Construction General
Permit – Stormwater
Deadline: 5/4/07 5pm

April 23, 2007

Ms. Song Her, Clerk to the Board
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, CA 95814

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SWRCB EXECUTIVE

RE: Comment Letter – Draft Construction Permit

Dear Ms. Her:

We would like to take this opportunity to provide some general comments to the Preliminary Draft of the General NPDES Permit for Construction Activities (GCP). We will also ask that some clarifications be made in the GCP so there is no misunderstanding of the intent or expectations.

We will provide a brief background of our company's experience in order to give you an idea of the basis for our comments and observations. Clear Creek Systems, Inc. (CCS) has been involved in providing sediment control filters and treatment systems for construction stormwater for approximately 10 years in California, Washington and Oregon. We have worked with a variety of polymers both in actual stormwater field operations and controlled testing environments. These polymers include Chitosan based polymers, synthetic cationic polymers, polymers containing Alum, and anionic polymers. We have also worked on projects involving industrial stormwater and wastewater.

In 2001, at the request of staff from the San Francisco Regional Water Board, we worked with UC Berkeley and the California Department of Fish & Game (DFG) to evaluate the effectiveness and environmental safety of polymers when used to reduce turbidity from construction stormwater. Based upon the results of those tests, we worked with Mike Rugg to create the first testing guidelines for using polymers in the region to reduce turbidity from construction stormwater. We have commented on the development of the guidelines that the Central Valley Regional Board developed for Active Treatment Systems (ATS) in the last few years. We have gone through the process of having a polymer receive approval for use in the state of Washington. We are familiar with the operating requirements and conditions in both states—and how they differ.

CCS not only provides polymers and ATS units, we have operated over 50 ATS on a wide variety of sites with thousands of man hours of operations. The majority of our sites have been in the Central Valley region, but we have done projects in the San Diego and Santa Ana regions. We have also done a project in the Central Coast region that included hydrocarbon contamination in the stormwater runoff. Flow rates have ranged from 200 to over 3,000 gallons per minute. We worked on sites that had high levels of

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erosion and sediment controls and sites that had very low levels of erosion and sediment controls. Runoff from sites prior to the ATS has ranged from 80 NTU to over 6,000 NTU. After the ATS, the water has consistently averaged less than 10 NTU. We have seen receiving waters from 3 NTU to around 200 NTU. Our operations have been in both highly regulated environments and loosely regulated environments. We do not supply a specific polymer or treatment system. Materials and equipment used have changed with technology advances and regulatory requirements. Our operating experience provides the main basis for the following observations and comments. Our comments are based upon the assumption that continuous flow (also called "flow through") systems are being used. Batch treatment is a relatively outdated and inefficient method of operations. Also, any security measures in place for continuous flow systems are almost always effective for batch treatment as well.

The GCP discusses ATS related activities in many areas of the document. We have done our best to indicate the location in the document that is being discussed.

Physical Filter:

p. 20, c: It states, "The discharger shall direct all ATS discharges through a physical filter such as a vegetated swale..."

To date in ATS operations, the term "physical filter" has always meant a filter like a cartridge or sand filter. A sand filter is frequently needed to ensure the discharge meets WQO. This will especially be the case if the NEL stays at 10 NTU. A 0.5 micron nominal rated filter is frequently used in addition to a sand filter for additional security and water quality. When a cartridge filter has followed a sand media filter, it is commonly referred to as a "polishing filter". There can be flexibility, and both are not always used together.

A vegetated swale has not typically been considered a physical filter. One reason is that you can not guarantee that all the water will come in to contact with the matter or to what degree. As such, there is not near as high a level of security. Infiltration across vegetation is sometimes used in Washington in place of physical filters, but it is only allowed in cases where the water does not discharge into surface water.

We think a physical filter such as sand media and/or cartridge filter should be required for all ATS units in which the discharge will go to a surface water. This is for operational security in relation to protection if there is an error in the polymer dosage or there is sediment sucked into the system. Vegetated swales should only be allowed in place of media or cartridge filters if the water does not discharge into surface water.

Testing for Residual Polymer and Toxicity:

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p. 11, IV. 4 and p. 63. c.:

The NEL's for Acute and Chronic toxicity are not like anything we have seen in California or Washington for ATS. There are references to batch treatment cycles but not continuous flow systems. There is no mention of field tests or how that would alter the testing program and requirements.

During the public hearings, staff discussed how they wanted to make this a risk based permit structure with more stringent requirements for higher risk sites. We think that the same concept of more stringent requirements for higher risk ATS operations would be a very good way to ensure environmental safety while providing incentives for the adoption of even safer polymers and ATS operations. For example, less stringent testing and monitoring requirements can be required for sites that use a polymer that can be used at levels below the toxic threshold. Conversely, if someone wanted to use a polymer for which there is not a verified field test, the site might have to have laboratory effluent toxicity done every day. A polymer that is used at levels higher than the toxic threshold but has an effective field test with a detection limit below the toxic threshold might have a less frequent requirement for laboratory toxicity testing. This is analogous to the low, medium, and high risk classification for sites in general. It would create a financial incentive to develop and move towards the safest types of operation.

The GCP does not appear to include or encourage the use of field tests in addition to outside laboratory analysis. Field tests for some polymers have been developed—and more undoubtedly will if they are encouraged to do so in the permit language. Field tests are an incredibly valuable tool for effective monitoring and environmental safety. Real time data not only provide better protection for the environment, they allow better operations. For field test to be effective they should have detection limits at a reasonable level below the toxicity threshold for the most sensitive species. In Washington, a detection limit 1/3 of the toxicity threshold has been used. Currently, Chitosan and another biopolymer called Clariver have field tests that work. I believe the same field test would work for a few other biopolymers based upon the organic makeup of the material, but we are not aware if anyone has done the testing.

While none of the current field tests is an EPA approved methods, some have been verified by state certified laboratories and independently verified by a number of companies. We think verification of the effectiveness of the test and parameters by a state certified laboratory is a good standard for the development of acceptable field test. It is our understanding that a field test method does not have to be an approved EPA test method for the board to allow it to be used. The State of Washington allows the use of field tests that are not EPA methods for pH and turbidity in its General Construction Permit. It also looks like the State of California will allow field test for pH and turbidity

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that are not EPA methods. The current field test that works for Chitosan and some other polymers can be done in a few minutes and cost less than two dollars in supplies. It has been conducted thousands of times by numerous companies. It has been tested under a variety of conditions and is exceptionally reliable.

The toxic thresholds for both acute and chronic toxicity thresholds (NOEC or EC25) for a polymer should be determined before the polymer is used in the field.

In California, third party analysis has been done at periodic intervals by using a survival fish test on treated effluent water samples at a state certified laboratory. It was typically once a month or quarter. In the case of ATS operations it appears that the T test criteria in the GCP is another way of saying "No Chronic Effect" for the discharge--not just any residual polymer. From my conversations with laboratories, this treatment plan is basically derived from a wastewater treatment plant discharge permit setup in which the contaminants (or potential contaminants) are not known and can not be tested for. I have talked to managers at two of the testing labs we use for survival and chronic testing. The way it is currently written does not seem to make sense to them in light of the fact that a field test can be done to confirm that there is not polymer in the effluent above either the acute or chronic threshold levels. They can see the logic for using T test criteria for synthetic polymers or other materials where there is not a test that can detect the polymer below the toxic threshold. This setup would not only test for the presence of any toxicity resulting from the polymer, it would show any chronic toxicity from anything coming off the site.

We think that some type of frequent fish survival testing is a good alternative test in cases where there is not a test (field or laboratory) with a detection limit below the toxicity threshold for the polymer being used. (It might be a good idea to even require the results prior to discharge.) By having to resort to the costly and time consuming fish survival testing if there is not a polymer specific test, it will provide a strong incentive to develop effective polymer specific tests while not putting a limit on what polymer a project can use. It also provides the highest level of safety in cases where the polymer being used could be problematic.

I am sure there could be some economies of scale, but, currently, the T test would cost about $1,700 per test. The test takes seven days and the results take another seven days. A fish survival test is about half as much, but still takes as much time. Is there a reason why a 100% survival rate for a fish survival test is not an acceptable test when third party testing is required? When we developed the original operating guidelines for ATS systems with DFG in 2001, a 96 hour survival test on the effluent was acceptable to DFG. (We have attached the guidelines which were developed at that time for your reference. Please keep in mind that the guidelines were developed for a synthetic polymer and Chitosan. Chitosan was very new and there was limited experience with the synthetic

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polymer. That is why there is the onsite fish test section. This onsite fish test was also done in Washington in the early stages until there was an acceptable confidence level in the safety of Chitosan and the residual test for Chitosan was developed and verified. We do not see that as being relevant any longer for sites using Chitosan products since those two issues have been overcome.)

Washington does not currently require periodic laboratory testing of effluent from sites using Chitosan ATS systems due to the residual test, knowledge base, and monitoring controls such as effluent turbidity and pH monitors with auto shutoff/diversion for discharges exceeding the acceptable range. We think that periodic laboratory testing may be a good security measure in California due the fact that the program is somewhat different in California. One to four times a season would be reasonable in our opinion. (Again, this is based upon the assumption that the polymer being used has a field test that has a detection limit below the toxic threshold for the polymer so there is a daily safety check. If there is not a test for the polymer below the toxicity threshold, then much more frequent T test type testing is a safe route when that polymer is used.)

ATS NEL:

p. 20, e: ATS NEL violation and notification. Is there any confirmation of the violation allowed? What if the turbidity sensor was in error? Is that still considered a violation?

p 11, 4, c and d: 10 NTU NEL and pH NEL's: Are those instantaneous limits or averages of some type?

In the State of Washington Designation Document it states 10 NTU as, "an expected value".

ATS systems have shown the ability to consistently and effectively bring a wide array of runoff water quality to within less than 10 NTU—and Basin Plan Water Quality Objectives. This makes it an extremely effective and reliable BMP. We see this as a major breakthrough since BMP's can finally be counted on to bring runoff water quality in line with Water Quality Objectives. Previously, most BMP's could not be expected to bring runoff water quality to within the levels of Water Quality Objectives (with the exception of not disturbing the land) under a wide variety of site conditions. We have attached some data from a presentation at StromCon 2005 showing the effectiveness of ATS systems over a range of water quality. The effluent maximums are higher than would be allowed under the permit. That is because there was not a prohibition of having those one time high number given that the effluent was well within basin plan Water Quality Objectives. Under the new permit, effluent monitoring turbidity meters would detect the surge and either recirculate or shutoff the water flow so that would not be a

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problem. That is what is done in Washington which has effluent guidelines in the range of 10 NTU. The important value is the average effluent NTU.

Although, an instantaneous limit of 10 NTU is achievable, we think a daily average of 10 NTU would be reasonable. If you want an instantaneous max of something like 25 NTU could be added if there was concern about upper limits.

pH:

p. 11, 4. c and p 12, VI. 6 and p12, VI. 7

pH is referenced in both of these sections. On p. 11, it talks about NEL's for ATS discharges and list the range of 6.5 to 8.5. On page 12, it talks about receiving water limitations. Item number 6 states that discharges from high and medium risk sites shall not be more than 0.2 standard pH units higher or lower than receiving water. Item number 7 states the same thing for ATS units.

While a 0.2 range can certainly be within 6.5 to 8.5, it seems odd to have a more stringent limit/range than the NEL (and it applies it to non ATS sites, too.) I have looked at the basin plans for the SD, LA, SF, CV and SA regional boards. The only two that mention a 0.2 range for the receiving water are LA and SD. For both of those regions the 0.2 range only applies to marine waters or estuaries. For inland surface waters, it is 0.5 standard units. For SF and CV it is within a range of 6.5 to 8.5. They both have a 0.5 range around ambient (for the CV, it only applies to certain beneficial use classes). The CV says averaging can be used as long as it does not have a negative effect. The SA only states that it shall not be below 6.5 or above 8.5.

A range limit of 0.2 can force the use of some strong acids or caustic solutions due to the required sensitivity of the pH adjustment. A range of 0.5 will allow the use of much more environmentally friendly materials such as CO_2. CO_2 is currently the common material used in Washington and California for pH adjustment of construction stormwater. A range limit of 0.2 may be too tight to dial in using CO_2 because it is not a strong acid. However, CO_2 has some big benefits over other chemicals to reduce the pH. One is that in practical conditions it will not reduce the pH to below 6.5. So there is not an overdosing concern that can lead to bigger pH problems if something malfunctions. It is also not a hazardous material.

In our experience on sites, it is not uncommon to see pH more than 0.2 standard units beyond the background for periods of time before ATS units. Both the background and the receiving water may bounce around more than 0.2 on some occasions but still be

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within the 6.5 to 8.5 range. Again, this is before the ATS systems, and this has nothing to do with ATS systems.

We have heard some people make comments about situations where the receiving water pH is out of the 6.5 to 8.5 range. The site would then be in a bind. It could not be within the NEL and Receiving water limitations. (This is also the case for non ATS systems.) That would still be the problem based upon current basin plans. We have not come across this situation in our work. Maybe special wording can be added saying which standard is to be followed in the case of a conflict.

Currently, ATS operations are held to the 6.5 to 8.5 range in California and Washington. We think a good solution would be to use a 0.5 variation (within 6.5 and 8.5), which complies with basin plans.

Basin Sizing:

p. 20 c. The permit specifies capturing and treating a 10 year 24 storm event within 48 hours. When we have talked with engineers and project managers about basin size and system size, we have typically included both of them in the calculation of handling the design storm event. This has been the case in both California and Washington. I have checked with a regional board staff member. They read the permit as allowing that calculation. However, a BIA attorney told me he did not read it that way. It might be a good idea to confirm that both factors can be included in the calculation.

Also, taking 1.5 times the 10 year 24 hour storm event in San Diego County is roughly equivalent to the 100 year 24 hour storm. Is that the goal? Can something closer to the 10 year 24 hour storm be used? Maybe the 25 year 24 hour if 10 years is too low.

There has been little to no guidance on the design storm from regulators in the past. A commonly used design is the 10 year 6 hour storm with 72 hour draw down. This has proved to be small on occasion—especially in relation to multiple back to back storms. This has led to both uncertainty and abuses. If the choice is only between the 100 year storm design range and no design included, then we think it is better to have a design storm at the 100 year level than no design storm included. Without a storm design, sites will be tempted to cut the capacity short. This will lead to operational problems and bypasses of untreated water. While the contractor will be liable, it is still bad from an environmental perspective. A design storm also levels the playing field and takes a lot of the risk out of operations.

30 Day Report Submission For ATS Operations:

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p. 19, IX. G. 2: states, "Thirty days before deploying an ATS, the discharger shall submit a supplemental report to the appropriate Regional Water Board for approval prior to discharge..."

What if someone has tried source control or is under the 10% threshold, but can not meet the action levels so they need to move to ATS? The time for approval could be a problem. Washington has a formal application type process to use an ATS system on a site. It has been plagued with delays and there only have been a limited number of sites there.

Does the Regional Board have only 30 days to approve the report? What happens if the Regional Board does not respond within 30 days? What happens if the Regional Board does not approve the report? Does the Regional Board have discretion in its reasoning for not approving the report? We think that the Regional Boards should have discretion to not approve reports that they feel are proposing to use inadequate ATS designs or operations.

Receiving water:

p. 64, F. 6: How is the location for the receiving water sampling to be determined? How will this apply to discharges into MS4's since a background sample is supposed to be from an unimpacted source?

We have had to locate the receiving water on about 75% of the sites we have operated. The source of the receiving water has not been obvious on numerous occasions. The client has been able to work it out with the Regional Board with some basic discussions. On occasion, the receiving water sampling point has been a long way from the site (miles), but it was not a problem.

We think that it is important to have a formal method of determining the receiving water in advance as it could be very cumbersome to have those discussions for a large number of sites. It is likely that given a larger number of sites, there would be some disputes as to an acceptable location if there are not firm guidelines. It would be best to prevent disputes in advance.

Training:

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p. 20, 4 a: Who determines what is appropriate training and who is authorized to train for ATS operations? It might be more cost effective and efficient to have the ATS operator do the other sampling that is required of a site such as receiving water.

ATS Industry capacity:

We have heard numerous people talk about the ability of the ATS industry to meet the demand. The trained personnel and equipment availability point is an interesting Chicken/Egg debate. The demand can be met on a reasonable timeline, but there needs to be a demand. One key question is what is the true number of sites that will need an ATS system 90 days after the permit is adopted? 180 days? 1 year? 2 years? Even if one assumes most sites are above the threshold, some sites will choose source control. The industry can not ramp up until there is actual need. We have checked with key suppliers, the capacity is there, and people can be trained on a reasonable timeline. To us, this means months not years. Any phase in periods will actually become the new deadline. If there is 12 months to put in an ATS system, the builders who need the system will just wait 12 months. We have seen this with regard to regulations in construction, Urban Runoff, and industrial treatment. The ATS suppliers can not afford to ramp up until they know the need is going to be there, but there is the capacity to meet the demand as needed.

Operational Controls and Security:

p. 20, 4 b: It states, "In the event of a system malfunction, the ATS shall either have an automatic shut-off mechanism or a telemetry system that will immediately notify the operator of the system malfunction."

Telemetry alone is probably not a good option because the system can continue to discharge until someone takes action. We strongly encourage that the permit requires controls that will shutoff the system or have automatic valves that can put the system into recirculation when operating parameters fall out of the desired range. We think it should be clear that the controls will take action in conditions when the turbidity and pH exceed the discharge set point (10 NTU as currently written)—not just a malfunction. Such controls and prevention are required in Washington, and we think they will greatly enhance safety. We think the permit should authorize the regional boards to state whether someone has to be monitoring the system during operation or how often someone has to physically inspect the sites. We suggest the Regional Board have the authority to change the specifics of the monitoring requirement because over the next 5 years there will be improvements in the reliability of the controls that could dramatically reduce the frequency of realistically needing someone standing next to the unit from what

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is currently prudent. Remote monitoring by both instruments and video are beginning to show promise but need a few more years to get really solid. Labor can be a big cost to the contractor so we think it is a good practice to allow this specification to change with technological capability.

We feel good and robust operational controls and security are critical to make the program a success on a large scale. We think that includes the types of control measures mentioned in this section, but, also, the types of guidelines and requirements for the type of equipment and polymers used. It is important to remember that it is not just the environmental safety of the polymer that is used, but the reliability and safety of the equipment that is used, too. An important example of this principle is the ability of a sand filter to remove free Chitosan. At least one other company in addition to CCS has conducted tests that show that when Chitosan was mixed into clean water and passed through a sand media the Chitosan was removed—even when there was not any sediment for coagulation. We have seen DADMAC pass through a sand filter. In our view, such additional basic security is a very beneficial component of overall system security because it is a physical barrier protection that is always in place and is not dependent upon electronic sensors.

Clear and enforceable guidelines for polymer and equipment use have been an area of major difference between Washington and California. We think this has been a large part of the reasons that there have been some issues on sites in California.

It is a balancing act to make sure there are solid protections in the permit while at the same time creating a structure flexible enough to allow—and actually encourage—new innovations in safety and reliability that will be possible over the next 5 to 7 before the next permit update.

We would like to thank you for the opportunity to be a part of this process. We think by seeking input at this stage is very helpful to achieving a better permit. If you have any questions about these comments please do not hesitate to contact me at (661) 979-2525.

Sincerely,

Joe Gannon
Clear Creek Systems, Inc.

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TESTING PROCEDURES FOR USING
CATIONIC POLYMER OR CHITOSAN

These procedures are for the use of Calgon Catfloc 2953 (Cationic polymer) and Chitosan in construction stormwater and dewatering operations. The testing procedures are the same for each material.

PLEASE NOTE THAT THE OPERATIONAL PROCEDURES FOR EACH MATERIAL WILL BE SLIGHTLY DIFFERENT. IT IS IMPORTANT TO FOLLOW THE OPERATIONAL PROCEDURES FOR EACH MEDIA AND TO HAVE REGULATORY PERMISSION OF THE TREATMENT PROCESS PRIOR TO INITIATING TREATMENT.

THE USE OF EITHER OF THESE MATERIALS FOR WATER TREATMENT REQUIRES TRAINED PERSONNEL TO MONITOR OPERATIONS.

Aquatic Toxicity Testing:

Species to be tested:

During winter and fall:	Rainbow Trout
During summer and winter:	Fathead Minnow

A total of 4 lab test shall be conducted during the duration of the project or weekly, whichever is less. Water samples shall be sent to a certified laboratory.

Test type:	Static Acute
Duration:	96 Hours

The test is to be based up "Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, 3rd Edition (EPA/600/4-85/013)"

A representative sample shall be sent to the laboratory upon start up of the water treatment system.

If any of the samples have less than 100% survival of the species the test shall be repeated with a new sample within 24 hours of receiving the laboratory results.

Other Parameters To Be Evaluated During operations:

Turbidity
Dissolved Oxygen
pH
Conductivity

The above tests are to be taken daily during operations.

Discharge of water can be undertaken while awaiting toxicity testing from the laboratory if the following field test is maintained continuously during operation.

A slip stream of the treated effluent is continuously passed through a 10 gallon aquarium with rainbow trout. The test must maintain a minimum of 20 young trout at all times. The water can be cascaded into the field test or an aerator can be placed into the aquarium. (It is recommended that the trout be feed with "Trout Chow" once a day.) If a trout dies, it must be replaced with a live trout.

The operator shall keep a daily log during operations. Included in the log shall be the above test results and observations of the field toxicity test.

CLEAR CREEK SYSTEMS, INC.
CHITOSAN TREATMENT RESULTS 2005

Site	Total Volume Treated (GAL)	Average Flow Rate (GPM)	Influent Turbidity (NTU)			Effluent Turbidity (NTU)			Residual Chitosan Test
			Average	Minimum	Maximum	Average	Minimum	Maximum	Number of Tests
1	20,819,400	388	2720.9	853.0	4816	1.90	0.10	26.0	89
2	42,542,300	567	2720.9	853.0	4816	4.85	0.20	26.4	252
3	7,215,600	1143	132.4	35.8	289	1.93	0.04	26.0	19
4	6,099,900	1131	409.4	56.5	985	2.49	0.08	40.0	51
5	1,167,600	398	942.5	344.0	1304	3.14	0.89	16.9	8
6	1,143,300	191	508.5	209.0	>1000	4.72	0.10	46.5	18
7	5,687,600	503	481.3	42.0	825	5.45	0.08	56.4	27
8	2,551,200	392	556.6	204.0	1000	12.15	0.37	71.6	13
9	29,442,100	1774	627.7	82.0	1998	2.01	0.02	68.0	82
10	57,291,500	1619	159.9	63.7	1020	4.50	0.13	59.5	85
11	60,218,600	1732	159.9	63.7	1020	4.09	0.21	38.7	178
									All Tests were below
									detection limit