



Re: Evaporation rates-correction

Bill.Lehr o Marcia K McNutt

05/23/2010 11:33 AM

Line should read evaporated or dissolved. Also, the cleanup/burn numbers may be bigger.

Is USGS going to present a mass balance at the 1600 hrs meeting?

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

From: <Bill.Lehr@noaa.gov>
Date: Sunday, May 23, 2010 8:13 am
Subject: Re: Evaporation rates
To: Marcia K McNutt <mcnutt@usgs.gov>

> If you have the chemistry,
>
> Essentially anything with carbon number lower than 14 should be gone
> by now unless encased in less viscous oil, e.g. tar balls.
>
> Right now, my very rough calculations, that may change drastically,
> are something like this:
>
> by May 17
>
> on surface 150,00 - 250,000 bbl
> cleanup or burned 50,000-75,000 bbl
> evaporated or dispersed 150,000 -250,000
> water column as dispersed 100,000 -200,000
>
>
> Even on the low end, that's in the neighborhood of 15-20 K bbls/day.
>
> But we need better numbers. For example, I am having difficulty even
> getting good cleanup numbers. Do you have goos values for them?
>
>
>
>

> ----- Original Message -----

> From: Marcia K McNutt <mcnutt@usgs.gov>
> Date: Sunday, May 23, 2010 7:48 am
> Subject: Re: Evaporation rates
> To: Bill.Lehr@noaa.gov

> > OK - I will assume exponential.

> > Thanks.

> > Marcia

> > *****
> > Dr. Marcia McNutt
> > Director
> > US Geological Survey
> > 12201 Sunrise Valley Drive, MS 100

> > Reston, VA 20192
> > (703) 648-7411
> > (703) 648-4454 (fax)
> > (571) 296-6730 (cell)
> > mcnut@usgs.gov
> > www.usgs.gov
> > *****
> >
> >
> >
> > From:
> > Bill.Lehr@noaa.gov
> > To:
> > Marcia K McNutt <mcnut@usgs.gov>
> > Cc:
> > Victor F Labson <vlabson@usgs.gov>
> > Date:
> > 05/23/2010 10:45 AM
> > Subject:
> > Re: Evaporation rates
> >
> >
> >
> > Marcia,
> >
> > The evaporation rate declines exponentially. The challenge for this
> >
> > spill
> > is that the oil comes as droplets from a mile deep so that
> > dissolution, a
> > competitive process with evaporation, is significant in this case.
> > We
> > have
> > been trying for weeks to get oil samples right above the leak
> > source
> > to
> > compare with oil that have moved further away, to be able to
> > estimate
> >
> > which fraction is lost to the atmosphere and what part is lost in
> > the
> >
> > water column.
> >
> >
> > Bill
> >
> > ----- Original Message -----
> > From: Marcia K McNutt <mcnut@usgs.gov>
> > Date: Sunday, May 23, 2010 7:33 am
> > Subject: Re: Evaporation rates
> > To: Bill.Lehr@noaa.gov
> > Cc: Victor F Labson <vlabson@usgs.gov>
> >
> > > Bill -
> > >
> > > Is your guess that the rate of evaporation is linear over the
> > > month
> > >
> > > > time
> > > > period, or would you guess that the rate is much higher during say
> > > >

> > the
> > >
> > > first week, and then it greatly tails off during the next few
> weeks
> >
> > > (e.g.,
> > > an exponential decrease thereafter)?
> > >
> > > Marcia
> > > *****
> > > Dr. Marcia McNutt
> > > Director
> > > US Geological Survey
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> > > *****
> > >
> > >
> > > 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 <mcnut@usgs.gov>
> > > Date:
> > > 05/23/2010 10:14 AM
> > > Subject:
> > > Re: Evaporation rates
> > >
> > >
> > > 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?
> > > >
> > > > Thanks,
> > > >
> > > > Vic
> > > >
> > > > Victor F. Labson, Ph.D.
> > > > Director - Crustal Geophysics and Geochemistry Science Center
> > > > US Geological Survey
> > > > Denver, Colorado
> > > > Phone 1(303)236-1312, fax 1(303)236-1229e-mail vlabson@usgs.gov
> > >
> > >
> > >