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Croton Watershed Clean Water Coalition



WATER, THE LAW AND THE CROTON WATERSHED

By Fay Muir, President CWCWC and Marian Rose, President Emeritus CWCWC

The Croton Watershed is unique in its natural ability to produce superb drinking water, attributable to its abundance of wetlands, regrowth of forests, and its alluvial soils left over from the thick sheet of ice that covered this area over ten thousand years ago. What is happening to our water here in the Croton Watershed is a microcosm of what is happening in the world at large. Contrary to its statements that watershed protection is essential regardless of building a water treatment plant in Van Cortlandt Park, the Department of Environmental Protection (DEP) is allowing the Croton to be ruined by irresponsible and unneeded developments, sacrificed in order to exploit the watershed's attractiveness for real estate development. CWCWC took the DEP up to the NYS



Fay Muir

Supreme Court Appellate Division on the grounds that DEP, as lead agency, failed to perform due diligence by ignoring new, relevant information pertaining to a more effective technology for providing safe, clean drinking water. Although we lost, time has proven clearly the validity of our claims. This year two separate and favorable court decisions have resulted from a similar argument that the lead agency did not use due diligence.



Marian H. Rose

Unfortunately, DEP still continues to hold onto an obsolete, power hungry, expensive water treatment technology whose cost has ballooned to \$2.8 billion and rising, instead of using membrane filtration. We hope you agree with our assessment and will participate in our action

(cont'd on page 2)



Nature's Way of Producing Safe, Clean Water
(DEC Wetland K-12, Mt. Kisco, NY)

WATER, THE LAW *(cont'd from page 1)*

requests to call for an investigation into the cost overruns and implement the far superior new membrane technology.

CWCWC's LAWSUIT AGAINST DEP

CWCWC's case against DEP hinged on a decision in 1982 when, for the first time in NYS, a court found that a lead agency has a "continuing duty to evaluate new information relevant to the environmental impacts of its action." (See article by James Bryan Bacon, attorney for CWCWC, that appeared in the January, 2007 issue of The NY Law Journal. The title of the article was: "Is the Public Being Protected? A Lead Agency's Duty Under SEQRA to Review Newly Discovered Information.")

In response to this decision, DEC promulgated a new section of the State Environmental Quality Review (SEQR) to address the issue of the lead agency's duty in light of "newly discovered information." DEC promulgated # 617.9(a)(7) in 1987 stating in part: "[T]he need for a supplemental EIS arises if a material change in circumstances, including project modification advancements in technology or newly discovered information, renders the EIS inadequate for any agency to make the requisite SEQR findings."

CWCWC contended that in view of the rapid advances in membrane technology in the years following 1999, DEP should have taken a "hard look" at this emerging technology prior to deciding on DAF/F (Dissolved Air Flotation/Filtration) for its Croton water treatment plant in Van Cortlandt Park.

The last time that DEP took a "hard look" at membrane technology was in 1999 when it decided to opt for DAF/F. In the meantime, DEP must have been aware of the significant advances in membrane technology that pointed to a rapidly expanding, more effective, safer, less costly process and with less environmental impact than DAF/F. Although there was sufficient time to switch to membrane technology and have the plant built by the due date in 2011, DEP did nothing to change course.

CWCWC filed an Article 78 against DEP in September, 2004 arguing that DEP, as lead agency in reviewing the DEIS for its own WTP, was required to take the requisite "hard look" at membrane technology before site preparation or construction began. DEP refused, arguing that it had done the necessary due diligence. Indeed, in his deposition in 2005 in the Appellate Division of the Supreme Court of the State of New York, Warren Kurtz, Deputy Commissioner of the Bureau of Environmental Engineering of the NYC DEP, stated: "DEP decided on this filtration process in the late 1990s, approximately five years ago. Since that time, DEP has prepared conceptual and preliminary designs for the water filtration plant based on this filtration process and has commenced final design. Petitioners, in essence, are asking DEP to turn back the clock more than five years, to start again to assess different filtration technologies, and to approve a technology already considered and rejected by DEP. Even in the absence of the federal court order requiring DEP to construct the filtration plant, DEP will not discard five years of work under these circumstances."

...Although there was sufficient time to switch to membrane technology and have the plant built by the due date in 2011, DEP did nothing to change course...

There is no doubt that DEP had the time to reconsider membrane filtration and change course if needed. It could have done so even before the start of excavation of the gigantic hole in Van Cortlandt Park. To quote from the Law Journal article, "The petitioners showed that long before actual construction commenced and prior to completion of the excavation activities, DEP would be able to assess membrane technology, a process CWCWC's experts concluded would take six months. If DEP made the decision to switch, the necessary environmental review could be completed while potential vendors submitted design plans. That would leave DEP's same stated 30-month time period to construct either plant; further, the membrane plant would not take as long to build, given its greatly reduced size and use of modular components. CWCWC further contended that if DEP had performed its duty under SEQRA when it should have, and if it had decided to switch, it might actually have completed the filtration plant two years sooner than scheduled. The petitioners

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WATER, THE LAW *(cont'd from page 2)*

stated that if DEP had taken a hard look at the new information on membrane technology, and had provided a reasoned elaboration for deciding to stay with the choice of DAF/F in the 2004 FSEIS, there would be no lawsuit. However, DEP took no such hard look, and advised the court that even were the petitioners to be correct, it would not reverse its 1999 decision to use DAF/F.”

The ultimate decision against CWCWC by the Second Department of the Supreme Court, Queens County – a refusal to make DEP reconsider membrane filtration in light of its probable advantages over DAF/F - was a serious setback to the health and well-being of the community adjacent to the Van Cortlandt Park site for the WTP. Further, it meant that a new technology that in all likelihood would assure safer, cleaner, less costly drinking water for NYC consumers was being carelessly overlooked.

The hole has been dug but so far no construction has commenced. It is still not too late to switch to membrane filtration.

DEP'S CROTON WATER TREATMENT PLANT IN VAN CORTLANDT PARK

DEP has been able to obtain a Filtration Avoidance Determination (FAD) from EPA for its Cat/Del system meaning that it is not required to build a water treatment plant for that system so long as it fulfills all the state and federal requirements to protect that watershed and the reservoirs that provide the drinking water.

DEP's program to protect the source waters of the Croton was deemed insufficient, and DEP signed a Consent Decree to build a water treatment plant for Croton water. There was immediate public opposition. Watershed residents were opposed because they were convinced that a plant would be an excuse for less protection of the watershed and the reservoirs on which they depend.

In favor of the plant were the powerful construction unions. The clash of the opposing sides was played out at a public hearing on the Final Supplemental Environmental Impact Statement (FSEIS) for the plant. Christopher

Ward, then DEP Commissioner, chaired the hearing. One hundred or more union members were bussed in and succeeded in disrupting the so-called hearing by shouting down the opposition while Commissioner Ward stood by and did nothing.

DEP chose a method of water treatment known as Dissolved Air Flotation with Filtration (DAF/F) that can only be described as a construction-heavy, chemically-dependent dinosaur among the new technologies that are rapidly replacing it.

Having gained site approval for the plant in Van Cortlandt Park, Commissioner Ward immediately resigned. A year later he took a job with The General Contractors Association, the main group responsible for disrupting the public hearing.



*Man's Way of Producing Safe, Clean Water
(Construction of Water Treatment Plant in
Van Cortlandt Park)*

A COMPARISON OF DAF/F FILTRATION WITH MEMBRANE FILTRATION

What is Dissolved Air Flotation with Filtration (DAF/F)?

DAF/F is the train of processes chosen by DEP to treat Croton water at its Van Cortlandt Park facility. The filtration medium is coarse granular (anthracite and sand for DEP's Croton plant) and does not have the ability to stop small particles or pathogens such as *Cryptosporidium*. For that reason, the feed stream carrying the materials to be removed is chemically pre-treated via coagulation and flocculation in order to clump the material particles to a size where the filter material can mostly stop them. With dissolved air

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flotation (DAF) there is an additional hurdle prior to filtration. DAF is a process that attaches some of the particles to air bubbles. These float to the surface where they form a scum or "float" that can then be removed. Further chemical processes such as pH adjustment are then needed to form particles of the correct weight so that they can be carried to the surface by the bubbles.

What Is Membrane Filtration?

The material that does the separating i.e., the membrane, is basically a thin wall (1 millimeter thick) of synthetic, porous material. "In membrane filtration, the feed stream is a suspension, or two-phase system, in which the dispersed solid phase to be separated may include sediment, algae, bacteria, protozoa, viruses, or colloids. The primary goal of membrane filtration is to produce a product stream (water) from which the targeted solids have been completely removed." (ibid).

Microfiltration (MF) membranes are capable of completely blocking sediment, algae, protozoa. Ultrafiltration (UF) membranes with pore sizes 10 times smaller are additionally able to block small colloids and viruses. The great advantage of ultrafiltration membranes is that they are able to completely block *Cryptosporidium*.

Commenting on ultrafiltration, the EPA Guidance Manual lists the following advantages:

- *No need for chemicals (coagulants, flocculants, disinfectants, pH adjustment);*
- *Size-exclusion filtration as opposed to media depth filtration;*
- *Good and constant quality of the treated water in terms of particle and microbial removal;*
- *Process and plant compactness; and*
- *Simple automation.*

The Milwaukee 1993 disaster in which an overload of *Cryptosporidium* in the drinking water caused 400,000 illnesses and 50 deaths set a panic among water providers and resulted in much stricter water treatment rules. These included more reliable removal of pathogens such as *Cryptosporidium* while at the same time using fewer chemicals. Membranes which until that time had been used only at the household level now began to find wider application.

Quoting from Water Treatment Principles and Design, 2nd edition, John Wiley & Sons, 2005 – "The focus at the beginning of the twenty-first century has been to continue to reduce exposure to man-made chemicals with known health effects as well as to reduce microbial contaminants. During the last three decades of the twentieth century, three developments have taken place regarding new approaches to treatment. The first discovery concerning water quality was that oxidants used for disinfecting water, particularly chlorine, react with natural organic matter in the water supply to form chemical byproducts, some of which are suspected carcinogens. The second discovery was that certain pathogenic microorganisms, namely *Giardia* and *Cryptosporidium* can be of zoonotic origin and, therefore, can occur in a water supply that is completely free of wastewater contamination. The final and perhaps the most significant change was the development of membrane filtration technologies suitable for treatment of water on the scale required for domestic supply. Membrane technologies have the potential to completely reject pathogens by size exclusion, a possibility that could substantially improve the safety of drinking water. *Membranes are arguably the most important development in the treatment of drinking water since the year 1900 (emphasis added)...*"

Comparison of Membrane with DAF/Filtration for the Croton Water Treatment Plant

The following comments are excerpted from the CWCWC Position Paper On the Need for Examination of the Use of Membrane Technology to Treat the Waters of the Croton System, November 2004. A few updates have been made.

The proposed DAF/F facility will occupy approximately eleven acres of former parkland. The footprint of the main treatment building is 8.7 acres (555 feet by 685 feet) or 380,175 square feet. It will utilize at least five chemicals in the pre-treatment process and DEP will store between 163,840 and 171,135.5 gallons of chemicals on site on a continuous basis. The higher volume would result from the use of

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potassium permanganate in pretreatment.

DEP has stated that the plant will use 21.6 megawatts of power on a regular basis with a peak usage of 32.3 megawatts. Subsequent to the filtration process, the effluent is treated with ultraviolet radiation (UV) as a further disinfectant in case some pathogens pass through the filter.

In order to limit post-construction impacts in Van Cortlandt Park, DEP put most of the water treatment plant (WTP) underground. Doing so necessitated the excavation of a hole 80 or more feet deep and removal by truck of approximately 1,250,000 cubic yards of dirt and rock.

From the original estimate of \$800 million, the cost of the plant escalated to \$1.3 billion and is now \$2.8 billion.

The membrane filtration plant could be expected to be 1,000 times more effective in removing such pathogens as *Cryptosporidium*. This result is confirmed by EPA. Pathogen removal is the single most important objective of a water system operator.

The membrane filtration plant would have a dramatically smaller footprint than the DAF/F plant, permitting greater flexibility in siting. Based on the footprint for a 250-million-gallons-per-day (mgd) membrane plant that was proposed for Portland, Oregon, it is estimated that the 290-mgd Croton membrane filtration plant would occupy slightly less than one-half acre of land or 20,750 square feet. Depending on the method of disinfection chosen, the membrane plant footprint might increase but it will never approach the size of the DAF/F facility.

The construction of a membrane facility would have obviated the need to excavate the 1,250,000 cubic yards of dirt and rock proposed for the DAF/F plant. The membrane facility could be built above ground sparing local residents the serious hazards of massive construction. Transportation of the dirt and rock necessitates

162 – 300 truck trips per day. The rise in levels of fumes and particulate level further endangers the health of the neighboring community that suffers from the highest degree of asthma in NYC.

Professional engineers estimate that a membrane plant would use roughly one third the electrical power of a DAF/F plant for average daily water production. This is an important safety consideration in the event of a power outage. DEP has plans for only minimal backup power in such an event.

However, the far smaller electrical consumption of a membrane plant means that enough backup power could be installed to satisfy the City's most urgent needs such as hospitals. In view of the Delaware and/or the Catskill systems being taken off-line for some years, it would be disastrous if the Croton WTP were to cease functioning. This danger has been referred to many times by CWCWC Vice President David Ferguson.

In terms of cost, the most recent estimate for the San Diego County's 100-mgd Twin Oaks Valley WTP total design/ build/

maintenance is \$159 million or \$1.59 per gallon. By contrast, the Croton plant at \$2.8 billion for 300 mgd maximum is close to 6 times that amount.

Back in 1997 when DEP engineers were examining the pros and cons of DAF/F vs. membrane filtration, the latter was passed over because it was too costly and had never been scaled up to the capacity needed to treat the Croton. Both those objections are no longer valid.

The phenomenal rise in the number of membrane plants has sent the cost plummeting to considerably less than an equivalent DAF/F plant. Although it is true that a membrane plant the size of 290 mgd has never been built, this is also true of DAF/F plants. The largest DAF/F plant in the US, the Table Rock / North Saluda Water Treatment Plant in South Carolina, is presently treating 75 mgd. No larger DAF/F plants are being built. By contrast, several larger membrane plants are already operational or on

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the verge of completion. The Twin Oaks plant outside San Diego will treat 100 mgd; the Olivenhain Water Treatment plant in Encinitas, CA can be expanded to 82 mgd; the Columbia Heights plant in Minneapolis is already operating at 70 mgd; the Lakeview Water Treatment Plant in Mississauga, Ontario has a capacity of over 80 mgd; and the Fridley plant in Minnesota has a capacity of 90 mgd.

As of 2005, there were approximately 20 DAF/F plants in operation compared to 161 membrane plants on line or scheduled to begin operation in the very near future. Most research being conducted today is in further refinements of membrane technology, not DAF/F.

FUTURE PROBLEMS WITH THE CAT/DEL SUPPLY PLACES HEAVY RELIANCE ON THE CROTON SYSTEM

NYC will depend heavily on the Croton water supply when the Delaware aqueduct that on average supplies 60% of the City's and the metropolitan area's water needs is shut down to repair a 40-million-gallon-per-day (mgd) leak. Work will also be needed on the Catskill aqueduct.

According to the Final Supplemental Environmental Impact Statement (FSEIS) for the Croton Water Treatment Plant – SECTION #2.4.1.3 Importance of the Croton System during Extended System Maintenance – “[T]he Delaware System is known to have a large leak in deep bedrock west of the Hudson River. It may be required to shut this conduit for a number of years to repair this leak. The Catskill Aqueduct is also in need of service. Plans are underway to pressurize this aqueduct between Kensico Reservoir and Eastview Site in order for the Catskill/Delaware Ultraviolet Light Disinfection (UV) Facility to be able to utilize the Catskill System. This pressurization work could put the aqueduct out of service for a number of years, thus requiring the Croton System to be fully operational during that time period in order to meet the City demand.”

In the same FSEIS, DEP states the following: ITEM #190 “The Croton System is critical to meeting the City's current and future water supply needs, both for routine use, droughts, and emergency contingencies.” And under ITEM #24: “NYC DEP is committed to a multibarrier approach to water quality which includes as its cornerstone watershed protection.”

DEP'S LACKLUSTER PROTECTION OF THE CROTON WATERSHED

Despite the City's proclaimed adherence to the multibarrier approach and watershed protection, the prospect of the chemical treatment/filtration plant to treat Croton water has gutted any resolve that DEP may have had to protect the Croton.

The most effective means of guaranteeing safe drinking water is to protect the source water and prevent it from being degraded. Given the naturally high quality of Croton source water, the public might wrongly assume that DEP would be protecting it to the fullest. For example, a cursory glance at the watershed land that DEP has acquired since the 1997 Watershed Agreement

and the land under the control of developers shows a lop-sided 4/1 ratio in favor of developers.

Moreover, DEP neglect does not stop with its reluctance to buy land. DEP's performance in terms of comments on stormwater management proposals offered by various developers/applicants are lackluster. And DEP engineers, except for one time (the Eagle River development in Somers, NY) are never to be seen or heard at public

hearings to defend their watershed or to help the citizens who would defend it.

A recent example is the Kent Manor development in the Town of Kent, Putnam County. Here, DEP is acting as lead agency in reviewing the application for the third and last application in the Phosphorus Offset Pilot Program (POPP). This program, a component of the 1997 Memorandum of Agreement (the Watershed Agreement), allows up to three above-surface sewage disposal systems in Putnam County provided that, in each case,

...Membranes are arguably the most important development in the treatment of drinking water since the year 1900...

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the applicant decreases the phosphorus to 1/3rd its original value, either from the site itself or from another site within the same watershed.

DEP's granting of this third permit to the developers is shocking due to the numerous severe flaws in the application that DEP has apparently chosen to overlook. Most shocking of all was the complete failure to make the applicant, Kent Acres Development Company, Ltd. comply with the required 3:1 phosphorus offset that DEP is supposed to uphold. As a result, CWCWC and the Putnam County Coalition to Preserve Open Space (PCCPOS) have filed suit against DEP and the applicant.

THE PROBLEM OF PHOSPHORUS

DEP's failure to properly protect its watershed has culminated in its failure to make applicants use the appropriate numbers when estimating the amount of phosphorus emanating from various land uses such as forest, meadow, impervious surface etc. Phosphorus is deemed by DEP and DEC to be the pollutant that is causing most harm to the reservoirs because it is critical to the growth of algae. One pound of phosphorus can trigger the growth of 115 pounds of algae. An overgrowth of algae can necessitate the use of large amounts of chlorine to disinfect the water. This, in turn, will result in high concentrations of disinfection byproducts (haloacetic acids and trihalomethanes), some of which are deemed carcinogenic.

DEP and DEC, under the Total Maximum Daily Load (TMDL) program specifically for the Croton Watershed, calculated the amounts by which each municipality in the watershed had to reduce the phosphorus to each reservoir within their particular watersheds. These values were approved by the US Environmental Protection Agency (EPA) in October 2002. In making these evaluations for the TMDLs, both DEP and DEC used a value of 0.0446 lbs/acre/year for the phosphorus export coefficient from forested land. Inexplicably, DEP now allows applicants to use a value of 0.1 lbs/acre/year, a value deemed appropriate for northern Virginia forests. This inappropriate value makes it twice as easy for a developer to retrieve the required pre-development value for phosphorus runoff from

the land. Why is DEP allowing a value that contradicts its own research and which facilitates development in the Croton Watershed?

Despite all DEP's assurances that a rigorous Croton Watershed protection plan would be pursued in conjunction with building the water treatment plant, this has not been the case. We have to conclude that despite its written and verbal commitments to the multi-barrier approach DEP is, in fact, not adhering to it.

CONCLUSIONS

The decision against CWCWC's Article 78 lawsuit against DEP was undoubtedly a setback for assuring that lead agencies perform due diligence in the SEQRA review process and take all information into account, including "newly discovered information." However, since then, CWCWC and its allies, notably Putnam County Coalition to Preserve Open Space (PCCPOS), have been successful in two important cases in Putnam County where the judge agreed with us that the lead agency had not taken the requisite hard look. One of those cases, the "Meadows" case, has been appealed by the applicant to the NYS Court of Appeals. The case will be heard in court on Thursday, October 18th, in Albany.

The decision by the court will have a profound effect on how future applications are handled by lead agencies. Will developers be able to obtain permission, as they have in the past, to impact wetlands, destroy forested lands, increase traffic and degrade water and the quality of life for the neighboring community, or will they be obliged to develop their projects with full consideration of all the environmental and social impacts?

We shall continue the fight so that no development, in any way, will be allowed to degrade our unique and vital water supply.

PLEASE CONTRIBUTE!

Our legal work that is so vital to protecting our watershed is expensive. Please help us continue by sending us a contribution with the form on the last page of this newsletter.

If you'd prefer receiving an electronic version of the bi-monthly newsletter, please send your email address to crotonwshed@aol.com.



The Croton Watershed Clean Water Coalition strives to protect and improve the waters of New York City's Croton Watershed, a critical component of the water supply for over half the population of New York State. We are an alliance of individuals and groups who believe that safe, clean and affordable drinking water is a basic human right.

Send in your membership and receive membership mailings and a subscription to CWCWC newsletter "Our Water, Our Future." Most importantly, your membership will help you get involved with the preservation of one of our most precious resources, our water.

Croton Watershed Clean Water Coalition Membership Application

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Email: _____

- | | | | |
|---|-----------|--|-----------|
| <input type="checkbox"/> Group/Coalition Membership | \$50/year | <input type="checkbox"/> Students/Seniors | \$10/year |
| <input type="checkbox"/> Family Membership | \$25/year | <input type="checkbox"/> Other | \$ _____ |
| <input type="checkbox"/> Individual Membership | \$20/year | <input type="checkbox"/> Additional Contribution | \$ _____ |

Is this a Renewal or a New Membership? (Circle one)

Make checks payable to Croton Watershed Clean Water Coalition, Inc. and mail along with your membership form to:

Don Pachner, Treasurer, CWCWC, INC., PO Box 484, Bedford NY 10506



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