

# KEY NOTE



**PRICE & COMPANY**  
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SITE CIVIL IMPROVEMENT ↔ EROSION CONTROL ↔ SURFACE WATER QUALITY

Geopro® Learning Tool

April 2, 2003

## Floc Log Safety

**Floc Logs**®, semi-hydrated forms of polymer blends, rapidly clarify construction site stormwater runoff and industrial site process waters. Through proper application [contact your *Price and Company, Inc. Regional Representative* for information], water clarification is achieved via flocculation, particle entrapment and/or chelate formation. Often, these chemical processes are the only economically viable methods to remove fine suspended solids from runoff or process waters in either a continuous flow or batch process. For nearly all Michigan construction projects which involve disturbing soils with trace or greater quantities of very small particles [fine silts and clays], acceptable quality of runoff cannot be achieved without such polymer use.

*MDEQ* allows the use of **Floc Logs** on projects via a simple, rapidly obtained permit process. *MDEQ*'s acceptance of this chemical technology is predicated on the safety by which **Floc Logs** can be used, even with the relatively uncontrolled working environment of complex and continuously changing construction sites. In essence, **Floc Logs** are non-toxic to humans, other terrestrial animals and aquatic wildlife. Even if a 'major spill' develops, they are easily remediated without environmental damage or product loss. The following paragraphs offer details pertaining to the handling and environmental safety associated with **Floc Logs**.

### Toxicity Testing

All **Floc Log** types included on *MDEQ*'s 'Water Treatment Additive List' are made from NSF Standard 60 chemicals. This designation indicates that these chemicals may be included in human drinking water. While safe for human ingestion, we do not suggest eating these products as they have a tendency to 'lubricate' the digestive tract!

All **Floc Log** types included as *MDEQ* allowed 'Water Treatment Additives' have been tested to establish an acute LC50. All testing was completed using 'whole-product' samples, *EPA* approved

facilities, *EPA* test protocols and *MDEQ* designated species. Each **Floc Log** type, with the exception of the 703d, exhibited an LC50 in excess of 420 mg/l, the *EPA* threshold above which, toxicity is not an issue for the application into which these products are intended. The 703d **Floc Log** exhibited an LC50 of 383 mg/l. All toxicity test data are available upon request from *Price and Company, Inc.*



Floc Log Assortment

### Application Rates

As water passes around, over and under a **Floc Log**, the constituent polymer blend slowly dissolves. The greater the water flow, the faster the dissolution speed. Dissolution speed should not be confused with dosage rate. With greater water flow, more polymer is dissolved, but at a relatively constant dosage rate. **Floc Logs** are designed to achieve a dosage rate of approximately 1-3 mg/l. Each standard size **Floc Log** is capable of providing this effective dosage for flows of up to 50 to 70 gpm [system adjustments, made in the field, will likely produce performance effectiveness at significantly greater flow rates – please contact your *Price and Company, Inc. Regional Representative* for more information]. Therefore, by virtue of design, **Floc**



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**Logs** should deliver an effective dosage rate that is a small fraction of its LC50. For the worst case condition associated with Michigan allowed **Floc Log** types, i.e., with the 703d material, the dosage rate should be no greater than 3/383 or 0.78% of the measured LC50. This low application rate precludes environmental damage.

Conventional admixing of polymer flocculants in emulsion or granulated form enables relatively exact 'dosage rate' attainment. However, the flow of storm water varies significantly during and between storm events, making conventional admixing processes expensive, unwieldy and unreliable for construction site operations. The dissolution process associated with **Floc Logs**, while ideal for construction site applications, precludes precise 'dosage rate' attainment. Therefore, the **Floc Log** polymer blends must be and are environmentally friendly [as should be any chemical used on construction sites, whether by an admixing or a dissolution process].

Without precise dosage rate measurement or monitoring, the best method to evaluate actual application rates for a dissolution process involves measuring polymer use in known flow-quantity regimes. *Price and Company, Inc.* has completed this at projects using pumps with known flow rates and hours of operation. Such antidotal measurements repeatedly resulted in application rates of one standard-sized **Floc Log** [7.5 lbs] for every 475,000 to 550,000 gallons of treated water, corresponding to application rates of 2.0 mg/l to 1.7 mg/l, respectively. This range in measured application rate coincides with product design safety considerations for maintaining a healthy environment.

## Residual Values

*Applied Polymer Systems, Inc.* [APS] strongly recommends that polymers be matched to the specific site soil and/or water chemistry. This mandate is based on two desired results:

a) **Optimized Performance** – where treated water quality is defined by achieving approximately 30 mg/l or less of suspended solids within the water rather than hundreds or even thousands of mg/l when the polymer chemistry is not matched to soil or water chemistries, and

b) **Efficiency In Polymer Use** – to reduce polymer usage and thus project cost as well as lower unused polymer concentrations in post-treatment receiving waters. With proper matching of polymers to site-specific soils/waters, in conjunction with proper mixing processes [a requirement for all polymers], utilization efficiencies

should approach 100%, reducing residual or pass-through concentration levels to nearly zero.

With the application rates so far below measured LC50 values, coupled with the *APS* mandate for site specificity chemistry matching [and the resulting high utilization efficiency], **Floc Logs** offer no 'over application' toxicity concerns.

## Accidental 'Spills'

**Floc Logs** are semi-solid masses, typically produced with a securing rope and terminal loop. Unlike granule and emulsion forms of polymers, **Floc Log** 'spills' are virtually impossible. In the event that a stored pallet of **Floc Logs** is tipped or rolled into a water body, their retrieval is not only possible, but often quite easy. Even if the 'accident' goes unnoticed for some time, their dissolution process is so slow and their LC50 values so high, that environmental damage is not a realistic concern.

## Other Concerns

This *KeyNote* addresses toxicity issues specific to **Floc Logs**. Other toxicity issues such as bio-accumulation, degradation constituents, etc., associated with using polyacrylamides, may be of concern to designers, regulators, contractors, etc. All such categorical issues have been thoroughly researched and reported by the *U.S. Dept. of Agriculture*. If additional information is sought regarding these issues, excellent resources are available on-line:

<http://kimberly.ars.usda.gov/pampage.shtml>

<http://kimberly.ars.usda.gov/Pamprim.shtml>

Call your *Price and Company, Inc.* **Regional Representative** for further information on how **Floc Logs** can be safely used to clarify construction site and industrial process waters.

*Silt Stop* is a trademark of Applied Polymer Systems, Inc.



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