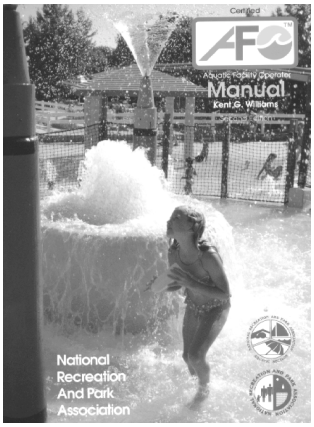
The PPOA
PUMPROOM PRESS

Official Publication Of The
PROFESSIONAL POOL OPERATORS OF AMERICA

***PrP Extra* ~ Summer 1998**

Waterparks, a growing industry in numbers and popularity, have taken an undeserved hit recently. This photo, comprising the cover of NRPA's *Aquatic Facility Operator Course* textbook, best illustrates the potential for high organic load, challenging chemical disbursement, and conditions resulting in extreme chlorine loss... all of which can be dealt with by trained operators and good equipment - on board at most parks in this country.



Original photo taken by Al Turner, president of the World Waterpark Association.

What is The Pumproom Press Extra?

The *PrP Extra* serves as an occasional, free supplement to the PrP, to be used for special announcements, information intended for *inactive* as well as active members, overflow or extended technical subjects, or any other purpose which will serve our membership. We find that continuity suffers with three (or more!) months between issues, so the *Extra* works well as a filler, with timely material offered to keep you remembering who your organization is.

This *Extra* is being sent to all members now because of the urgency of the E-Coli issue and the sensationalized, inaccurate and presumptuous press the waterpark has received. Read this article, first appearing in the NRPA Aquatic Newsletter, then you be the judge. (You may recognize a few paragraphs from PrP #4, Fecal Water Balance...)

Your editor has material ready for the next two *PrPs*, but our new format is stuck in a Mac and we can't seem to get it, graphics and all, out and into this PC. Everything takes time; have you noticed? Active members will, nonetheless, be getting their PrP-16, all ten packed pages, before month's end. Somehow.

We have included the latest index of contents for the first 15 *PrP* issues so you can reference your back-issue contents or see what you've been missing. Our membership continues to grow nearly beyond our capabilities, keeping your unpaid newsletter staff mighty busy.

If you're now inactive and want again to get your quarterly newsletter, wish to order back issues, want to contribute newsletter material, or would like to comment on the E-Coli article herein, please call us at 916 663-1265, Fax at 663-2030, or E-mail the editor at kent@altarfire.com.

And visit our website, **www.ppoa.org**, for upcoming schools, technical articles, logo items, sump stories and pool-guy links all over the world.

The *Dreaded E.Coli* Bacterium

~ What is the likelihood of infecting your pool?

In two words, practically zero. While it makes good press and brings the doctorates and doomsayers out of the woodwork with predictions of another plague, statistics and science weigh heavily in your favor. Taking fastidious care of your water remains more important than ever, of course… worth underscoring here. And emphasizing appropriate training to minimize ingestion by toddlers and swimmers becomes one of the best preventatives. But first, let's examine the scare itself in the context or reality.

The aquatic world has been fanned into a frenzy over what is currently known as the "FECAL ACCIDENT"! A subject of humorous conversation during pool schools and elsewhere, public reaction and legitimate concern have made it no laughing matter. Worse, we're rapidly becoming saddled with new rules that make the various states' codes ever more inconsistent and the running of our pools and parks more difficult than ever. The discovery of a "pool stool" may be quite a shock to the unsuspecting breast-stroker in lane two but - according to many medical authorities and water-treatment experts - it should be nothing to warrant a 911 call to the Centers for Disease Control in Atlanta!

Meanwhile our nation's health departments, earnestly attempting to provide the best in protection for our swimming-pool patrons and rightfully concerned about a few apparent outbreaks of cryptosporidiosis and the more recent and sensationalized E.Coli infestation in Atlanta, are reacting at a fever pitch. The resultant procedures and precautions, when heeded, are so costly in time and effort that they are threatening to put some pools and many waterparks practically out of business!

One exasperated operator recently told this writer that "If I had to shut down for a day each time we encountered suspected fecal material in our park's water, I'd be closed all summer!" Another old-timer said "I do what's worked for me over thirty years, and it doesn't include closing my pool!" These are common laments. And the extreme nature of the more recent and more radical procedural requirements for such encounters is causing many to take a more practical approach, ignoring the "rules" altogether. *(Please be aware that neither the PPOA nor this author is advocating the sidestepping of health-department guidelines; one courts liability when not following published requirements. It is, however, reasonable to examine the extremes and discuss them with your environmental health specialists and other regulatory agencies…)*

Let's look at a few logical and hard-to-refute concepts bearing on the subject of pool-water sanitation or the lack of it.

1. Statistical improbability: Millions of public pools have been operated throughout this century, many with equivalent organic loads and far less sanitation awareness or disinfectant control than we have today, yet extremely few pools have ever contributed to the outbreak of disease. It is true that a New York pool was blamed in the late 1940s for initiating the terrible Poliomyelitis outbreak, a Los Angeles pool and one or two others manifested crypto in the early 1990s, a cruise-ship spa recently infested travelers with Legionnaire's Disease, and many spas have been blamed for pseudomonas or other biounmentionable infestations over the years. The recent, lone E.Coli manifestation, however - ostensibly traced to the Atlanta waterpark - is the only E.Coli O157:H7 ever blamed on a body of sanitized public recreational water. *Serious doubt exists that this water-park kiddie pool was in fact the source of or the conduit for the infection.*

Looking at the numbers, it is revealing to note the odds. Let's estimate that our 210,000 public pools (high-load and low, full-time or seasonal) operate an average of 14 hours per day for one third of the year and 8 hours a day for the other two thirds, serving an average annualized daily attendance of roughly 50 people. Considering that each swimmer is in the water one-quarter of the

pool's open hours - *that's 9.5 billion swimmer-hours per year*. And the Atlanta debacle appears to be the first E.Coli case on record... just a single occurrence! If one considers it takes a fraction of a swimmer-hour during infectious conditions to contract the disease, the statistical track record against likely infection becomes truly staggering.

And consider drownings in this country. We experience about 1300 tragic drowning losses each year in swimming pools, figuring such occurrence is just 20% of the reported 6,500 total drownings per year from all causes. The likelihood, therefore, that an E.Coli outbreak will occur is hundreds, maybe thousands of times less than the probability that you will have a drowning in your pool this year. And that's if nearly one E.Coli outbreak per year actually happens!

2. Daily fecal introduction: In busy public facilities everywhere, the bacteriological and sometimes physical equivalent of a "fecal accident" is introduced into the pool water *every single day the pool is in use*. How much fecal material do you suppose is actually released into the pool by a thousand swimmers in the million-gallon wave pool, or a hundred or so toddlers in a few thousand gallons of wading-pool water? What amount, when and from where?

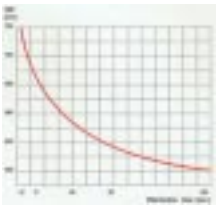
How can we be delicate in describing this stuff...? Let's just call it *cheek wash*! Imagine all those kids hurriedly finishing the paperwork after a trip to the commode, rinsing the last into the pool water itself.

It's not a pretty thought, but one physiologist estimates a tenth of a cubic centimeter of fecal material is rinsed into a pool by *every* bathing patron who enters the water! Naturally the more hygienic of us would contribute less, while others might introduce quite a bit more... In any case, for each 100 swimmers, ten cubic centimeters - about one tablespoon's worth - is released into our pristine pool water. Five hundred swimmers could easily match a very large one-time release of solids. And *none* of this subtle but solid organic material is ever scooped out of the water as is the more obvious pool stool. There's none of the fanfare, hoopla or sensational ritual that one finds so commonly attached to the classic floating discovery! It just stays in the pool, to be oxidized, sanitized and maybe even filtered - while the hazard of this daily occurrence to humans is, thank goodness, minuscule.

3. Training the kids as well as the operators - a new look at infection prevention: There's no doubt that nationally recognized pool operator certification, like NRPA's AFO program or the CPO course, is essential for the safe operation of public pools. We no longer can trust the seat of our collective pants, or what the guy at the pool store tells us. But training the toddlers and the swimmers *not to ingest pool water* is a fairly fresh idea that could virtually eliminate infection even in marginal water. Parents and trainers should impress on their kids at a very young age that there's water to drink and water in which to swim. Designated water from drinking-water fountains and other appropriate sources must be stressed as only safe water to swallow! Most parents polled are not currently doing this - and their kids commonly gulp pool water. It seems as if it could be a simple addition to youth training, as essential as the washing of hands. Haven't we all swum in untreated water - from pasture ponds to the mighty Mississippi - with our lips tightly sealed? This author water-skied in Saigon's Mekong River some years ago, with floating feces as common as the leaves and twigs, but he "didn't drink the water". And he didn't get sick.

4. Sanitation certainty: Let's face it. Pathogens, including cryptosporidium, pseudomonas auruginosa, staphococcus and, for sure, coliform, are *going to be* introduced - most of them every single day - into our busy pools! Maintaining an Oxidation/Reduction Potential (ORP) of 750 millivolts or more - that's equivalent to just half-a-part "free", unstabilized, un-combined chlorine at a pH of 7.4 - will do what it's always done; it will render the pool safe for human use. (While beyond the scope of this article, ORP is the qualitative measure of what's in fact going on in the water - far more reliable a measure than parts per million vs. time…)

Regarding the disinfection potential of chlorine (or any appropriate sanitizer) in the context of E.Coli, it doesn't take much. The coliform family is used as the *baseline measure* of minimum sanitation. Even single-digit numbers of such organisms found under the microscope indicate the sanitizing job is incomplete. Research has shown this pathogen experiences a three-log deactivation (just one surviving in a thousand) in barely 1.2 seconds when free-floating in water which exhibits 750 millivolts ORP, and in about ten seconds at a mere 650 millivolts - achieved by an unfettered .1 ppm "free" chlorine at pH of 7.3. This is the World Health Organization's minimum qualitative value for appropriate sanitation, now being considered as a minimum in many state swimming-pool codes. Even trace values somewhat lower than 650 mV. will result in bug deactivation



too - although the time required is sometimes excessive.

Considering again the Atlanta waterpark incident (or one in any other extremely high-load, high dissipation pool in which fecal matter is introduced in a scattered fashion with, possibly, marginal chlorine or bromine residuals), E.Coli still has little chance of surviving for periods measured beyond mere minutes. Hours or days of infecting persistence, as has been implied by news reports, enter the realm of absurdity. Even those bacteria safely embodied deep within organic particulate of visible dimension are doomed. The oxidizing process or, eventually, the filtering will consume or remove the suspended material. Given the remote possibility of such pathogenic survival into as much as a full day, a child nonetheless must ingest the very parcel of water containing the particulate in order to be infected! Homogeneous distribution of free bacteria may be possible in completely un-sanitized water, however fecal particulate from an isolated event cannot possibly be uniformly distributed or of significant density to assure most ingested water contains E.Coli-bearing solids. The preponderance of the water "parcels" are, logically, sanitary and free of bacteria.

This observer asserts that, while the possibility of infecting a single child within, say, an hour of diarrheic contribution in marginally sanitized water exists, the possibility of infecting greater numbers reduces exponentially. Further, occurrences of infection spanning two adjacent days then another, five days later (as presumed in the Atlanta event) are virtually impossible. Even if the "infecting child" returns repeatedly, will he defecate again and again, with chlorine coincidentally low each time?

So what about all these extreme measures frantically directed by our paragons of public health? Superchlorinating a closed pool for a day, sanitizing the filter if not changing the media, even draining the pool and chlorine-washing the pool shell Caddy-Shack style are measures recently directed. Requiring tightly sealed infantwear, even nude showers after each bowel movement (hopefully in the "facility") and bactericidal scrubbing of hands afterwards? One pool operator said "they'll soon have us requiring stainless-steel diapers and duct tape on the kids!"

Closing and super-treating the pool after a "fecal accident" is a little like washing your hands for one meal each week. Does it make any sense to go overboard one or two days a month, disrupting aquatic programs, wasting water and adding maintenance costs and hours, if the cheekwash just happens to be lumped all in one spot or area on those particular days? This observer thinks not.

5. Automation of water variables: Chemical automation is essential for "well managed water" in busy, public pools these days. Managed pH and ORP values are essential, moment by moment. Manual tests, record keeping and regular monitoring of the systems by a certified, responsible operator add to the picture, further assuring safe water continuously. The best modern controllers allow remote monitoring, control, and detailed analysis, as well as data collection. Most important, secure archiving of water values can be achieved by downloading for storage using a remote computer. Technology has much to offer, assuring safer water in our overtaxed pool systems - with healthy kids the result. We should avail ourselves…

Witnessing a fecal accident recently, the kid said it was no accident. He did it on purpose! The youngster was sent home, time-out was called in the pool and the trout scooped out. A gallon of liquid chlorine was poured ceremoniously in the area for effect as well as assured sanitation then, in half-an-hour, the whistle blew and the kids went back to swimming.

Swimming. Just like we all do every day, routinely withstanding the effects of a few dozen grams of human organic waste. It's that very same organic matter that, if it happens to be visible, sends everybody scrambling for the showers and the mouthwash. Silly, isn't it?

One Environmental Health Specialist summed it up best, saying "To avoid these hazards to health, all we really need is well managed water, well operated filters... just plain well run pools. And that requires operators who care and who use their heads!" ~ kw

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