

**Summary of the Surveillance Data**  
**Post Re-opening Grids C13, C17, C21-22, C26 (fish & shrimp)**

**Background:** This area was reopened to fishing on September 2, 2010 after the results of sensory and chemical testing on numerous fish and shrimp specimens showed that the seafood from this area was safe for consumption. To support consumer confidence and demonstrate that seafood from the area continues to be safe for consumption, the area was re-sampled between March 7 and May 6, 2011 as part of a post re-opening sampling event. During this sampling effort, 157 specimens (comprised of 833 individual organisms) were taken representing the important reef fish and pelagic fish species, as well as shrimp species (grids C13, C17, C21 only), that occur in the area. The samples from this sampling effort were processed and analyzed for chemistry only (no sensory testing). Because this is a surveillance program to confirm the results of the re-opening, the analytical chemical analyses provide sufficient information to confirm that the seafood from an area continues to be safe for human consumption.

A gas chromatography/mass spectrometry (GC/MS) method was used to measure polycyclic aromatic hydrocarbons (PAHs) in seafood samples analyzed for re-opening of the grids and a high performance liquid chromatography/fluorescence (HPLC-UVF) method developed by the FDA (<http://www.fda.gov/downloads/ScienceResearch/UCM220209.pdf>) was used to analyze samples from surveillance of the re-opened areas. The HPLC-UVF method provides reliable estimates of PAH levels in seafood. A minor difference between the two methods is that the HPLC method has higher limits of quantitation than the GC/MS method but this does not affect the ability to measure PAHs and determine if they are below the levels of concern. Because the HPLC method is faster, larger numbers of samples can be analyzed, thus increasing the capacity of the surveillance program.

The samples were also analyzed for dioctyl sodium sulfosuccinate (DOSS) a component of the dispersant used in response to the DWH spill. The HPLC MS/MS method that was jointly developed by FDA and NOAA (see New Method for DOSS Detection in Seafood at: <http://www.fda.gov/Food/FoodSafety/Product-SpecificInformation/Seafood/ucm210970.htm#DOSS>) was used.

**Post Re-opening Surveillance Results:** The chemistry results are in the accompanying table ([hyperlink](#)). All PAH and DOSS levels measured in the samples were well below the levels of concern (LOC). The chemistry data are reported in nanograms per gram (parts per billion: ppb) PAH or micrograms per gram (parts per million: ppm) DOSS in edible tissues of the finfish or shrimp collected. Above each compound symbol is a numeric value for the LOC expressed in ppb for PAHs or ppm DOSS. Chemistry results below the LOC for that particular PAH compound or DOSS show that the fish or shrimp sample is safe for human consumption. Results that include the “less than” (<) symbol indicate results that are less than the limit of quantitation for PAHs determined by HPLC-UVF or below the limit of quantitation for DOSS determined by HPLC MS/MS. These values are the levels at which the analytical instrumentation can measure the quantity of the compound in a sample. Two different HPLC-UVF systems were used to measure the PAHs in the seafood as part of this recent post re-opening surveillance sampling effort. A superscript 2 (<sup>2</sup>) after the chemical test number in each table indicates the samples analyzed using an Agilent HPLC-UVF system versus a Waters HPLC-UVF system.

**Comparison to Re-opening and Previous Post Re-opening Surveillance Results:** To allow comparison of the surveillance chemistry data to the chemistry data for the re-opening of this area and a previous post re-opening surveillance sampling event (Oct. 6-Dec. 19, 2010) the following table summarizes the LOCs, as well as the range of concentrations of PAHs measured in all of the

samples analyzed. Such a comparison cannot be made for DOSS because the method for DOSS was developed after this area was re-opened. The results for the current surveillance sampling are comparable to the results for re-opening and previous surveillance sampling efforts, confirming that finfish and shrimp from this area continue to be safe for human consumption. The only minor difference among the sets of data is that the concentrations of naphthalene and fluorene are slightly higher in the surveillance samples than in the samples from re-opening. This is due to a technical difference between the two analytical methods. The HPLC method measures both parent (naphthalene or fluorene) and alkylated PAHs (naphthalene with an alkyl group or fluorene with an alkyl group) whereas the GC/MS method measures only the parent PAH. The highest concentrations of naphthalene and fluorene (48 ng/g and 7.6 ng/g, respectively) measured in shrimp samples collected during the most recent post re-opening surveillance effort, however, are still more than 2500 times lower than the level of concern for each compound.

## Post Re-opening Grids C13, C17, C21-22, C26 (fish)

PAHs	Level of Concern (ppb)	Data table symbol	Samples from	Samples from	Samples from
			Sept. 2, 2010 Re-opening	Oct. 6-Dec. 19, 2010 Post Re-opening Surveillance	Mar. 7 – May 6, 2011 Post Re-opening Surveillance
			Range of values (ppb) GC/MS analyses	Range of values (ppb) HPLC/fluorescence analyses <sup>^</sup>	Range of values (ppb) HPLC/fluorescence analyses <sup>^†</sup>
Naphthalene	32,700	NPH	0.53 - 1.7	<2.5 - 40	<10.55 - 40
Fluorene	65,300	FLU	<0.16 - 1.1	<1.0 - 1.8	<1.0 - 7.42
Anthracene/Phenanthrene	490,000*	ANT/PHN	0.31 - 1.7	<1.4 - 3.0	<1.99 - 3.0
Pyrene	49,000	PYR	<0.33	<0.72	<0.72 - <3.19†
Fluoranthene	65,300	FLA	<0.13 - 0.38	<4.1	<4.1 - <5.57†
Chrysene	35,000	CHR	<0.19 - 0.84	<1.1 - 1.8	<1.1 - <4.34†
Benzo(k)fluoranthene	3,500	BKF	<0.33	<0.58	<0.58 - <0.63†
Benzo(b)fluoranthene	350	BBF	<0.33	<0.67	<0.67 - <0.77†
Benz(a)anthracene	350	BAA	<0.29	<0.59	<0.59 - <3.36†
Indeno(1,2,3-cd)pyrene	350	IDP	<0.29	<2.5	<1.87 - <2.5†
Dibenz(a,h)anthracene	35	DBA	<0.25	<5.3	<1.20 - <5.3†
Benzo(a)pyrene	35	BAP	<0.30	<1.1	<0.81 - <1.1†
DOSS	Level of Concern (ppm)		Range of values (ppm)	Range of values (ppm)	Range of values (ppm)
<b>Diocylsulfosuccinate</b>	100	<b>DOSS</b>	<0.046	<0.045	<0.044 – 0.066

\* Level of Concern for Anthracene and Phenanthrene combined

<sup>^</sup> HPLC/fluorescence (screening) analyses have higher limits of quantitation than the more sensitive and laborious GC/MS analyses.

<sup>†</sup> Analyses were conducted using two different high performance liquid chromatography/fluorescence systems that have different limits of quantitation for each analyte.

## Post Re-opening Grids C13, C17, C21 (shrimp)

PAHs	Level of Concern (ppb)	Data table symbol	Samples from	Samples from	Samples from
			Sept. 2, 2010 Re-opening	Oct. 6-Dec. 19, 2010 Post Re-opening Surveillance	Mar. 7 – May 6, 2011 Post Re-opening Surveillance
			Range of values (ppb) GC/MS analyses	Range of values (ppb) HPLC/fluorescence analyses <sup>^</sup>	Range of values (ppb) HPLC/fluorescence analyses <sup>^</sup>
Naphthalene	123,000	NPH	0.50 - 1.3	<3.4 - 26	7.5 - 48
Fluorene	246,000	FLU	<0.17 - 0.30	<0.69 – 1.4	<0.69 – 7.6
Anthracene/Phenanthrene	1,846,000*	ANT/PHN	0.31 - 0.78	<0.70 - 2.6	<0.70 – 0.75
Pyrene	185,000	PYR	<0.22	<0.29	<0.29
Fluoranthene	246,000	FLA	<0.22	<0.25	<0.25
Chrysene	132,000	CHR	<0.29	<1.4	<1.4
Benzo(k)fluoranthene	13,200	BKF	<0.29	<0.37	<0.37
Benzo(b)fluoranthene	1320	BBF	<0.29	<0.76	<0.76
Benz(a)anthracene	1320	BAA	<0.25	<0.78	<0.78
Indeno(1,2,3-cd)pyrene	1320	IDP	<0.26	<4.5	<4.5
Dibenz(a,h)anthracene	132	DBA	<0.22	<6.2	<6.2
Benzo(a)pyrene	132	BAP	<0.26	<0.53	<0.53
DOSS	Level of Concern (ppm)		Range of values (ppm)	Range of values (ppm)	Range of values (ppm)
Diethylsulfosuccinate	500	DOSS	<0.046	<0.045	<0.044 - 0.053

\* Level of Concern for Anthracene and Phenanthrene combined

<sup>^</sup> HPLC/fluorescence (screening) analyses have higher limits of quantitation than the more sensitive and laborious GC/MS analyses.