From: Larry Lindsay
To: Bert Sandell
Date: 1/2/2007 10:52:49 AM
Subject: RE: Vineyard Club Report & Design

Your equation is correct but for your design the head is 7 inches, not 5. The head is measured from the water surface down to the <u>center</u> of the orifice.

Larry

>>> "Bert Sandell" <bertsandell@earthlink.net> 12/29/2006 11:22 AM >>>
Larry,

Thank again for providing the additional information. I was hoping that you might be able to give me with some help with my calculation for the Measuring Device / Bypass Opening. I understand that I need to include a shear effect coefficient, but I'm not quite sure where it should be included in my equation.

Here's the calculation information I provided in my Draft Compliance Plan:

Bypass Opening Flow is calculated using a simplified version of Bernoulli's equation which yields the following:

$Q = A \times V;\quad A = pi \times r2\ ;\quad V = sqrt\ (2gh)$

Where:

Q = Flow
A = Bypass Opening Area
V = Velocity
g = Gravitation Acceleration = 385.83 in./sec.2
h = Head Height

Therefore:

Bypass Opening Diameter   = 4 inches
Head Height   = 5 inches

Q   = (pi x r2) x sqrt (2gh)
       = (3.14 x 4) x sqrt (2 x 385.83 x 5)
       = 12.56 x 62.12
       = 780.17 cu. inches / second
       = .45 cu. ft. / second

A flow of .45 cubic feet per second exceeds the bypass requirement of License No. 12831

My thought was that the "shear effect coefficient" of .60 should be included in the flow calculation as follows:

Q = A x V x (shear effect coefficient)
   = A x V x .60

Using the data from above yields a flow rate of .27 cubic feet per second.
From your email below, I see that you obtained a flow rate of .32 cfs.
Where is my calculation off?

Thanks & Best Regards,

Bert Sandell

-----Original Message-----
From: Larry Lindsay [mailto:LLINDSAY@waterboards.ca.gov]
Sent: Wednesday, December 27, 2006 12:09 PM
To: bertsandell@earthlink.com
Cc: John O'Hagan; Mark Stretars
Subject: Vineyard Club Report & Design

Mr. Sandell,

I reviewed the design you proposed and your equation neglects the
coefficient to account for the shear effect between the orifice and the
water and the contraction of the stream throught the orifice. Your equation
is correct except for that term. The coefficient varies depending on the
edge of the orifice in the weir. Values usually range from 0.60 to 0.68.
Using the worst case for the coefficient (0.6) since we do not know the
shape of the edge in the orifice, I get 0.32 cfs for your design. Also, the
head is measured from the water surface to the center of the orifice.

I have attached the report of my inspection that is in the Vineyard Club's
water right file. I put the text pages in one file and the photograph pages
in another to keep the file size as small as possible. The photographs
follow the text in the report.

Larry

Charles L. Lindsay, Chief
Hearings Unit
Division of Water Rights

(916) 341-5358

CC: John O'Hagan; Mark Stretars