KEY NOTE

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SITE CIVIL IMPROVEMENT ↷ EROSION CONTROL ↷ SURFACE WATER QUALITY

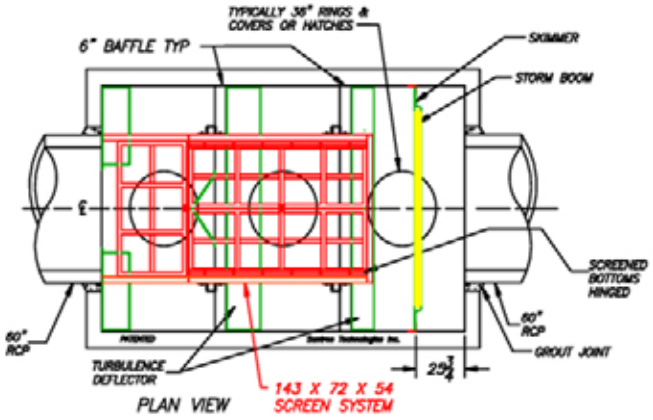
GeoPro® Learning Tool

April 18, 2008

NSBB Hydrocarbon Capture System

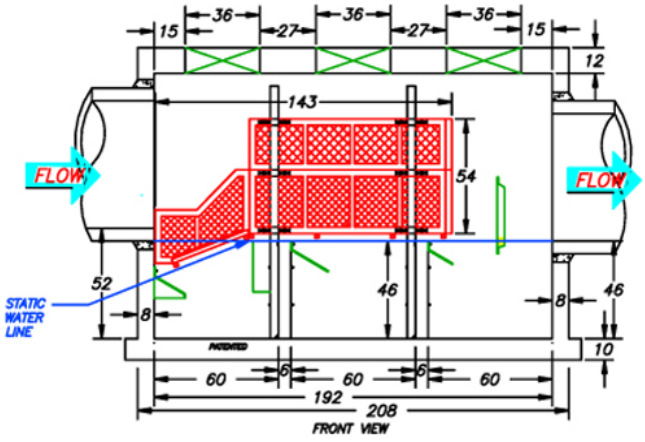
Suntree Technologies, Inc. produces **Nutrient Separating Baffle Boxes** [NSBBs], each of which is equipped with a **Storm Boom**. **Storm Boom** absorbs [emphasis on the 'b'] hydrocarbons brought to it via the flow of not only 'first flush' events, but also during greater intensity storms. Once locked into the **Storm Boom**, hydrocarbons are safely and easily removed, handled, transported and disposed of ... free liquids and associated drips and spills are eliminated.

Illustrated below, Storm Boom resides adjacent and up-gradient to the skimmer [near the effluent pipe].



Plan view of NSBB 10-16-125: Storm Boom shown in yellow

The profile [front] view shows **Storm Boom** residing within a track, built into the skimmer, which allows its vertical movement, thereby enabling interception of hydrocarbons at the water surface over a considerable range of flows. Not only do more hydrocarbons get captured, they cease to remain 'free liquids', making treatment system maintenance operations safer for personnel. In addition, 'free liquids' cease to be problematic during transportation and disposal.



Profile view of NSBB 10-16-125: Skimmer shown in green

The skimmer, in combination with the **Storm Boom's** vertical movement capability, enable most of the hydrocarbons to move to and within the **Storm Boom** - hence significant capture and retention are achieved.

The quantity of hydrocarbons retained by **Storm Boom** is dependent on the quality and quantity of absorbent material used. The following table provides the expected retention capability of a **Storm Boom** for each size of **NSBB** unit. Considering the relatively small quantity of hydrocarbons moving within storm drains [exclusive of spills and illegal 'dumping'], the capacities shown are significant ... **Storm Boom** replacement 'need' is typically less frequent than basket system or sediment chamber cleaning 'needs'.

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NSBB Model	Storm Boom Capacity (gallons)	Spill Capture Capacity (gallons)
2-4-60	0.6	20
3-6-84	1.0	80
4-6-72	1.4	100
4-8-84	1.4	100
5-10-84	1.9	330
6-12-84	2.4	480
8-12-84	3.4	730
8-14-96	6.8	730
8-14-100	6.8	730
8-14-125	6.8	730
10-14-96	8.8	1000
10-16-125	8.8	1000
12-20-132	10.8	1250

Hydrocarbons are a low-volume, high-concern contaminnt

Do all hydrocarbons get captured? No ... some are well mixed with the water upon entry into the unit and even though the **NSBB** uses an energy reduction process to collect contaminants, sufficient turbulence remains to make full contact between the hydrocarbons and the **Storm Boom** impossible.

Complicating this issue with all hydrocarbon removal processes in all treatment systems are flow turbulence, flow speed and hydrocarbon type. While the first two factors are relatively self evident, understanding the relationship between hydrocarbon type and its ability to mix with the transporting water is often overlooked. Motor oil, transmission fluid, engine coolant and gasoline, much less a whole host of other organic liquids found on industrial sites, exhibit radically different propensities to 'mix' with water and transport through a system. With regard to storm flows and the capture of gross pollutants, the primary focus for most treatment systems, virtually no studies differentiate among organic liquids which must be removed. As an industry, we differentiate organic liquid removal only when project-specific requirements mandate more expensive water polishing process results. Hence, for primary water treatment, that is the removal of gross pollutants, none of the existing systems are full-proof regarding the capture and storage of 'hydrocarbons'.

Several treatment systems utilize a hydrocarbon entrapment process based on creating an upper zone within a wet contaminant storage vessel where water movement will cease and the lighter free-liquids will collect. Typically, these systems are controlled by an up-gradient weir structure which allows only the 'first flush' storm flow to move into the vessel [off-line treatment]. This method of capture assumes that the path length of flow internal to the vessel is sufficient to enable all hydrocarbons to move upward into the upper, no movement zone and thereby be stored. In fact, a good portion of the hydrocarbons are, indeed, captured in this way. But not all. Some of these contaminants remain in the flow path and exit the vessel - even during the low-flow or first flush events. And with sufficient storage of hydrocarbons, the bottom level of hydrocarbons are susceptible to movement back into the flow path ... and unimpeded discharge. Of note, once after the runoff intensity causes flow to top the weir, virtually all hydrocarbons entering the treatment system by-pass the off-line component and continue to down-gradient pipes unimpeded.

In such systems, this hydrocarbon removal process requires a vac truck to remove all liquids within the vessel - water as well as the free-liquid hydrocarbons. Therefore, all removed water is contaminated and must be handled and disposed of accordingly.

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Still other treatment systems use an inverted weir within either on-line or off-line storm flows to pool the water and hydrocarbons, assuming the hydrocarbons have sufficient time and ability to rise to the pool surface and be captured. Again, such systems capture a portion of the hydrocarbons, but not all, as some of the free-liquids remain within the primary flow path and continue to the discharge pipe. Maintenance of such treatment systems are identical to those that are weir based - personnel will be exposed to free liquids and all water removed from the structure is contaminated.

In summary, well-designed, gross pollutant treatment systems within closed conduit [piped] storm drains offer significant hydrocarbon capture and retention capability. However, currently produced systems lack the ability to capture all hydrocarbons, regardless of flow rate, turbulence creation/reduction or targeted hydrocarbon type. Complete or near complete hydrocarbon removal within such systems is relegated to high-cost water polishing units. **Storm Boom**, the primary hydrocarbon capture and retention element within a **Nutrient Separating Baffle Box** meets or exceeds all realistic standards for primary stormwater treatment systems.

Suntree Technologies Inc.

Storm Boom is specifically designed for stormwater applications to capture and retain hydrocarbons upon contact. The outside covering will not clog with sediment, allowing indefinite hydrocarbon penetration to the element's center and the absorbent polymer. Hydrocarbons coming in contact with the polymer is drawn into the polymer's molecular structure. The only release mechanisms available for the captured hydrocarbons are evaporation and incineration. Leaching and draining are prevented ... no free liquids to handle, transport or dispose.

Greater detail regarding the significant differences between 'absorbents' and 'adsorbents' may be found at [click here]. Absorption, the process by which **Storm Boom** functions, offers state-of-the-art hydrocarbon capture and retention capabilities. Functionally superior, environmentally safe, people safe - request **Storm Booms** from *Price & Company* when replacement is required.

Spill Capture

NSBBs provide an excellent safeguard for downstream water bodies from liquid organic spills. The design of NSBBs enable the capture and retention of floating hydrocarbons in significant quantities prior to clean-up by qualified environmental personnel. The table on page 2 indicates the temporary holding capacity of these contaminants for selected NSBB units.

Contact our *Regional Representative* for additional **Storm Boom** and **Nutrient Separating Baffle Box** information.

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