

# Northern Flows



Alaska's Drinking Water Program Newsletter

Issue 37 • Spring / Summer 2009



## Ground Water Rule Treatment Options *By Vanessa Wike*

**O**n January 8, 2007, EPA finalized the *Ground Water Rule* with a compliance date of December 2009. This rule is aimed at reducing the threat of microbiological pathogens in public water systems utilizing ground water sources. A summary of the Ground Water Rule was presented in *Northern Flows*, Issue 34 (Summer 2008). As indicated in that article, the goal of the *Ground Water Rule* is to reduce the fecal contamination threat to public water systems. Therefore, the treatment objectives associated with this rule are based on the inactivation of viruses and bacteria for those systems determined to be at high risk of contamination. A system may be required to install treatment in two ways:

- ♦ Risk-Targeted Approach: The source is determined to be "vulnerable" or at a high risk to contamination based on poor

well construction or proximity to sources of fecal contamination;

- ♦ Triggered Approach: The water system has a history of fecal contamination events.

If the system falls within one of the above categories, the system would be required to install treatment sufficient to achieve a 4 log (99.99%) inactivation or removal of viruses. DEC does not currently have primacy for the *Ground Water Rule* and does not anticipate having primacy for this rule until 2010. When DEC is responsible for administering this rule, we are anticipating using primarily a triggered approach for implementation. Based on the fact that there are few systems that have a history of fecal contamination, DEC is anticipating that less than 1% of existing public water systems will be required to install treatment. However, in the event that treatment is required, this article will summarize general treatment options.

The two approaches to achieving 4 log virus treatment are either through removal or inactivation. In general, the small sizes of viruses (approximately 0.005 to 0.1 micron) limits effective filtration options. Unless water systems already are using a filter, installing a filter just to meet the virus removal requirement may not be the most cost effective solution. The following summarizes viral removal credits for basic types of filtration:

- ♦ Conventional Filtration – 2 log removal;
- ♦ Direct Filtration – 1 log removal;
- ♦ Slow Sand – 2 log removal;
- ♦ Diatomaceous Earth – 1 log removal;
- ♦ Bag and Cartridge Filtration – Not Appropriate, viruses too small;
- ♦ Micro and Ultra Membranes – Not Appropriate, viruses too small;
- ♦ Nano Membranes – Up to 4 log, based on challenge tests; and
- ♦ Reverse Osmosis – Up to 4 log, based on challenge tests.

The second approach, inactivation, includes methods to inactivate or disinfect the water to achieve the 4 log virus treatment requirement. These options include:

- ♦ Ultra-Violet Radiation (UV) – Not effective against viruses (particularly adenovirus);
- ♦ Ozone Gas-0.5 – 4 log possible, requires 1 year of raw water quality data;
- ♦ Chloramines – Not effective against viruses; and
- ♦ Chlorine-0.5 – 4 log possible, inexpensive and readily available.

Of these options, the least expensive and simplest solution, is the use of chlorine for disinfection. Chlorine disinfection equipment is comparatively easy to operate, and chlorine is also relatively easy to handle and manage. Disinfection-by-products are a possible problem. However, due to

(Cont. on page 9)

## This Issue

### Ground Water Sources

5

### What's Wrong With This Picture?

6 & 8

### Message from the Manager

2 & 6

### Regulations Corner

4

### Swine Flu

3 & 5

### The First Barrier (Drinking Water Protection)

7 & 8

## Message from the Manager *By James Weise*

Spring in Alaska is long over, summer is in mid stride, and fall is fast approaching. I am actually looking forward to the end of summer and the arrival of cooler and somewhat wetter weather; however, not the typical “Alaska monsoon season”. Some steady rain to fill our surface water basins, provide greater flow in our rivers and streams for recreational opportunities and our salmon fisheries, and recharge our aquifers, especially our shallow unconfined aquifers, is essential. The weeks (20 days) of hot and record-breaking high temperatures and dry weather in central and south-central Alaska have resulted in a significant increase in water usage, a greater concern for wildfires and overall lower air quality, and decreased production and capacity for shallow drinking water wells.

- ◆ At the national level, American Recovery and Reinvestment Act (ARRA) of 2009 (Economic Stimulus) funds have been received by Alaska for many activities; however, the activities of primary concern for those professionals in the water industry most likely focus on drinking water and wastewater projects. The Alaska Department of Environmental Conservation, through the Division of Water, Municipal Grants and Loans Program and the Division of Environmental Health, Drinking Water Program and Environmental Health (EH) Laboratory, are planning for, reviewing, and/or developing drinking water projects and non-projects that involve the use of \$19.5 million ARRA dollars

through the Drinking Water State Revolving Fund (DWSRF). Of this, approximately \$18.25 million will be used for drinking water construction and infrastructure projects. The Drinking Water Program and EH Laboratory plan to use \$814,600 to complete non-project activities using four contracts and the RFP process for the following activities:

- ◆ Regulatory Engineering and the development of guidance and implementation strategy documents for the Long Term 1 and Long Term 2 Enhanced Surface Water Treatment Rules;



- ◆ Engineering Technical Services in the review of Alaska PWS files to document the current status for those systems using a surface water source or ground water under the direct influence of surface water (GWUDISW);
- ◆ Document Digitizing support in the organization, scanning, and cataloging of Alaska PWS files to make them available, in a digital format, on a statewide basis; and
- ◆ StarLIMS Data Base Coding and Crystal Reporting for better management and accessibility of PWS data from DEC certified laboratories.

The “Economic Stimulus” funds being used by the Drinking Water Program and EH Laboratory are to better assist Alaska PWS owners, operators, consultants, and technical assistance providers in achieving and maintaining better compliance with Safe Drinking Water Act requirements and greater overall public health protection for the residents and visitors to the state of Alaska.

- ◆ This issue of *Northern Flows* contains the second article in the series for the Ground Water Rule written by Vanessa Wike, P.E., and the Drinking Water Program’s Engineering Coordinator. This Ground Water Rule article focuses on “Ground Water Rule Treatment Options”. As a program with a public health protection and regulatory focus, the Drinking Water Program is planning three Drinking Water Regulations, 18 AAC 80, revisions packages for calendar year 2009. These revisions packages primarily include the adoption by reference of the Lead and Copper Short-term Regulatory Revisions and Clarifications Rule, new fees and fee increases for both the Drinking Water Program and the EH Laboratory, and restructure/reorganization of our Class C (state-regulated) water systems requirements. For more in depth information about these planned regulations revisions packages, please check out the “Regulations Corner” article of this issue of *Northern Flows*. Lastly, as we have done in previous years to better assist PWS owners,

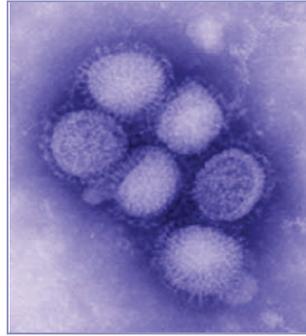
(Cont. on page 6)

## Swine Flu *By Leslie Shurtleff*

The face masks have largely been retired, the school closures have been lifted, and the threat of travel restrictions has faded from the headlines. Yet as we let out a collective sigh of relief that the Associated Press prediction of “two million dead” did not come to fruition, novel influenza A (H1N1) still holds a stake in the future of global health. On June 11, 2009, the World Health Organization (WHO) officially declared that a global pandemic is underway – the first global flu pandemic in 41 years. The WHO designation of a global pandemic is not a reflection of the severity of the illness caused by novel H1N1 infection, but rather a response to widespread human infection.

Despite waning media attention, novel H1N1 virus is unpredictable and experts are warning that as illustrated by the 1918 influenza pandemic, the virus may evolve into a more lethal strain as the coming flu season arrives. According to the Centers for Disease Control and Prevention (CDC), “there will be more cases, more hospitalizations, and more deaths associated with this pandemic in the coming days, weeks, and months.” While the future impact of novel H1N1 virus is uncertain, the past few months have served as a wakeup call that pandemic influenza preparedness measures should be incorporated into every water system Emergency Response Plan (ERP). As such, there is no time like the present to evaluate the quality of preparedness measures enacted at your water system. By now everyone is familiar with the prescribed mantra to stay home if you notice flu-like symptoms and to

wash hands thoroughly and frequently, but here are a few specific best management practices that should be adopted at your water system for posterity’s sake:



### 1) **Stay Informed**

Remain aware of the influenza “buzz”; the sooner you activate your response measures, the fewer incidents you may have to respond to. Visiting the CDC website frequently is a great way to stay in the loop: →

Additionally, if you have not already done so, become a subscriber to WaterISAC (Information Sharing and Analysis Center) Pro. WaterISAC is a community of water sector professionals and analysts who act as a clearing house for classified intelligence and open source information from both the government and private sectors. Subscribers have access to reference databases, vulnerability assessment tools, security, emergency preparedness materials, and email notifications about threats and incidents demanding immediate attention (including the H1N1 virus). This valuable resource has been online since 2002 and traditionally cost Pro Subscribers an annual fee of \$500. However, for a limited time, **WaterISAC is offering a**

**free 12 month trial Pro subscription for US water/wastewater systems** – Don’t miss out, subscribe today! →

### 2) **Reference Guidance Templates**

Strengthening your pandemic influenza plan has gotten a little easier in light of the recent production of water/wastewater guidance documents and templates. While such templates save you from reinventing the wheel, to be sufficiently prepared, you will need to tweak the plans to address the individuality of your system. Nonetheless, guidance templates are a great place to start and often will introduce you to preparedness measures that may not have occurred to you. “Water and Wastewater Sector Pandemic Guideline” developed by the Department of Homeland Security and “Pandemic Influenza Checklist for Small Systems” developed by the North Carolina Rural Water Association, are both excellent references. These guidelines can be found in the Library Section of WaterISAC for Pro subscribers.

### 3) **Cross Train Personnel on Essential Functions**

This measure is not unique to pandemic influenza preparedness and should be exercised as a component of a general ERP; however, it is of particular importance considering that the greatest threat of a pandemic to system operation is workforce absenteeism.

*(Cont. on page 5)*



## Alaska Department of Environmental Conservation and Alaska Training/Technical Assistance Center (ATTAC)



Will Present

### THE GROUND WATER RULE WORKSHOP

September 22-23, 2009

Z. J. Loussac Library, Wilda Marston Theater  
Anchorage, Alaska

This workshop is **free** and CEUs will be available for workshop participants!

Hotel rooms at a discounted rate are available for workshop participants at: **Springhill Suites, 3401 A Street.**

For Reservations, phone toll-free: 1-800-314-0783; or email: [hotelreservations@nmsusa.com](mailto:hotelreservations@nmsusa.com).

To receive the discounted rate, reservations must be made by Sept. 8, 2009, and when making the reservation, you must mention the "DEC Ground Water Workshop."

Please register for the workshop by September 8, 2009.

**Online registration** will be available through ATTAC starting in July, 2009 at: <http://www.uas.alaska.edu/attac/workshops.html>

**Registration by telephone** will be also be available through ATTAC in July. Phone toll-free: 1-888-750-3823.

**\*\*DEC's Drinking Water Program staff will present information on the requirements for this rule, many of which will be determined by the state. Compliance for public water systems begins December 1, 2009.\*\***

Who should attend:

- Ground Water PWS Owners and Operators
- Drinking Water/Health Professionals
- Technical Assistance Providers
- Government Representatives

Questions? Please contact Dan Weber at: (907) 269-7514 or email: [daniel.weber@alaska.gov](mailto:daniel.weber@alaska.gov)

## Regulations Corner *By Gloria Collins & Dan Weber*

**2**009 is a busy year for Alaska's Drinking Water Regulations (18 AAC 80). In April, changes to the regulations went into effect that:

- ♦ replaced the Class A and Class B categories of public water systems with federal terminology: Community Water Systems, Non-transient Non-community Water Systems, and Transient Non-community Water Systems;
- ♦ clarified the roles of Owner and Operator; and
- ♦ adopted by reference the federal provisions from 40 CFR 141 and 143 that had been written out in 18 AAC 80 Articles 3 and 6.

We are currently in the process of adopting by reference the federal Lead and Copper Short-Term Regulatory Revisions and Clarifications Rule and we anticipate

this change will be effective before the end of 2009.



Over the next couple of years, the Drinking Water Program plans to introduce regulation changes relating to fees, Environmental Health Laboratory certification/fees, Class C Public Water Systems, analytical methods, emergency response, and engineering/minimum separation distances, as well as to adopt by reference three federal rules:

1. Long Term 2 Enhanced Surface Water Treatment Rule
2. Stage 2 Disinfectant/Disinfection Byproducts Rule
3. The Ground Water Rule

A note about the Ground Water Rule: This EPA rule has a compliance date of December 1, 2009. The Drinking Water Program, in conjunction with ATTAC, will present a two-day public workshop on September 22-23, 2009, in Anchorage on this rule (see the above ad for more information). The workshop will provide information on the basic federal requirements, where the EPA has provided for state discretion, and the supplementary requirements the state is planning for this rule.

Questions about Drinking Water Regulations, 18 AAC 80, or the Ground Water Rule Workshop may be directed to:

Gloria Collins (907) 269-3075,  
E-mail: [gloria.collins@alaska.gov](mailto:gloria.collins@alaska.gov) or  
Dan Weber (907) 269-7514,  
E-mail: [daniel.weber@alaska.gov](mailto:daniel.weber@alaska.gov).

## Swine Flu *cont.* By Leslie Shurtleff

In conjunction with cross training personnel and developing a skeleton ancillary workforce, you must ensure that critical workers are safeguarded. Make provisions for the basic needs of workers to minimize the risk of further exposure. For instance, stock facilities with a 7 -day supply of food and provide sleeping materials such as cots and blankets.



For further information regarding pandemic influenza preparedness, or to obtain a copy of the above referenced guidance template(s), contact Leslie Shurtleff, Public Water System Security Specialist for the Drinking Water Program:

E-mail: [leslie.shurtleff@alaska.gov](mailto:leslie.shurtleff@alaska.gov)  
Direct: (907) 269-8924

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<http://notes5.state.ak.us/wa/mainentry.nsf/WebData/1hp1HomePage/?Open>



## Ground Water Sources By Chan Pongkhamasing (EPA)

### **Ground Water Sources: Install Source Water Sample Taps by December 1, 2009**

The Ground Water Rule (GWR) will require many water systems to collect source samples and have them tested for a fecal indicator. The rule goes into effect at the federal level on December 1, 2009, for all ground water systems. However, the sampling aspect of this rule may require your attention sooner.

The Ground Water Rule will require water systems with ground water sources to sample each ground water source whenever the system has a positive total coliform result under the Total Coliform Rule routine sampling. Ground water systems that provide and monitor for 4-log virus inactivation will not be required to do source monitoring.

To meet the monitoring requirements, these water systems are expected to have a source tap

available at each applicable ground water source by December 1, 2009. Each tap should be located as close to the source as possible and should be upstream of any pressure tank, storage tank, or treatment system.

Initially, the U.S. Environmental Protection Agency will implement the rule in Alaska. The Drinking Water Program plans to assume regulatory oversight by Fall of 2010.

### **Visit these links for more information on the GWR:**

- ♦ [http://www.epa.gov/ogwdw/disinfection/gwr/pdfs/grg\\_gwr.pdf](http://www.epa.gov/ogwdw/disinfection/gwr/pdfs/grg_gwr.pdf)
- ♦ [http://www.epa.gov/ogwdw/disinfection/gwr/pdfs/grg\\_gwr\\_compliancemonitoring.pdf](http://www.epa.gov/ogwdw/disinfection/gwr/pdfs/grg_gwr_compliancemonitoring.pdf)
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## Message from the Manager *cont.* *By James Weise*

operators, consultants, and technical assistance providers in the understanding and implementation of new federal drinking water rules, we are co-sponsoring a workshop with the Alaska Training and Technical Assistance Center (ATTAC), a workshop on the Ground Water Rule. This workshop is scheduled for September 22 – 23, 2009, in Anchorage, AK at the Loussac Library auditorium. Please review the notice in this newsletter or check the DEC Drinking Water Program website or the ATTAC website and take the opportunity to register and participate in this workshop.

We are pleased to announce the following new staff member to DEC Drinking Water Program: Shawna Laderach, Environmental Engineer, in the Fairbanks office. We also say “farewell” and “good luck” to Joshua Brewer, Environmental Program Technician in the Fairbanks office who is leaving the program to begin graduate work at the University of North Dakota. The Drinking Water Program is actively recruiting for several positions at this time. If you have interest in working for the State of Alaska, Drinking Water Program, in a progressive and challenging environment, please check Workplace Alaska recruitment notices for job postings in your area.

Enjoy the summer and I hope you are able to take full advantage of the incredibly great weather for fun-filled activities and to complete necessary water system upgrades, inspections, sanitary surveys, and/or drinking water protection activities.

*James R. Weise*

James Weise  
Manager  
Drinking Water Program



## What's Wrong With This Picture? *By Scott Forque*

The photograph below was taken during an inspection of a public water system (PWS). This PWS is using a ground water source and this is an inspection of the well head.



(Answer on page 8)

## The First Barrier (Drinking Water Protection) *By Charley Palmer*

*Protecting your source of drinking water from potential contamination is the first step in a multi-barrier approach to maintaining clean and safe drinking water.*

### **Current Events**

#### **Source Water Assessments**

Drinking Water Protection (DWP) staff continues to work on completing Source Water Assessments (SWA) for new Community Water Systems (CWS) and Non-Transient Non-Community Water Systems (NTNCWS) (both formerly known as Class A public water systems). URS Corporation has finished their work on completing 226 SWAs for Transient Non-Community Water Systems (TNCWS) (formerly known as Class B public water systems). DWP staff also continue to verify the information included in *all* SWAs completed to date through field (on site) visits whenever possible throughout the state, usually in conjunction with workshops and other travel opportunities. If your community needs assistance in developing a drinking water protection plan, or feels that your SWA needs corrections, please contact us to organize a field visit. Remember, having an Endorsed Drinking Water Protection Plan may help build your grant application portfolio!

#### **2008-2010 SOC Monitoring Waiver applications**

**The 2008-2010 SOC Monitoring Waiver applications are now available online under the 'Drinking Water Forms' link:** →



#### **Proper Well Placement?**

This well was placed in a flood plain, and the changing river course has now rendered it unusable. **Note:** it is now an abandoned well and must be properly decommissioned following the requirements of 18 AAC 80.015.

#### **Drinking Water Protection Grant**

**Grant funding:** Drinking Water Protection has allocated some funds to the Department's Alaska Clean Water Actions (ACWA) grant process. The funds are to be used for Community Water Systems (CWSs) to conduct drinking water source protection activities. The next open period will be February, 2010, but it is important to prepare now by developing a Drinking Water Protection Plan and identifying activities that would minimize the potential for contamination to enter your drinking water source. For more information on this funding opportunity, see: →

Additionally, if you are interested in getting a jumpstart on developing a Drinking Water Protection Plan that meets our criteria for endorsement, please do not hesitate to call the Drinking Water Protection group: Chris Miller or Charley Palmer, with questions or for assistance.

#### **New Wells**

**Problem:** I just put a new well in and

I have to do all of this work to get it approved for operation.

**Solution:** Many new wells are drilled without first reviewing Drinking Water construction regulations **18 AAC 80.015**, or other guiding factors embedded in the Drinking Water regulations, 18 AAC 80, and federal rules. By reviewing the construction regulations and other appropriate sections of the regulations, the water system owner can understand in advance the potential ramifications of the proposed well placement and proposed construction.

**Considerations:** There are proposed and existing drinking water regulations that are intended to address the receptiveness of wells to contamination commonly found in surface water. These include the Ground Water Rule (GWR) and the Surface Water Treatment Rule (SWTR). The GWR provides for increased protection against microbial pathogens for public water systems that use ground water sources vulnerable to fecal contamination by ensuring that the wells influenced by sources of contamination through inadequate wellhead construction or susceptible aquifer materials take corrective action to reduce the risk of contamination, such as providing sufficient disinfection. The purpose of the SWTR is to improve public health protection through the control of microbial contaminants, particularly viruses, *Giardia*, and *Cryptosporidium*. The SWTR also applies to wells using ground water under the direct influence of surface water (GWUDISW). These rules and others should be

(Cont. on page 8)

## What's Wrong With This Picture? *cont.* By Scott Forgue

### **ANSWER:**

The picture was taken during an inspection conducted as a follow-up to repeated positive coliform bacteria samples. Water has entered this well pit and contaminated the drinking water system.

This picture illustrates some of the reasons why well pits are generally prohibited by the Drinking Water Regulations, 18 AAC 80.

Well pits are typically not water-tight. This greatly increases the possibility that water will submerge a well head, be drawn into the well and contaminant the drinking water system.

Well pits are infrequently inspected. If water leaks into the pit it's likely that it will go unnoticed. In the case of the pictured system, it was only

after repeat positive analytical results for coliform bacteria that the submerged well head was discovered.

Well pits also pose a threat to the drinking water aquifer. An inundated well can allow contaminated water from the surface to pollute a source of drinking water supplying many water systems.

The argument that a well pit should be allowed if there is a sump pump in the pit surely "does not hold water" in the case pictured here. A close look at the picture will reveal not one but two sump pumps that failed to keep this pit dry.

In some cases, continued use of existing well pits may be allowed. A department review on a case-by-case basis is necessary. A registered



engineer must demonstrate to the department that the pit is adequately protected from flooding and the department must find that the continued use of an existing well pit serves the interest of public health.

There are additional concerns regarding well pits beyond the drinking water system aspects. Safety issues related to potentially submerged electrical components and confined space access are also present.

Thanks to JeanMarie Merli for this picture. If you have feedback you would like to share with other readers of *Northern Flows*, or you have a picture you would like to see in a future "What's Wrong with this Picture," send it to Scott Forgue at [Scott.Forgue@alaska.gov](mailto:Scott.Forgue@alaska.gov).

## The First Barrier (Drinking Water Protection) *cont.* By Charley Palmer

reviewed prior to drilling a new public well. Some considerations that could have a substantial impact on the cost to serve clean and safe water include but are not limited to the following:

### **Well Placement**

- ♦ *Are there nearby potential sources of contamination?* These may include septic systems and associated leach fields, dog kennels, livestock feedlots, or other sources of human or animal waste. Consider the cost to mitigate the risk posed by a nearby source of contamination, or the cost to remove that source of contamination.
- ♦ *Is there a nearby surface water body? Is my well (or infiltration gallery) using a GWUDISW source?* The cost of showing the Department that there is a low



risk that the well is using a GWUDSIW source can be substantial.

- ♦ Consider locating the well in a location that does not and will not be threatened by changing land use.

### **Wellhead Construction**

See Drinking Water regulation **18 AAC 80.015**

- ♦ *Is there a properly installed sanitary seal?* A sanitary seal can be the most visible defense against direct contamination at the wellhead. This is especially important if the well is vulnerable to seasonal flooding.
- ♦ *Is the ground surface (or well pad) sloped to drain away from the wellhead?* This ensures that snowmelt, rain events, or local spills do not pool around the wellhead and allow for the downward migration of

contaminants along the well casing.

- ♦ *Does the well have below-ground grout seal around the annular space of the casing?* This ensures that the natural protection provided by the soil is not compromised by leaving an opening around the casing that is a direct pathway for contaminants to migrate to the aquifer.
- ♦ *Is the wellhead at least one (1) foot above the ground surface or well pad?* This may prevent the wellhead from being submerged in potentially contaminated surface water during seasonal flooding and snowmelt.

Remember, proper well placement is very important and could have a significant impact on the cost to construct and operate a public water system.

## Ground Water Rule Treatment Options *cont.* *By Vanessa Wike*

the typical short contact times required for virus and chlorine inactivation, the formation of disinfection-by-products is much less of a problem than for systems disinfecting for *Giardia*.

Ozone is a much stronger oxidant than chlorine and is a very effective disinfectant. The handling and management of ozone gas is somewhat more complicated than the handling of chlorine. Ozone more strongly oxidizes other components that may be in the water, such as iron, manganese, and organics. This could interfere with the disinfection

of viruses. Therefore, in designing ozone units, you must be even more careful to ensure that you have captured the worst case water conditions for any given year. Ozone may also create bromate, a disinfection-by-product formed from bromide.

In the event that treatment is needed, engineered plans must be submitted to DEC for approval prior to construction. The same engineering standards and criteria will be used in these reviews, as is currently used in reviews of the other various treatment options. Engineering

checklists of submittal requirements are available online at: ↘

<http://www.dec.state.ak.us/eh/dw/dwmain/engineering.html>

The *Ground Water Rule* is posted on the EPA website at: ↘

<http://www.epa.gov/fedrgstr/EPA-WATER/2006/November/Day-08/w8763.htm>



# Northern Flows

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