

Appendix C
Flocculent

Anionic polyacrylamides and their impact upon the environment.

Jennifer L. Kerr, MSc.*

Importantly, though susceptible to photo, chemical and biological degradation, PAM does not break down into acrylamide monomers or other known toxic compounds under environmental conditions (as reviewed by Caulfield *et al.*, 2002). Furthermore, these compounds are not allowed to contain greater than 0.05% residual acrylamide (a known carcinogen; Exon, 2006) if they are to be used in drinking water clarification (Barvenik, 1994). Whatever residual AMD that would be deposited into the environment by PAM treatment would likely be quickly degraded, due to the rate at which AMD is metabolized by microorganisms (Lande *et al.*, 1979; Shanker *et al.*, 1990).

Regarding the dispersion of anionic PAM to environments, studies have indicated that anionic PAM applied to soils does not persist for a long time in runoff water, as it quickly adsorbs to suspended sediments and/or surrounding soil surfaces (Lentz and Sojka, 1996; Sojka and Entry, 2000).

Bioaccumulation is a major concern in environmental toxicology. However, due to the very large size of PAM, this compound is unable to cross the cell membrane of tissues such as the gastrointestinal tract and thus is at low risk for bioaccumulation (Stephens, 1991). (Muir *et al.*, 1997).

Shanker, R., Ramakrishna, C. and Seth, P.K., 1990. Microbial degradation of acrylamide monomer. *Archives of Microbiology*, **154**: 192-198.

Muir, M. M., Kosteretz, K. G. and Lech, J. J., 1997. Localization, depuration, bioaccumulation and impairment of ion regulation associated with cationic polymer exposure in rainbow trout (*Oncorhynchus mykiss*). *Xenobiotica*, **27**(10): 1005-1014.

Caulfield, M.J., Qiao, G.G. and Soloman, D.H.. 2002. Some aspects of the properties and degradation of polyacrylamides. *Chemical Reviews*, **102**: 3067-3083.

Exon, J. H., 2006. A review of the toxicology of acrylamide. *Journal of Toxicology and Environmental Health Part B: Critical Reviews*, **9**(5): 397-412.



Material Safety Data Sheet

1. Identification of the Product and the Company

Product Name: CFPL 394

Clearflow Enviro Systems Group Inc.
 #140, 134 Pembina Road
 Sherwood Park, AB T8H 0M2
 Ph. 780-410-1403
 Fx. 780-410-1406
www.clearflowgroup.com

2. Composition / Information on Ingredients

Identification of the preparation: Anionic water-soluble co-polymer gel mix.

3. Hazard Identification

Placement of these materials on wet walking surface will create extreme slipping hazard.

4. First Aid Measures

Inhalation: None.

Skin contact: Contact with wet skin causes dryness and chapping, wash with water and soap.

Eye Contact: Rinse thoroughly with plenty of water, also under the eyelids, seek medical attention in case of persistent irritation.

Ingestion: Consult a physician

5. Fire-Fighting Measures

Suitable extinguishing media: Water, water spray, foam, carbon dioxide, dry powder.

Special fire fighting precautions: Polymer logs that become wet render surfaces extremely slippery.

Protective equipment for firefighters: No special equipment required.

6. Accidental Release Measures

Personal precautions: No special precautions required.

Methods for cleaning up: Dry wipe as well as possible. Keep in suitable and closed containers for disposal. After cleaning, flush away traces with water.

7. Handling and Storage

Handling: Avoid contact with skin and eyes. Wash hands after handling.

Storage: Keep in a cool, dry place.

8. Exposure Controls / Personal Protection

Engineering Controls: Use dry handling areas only.

Personal Protection Equipment

Respiratory Protection: none.

Hand Protection:	Dry Cloth, Leather, or Rubber Gloves.
Eye Protection:	Safety glasses with side shields. Do not wear contact lenses.
Skin Protection:	No special protective clothing required.
Hygiene Measures:	Wash hands before breaks and at end of workday.

9. Physical and Chemical Properties

Form:	Granular semi-solid gel
Color:	White
Odor:	Slight vinegar smell
pH:	3-10
Melting Point:	N/A
Flash Point:	N/A
Autoignition:	N/A

10. Stability and Reactivity

Stability:	Product is stable, no hazardous polymerization will occur.
Materials to Avoid:	Oxidizing agents may cause exothermic reactions.
Hazardous Decomposition Products:	Thermal Decomposition may produce nitrogen oxides (NO _x), carbon oxides.

11. Toxicological / Ecological Information

Acute Toxicity

Environment Canada, EPS1/RM/14, 2nd Ed. Dec. 2000

LC 50 / *Daphnia magna* / 48h / 1415 mg/L

EC 50 (immobility) / *Daphnia magna* / 48h / 833 mg/L

Environment Canada, EPS1/RM/13, 2nd Ed. Dec. 2000, Amended May 2007

LC 50 / *Oncorhynchus mykiss* / 96h / >2500 mg/L

Bioaccumulation:	The product is not expected to bioaccumulate.
Persistence / Degradability:	Not readily biodegradable (~85% after 180 days)

12. Transport and Regulatory Information

Not regulated by DOT, RCRA status-Not a hazardous waste

NFPA and HMIS ratings:

NFPA:	Health: 1	Flammability: 0	Reactivity: 1
HMIS:	Health: 1	Flammability: 0	Reactivity: 1