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Subject: Mudflat Delineation/Determination Issues

Hi Chris and Matt,

Apex has completed the sampling that we previously discussed in a teleconference with Deerin Babb-Brott on June 28th, in order to confirm the presence or absence of mudflat within the intertidal area at the proposed location of the South Terminal CDF. Samples were collected on a grid within the intertidal zone (mostly biased toward Mean Lower Low Water, please see attached map). Survey equipment was utilized in order to locate Mean Lower Low Water, to ensure that the samples were being collected at an elevation low enough to ensure that the lowest reach of the intertidal area was being investigated. A plan with the sample locations is attached. Samples were submitted to a laboratory for grain size analysis. We have received the grain size analysis information from the laboratory today (the raw data is attached).

As per usual, the laboratory sorted the sediment particles into categories, which are: Cobbles, Coarse Gravel, Fine Gravel, Coarse Sand, Medium Sand, Fine Sand, and Total Fines. Fines are typically silts, clays and organic material (see attached data sheets and summary table below).

For reference, the definition of mudflat within 40 CFR 230, 404(b)(1), Subpart E (citation attached) is:

§ 230.42 Mud flats.

(a) Mud flats are broad flat areas along the sea coast and in coastal rivers to the head of tidal influence and in inland lakes, ponds, and riverine systems. When mud flats are inundated, wind and wave action may resuspend bottom sediments. Coastal mud flats are exposed at extremely low tides and inundated at high tides with the water table at or near the surface of the substrate.

The substrate of mud flats contains organic material and particles smaller in size than sand. They are either unvegetated or vegetated only by algal mats.

(b) Possible loss of values: The discharge of dredged or fill material can cause changes in water circulation patterns which may permanently flood or dewater the mud flat or disrupt periodic inundation, resulting in an increase in the rate of erosion or accretion. Such changes can deplete or eliminate mud flat biota, foraging areas, and nursery areas. Changes in inundation patterns can affect the chemical and biological exchange and decomposition process occurring on the mud flat and change the deposition of suspended material affecting the productivity of the area. Changes may reduce the mud flat's capacity to dissipate storm surge runoff.

Approach to Results Interpretation

Based upon the above definition, we assumed that if the samples presented “mud” or a high degree of fines, it would indicate an area that should be categorized as mudflat, and we would be able to then delineate the mudflat area and quantify it for resource area delineation purposes. Although the definition of mudflat does not specify what percentage of fines would be the cut-off point for making a delineation of mudflat, we had discussed that 100% fines would clearly qualify, greater than 50% fines would likely qualify, that 1% would likely not qualify, and that it was possible that percentages between 50% and 1% might theoretically qualify. The following is a summary of the percentage of fines within the samples sent for grain size analysis:

Sample	% Fines
A1	0.6%
A2	9.1%

B1	0.5%
B2	1.6%
C1	0.9%
C2	0.9%
D1	1.2%
D2	12.8%
E1	1.1%
E2	0.1%
F1	2.3%
F2	0.1%
G1	4.2%
G2	0.5%
G4	0.5%
G5	0.4%
G6	0.8%
H1	4.5%
H2	2.5%
H4	0.2%
H5	0.2%
I1	5.6%
I2	1.0%

I3	0.9%
I4	0.5%

Chris had mentioned the presence or absence of benthic invertebrates as being important in this discussion, so I am also attaching the map showing our shellfish survey grid, as well as Table 1, which catalogued all of the shellfish and invertebrates that we located during the investigation.

The data seems to indicate that, although the area in question may be important intertidal area that provides significant ecological function/habitat, it may not meet the regulatory definition of “mudflat”.

We would like to get your input on this hypothesis prior to advancing our report.

Thanks,

Chet Myers, PE, LSP

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 - 40cfrPart230[1].pdf  - Grain Size Analysis Info.pdf  - SOUTHTERMINAL_Sieve_Samples.pdf 
- Shellfish Survey Figure and Benthic Recovery Table.pdf