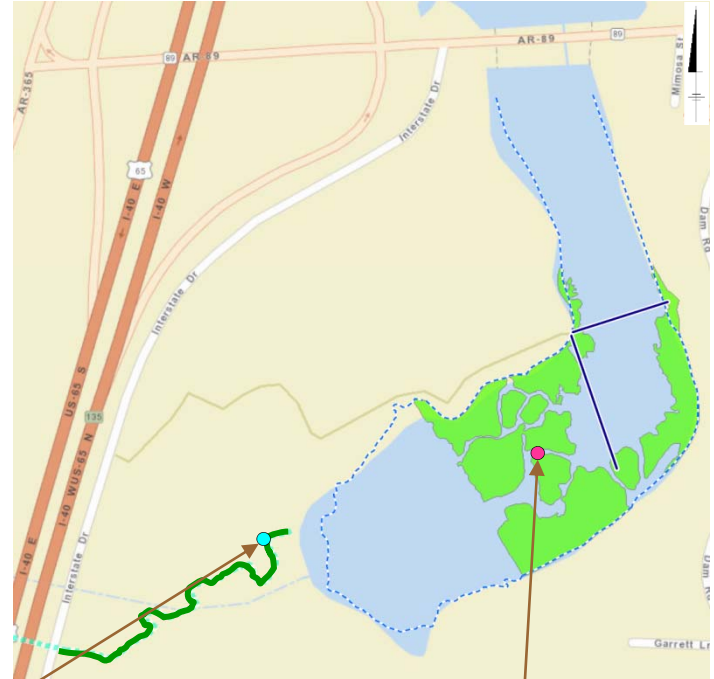
Path Forward for June 2015: Continue biweekly sheen monitoring in cove.

**Legend:**

Green Line – No Sheen

Aqua Circle – Brittle Sheen Location

Pink Circle – Non-Brittle Sheen Location



Cove (Summary of Observations from May 2015)



Silver Gray Sheen Cover Observation on 05/05/2015



Silver Gray Sheen Patch/Streamer Observation on 05/19/2015

**Notes:**

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

# Mayflower Pipeline Incident Response

## Post-Construction Sheen Monitoring Monthly Report #3: June 2015

Mayflower, Arkansas

Period: 06/01/2015 through 06/30/2015

Monitoring Days: 06/05/2015, 06/12/2015, and 06/23/2015

**Legend:**

Green Line – No Sheen

Aqua Circle – Brittle Sheen Location

Pink Circle – Non-Brittle Sheen Location

Observations in Inlet Channel:

- No sheen observed in the Inlet Channel.

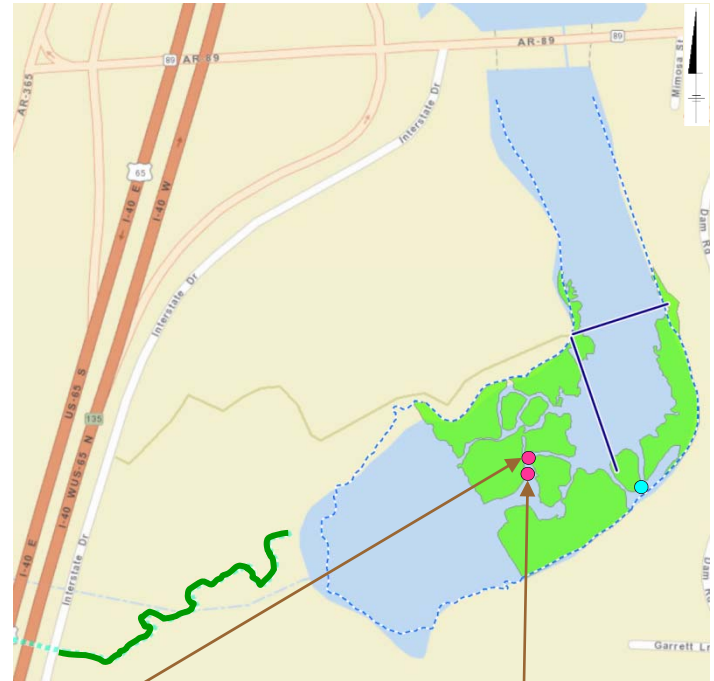
Observations in Cove:

- No sheen observed in Open Water Area.
- June 12, 2015: One patch/streamer of silver gray sheen observed in Heavily Vegetated Area. Sheen did not break when disturbed (“non-brittle”)¹. A sheen sample was collected for laboratory analysis.
- June 12, 2015: One cover (no particular structure) of silver gray sheen observed downstream of Heavily Vegetated Area. Sheen broke apart when disturbed (“brittle”)².
- June 23, 2015: One patch/streamer of non-brittle¹ silver gray sheen observed in Heavily Vegetated Area. A sheen sample was collected for laboratory analysis.

Mitigation: Sheens were removed.

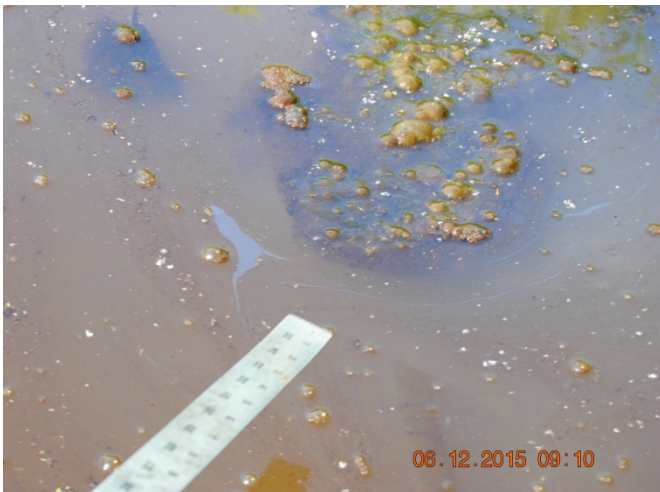
Sheen Sampling Results³:

- The laboratory analysis of sheen net samples collected from Heavily Vegetated Area on May 19, June 12, and June 23, 2015 indicated that sheens resemble to crude oil from the Pegasus Pipeline.

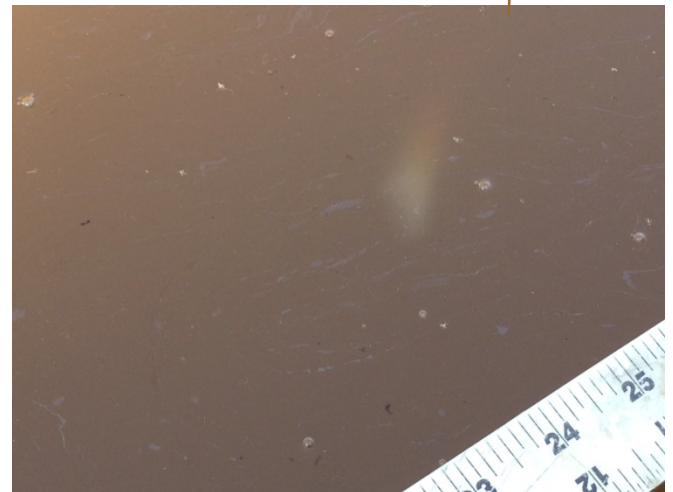


Cove (Summary of Observations from June 2015)

Path Forward for July 2015: Continue biweekly sheen monitoring in cove.



Silver Gray Sheen Cover Observation on 06/12/2015



Silver Gray Sheen Patch/Streamer Observation on 06/23/2015

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 biologic activity).
- Sheen color (dark/metallic/rainbow/silver gray) and structure (patches/streamers/cover) terminology reference: NOAA 2007. NOAA Open Water Oil Identification Job Aid.

# Mayflower Pipeline Incident Response

## Mayflower, Arkansas

### Post-Construction Sheen Monitoring Monthly Report #4: July 2015

**Period:** 07/01/2015 through 07/31/2015

**Monitoring Days:** 07/02/2015, 07/16/2015, and 07/30/2015

Observations in Inlet Channel:

- No sheen observed in the Inlet Channel.

Observations in Cove:

- No sheen observed in Open Water Area.
- July 2, 2015: One streamer of silver gray sheen observed in Heavily Vegetated Area. Sheen did not break when disturbed ("non-brittle"<sup>1</sup>). A sheen sample was collected for laboratory analysis.
- July 16, 2015: One patch/streamer of non-brittle<sup>1</sup> silver gray sheen with an oil spot (0.125-inch wide) observed in Heavily Vegetated Area. A sheen sample was collected for laboratory analysis.
- July 16, 2015: One cover (no particular structure) of silver gray sheen observed in Heavily Vegetated Area. Sheen broke apart when disturbed ("brittle"<sup>2</sup>).
- July 30, 2015: One patch of brittle<sup>2</sup> silver gray sheen observed in Heavily Vegetated Area.

Mitigation: Non-brittle sheens were removed by sampling.

Sheen Sampling Results<sup>3</sup>:

- The laboratory analysis of sheen net samples collected from Heavily Vegetated Area on July 2 and 16, 2015 indicated that sheens resemble crude oil from the Pegasus Pipeline.

Path Forward for August 2015:

- Continue biweekly sheen monitoring in Cove.

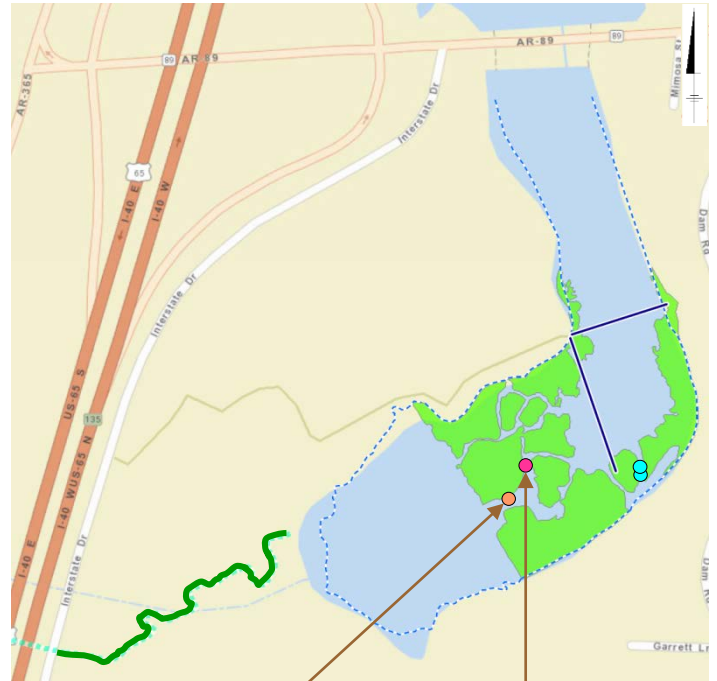
**Legend:**

Green Line – No Sheen

Aqua Circle – Brittle Sheen Location

Pink Circle – Non-Brittle Sheen Location

Orange Circle – Non-Brittle Sheen with Oil Spot Location



**Cove (Summary of Observations from July 2015)**



**Silver Gray Sheen Patch/Streamer Observation with an Oil Spot (0.125-inch Wide) on 07/16/2015**



**Silver Gray Sheen Streamer Observation on 07/02/2015**

**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.

**Attachment 2**

Product Data for PMFI®  
Organoclay



# ORGANOCLAY® PMFI

## ORGANIC ADSORPTION MEDIA

### PRODUCT DESCRIPTION

Organoclay® PMFI is specially formulated for use in the following applications:

- Bulk Capping: provides subaqueous chemical isolation of contaminated sediment NAPL seeps in waterways. When used for in-situ capping, bulk organoclay should be first screened with a No. 50 screen and then pre-wetted.
- Permeable Reactive Barrier walls for removal of NAPL and dissolved low solubility organic compounds.

**Organoclay® PMFI is a proprietary granular adsorption media effective in removing oils, greases other non-aqueous phase liquids (NAPL) and other dissolved high molecular weight/low solubility organics.**

### BENEFITS

- Adsorbs dissolved low solubility organic compounds.
- High adsorption capacity of oils, greases and other NAPL.

### PHYSICAL PROPERTIES

PROPERTIES	TEST METHOD	VALUE
Bulk Density	ASTM D7481	40-55 lbs./cu.ft.
Oil Adsorption Capacity	CETCO Test Method	0.5 lb/lb Minimum
Hydraulic Conductivity	mod ASTM D 2434	1x10 <sup>-3</sup> cm/sec Minimum
Quaternary Amine Content	ASTM D7626	25-33% min. Quaternary Amine Loading

### PACKAGING

- 50 lb bag
- 1500 lb super sack

### AVAILABILITY

Contact your local technical sales manager at:  
714-384-0111 or 800-527-9948