MEGA-Drain™ WATER TREATMENT SOLUTIONS

"Water is an asset, not a Liability"

Our Partner Selection Criterion:

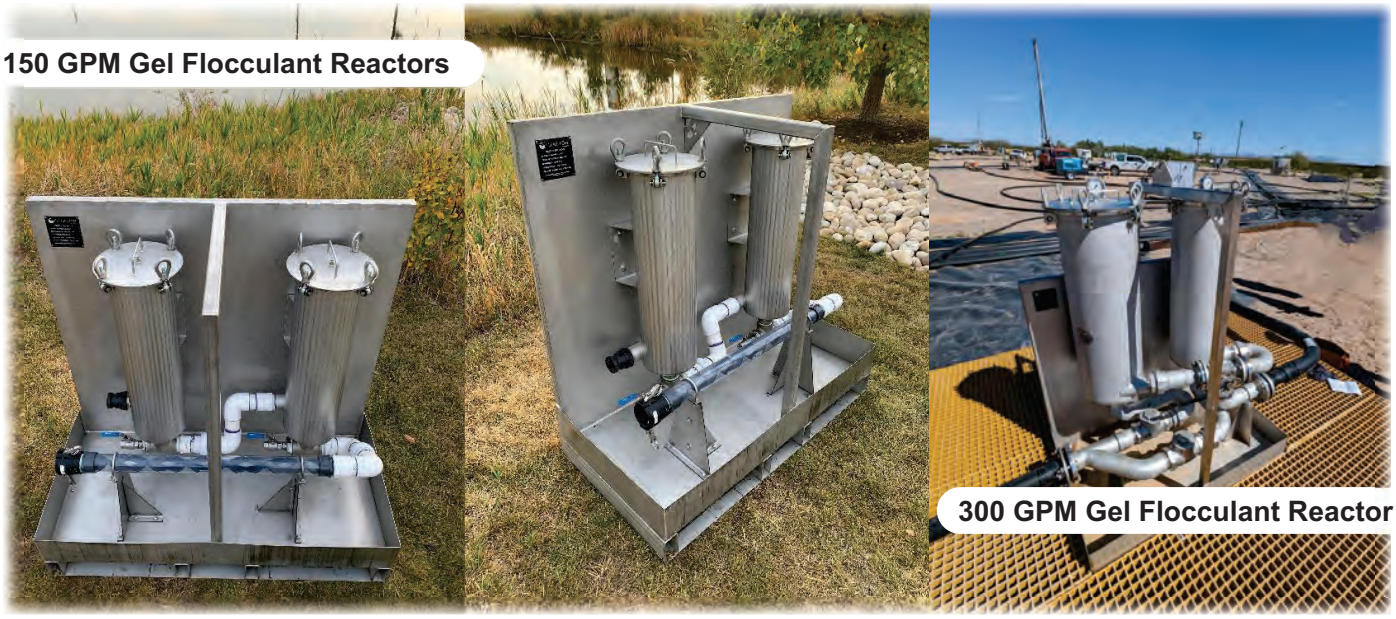
Find the most dependable and easily maintained treatment systems that offers great economy with a wide range of efficacy through innovation.

This survey brought us to:

CLEARFLOW

Manufacturer of vertical flocculation and in-line treatment reactors using proprietary floc gels

Vertical Reactors



150 GPM Gel Flocculant Reactors

300 GPM Gel Flocculant Reactor

In-Line Pipe Reactors

400 GPM Pipe Reactor

Gold Mine Water Treatment

MEGA-DRAIN™ 3500 Oakmont Blvd, Suite 200, Austin, TX 78731 +(830) 708-8318 www.megadraincorp.com

About Our Partner

What Does Clearflow Do?

- Clearflow specializes in the manufacture of water treatment and solids management technology which includes patented Gel Flocculants and Dewatering/Treatment equipment.
- Clearflow's unique patented core technology, “Gel Flocculant” formulations were designed to remove suspended solids, metals and phosphorus to meet or exceed regulatory requirements while protecting the environment, fish and surrounding ecosystem.
- Clearflow also manufactures innovative technology for Water Polishing, Soil Stabilization, Sediment binding and Dust Control, all of which are environmentally safe.

Clearflow Technology for Sustainable Mining, Construction and Oil & Gas Projects

Protecting and Preserving Watersheds Today for a Greener Tomorrow

About Our Partner

Clearflow Overview

- The company started in 2005 as Clearflow Consulting Inc. and since that time has evolved into Clearflow Group Inc. as of 2016.
- In 2020 opened a new USA company called Clearflow Group US Inc.
- Clearflow Group US Inc. is the manufacturing plant for our US Clients and all international
- Manufactures proprietary products for water treatment, sediment and soil erosion control.
- Manufactures Patented and Patent pending mechanical water treatment processes for industrial and/or high solids contamination situations.
- Core Focus Stabilize soil and clean dirty water allowing it to be released or re used.
- ASRT Accelerated Solid Removal Technology quickly/safely remove solids and contaminants from water to save money and footprint.
- Key advisory board Dr Greg Goss PhD Executive Professor Biological Science U of A, Dr Edyta Jasinska PhD Dept Biological Sciences U of A, Dr Anne Naeth PAg, PBiol Director Land Reclamation and Restoration Ecology U of A, Dr Michael Serpe Associate Professor Dept of Chemistry U of A.
- Owner Jerry Hanna is a member of the Métis Nation of Alberta.

CLEARFLOW
Global
Reach

Key Partner Innovation

Clearflow Gel Flocculants ... a Most Unique Innovation

- Environmentally-friendly, Fish-friendly;
- Self-dosing –no monitoring required;
- Passive treatment –no power or fuel required;
- Not temperature sensitive from freezing to boiling;
- Not pH sensitive between 3pH and 12pH;
- Not salt sensitive up to 250,000 mg/l;
  Easily installed in remote areas;
- Reduces sediment, metals, various levels of nutrients organics, VOCs and levels of light hydrocarbons.

Self-Dosing Gel Blocks

Their Deliverable:

Significant TSS Reduction

Pipe Reactors

LATEST IN ADVANCED TECHNOLOGY FOR HIGH RATE TSS REDUCTION

- Uses patented Clearflow Gel Block Flocculants
- Plug and play installation
- Passive treatment
- Small footprint
- In-line install treats water using pump energy
- Self-dosing / Self-limiting

THE CLEARFLOW PR1000

The PR1000 Reactor System is a flow through reactor engineered to release ready-state Clearflow Gel Block Flocculant into the water within the Cyclone chamber. The Cyclone chamber accelerates Gel Block Flocculant release utilizing induced vortex energy; this enables treatment of higher flow rates in a smaller footprint. Upon flow release from the system chamber, the flocculated solids aggregate based on reduced flow energy and induced cyclonic flow.

- Flocculates Total Suspended Solids for easy removal
- Flow rate, 400 – 1000 US GPM
- Stainless Steel construction
- Effective over a wide range of pH and temperature
- Additional injection points for other chemistry
- (liquid flocculants and pH adjustment)

Primary application is TSS removal from mining runoff and process water, stormwater, municipalities, and construction sites. Cyclone reactor hookup is easy using the 6” ANSI 150 flanged connection, no extra power is needed other than the flow from on-site pump. Design flow rate through the Cyclone is 400 – 1000 US GPM.

SPECIFICATIONS:

- Inlet – 6” MNPT SCH10 (or 6” ANSI 150 flange)
- Outlet – 6” FNPT (or 6” ANSI 150 flange)
- Length (without 6” ANSI 150 flanges) – 137”
- Length (with 6” ANSI 150 flanges) – 138”
- Width – 19”
- Height – 22” (to top of lifting brackets)
  Mass (dry weight) – 500 lbs

Pipe Reactor installation at Westmoreland Mountain mine location

- Starting NTU: 3400
- Treated NTU for release: 20 NTU

Vaule Proposition

CLEARFLOW

Sampling of Average Operational Cost Ranges With Gel Flocculant

Pumped Flow Application

(Flow is at 1000 gpm | Gel Flocculant Reactor is installed using 36 Gel Flocculant Slabs)

Sample Operational Cost Ranges	Length of Use
▼ At Higher Turbidity Concentrations	
$57.65 Per Acre Foot/$.071 per m^3.	Flocculant Slabs last for 14 days
▼ At Typical Turbidity Concentrations	
$58.33 Per Acre Foot/$.0427 per m^3.	Flocculant Slabs last for 21 days
▼ At Lower Turbidity Concentrations	
$35.00 Per Acre Foot/$.028 per m^3.	Flocculant Slabs last for 35 days

Open Flow Application

(Flow is at 1000 gpm | Per dosing rates, 20 Gel Flocculant blocks are placed in the channel)

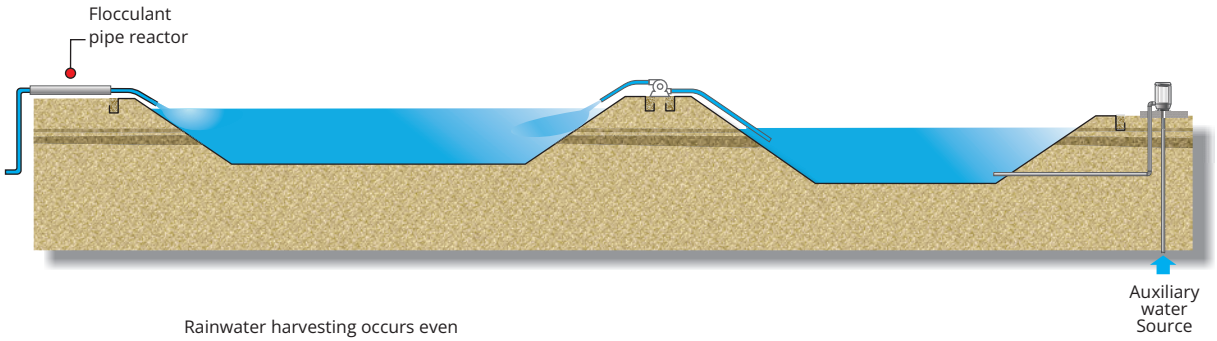
Sample Operational Cost Ranges	Length of Use
▼ At Higher Turbidity Concentrations	
$22.61 per acre foot/$.018 per m^3	Flocculant Blocks last for 30 days
▼ At Typical Turbidity Concentrations	
$11.31 per acre foot/$.009 per m^3	Flocculant Blocks last for 60 days
▼ At Lower Turbidity Concentrations	
$7.56 per acre foot//$.006 per m^3	Flocculant Blocks last for 90 days

Comparative liquid flocculant operational cost = $651.70 per acre foot/$.53/m^3

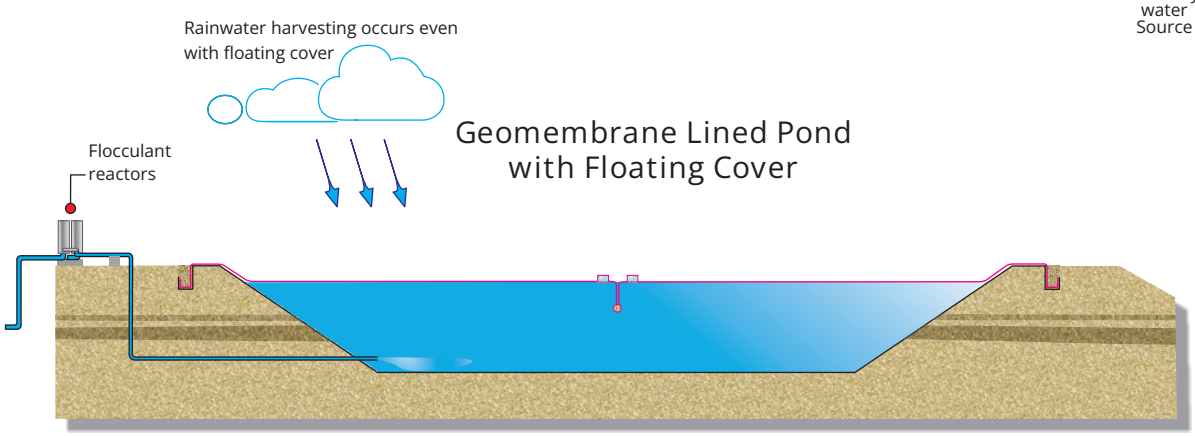
**Average prices last updated Dec 2023*

Sample Reactor Layouts

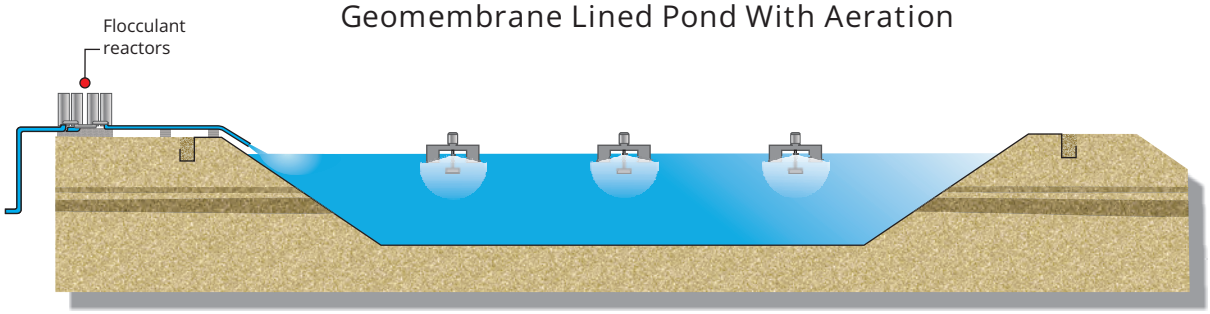
Geomembrane Lined Ponds



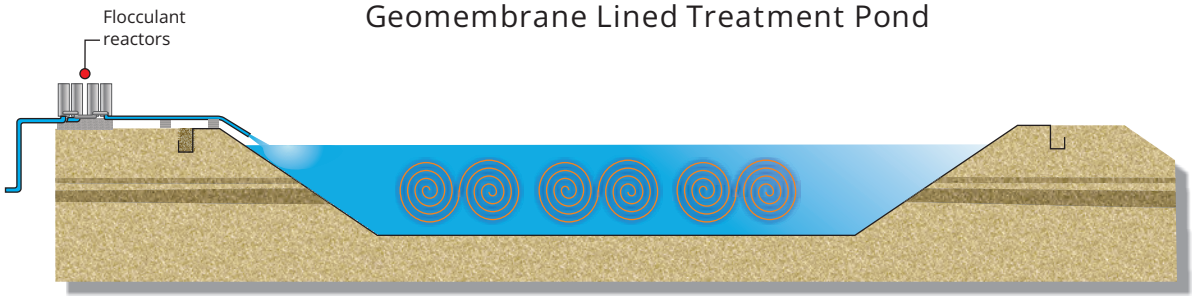
Geomembrane Lined Pond with Floating Cover

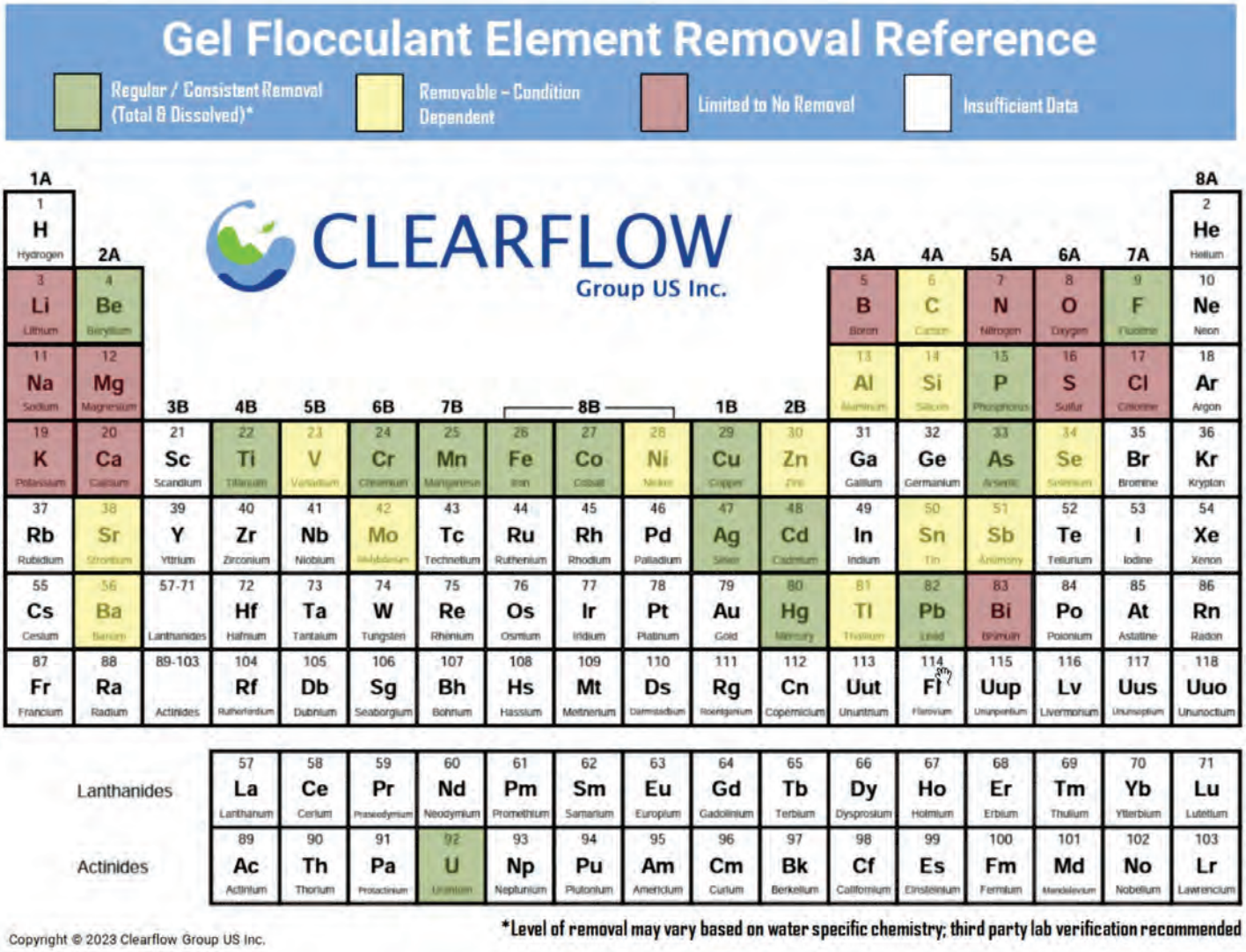


Geomembrane Lined Pond With Aeration



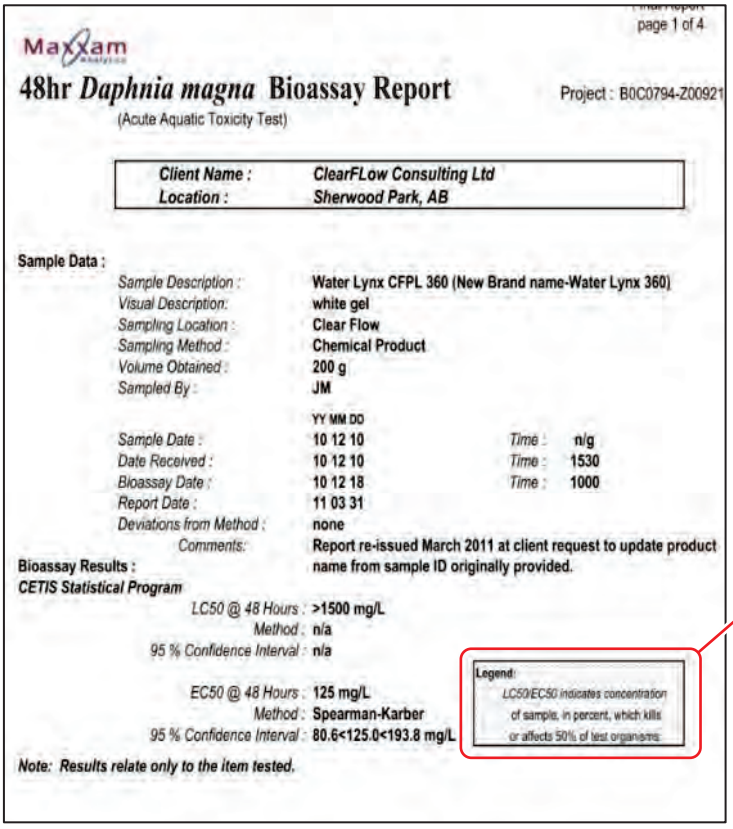
Geomembrane Lined Treatment Pond





*Level of removal may vary based on water specific chemistry; third party lab verification recommended

CLEARFLOW



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Maxxam

48hr *Daphnia magna* Bioassay Report

Project : B0C0794-Z00921

(Acute Aquatic Toxicity Test)

Client Name :	*ClearFLow Consulting Ltd*
Location :	*Sherwood Park, AB*

Sample Data :

Sample Description :	Water Lynx CFPL 360 (New Brand name-Water Lynx 360)		
Visual Description:	white gel		
Sampling Location :	Clear Flow		
Sampling Method :	Chemical Product		
Volume Obtained :	200 g		
Sampled By :	JM		
	YY MM DD		
Sample Date :	10 12 10	*Time :*	n/g
Date Received :	10 12 10	*Time :*	1530
Bioassay Date :	10 12 18	*Time :*	1000
Report Date :	11 03 31		
Deviations from Method :	none		
Comments:	Report re-issued March 2011 at client request to update product name from sample ID originally provided.		

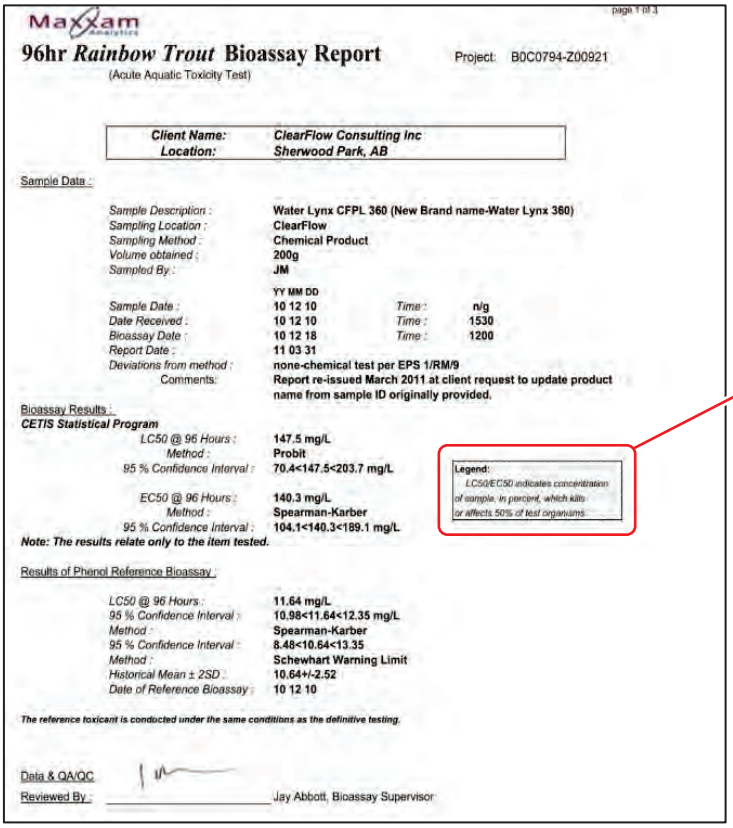
Bioassay Results :

CETIS Statistical Program

LC50 @ 48 Hours :	>1500 mg/L
Method :	n/a
95 % Confidence Interval :	n/a
EC50 @ 48 Hours :	125 mg/L
Method :	Spearman-Karber
95 % Confidence Interval :	80.6<125.0<193.8 mg/L

Legend:
LC50/EC50 indicates concentration of sample, in percent, which kills or affects 50% of test organisms

Note: Results relate only to the item tested.



page 1 of 3

Maxxam

96hr *Rainbow Trout* Bioassay Report

Project: B0C0794-Z00921

(Acute Aquatic Toxicity Test)

Client Name:	*ClearFlow Consulting Inc*
Location:	*Sherwood Park, AB*

Sample Data :

Sample Description :	Water Lynx CFPL 360 (New Brand name-Water Lynx 360)		
Sampling Location :	ClearFlow		
Sampling Method :	Chemical Product		
Volume obtained :	200g		
Sampled By :	JM		
	YY MM DD		
Sample Date :	10 12 10	*Time :*	n/g
Date Received :	10 12 10	*Time :*	1530
Bioassay Date :	10 12 18	*Time :*	1200
Report Date :	11 03 31		
Deviations from method :	none-chemical test per EPS 1/RM/9		
Comments:	Report re-issued March 2011 at client request to update product name from sample ID originally provided.		

Bioassay Results :

CETIS Statistical Program

LC50 @ 96 Hours :	147.5 mg/L
Method :	Probit
95 % Confidence Interval :	70.4<147.5<203.7 mg/L
EC50 @ 96 Hours :	140.3 mg/L
Method :	Spearman-Karber
95 % Confidence Interval :	104.1<140.3<189.1 mg/L

Legend:
LC50/EC50 indicates concentration of sample, in percent, which kills or affects 50% of test organisms

Note: The results relate only to the item tested.

Results of Phenol Reference Bioassay :

LC50 @ 96 Hours :	11.64 mg/L
95 % Confidence Interval :	10.98<11.64<12.35 mg/L
Method :	Spearman-Karber
95 % Confidence Interval :	8.48<10.64<13.35
Method :	Schewhart Warning Limit
Historical Mean ± 2SD :	10.64+/-2.52
Date of Reference Bioassay :	10 12 10

The reference toxicant is conducted under the same conditions as the definitive testing.

Data & QA/QC

Reviewed By : _____ Jay Abbott, Bioassay Supervisor

Proven SAFE for Aquatic Organisms

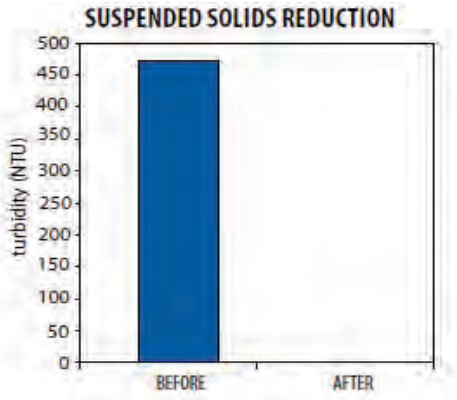
LC50 @ 48 Hours :	**>1500 mg/L**
Method :	**n/a**
95 % Confidence Interval :	**n/a**
EC50 @ 48 Hours :	**125 mg/L**
Method :	**Spearman-Karber**
95 % Confidence Interval :	**80.6<125.0<193.8 mg/L**

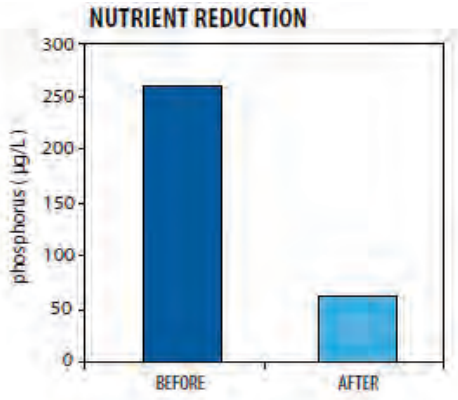
LC50 @ 96 Hours :	**147.5 mg/L**
Method :	**Probit**
95 % Confidence Interval :	**70.4<147.5<203.7 mg/L**
EC50 @ 96 Hours :	**140.3 mg/L**
Method :	**Spearman-Karber**
95 % Confidence Interval :	**104.1<140.3<189.1 mg/L**

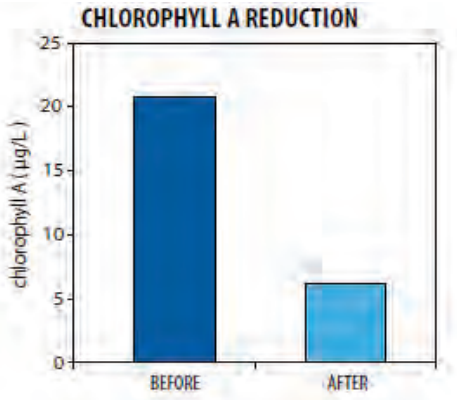
Technical Section

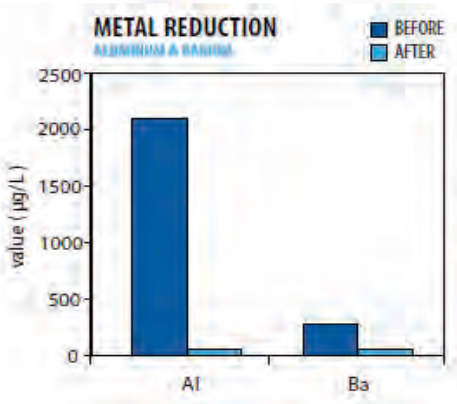
CLEARFLOW

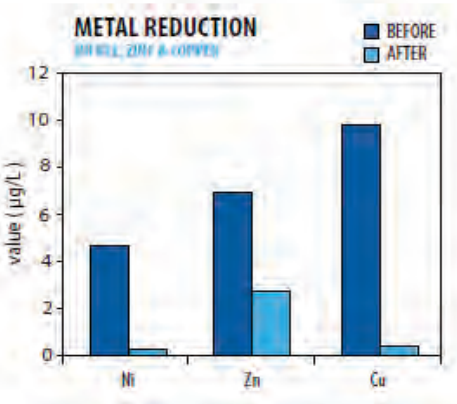
Improved Water Quality

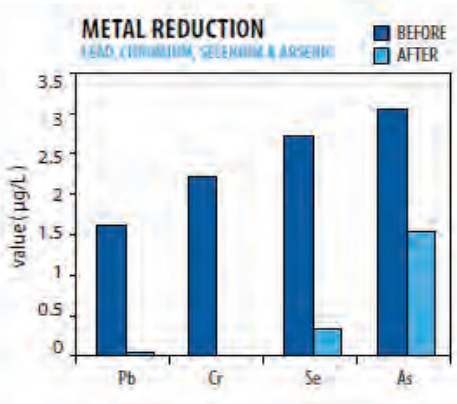




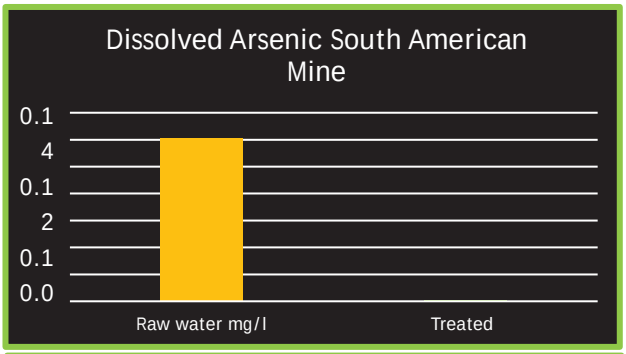


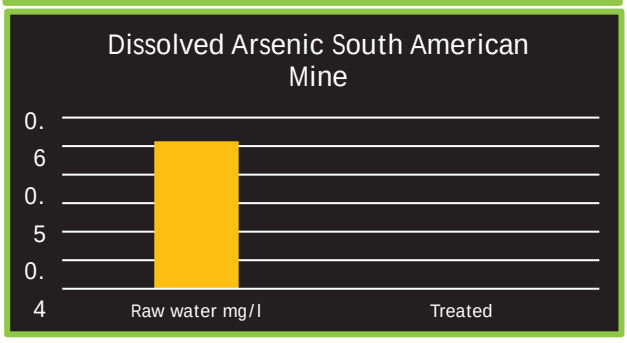




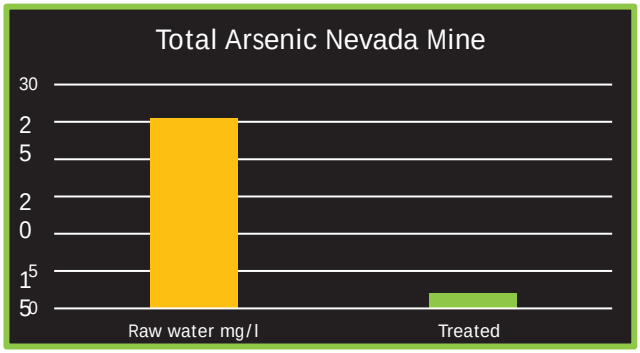


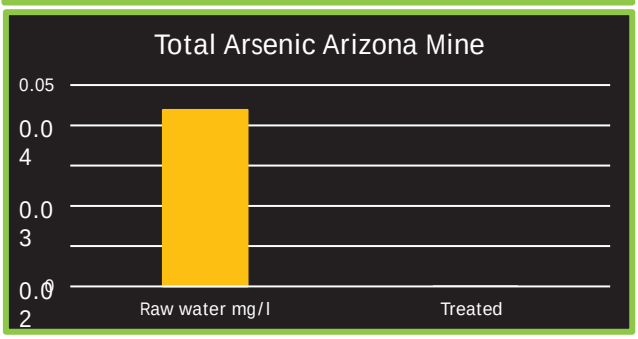
Dissolved Arsenic Reduction





Total Arsenic Reduction

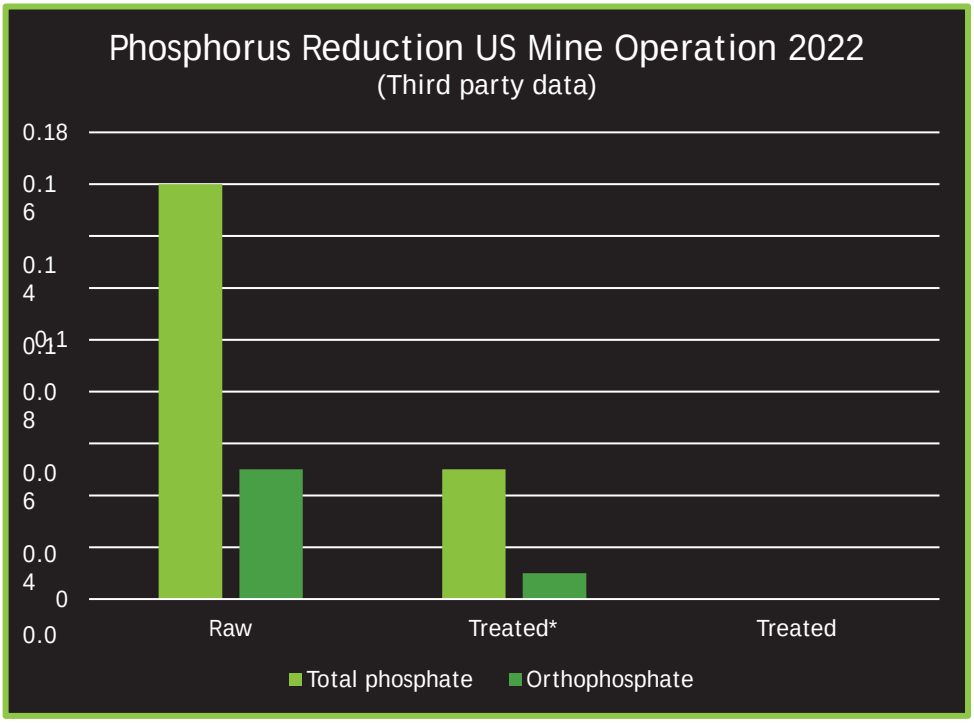


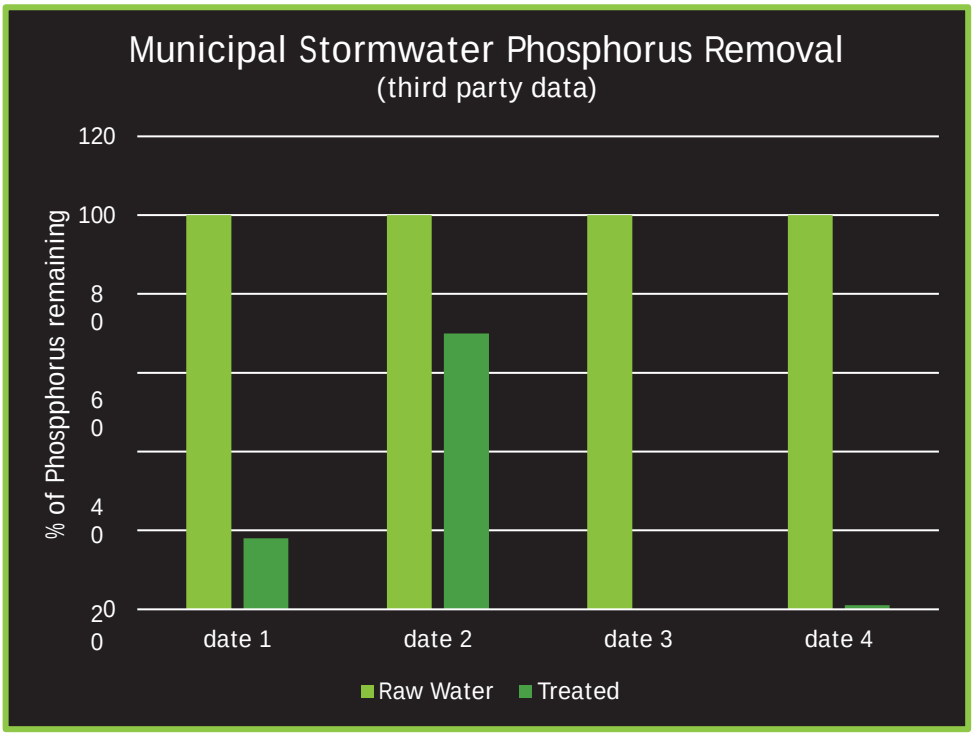


All data provided by Certified Third Party Laboratories

CLEARFLOW

Improved Water Quality

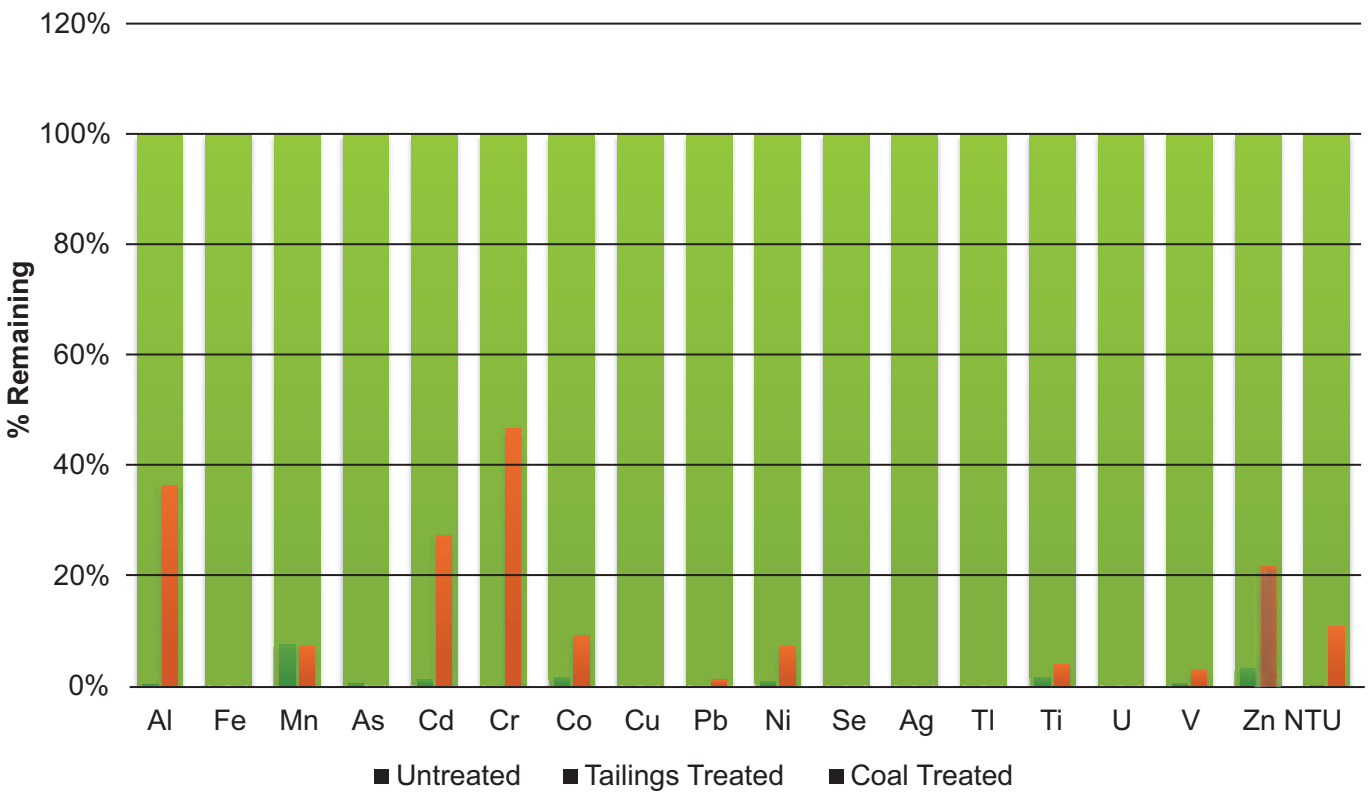




All data provided by Certified Third Party Laboratories

CLEARFLOW

Gel Flocculant Metals Reduction



CLEARFLOW

Extreme Leachate Testing With Incredible Results

Modified EPS TCLP Test: PFAS contaminated Soil mixed with 24% additive, cured 30 days, tumbled, exposed in pH 3.0 sulfuric acid 30 days, days, samples drawn every 24 hours and analyzed

Contaminant	PFOS	PFHxS	PFHxA	PFOxA
% of total PFAS by type in soil	74	15	3	2
Total PFAS ppb 3767	2738	555	111	74

Soil Type	Soil %	Additive %	Leachate Results ppb			
Silty Sand	76	24	0.0110	0.0070	0.0001	0.0000
Sandy Clay	76	24	0.0107	0.0074	0.0001	0.0000
Fatty Clay	76	24	0.0105	0.0071	0.0001	0.0000

Fe tailings and treated tailings tested fo **RCRA 8 metals** content results in **parts per billion**

Tailings Type	ICP-EOS Analysis Leach Results from Nanocrete, Nano technology polymerized Fe Tailings							
In ppb	Ag	As	Ba	Cd	Cr	Hg	Pb	Se

CLEARFLOW

Clearflow Group - Gel Flocculant Product Facts

Very Low Amounts of AMD is Present within Clearflow's Products:

Clearflow does not use AMD in a 'high volume' manner; Chemicals present in Clearflow's patented polymer products meet ANSI/NSF Standard 60 Drinking water treatment chemical standards and the anionic PAM within the products contains no more than 0.05% wt/wt residual AMD. This is a very low concentration of AMD and is suitable for potable water treatment (resulting in drinking water AMD concentrations not exceeding 0.5 µg/L when used at an appropriate concentration (U.S. EPA National Primary Drinking Water Regulations). We do not intend for the treatment of potable water, but it is important to note that the amount of residual AMD in our product is controlled and not allowed to exceed a maximum value. Anionic PAM only makes up approximately 40% of the Gel Block Flocculant weight. This further reduces the maximum amount of AMD present in each gram of Gel Block Flocculants.

Polyacrylamides do not break down into AMD or other known toxic compounds under environmental conditions (as reviewed by Caulfield *et al.,* 2002). Bacteria have been shown to be capable of growth using PAM as a sole source of nitrogen, but not as a sole source of carbon (Kay-Shoemake *et al.*, 1998b). Since the same bacteria were shown to be able to survive off of acrylamide as a sole source of both nitrogen and carbon (Kay-Shoemake *et al.*, 1998b) this indicates that the bacteria were unable to break down PAM into acrylamide monomers. While physical force and ultraviolet radiation can break the linear chain of PAM into smaller polyacrylates of various chain lengths (Barvenik, 1994), polyacrylate chains of ≤ 10 000 g/M have been shown to be able to be ultimately broken down into CO_2 and H_2O by the process of mineralization (Kawai, 1993).

Regarding the potential risk of AMD leaching from PAM treated fields into groundwater, a recent scientific study (Lentz *et al,* 2008) has investigated this subject. Lentz *et al.* (2008) conducted added anionic PAM to irrigation water at a concentration of 10 mg/L that then flowed into irrigation canals. They then measuring residual AMD concentrations in percolation water and furrow inflows following three furrow irrigations. The experiment occurred on a long-term field plot experiment near Kimberly, ID that had had PAM treatments in continual operation since 1993. The PAM that was used claimed to contain <0.05% wt/wt of residual AMD monomer; however, following analysis of the PAM product the authors discovered that it only contained 0.018% wt/wt AMD. Consequently, the authors created a 'worst case scenario' by adding raw AMD to the PAM stock solution until it constituted 0.05% wt/wt. While the AMD concentration in the furrow inflows was the expected 5 µg/L value (based upon a 0.05% wt/wt value), AMD concentrations within percolation water samples during all post-irrigation periods and all irrigations were below the minimal detection limit (MDL of 0.5 µg/L; Lentz et al 2008).

The authors came to the conclusion that this reduction in AMD concentration was due to both dilution and microbial degradation. They also state that "the risk that ground water beneath these water-soluble PAM-treated furrow irrigated soils will be contaminated with AMD appears

minimal". Lastly, Lentz et al (2008) also noted that since much of the potable water-grade PAM products used in erosion control and irrigation contains about half the allowable AMD, this would further reduce the risks of possible contamination.

No Reports of Ecological Toxicity from AMD Have Been Associated with Anionic PAM Use

In order to reach concentrations which cause the listed toxic effects on the fish and cattle (500 mg/L, or 0.5 g/L) the PAM concentration would have to be 1,000,000 mg/L. That is 1 kg/L polymer. Information provided by the University of Alberta and field operations indicates that Clearflow Gel Flocculant products only release at between 12-24 mg/L at a flow rate of 25 L/min.

In another sample calculation (using data from an *in-situ* site) information indicated that the average Gel Flocculant polymer concentration over a 7-day pumping period (568 L/min) was 2.1 mg/L. These Gel Flocculant concentrations are between **40,000** and **470,000** times lower than the 100,000 mg/L concentration that the authors state would be required to cause the AMD poisoning in exposed organisms. In addition to findings within the University of Alberta Study (Kerr et al Study Environmental Toxicology and Chemistry, Vol 33, No.7, pp.1552-1562,2014) Personal experiences of Clearflow staff has shown that it is extremely difficult to create high concentration stock solutions of the Gel Flocculant Block products – the products simply will not dissolve when a mass (e.g. 1000 mg) is placed in a set volume of water (e.g. 1L) and allowed to mix for >48 hrs.

Bioaccumulation

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). Indeed, repeated exposure-depuration fish studies involving several different types of polymers (epichlorohydrin-dimethylamine, polyacrylamide ester, and a polyacrylamide amide) did not result in bioaccumulation within gill tissue of exposed fish – the only tissue in which the polymers were found to bind in large quantities (Muir *et al.*, 1997). Binding was reversible.

Toxicity

Polyacrylamides have very low toxicity in mammalian systems (no significant adverse effects in rats exposed orally or dermally to > 5 mg/kg or to lower PAM concentrations in chronic toxicity studies, and no compound related lesions in a three generational study in rats; McCollister *et al.* 1965; Stephens, 1991).

Anionic polyacrylamides also have very low toxicity to aquatic life (Barvenik, 1994; Entry *et al*., 2002; Liber *et al.*, 2005; Weston *et al.,* 2009). For example, Weston *et al.* (2009) recently published a study investigating the toxicity of anionic PAM formulations when used for erosion control in agriculture. They evaluated a number of different anionic PAM products for acute and/or chronic toxicity to aquatic amphipods (*Hyalella azteca*), midge larvae (*Chironomus dilutes*), water fleas (*Ceriodaphnia dubia),* fish *(Pimephales promelas*) and freshwater algae (*Selenastrum capricornutum*). Weston *et al.* (2009) found that with a granular PAM product, four of the five species tested showed no evidence of toxicity at even the highest concentration

tested (100 mg/L) – only *C. dubia* showed an effect from granular PAM (reproductive IC50 of 5 mg/L and LC 50 of 29 mg/L). The authors state that "if it is assumed that sufficient granular material is used to achieve the same PAM concentrations desired when using liquid formulations (1-10 mg/L PAM), then it appears no acute toxicity to any of the test species would be expected, and at most there may be impairment of *C. dubia* reproductive ability within this concentration range". A tablet form of PAM (similar to Gel Blocks) resulted in no indication of toxicity up to at least 100 mg/L to midge larvae (Weston *et al.*, 2009). The authors also point out that laboratory testing represents worst-case conditions, partially because PAM adsorbs to soil and can be lost from tailwater in a relatively short distance after leaving the site of application (Lentz *et al*, 2002). As mentioned earlier, Clearflow's Gel Flocculant Block products have been calculated to release at between 2 mg/L to 24 mg/L (data supplied by University of Alberta and University of Guelph Study, Kerr et al study).

In addition to the scientific literature available on anionic PAMs, Clearflow Group has conducted numerous third-party toxicity tests on our own anionic PAM products (whole product toxicity; not simply the active ingredient). These toxicity tests have shown very low toxicities of Clearflow's Gel Flocculant Block products to aquatic life. All acute and chronic toxicity tests were conducted by certified laboratories following government standard toxicity tests (Environment Canada and U.S. EPA) and are freely available upon request. In addition to government standard toxicity tests, Clearflow has examined the effect of chronic, sub lethal polymer exposure on juvenile rainbow trout (*Oncorhynchus mykiss*). Fish were exposed to different concentrations (3 mg/L – 300 mg/L) of Clearflow Gel Block polymer product for up to 30 days.

They were then sampled at either Day 7 or Day 30 post exposure and analysed for gill histopathology as well as elevation in an enzyme associated with oxidative stress. These studies were conducted at the University of Alberta under the supervision of Dr Greg Goss PhD Professor, Department of Biological Sciences, Fellow, National Institute of Nanotechnology, Director of Office of Environmental Nanosafety and at the University of Guelph under the supervision of Dr. John Lumsden, PhD, Professor Department of Pathobiology. Gill histopathology was analysed in a blind fashion. Due to the important nature of the research to the Canadian Government, funding was provided by the National Research Council of Canada.

It is good to note that the standard "Chronic Toxicity Test" is over a 7-day period. To ensure environmental safety Dr Goss decided to conduct the "Chronic Toxicity Test" over a period of 30 days. In addition, Dr Goss conducted an additional study at the Federal Department of Fisheries fish hatchery in Bamfield, British Columbia. These tests were to identify if there was any impact on the osmotic process of Pacific Salmon (Oncorhynchus tshawytscha) changing from fresh water to salt water over a few months period and to do an embryotic study on Juvenile Rainbow Trout (Oncorhynchus mykiss) eggs to see if there was any impact on the fish eggs hatching based on the chemistry and viscosity of the anionic polymers. There were no negative effects in either case (Kerr et al 2014).

For the enzyme associated with oxidative stress (glutathione s-transferase, GST), at no time point did exposure to the highest concentration of Clearflow's anionic polymer products induce GST activity substantially higher than that of the control fish. Since an increase in GST activity is generally regarded as a biomarker for oxidative stress, this would indicate that the Gel Flocculant products tested do not induce oxidative stress in rainbow trout gill tissue at

concentrations ranging between 100 mg/L and 300 mg/L, as measured through elevated GST activity. These findings support the evidence that anionic polyacrylamides are unable to penetrate the cell membrane of aquatic organisms – the GST enzyme family are cytosol, mitochondrial and microsomal proteins. They aid in bio-transforming xenobiotics such that they can be more easily excreted from a cell. Thus, if PAMs are unable to penetrate a cell membrane due to their large molecular size (as indicated by the scientific literature; Stephens, 1991), GST enzymes would not be required to assist in detoxifying the compounds and enzyme activity would not be increased following exposure to anionic PAMs in the environment.

As a further study conducted in 2017, Clearflow and the University of Alberta in conjunction with the National Research Council of Canada conducted a study on the neutralization of cationic polymers. This study was to test the development of specific anionic polymers to match the neutralization requirements for cationic polymers used in industry. What was found was that Clearflow's Gel Flocculant Block 360 series product (specifically CN369) was able to not only neutralize the cationic and make it safe for release but in actual fact could reverse the binding effect of the cationic polymer on gill tissue thus mitigating negative stresses on the fish.

("Clifford, Jasinska, Hanna, Goss 2018 "Mitigation of chemical flocculation toxicity" University of Alberta.)
"Hypoxemia as the mechanism of acute cationic polymer toxicity in rainbow trout and prevention of toxicity using an anionic neutralizing polymer"
Journal of Aquatic Toxicology 248 (2022) 106198
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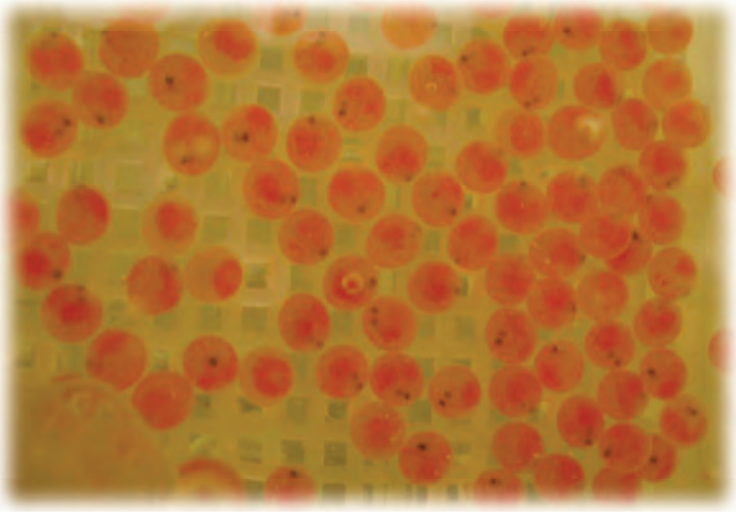
Embryo Testing of Clearflow Gel Flocculant Products
University of Alberta



Day 26 of Embryo Study

CLEARFLOW

As per a Provincial Regulatory request and to help users and regulators with the use of Clearflow Gel Flocculant Blocks, Clearflow has developed a series of curves that can be used to predict, or back-calculate, the concentration of product in the water. The product concentration can be compared to whole-product toxicity test results from third party labs to determine a safety factor when using the Clearflow Gel Flocculant Blocks. The curves use several inputs to calculate the product concentration:

- ***Design Criteria*** – this accounts for how many blocks are placed in the treatment system. Design criteria is represented as 1 Gel Block per a set flow rate. Since most installations utilize more than 1 Gel Block this input will require some knowledge of the site and some calculation. Design Criteria helps to determine the color of curve to follow on the graph for determining concentration.

Example: a site where the flow rate is 1000 US Gallons per minute (3790 Litres per minute) and has 20 blocks installed would have a design criteria of (1000 GPM) / (20 blocks) = (50 GPM) / (1 block) or **1 Block per each 50 GPM**.

- ***Life of Block*** – this accounts for how long a block lasts in the treatment system. In most applications a block will last for 60 to 90 days. In some cases, a block will last a whole construction season without needing replacement. However, since the release rate graphs are designed as a tool to determine safety factors, worst-case-scenarios are useful to look at. Clearflow has observed that the fastest time period for a block to completely dissolve was 21 days. Using a Life of Block time in days you move vertically from the x-axis at the desired value up to the selected Design Criteria curve; when you reach the curve move horizontally back to the y-axis to determine the Average Dosage in mg/L. A special note to consider is that only the time when water is flowing over a block should be accounted for when calculating the life of a block.

Example: using the same site previously described, where the Design Criteria is 1 Block per each 50 GPM, we want to predict the average dosage of Clearflow Gel Flocculant Blocks in the water if the blocks are completely used up in 21 days of continuous flow. We start at the Life of block along the x-axis at 21 days, we move vertically to the 50 GPM curve, then from the curve move horizontally to the y-axis, we find that the Average Dosage (concentration) would be **0.35 mg/L over the course of the life of a block**. Because this value is based on the design criteria, this already accounts for all the blocks installed and does not need to be multiplied by the number of blocks.

- ***Note:*** One last piece of information that is not on the graphs is the product toxicity. Taking the LC50 or EC50 values of the Clearflow Gel Flocculant Block and dividing it by the Average Dosage the safely factor of the product can be established.

Example: Again, using the hypothetical site above, we've established that the product concentration in the water would be 0.35 mg/L. If we look at the toxicity of Clearflow Gel Block Flocculant 494 to Rainbow Trout, we find that the LC50 is 210.2 mg/L. (210.2 mg/L) / (0.35 mg/L) = 600.6, the **safety factor for Clearflow Gel Flocculant Block 494 in the above described situation would be 600.6**.

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Scientific & Regulatory References

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CLEARFLOW

Syncrude 2021Current Project

- Syncrude was having TSS issues in the water from a newly constructed large storage pit
- To ensure they could meet regulatory requirements, Clearflow was brought in to provide a solution to remove the TSS and other associated contaminants to allow safe release
- Due to large water volume, water needed to be treated at up to 1000gpm
- Clearflow's patented PR1000 Pipe Reactor containing the Gel Flocculant was brought in to clean the pond water and Gel Flocculant blocks are used in the ditches to control sediment going into the pond.
- Data attached shows reductions greater than 99%

Syncrude Sample Results; May 13, 2021

ClearFlow REFERENCE NUMBER	DATE	LOCATION		PURPOSE	PRODUCT	TURBIDITY (NTU)		pH	MIX TIME (sec)	COMMENTS
		Region	Site			start	end	start		
21-05-0025	13-May-21	AB	Syncrude 7-09 Sump	Clarification	GFB 494		17.79		60	fluffy flocs
					GFB 484		-		60	minimal reaction
					GFB 474		10.51		60	fluffy flocs
					GFB 394		45.5		60	large flocs
					GFB 398		-		60	small flocs
					GFB 360		-		60	minimal reaction
					GFB 665	218	67	7.54	60	large flocs
					GFB 494 then GFB 398		11.88		60 & 30	minimal reaction
					GFB 494 then GFB 360		18.06		60 & 30	minimal reaction
					GFB 484 then GFB 398		74.6		60 & 30	medium-large flocs
					GFB 484 then GFB 360		45.1		60 & 30	medium-large flocs
					GFB 474 then GFB 398		1.35		60 & 30	large flocs
					GFB 474 then GFB 360		0.84		60 & 30	large flocs

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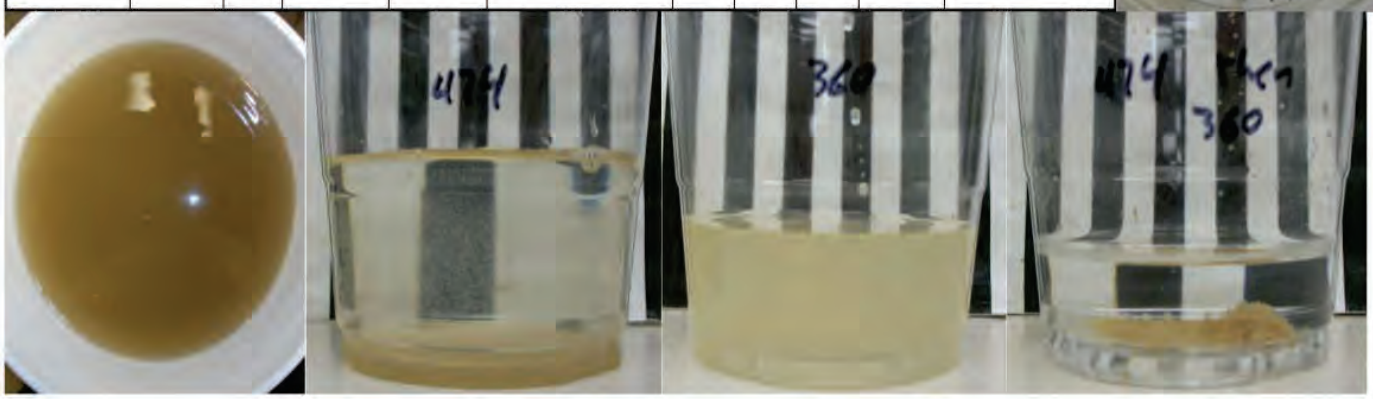

Projects Section

CLEARFLOW

CNRL Project

- CNRL was dealing with high TSS loads in waste stream water going into deep well injection
- TSS was causing back up on water
- Clearflow product was tested to reduce TSS from the water and allow for optimizing inflow to the well

CNRL Wolf Lake Sample Testing Results; October 2018

ClearFlow REFERENCE NUMBER	DATE	LOCATION		JOB NUMBER	PURPOSE	PRODUCT	TURBIDITY (NTU)		MIX TIME (sec)	COMMENTS
		Region	Site				end	after filter		
18-10-0049	11-Oct-18	AB	CNRL Wolf Lake	JABN 1379	TSS	untreated	7.1	–	–	very clear, some color, strong odor
			Salt Cavern #1 - Cavern Return			WLB 494	6.86	–	120	fluffy flocs, color removal
18-10-0050	11-Oct-18	AB	CNRL Wolf Lake	JABN 1379	TSS	Untreated	34.8	–	–	some solids, some color, some oil sheen, strong odor
			Salt Cavern #2 - Cavern Return			WLB 494	14.9	–	120	fluffy flocs (slow settling-low density), some color removal
18-10-0051	12-Oct-18	AB	CNRL Wolf Lake	JABN 1379	TSS	Untreated	367	–	–	similar odor and color to salt caverns, more solids that salt caverns, some oil sheen
			Unit 9 - Regen Waste			WLB 494	94.2	–	60	large flocs, cloudy
						WLB 665	20	–	60	large, tight flocs
						WLB 494 then WLB 665	7.87	–	60 & 30	flocs well bound, color removal
18-10-0052	12-Oct-18	AB	CNRL Wolf Lake	JABN 1379	TSS	Untreated	262	–	–	very dark, some oil sheen, strong odor
			Produced Water			WLB 494	27.1	–	60	large flocs
						WLB 398	-	-	60	partial reaction, small flocs
						WLB 494 then WLB 398	3.42	1.61	60 & 40	flocs tightened
						WLB 665	-	–	60	partial reaction, small flocs
						WLB 494 then WLB 665	3.37	1.92	60 & 40	flocs tightened
18-10-0053	12-Oct-18	AB	CNRL Wolf Lake	JABN 1379	TSS	Untreated	21.7	–	60	mix of Salt Cavern 1 and Salt Cavern 2
			Salt Cavern 1 & 2 combined			WLB 494	10.04	7.18	60	fluffy flocs, some color removal, pinflocs passed through filter

Projects Section

CLEARFLOW

Moses Lake Dredging And Centrifuge Operation In Washington State

- Unique site issue: water was 12pH; water was treated inline and returned to lake clear.
- Environmentally safe Clearflow granular flocculant used to dredge; cyclone and gel block flocculant to clarify water.

Obed Mountain Mine: Barge Dredging

CLEARFLOW

- 48,000m^3 of slurry dredged from settling pond using dredging barge and geobags.
- Clearflow granular flocculant utilized with dredge/ geobag operation.
- Clean water drained from geobag back into pond for safe release.

Projects Section

CLEARFLOW

Walterdale and LRT Bridge Crossings 2016-2018

- The City of Edmonton installed the new Walterdale Bridge across the North Saskatchewan River
- The City of Edmonton installed thenew Light Rapid Transit (LRT) Train across the North Saskatchewan River
- Clearflow Gel Flocculant was utilized to treat the water during the construction of both projects
- The treatment allowed for immediate release of the treated water from the coffer dams safely back to the river
- This method of treatment increased the efficiency of the operations and saved the contractor substantial dollars in both operational time and regulatory fines

Projects Section

Nablus River, Middle East 11,000 m^3/Day (10,795 Tons/Day)

July 17th: 3 days after Clearflow installation water is clear.