

Department of Environmental Studies

Louisiana State University

1285 Energy, Coast, and Environment Building
Baton Rouge, LA 70803
(225) 578-8521

IES/RCAT05-02

20 January, 2005

To: John Whitney
NOAA SSC

From: Scott Miles
Chemistry Support Team
Louisiana State University

Re: **M/V Selendong Ayu Oil Spill**

EXECUTIVE SUMMARY

On January 20, 2005, LSU received one (1) sample from Mr. Jeff Lankford. A chain-of-custody form was not supplied with the sample. The sample was taken from the #4 (STBD) HFO tank of M/V Selendang Ayu. Mr. Jeff Lankford requested that LSU perform an oil fingerprinting analysis and dispersability test on the oil sample, using Corexit 9500. Results from the fingerprinting analysis indicate the oil sample is a heavy fuel oil with normal alkanes ranging from nC-10 to nC-36. The sample taken from the #4 starboard tank did not match the fingerprinting profile of the oil taken from the #4 port tank of the M/V Selendong Ayu on December 19, 2004. The sample contains a high concentration of aromatic compounds and their substituted homologues. The normal biomarker compounds were detected, but at low levels. Table 1 gives a description of the sample sent by Mr. Lankford and the LSU identification number given at the time the sample was logged in at LSU.

Table 1. Client Identification and LSU Identification

Client ID	Collection Site	Date/Time	LSU ID#
#4 (STBD) IFO Tank	Alaska	01/07/2005	2N5020-01

OIL DISPERSION TEST

The testing method employed the use of the revised EPA baffled-flask. The container for the test is a modified 150-ml trypsinizing flask to which a glass stopcock (2 mm plug bore) has been placed near the bottom. The stopcock is used for removing subsurface samples of water without disturbing the surface oil layer. Approximately 2-mls of fresh and weathered sample oil were added to separate test flask, each containing 100-ml of hydrocarbon-free seawater (Instant Ocean). The weathered sample oil was created by reducing (evaporating) the total volume of the sample oil by approximately 10% with a rotary evaporator. A measured amount of dispersant (Corexit 9500) was added to each individual flask to produce oil-to-dispersant (v/v) ratio of 20:1. A control (seawater + oil) was also used in the testing. Moderate turbulent mixing was provided by placing the flasks on a standard orbital shaker table at 200 rpm for 10 minutes. Following shaking, the flasks were immediately removed from the shaker and maintained in stationary position for 10 minutes to allow undispersed oil to return to the water surface. Samples of water for gravimetric and IR analysis were then removed from the bottom of the flasks through the stopcock.

ANALYTICAL RESULTS

Visual observations show Corexit 9500, at a ratio of 20:1, to be moderately effective at dispersing the sample oil. The experiment was conducted at a temperature of 17°C. Results from the quantitative testing are given in Table 2.

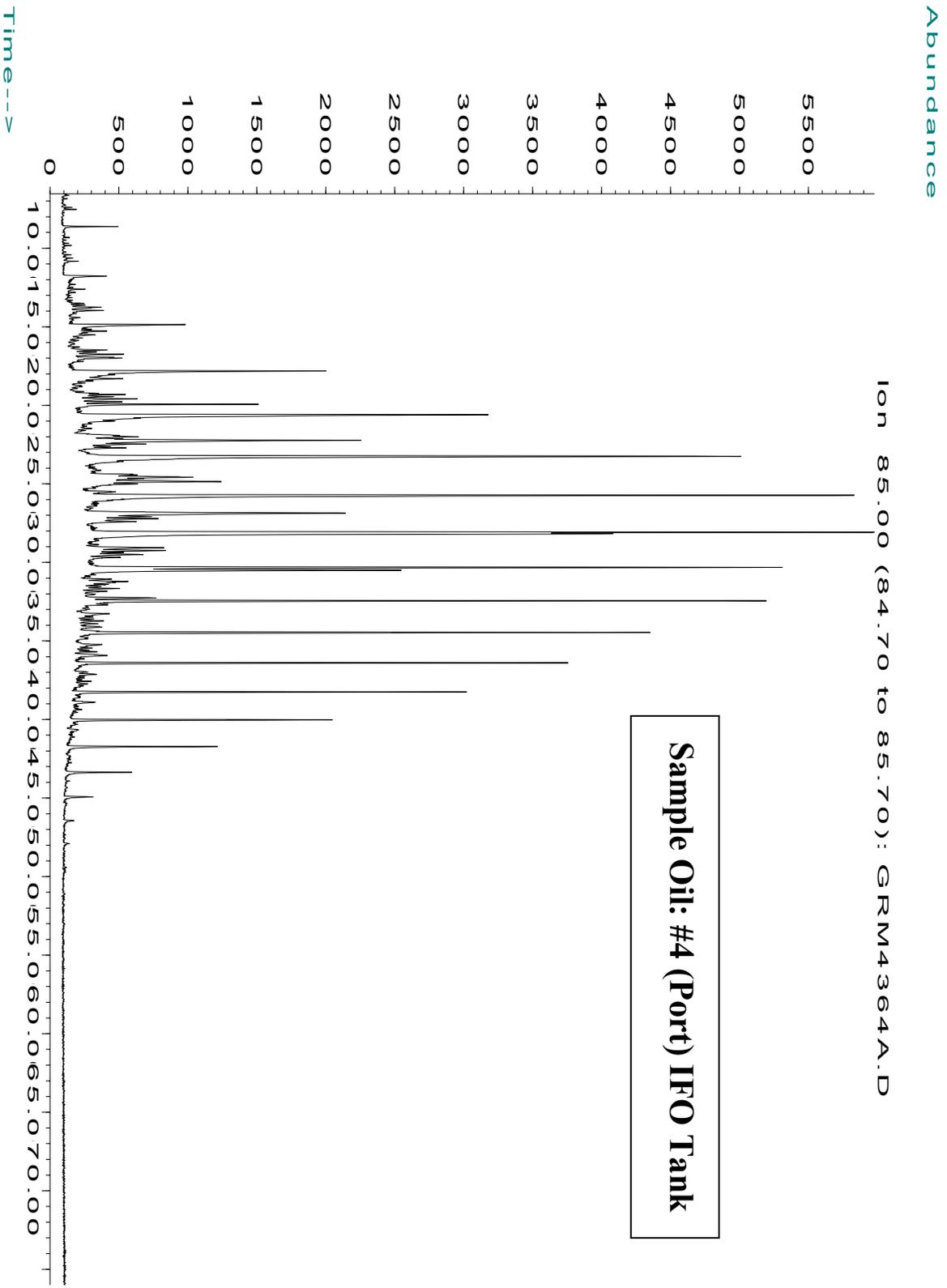
Table 2. Quantitative Results for Dispersant Test

Description	% Dispersion
Control	1
Fresh Oil Corexit 9500 (20-1 ratio)	37
Weathered Oil Corexit 9500 (20-1 ratio)	28

RESULTS AND DISCUSSION

Results from the fingerprinting analysis indicate the sample is an intermediate to heavy fuel oil with normal alkanes ranging from C-10 to C-36. The sample contains a high concentration of light and heavy aromatic compounds and displays no evidence of weathering. The significant oil-fingerprinting compounds, hopanes and steranes, were detected at low concentrations. The sample did not contain any significant asphaltenes or other unresolved high molecular weight compounds. Chemical analysis and olfactory observations indicated the oil sample contains high levels of sulfur compounds. Oil fingerprinting analyses prove that the two (2) oils received by LSU, from the M/V Selendong

Ayu, do not match chemically and do not originate from the same source. The normal alkane profiles for the original (12/19/04) oil sample and the newest (01/07/05) oil sample are displayed below.



Abundance

Ion 85.00 (84.70 to 85.70): GRM5020C.D

