UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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OFFICE OF
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Subject: Memo on Action Levels for Human Health and Ecological Risks based on SVOC contaminants at Bremerton MGP Waste Release Site

Introduction:

Preliminary risk assessments have been performed by EPA regional toxicologists on the analytical SVOC results of the EPA sampling of the beach sediments for the Bremerton MGP Waste Release Site on the night of October 9 - 10, 2010. This memo is intended to clarify the implication of those assessments and apply them to the determination of the extent of contamination on the beach that EPA recommends be excavated immediately.

Preliminary Human Health Assessment:

Carcinogenic PAH (cPAH) values that the lab reported above their minimum reporting limits were divided by the corresponding residential soil regional screening levels (RSLs). The risk associated with an RSL is 1 in a million or 1×10^{-6}. Consequently the risk associated with a contaminant concentration above the RSL is equal to that concentration divided by the corresponding RSL times 1×10^{-6}. A more detailed risk assessment using actual exposure data might lead to a lower risk estimate. cPAHs have a common mechanism of toxicity, and it is particularly appropriate to add the risks associated with these contaminants. For each sample, a total cPAH risk estimate was obtained by summing the risks for the individual cPAHs. These risks are displayed in Table 1 which should be used in conjunction with Figure 2-1 to locate the samples on the ground.

In evaluating risk, it is important to understand EPA's guidance on acceptable risk. A risk of less than 1×10^{-6} is generally below levels of concern and no further action is necessary. Risks above 1×10^{-4} generally require action. EPA may or may not take action for risks between 1×10^{-4} and 1×10^{-6}. A more detailed risk analysis would consider how people might be exposed to contaminants on a site specific basis. Since there has not been enough time to determine, gather and analyze the information needed to develop site specific exposure estimates, a judgment needs to be made by the FOSC on the acceptable amount of risk that the human population should be exposed to at this site. A risk above 1×10^{-4} requires EPA to consider action. The beach area is not a residential yard, however there is unrestricted access to it and there are children living and going to school in the neighborhood so there is a high probability the beach is used by them. This is further supported by the garbage left on the path down to the beach at the north end of Pennsylvania Avenue. Based on what we know right now, I believe the highest human health risk we should tolerate for near-term, human health, direct contact / ingestion exposure is 5×10^{-4}. Any beach sediments exhibiting risk factors above 5×10^{-4} should be addressed by excavation, capping or exclusion of humans from direct contact with the contaminated sediment.

Preliminary Ecological Risk Assessment:

The same SVOC data was compared to ecological screening level benchmarks for sediment. The potential risk to the ecological receptor was determined by dividing the sample concentrations above the minimum reporting limit by the ecological screening level. A more detailed ecological risk assessment using actual exposure data might lead to a lower risk estimate. Similar to the human health risk assessment, while a more detailed risk analysis would consider how ecological species might be exposed to contaminants on a site specific basis, there has not been enough time to determine and gather data to develop site specific exposure estimates. Therefore, a judgment needs to be made by the FOSC on the acceptable amount of risk that the ecological population should be exposed to at this site.

Once the potential risks were determined, the results were separated into three levels of risk. Level 1 includes sample sites with risks between 10-30 fold higher than the screening levels. Level 2 includes sample sites with risks to ecological species between 10-100 fold higher than the screening levels. Level 3 includes sample sites with risks to ecological species that range from 50 to over 100 fold higher than the screening levels. The Level 2 sample sites do pose risk to ecological species and the Level 3 sample sites pose significant risks. The Level 3 areas should be excavated immediately to protect ecological species. Since the affected marine species have the ability to crawl on and in the beach sediments, capping or fencing are not

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considered protective alternatives. These risk factors are displayed positionally in Table 2 which should be used together with Figure 2.1 to determine affected locations.

Conclusion:

To protect human health on the beach, the areas with risk factors above 5×10^{-4} should be capped, fenced or excavated immediately. The areas with risk factors above 1×10^{-6} should be considered for a removal or remedial action in the near future.

To protect marine animals using the beach, areas with ecological risk factors over 100 fold higher than the ecological screening level benchmarks for sediments should be excavated immediately. The areas above the ecological screening level benchmarks for sediments should be considered for a removal or remedial action in the near future.

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Table 1

BREMERTON MGP WASTE RELEASE

HUMAN HEALTH RISK - Cumulative Risk for PAH Concentrations in 10/10/2010 Samples

Removal action required for risk greater than 5 (Cancer risk at 1 x 10 -4) "Not necessarily protective"

Blue text represents sample locations under 5 x 10 -4 Cancer risk.

				OLLW				
67.7	1.0	2.7	W6		E6	SW outfall	6.3	2.4
14.3	5.5	12.6	W5		E5	0.50	8.0	4.5
7.5	2.5	8.4	W4	6.9	E4	6.0	6.0	0
	4.9	16.1	W3	3.5	E3	3.5	0	
	0.57	6.3	W2	4.5	E2	0	0	
		3.5	W1	2.4	E1	0		
				OHHW				

prepared 10/27/2010 by Kathy Parker

Table 2

BREMERTON MGP WASTE RELEASE

ECOLOGICAL RISK - Cumulative Risk for PAH Concentrations in 10/10/2010 Samples

Red Text: Removal action required for risk greater than 100 fold over the ecological sediment benchmark

				OLLW				
1509	**110**	60	W6		E6	SW outfall	**161**	43
372	**137**	**380**	W5		E5	47	**242**	98
220	**253**	**215**	W4	**187**	E4	**153**	13	0
	120	**477**	W3	**105**	E3	27	0	
	33	**172**	W2	60	E2	0	0	
		70	W1	50	E1	0		
				OHHW				

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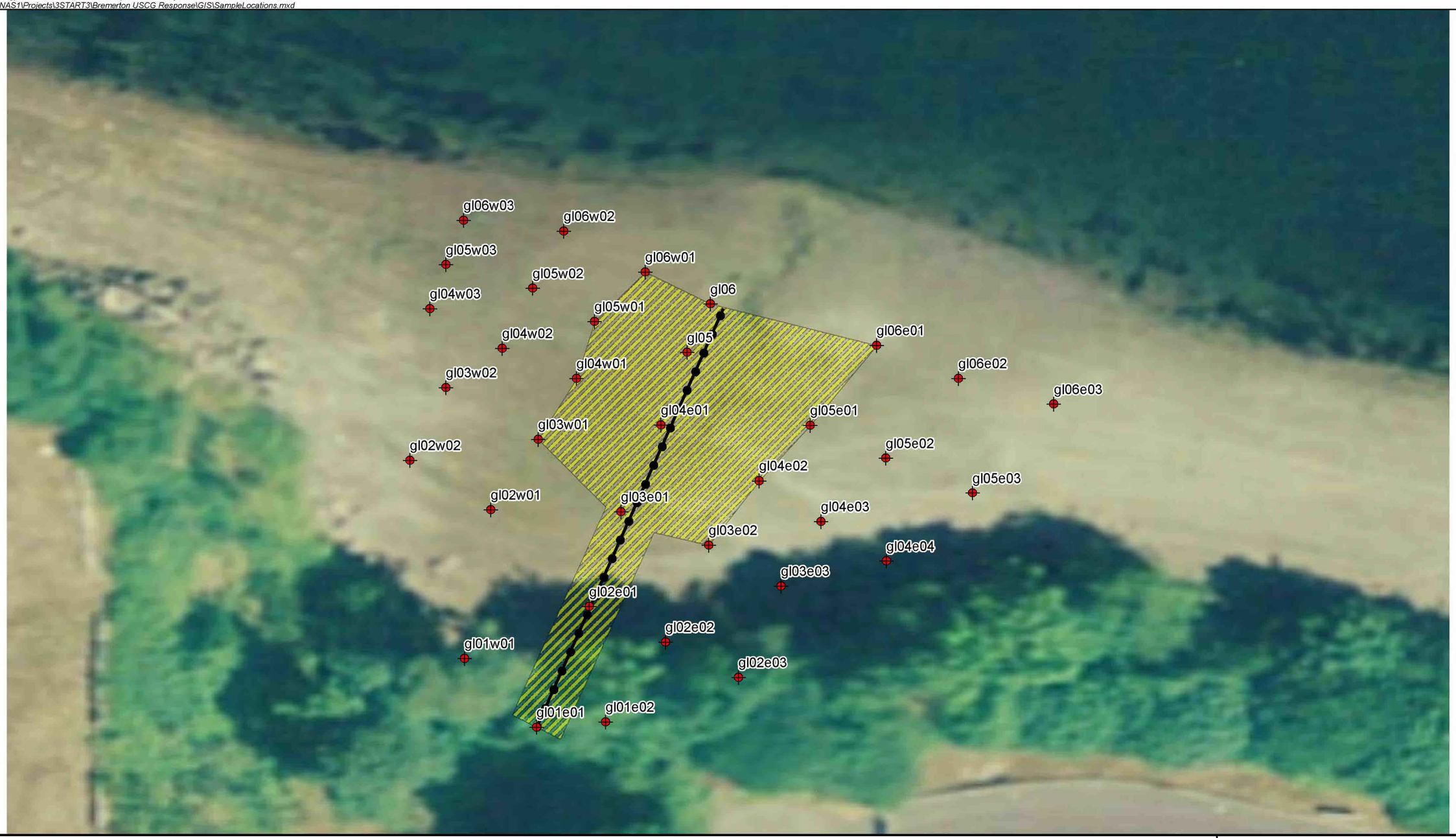

Legend

- Sample Locations
- Pipe Location
- Estimated Excavation Area (~4,000 Sqft)

BREMERTON MGP WASTE RELEASE

REMOVAL ASSESSMENT

Figure 2-1

10/10/2010 Sample Locations

0 10 20 40 60
Feet