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BP's Deepwater Oil Spill - the Problem of Cleaning Up Marshes - and Open Thread 2

Posted by Gail the Actuary on June 14, 2010 - 12:18am
Topic: Environment/Sustainability
Tags: deepwater horizon, marshes, oil spill [list all tags]

This is a second copy of this post, because of the large number of comments.

I have listened to some of the press conferences held by the Deepwater Horizon External Affairs folks. One thing they talk about is how different clean-up operations are for beaches compared to marshes. For beaches, workers are sent in with shovels and rakes to remove the portion with oil. For marshes, techniques vary by area, but there are few good options. This is a section from a press conference a few days ago describing the marsh situation.

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> Q Good morning, Admiral.
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> ADMIRAL ALLEN: Good morning.
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> Q I spoke -- I was down in Venice yesterday and I spoke with the Sierra Club and its president, who had just come in from touring the Barataria Bay . . . Michael Brune, the president, said he was struck by the futility of the cleanup effort and he said there really is no effective way to clean up an oil spill; that the boom, even when it's in place, is not very effective when you have wave action that pushes the oil inland into marshes or over pelican rookeries. . . So I'm wondering if you could comment -- I mean, you're talking about the battle line being drawn on the coast. I mean, what should people along the coast realistically expect of protective booms, cleanups, and the realistic of -- cleaning up in this disaster?
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> ADMIRAL ALLEN: Well, I think you've done a very good job at describing the vexing situation that exists out there, especially in the lower area in Barataria Bay and Plaquemines Parish where there is a lot of marshland. There is no good solution when oil enters a marshland. And as we know, boom can be defeated by seascape -- it has to go over or under the top of it, depending on environmental conditions.

> And skimming is very, very difficult. And if you use mechanical means back in the marshes, you do as much harm to the marshes as the oil might do. And, in some cases, you're faced with the prospect of either an in-situ burn or just to let it biodegrade.
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> And the real issue is to stop this thing at the source, do maximum skimming, in-situ burning -- deal with it as far off shore as possible, and do everything you can to keep it from getting to shore, because once it's into the marshes, quite frankly, I think we would all agree there's no good solution at that point.
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> That's the reason I think it's incumbent on us to really attack this containment at the source. And I think definitely, as you heard me mention earlier, as this spill proliferates into smaller spills from south-central Louisiana and clear into Pensacola, Florida, it's going to significantly stress not only boom production capability of the country, but the ability of skimmers. And we are working very, very hard to do that.
>
> A few scenarios involved in oil spill planning contemplated, that brought an area of defense of a spill and it's emblematic of the anomalous nature of this spill and why it's difficult for everybody. But we're working as hard as we can.

A 1998 MMS report called Effects and Management of Oil Spills in Marsh Ecosystems, relating to the Gulf of Mexico area says:

> The effects of oil spills on marshes are complex and should be considered at various scales of spatial and temporal resolution and modes of impact. In general, lighter weight oils are more immediately toxic to plants than heavier oils. However, many of the modes of impact to marsh macrophytes involve effects related to smothering of the gas exchange surfaces of the plant, or of limiting gas exchange into an oil-coated sediment. Oil in the sediment can lead to increased oxygen stress in belowground tissues due to reduced gas exchange, disrupt root membranes and ion selectivity, and may adversely affect vegetative regrowth as newly-emerging shoots contact the oil. Oil may have considerable effects on marsh soil biogeochemical processes, however, the effects warrant further research
>
> Oil has been found in marsh soil 7 years after a spill, which indicates the potential for long term effects. Crude oil greatly but temporarily stimulated soil respiration, affects Eh, and possibly remineralization rates, and may stimulate nitrogen fixation. A research program designed to better understand the long-term effects of petroleum hydrocarbons on nutrient cycling in coastal marshes is needed.

An aolnews.com article describes the techniques for cleaning up gulf marshes in as follows, each with a drawback. (These are techniques in general, not necessarily ones that would work with the particular type of oil that is a problem in this particular spill.)

> - Burning oil-coated plants, which removes oil quickly and minimizes trampling.
> - Low-pressure flushing, which helps push oil into areas where it can be vacuumed up or absorbed.
> - Cutting back vegetation to leave plants intact and prevent oiling of birds.

- Adding nutrients to speed natural degradation of the oil.
- Doing nothing. Oil that degrades over time hardens into a crust similar to asphalt, and letting Mother Nature take her course has the advantage of causing no collateral damage.

These are a few limitations of the above techniques:

> Cutting plants back, for example, only works in small areas -- and there may not be many of those with a spill that has pumped more than 4 million gallons of oil into the Gulf since April 20.
>
> Introducing nutrients to accelerate the activity of natural microbes in the marsh that "eat" oil has limited potential, since oxygen levels in wetland soils are often so low that microbe activity is limited whether nourishment is added or not.
>
> Likewise, low-pressure flushing only works when oil is floating on the surface.

The boom system for keeping the oil away from the marshes is not working very well. Regarding the effort to keep the oil away from the shore line, it says:

> Its chief weapon is “boom,” floating rolls of plastic and fabric laid on the water to contain and absorb oil. More than 1.2 million metres has been deployed to date.
>
> But Unified Command faces a crisis of confidence as it becomes clear that the boom system has major flaws of its own. There is not enough boom, for one, to line the entire coast; Alabama Gov. Bob Riley became enraged last week that the Coast Guard removed a large quantity from his state and sent it to Louisiana. And rough waters have both washed oil over boom lines and broken those lines up, sending boom adrift into the ocean and onto land.
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> “It’s a joke,” Billy Nungesser, the outspoken president of Plaquemines Parish, told Congress this week. “It washes up on the shore with the oil, and then we have oil in the marsh, and we have an oily boom. So we have two problems.”

Another approach to keeping the sand away from the marshes is building sand berms. Louisiana received approval from the EPA to build 40 miles of berm (sand piles six feet above the water level and 25 feet wide) to keep the oil away from some of Louisiana's marshes, despite concerns about the high cost, and the ability to work as planned. Some of these concerns are as follows:

> . . .that the emergency berms would take several months to build, by which time a lot of oil would have hit the coast; that dredging up the sand to build the berms could intensify coastal erosion and rip apart undersea oil-and-gas pipelines; and that the berms, by changing the flow of water, could alter the water's salinity, potentially hurting fish. . .
>
> In written comments May 26 to the Corps of Engineers, the EPA said the berms would

> be "unlikely to stop the majority of the oil from migrating inland," because they would leave many large water passes open.
>
> Furthermore, the EPA said in its comments, the construction of the oil-blocking berms "could exacerbate the emergency situation in the Gulf," in part because it could move around sand on the sea floor that already had been contaminated with oil, newly endangering aquatic life.

So there are no easy answers.

Furthermore, residents are concerned about the possibility of losing jobs because of the six-month moratorium on drilling according to the Guardian:

> The crisis is as much about money as it is about the environment. In Plaquemines, where rigs and refineries line the roads, there is as much anger at Obama for putting a moratorium on offshore drilling as there is at BP for provoking the six-month timeout in the first place.
>
> Almost everybody has someone who has worked in the industry and there is as much talk about fears that the offshore industry might migrate elsewhere as a result of the crisis as there is about the black tide washing into the marshes.

BP is still catching far less than the total amount of oil escaping. To try to solve the problem of catching oil, BP is being given 48 hours (to the end of the weekend) to come up with a plan to increase oil collection. Clearly, the best way to stop problems with oil getting into marshes (and other places) is to stop the flow at the leak.