Amendola Engineering, Inc.
August 4, 2017

Indiana Harbor Ship Canal
ArcelorMittal Indiana Harbor LLC
Indiana Harbor West – Outfalls 009 and 010

Visible Oil Sources
Abbreviated Report Outline and Work Plan

1.0 Introduction and Background

In response to findings of oil and oil-like materials in the Indiana Harbor Ship Canal in the vicinity of ArcelorMittal Indiana Harbor West Outfalls 009 and 010 in January 2017, ArcelorMittal, in cooperation with the U.S. Coast Guard, undertook investigative and corrective actions to remediate intermittent sources of visible oil at IH West Outfalls 009 and 010. ArcelorMittal found that a number of water collection sumps located in the IH West power house contained turbine oil from losses at the power house turbines. As of April 2017, discharges from these sumps were rerouted to IH West process wastewater treatment facilities that are equipped for oil removal and that do not discharge to Outfalls 009 and 010.

Since those corrective measures were implemented, visible oil at Outfalls 009 and 010 has largely been abated. In consultation with the U.S. Coast Guard, ArcelorMittal commissioned a third-party study of the oil issues at Indiana Harbor West, The Lake George Channel and the Indiana Harbor Ship Canal with the scientific objectives noted below. The overall objectives are to document that sources of oil to Outfalls 009 and 010 from ArcelorMittal have been abated; and, to document oil contamination in the Lake George Canal and the Indiana Harbor Ship Canal, which ArcelorMittal believes has contributed to visible oil observed from time to time behind the oil retention booms deployed at Outfalls 009 and 010.

2.0 Scientific Objectives

- Characterize visible oil sheen on the Lake George Channel (LGC), the Indiana Harbor Ship Canal (IHSC) and oils in LGC and ISHC sediments as follows:
  - Total Petroleum Hydrocarbons (TPH) quantitation and fingerprinting (modified EPA Method 8015D)
  - Polynuclear Aromatic Hydrocarbon (PAH) quantitation and fingerprinting (modified EPA Method 8270)
  - Quantitative biomarker fingerprinting (modified EPA Method 8270)

- Using the analytical methods noted above, characterize visible oil sheens as may be present in the following areas:
    - Upstream of IH West Outfalls 009 and 010 in the LGC and the IHSC;
    - At or near the IH West No. 2 intake;
    - At or near ArcelorMittal IH West Outfalls 009 and 010 and the IHSC Southwest collection area located immediately upstream of Outfalls 009 and 010; and,
    - Selected IH West internal samples.
- ~~To the extent possible~~ with data generated from this study, determine whether and to what extent visible oil sheens observed on the IHSC near ArcelorMittal Outfalls 009 and 010 are attributable to legacy deposits oil in sediments in the Canal and other upstream sources (e.g., oil coming out of the banks during heavy rains) or recent ArcelorMittal internal plant discharges.

3.0 Study Design

Field Program – Lake George Canal and Indiana Harbor Ship Canal

LGC and IHSC Surface (0 to 6") Sediment Samples will be collected from a boat with a Ponar dredge at the following locations, (see Figure 1 for locations and GPS coordinates). Sampling locations may be modified in the field due to the presence of moored vessels during the study and to ensure collection of samples of historical sediments. Any modifications to the sampling locations set out below will be fully documented:

Sediment Sample Station ID	Description
LGC-1	Lake George Canal ~ 75 yards downstream of Indianapolis Boulevard
IHSC-1	Grand Calumet River ~ 75 yards downstream of East Columbus Drive
IHSC-2	IHSC ~ 230 yards upstream of railroad bridge near Canal Street
IHSC-3	IHSC ~ 200 yards upstream of Dickey Road
IHSC-4	IHSC ~ 100 yards upstream of southernmost RR bridge upstream of Outfalls 009 and 010
IHSC-5	IHSC ~ 400 yards upstream of mouth of IHSC at Indiana Harbor

LGC and IHSC Visible Oil Sheen Samples. LGC and IHSC oil sheen samples will be collected at or near the above-listed sediment sample locations to the extent oil sheens are visible. Oil sheen samples will be collected from a boat with Teflon mesh samplers deployed on a pole sampler. The field crew will have the flexibility to collect oil sheen samples at their discretion, with the following principal objectives:

- Collect one oil sheen sample at or near each of the above sediment sample locations to the extent oil sheens are present. Sample locations to be documented with GPS coordinates.
- Collect up to four additional oil sheen samples at locations upstream and downstream of IH West Outfalls 009 and 010, including the Southwest containment area, to the extent oil sheens are present. Sampling of the heaviest/most visible oil sheens is preferred.

Field Program – ArcelorMittal Indiana Harbor West

Outfall Sampling. Oil sheen samples will be obtained in the IHSC at or near IH West Outfalls 009 and 010, to the extent oil sheens are present. Upon collection of oil sheen samples, the following will be noted:

- If the oil sheens appear to originate from the IHSC (surface, sediment), or ArcelorMittal outfalls;
- If any visible sheen is noted in the near field upstream at the time of sample collection, a sample will be collected;
- If the sheens are observed to leave the area where initially observed.

Internal Sewer System and Source Oil Sampling.

- Turbine oil in IH West power house sumps (all have been diverted to the IH West Terminal Lagoon and Outfall 011 treatment system)
- Upstream in the Outfall 009 and Outfall 010 sewer legs, if any oil is present
- Visible surface oil sheen in IH West No. 2 intake forebay
- Other possible IH West oil sources

4.0 Third-Party Study Report

Upon completion of field activities and sample analysis, Amendola Engineering in cooperation with NewFields Environmental Forensics will prepare a third-party report of the study for ArcelorMittal. The report will contain the following elements:

- Executive summary
- Summary reports of field sampling program and field observations

- Summary report by NewFields using TPH, PAH and biomarker fingerprinting described above that compares oils in sheens and sediments from this study to each other and to (a) IH CWTP study results and (b) reanalyzed U.S. Coast Guard extracts from selected samples collected during January and February 2017.
- Overall findings and conclusions
- Appendices will include summaries of recent (2017) ArcelorMittal historical data and findings; field and analytical reports from this study; information and data provided by EPA and the USGC; and, possibly a Ramboll Environ assessment of the IH West isolated impoundment and oil recovery system

5.0 Project Organization, Contact Information and Responsibilities

Principal Responsible Person	Contact	Responsibilities
Thomas Barnett Manager, Env. Technology ArcelorMittal Indiana Harbor LLC 3001 Dickey Road East Chicago, IN 46312	Office: 219-399-2380 Mobile: 219-313-1605 Thomas.Barnett@arcelormittal.com	• ArcelorMittal principal contact • Site access • Assistance with AM IH West sampling
Gary A. Amendola, P.E. Amendola Engineering, Inc. 15711 Detroit Avenue Lakewood, OH 44107	Office: 216-521-5901 Mobile: 216-598-0801 g.amendola@amendola-eng.com	• Study design
Matthew Oxsalida, P.E. Amendola Engineering, Inc. 15711 Detroit Avenue Lakewood, OH 44107	Office: 216-521-5903 Mobile: 440-223-1671 m.oxsalida@amendola-eng.com	• AEI project manager • Overall study implementation and field oversight. • Prepare study report
Kevin Reed EnviroScience, Inc. 5070 Stow Road Stow, OH 44224	Office: 330-688-0111 Mobile: 724-777-4982 kreed@enviroscienceinc.com	• ES field project manager • Mobilization of field resources and collection of field samples • Sample handling and shipping samples to Alpha Laboratories, Inc.
Scott Stout, Ph.D. NewFields Env. Forensics 300 Ledgewood Place, Suite 305 Rockland, MA 02370	Office: 781-681-5040 x 105 Mobile: 781-264-7080 sstout@newfields.com	• NewFields project manager • Provided sample kits • Responsible for arranging for chemical analysis by Alpha Analytical. Assessment of analytical results and preparation of summary report of findings
Susan O'Neil Alpha Analytical, Inc. 320 Forbes Road Mansfield, MA 02048	Office: 508-822-9300 Direct: 508-844-4117 soneil@alphalab.com	• Alpha laboratory manager • Preparation of samples and sample analyses per direction from NewFields

6.0 Project Schedule

Filed work is scheduled for the week of August 7, 2017. Analytical results and a summary report of the data by NewFields are expected approximately three weeks after receipt of samples by Alpha Laboratory. A complete project report should be available within a week to 10 days later.

FIGURE 1
SEDIMENT AND OIL SHEEN SAMPLING LOCATIONS