



**Fw: Evaporation rates**

Victor F Labson o Marcia K McNutt

05/23/2010 10:41 AM

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History: This message has been replied to.

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Marcia,

This looks like it should be acceptable especially since the analysis is based on May 16 sampling nearly contemporaneous with our May 17 overflight. This will also keep us consistent with the FRTG. The only wildcard in this adjustment is that there is no way to know how long the oil used for calibration had been on the surface and thus what per cent of the more volatile components were still present. This may bias Roger's estimate toward the more conservative side, but I don't think substantially if I really understand the order of the workflow. This is getting to be a lot of oil.

Vic

----- Forwarded by Victor F Labson/GD/USGS/DOI on 05/23/2010 08:22 AM -----

From: Bill.Lehr@noaa.gov  
To: Victor F Labson <vlabson@usgs.gov>  
Cc: Robert J Rosenbauer <brosenbauer@usgs.gov>, Geoffrey S Plumlee <gplumlee@usgs.gov>, Marcia K McNutt <mcnutt@usgs.gov>  
Date: 05/23/2010 08:14 AM  
Subject: Re: Evaporation rates

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From the report I am preparing to deliver to the NIC today

Spilled oil can take several pathways in the environment as shown in the diagram. In the process of rising through the water column and weathering on the sea surface, oil loses many constituents to dissolution and evaporation. Since this oil contains a high fraction of volatile compounds, we expect that a large fraction of the oil is lost to evaporation. We used the pseudo-component evaporation model used in the NOAA model, ADIOS2, initialized with data on the oil composition provided by BP, to estimate the fraction of oil possibly lost to evaporation over the period on the order of weeks to months. After the more volatile compounds have evaporated, the remaining oil tends to persist without evaporative change for many months, but other mechanisms such as photo-oxidation and biodegradation can reduce the remaining oil. Our models suggest that as much as half of the oil can be lost to natural processes over several weeks on the sea surface. Without further samples, we cannot sub-divide the amount lost to evaporation compared to dissolution.

We measured the composition of weathered oil collected from the sea surface on 16 May using GC/MS, and analyzed the results using the pseudo-component evaporation model. We found that the weathered oil sample had lost 38% of its mass to the combination of evaporation and dissolution. This analysis could be improved with a careful simulated evaporation study on the fresh oil, but we have not yet initiated this study. Therefore, as a first approximation, 30-50 % of the spilled oil, not removed by the response, has been removed by natural processes.

----- Original Message -----

From: Victor F Labson <vlabson@usgs.gov>

Date: Sunday, May 23, 2010 6:52 am

Subject: Evaporation rates

To: Bill Lehr <Bill.Lehr@noaa.gov>, Robert J Rosenbauer <brosenbauer@usgs.gov>

Cc: Geoffrey S Plumlee <gplumlee@usgs.gov>, Marcia K McNutt <mcnutt@usgs.gov>

> Bill and Bob,

>

> We are trying to refine the estimates of the oil-spill volume and we

> find

> we have no estimate of the evaporation rate of the oil spill to

> account

> for loss prior to the May 17 AVIRIS overflight we are using in our

> estimate. Can either of you provide a rate we can use or point us to

>

> someone how can?

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> Thanks,

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> Vic

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