

**Proposed Revisions to Cross Connection Control Rules for
Residential and Domestic Connections, Chapter 12, WY
DEQ/WQD Rules and Regulations**

**Additional Information
Requested by the Environmental Quality Council
From the Water Quality Division**

The Wyoming Environmental Quality Council (EQC) continued the public hearing conducted February 15, 2006. At that time the EQC directed that the Water Quality Division research the economic risk to benefit ratio of the proposed rules. The economic risk to benefit ratios are presented. This information and analysis has been prepared for the EQC to assist in the decision making process. It is being made available to the interested public through the DEQ website.

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APR 21 2006

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ECONOMIC RISK TO BENEFIT RATIO OF RESIDENTIAL AND DOMESTIC CROSS CONNECTION CONTROL PRACTICES

Data and assumptions made to facilitate the preparation of the economic risk to benefit ratio.

Primary Data:

Surveillance for Waterborne-Disease Outbreaks Associated with Drinking Water --- United States, 2001—2002 U.S. Centers for Disease Control, <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5308a4.htm>

2000 U.S Census

Cost of installation of backflow prevention for containment of service connections.

The costs used are the consensus estimates discussed at the February 15 EQC hearing.

Assumptions made to allow completion of analysis:

1. The surveillance data for 2001-2002 is typical.
2. All waterborne disease outbreaks associated with distribution systems were caused by contamination that would have been prevented by residential and domestic service connection containment.
3. Less than 10% of the residential and domestic service connections nationwide in 2001-2002 had service connection containment.

Evaluation of data set selection and the assumption statements impact on analysis:

1. Acute chemical poisonings are considered disease outbreaks and account for 20% of the outbreaks.
2. The 2001-2002 waterborne disease outbreak data was compared to a 1997-1998 data set and to a data summary for 1970 to 2001. The rates and severity of disease outbreaks were similar. The 2001-2002 data set was selected because it is the most current available and identified distribution system related outbreaks.
3. The \$500 cost per service connection is the high average number discussed and the general consensus of the municipal system managers present on February 15 as a reasonably accurate number.
4. The service life for a service connection was assumed to be 40 years.
5. A maintenance cost of \$120 per 10 years for the backflow prevention and thermal expansion equipment was assumed. This cost assumes that annual inspection or testing will not be required.
6. The cost of \$150 for a hazard classification survey is based on an estimate of 3 hours of effort by a \$20/hour wage rate for a system employee with hazard classification surveyor certification. A total billing multiplier of 2.5 was applied to cover overhead and training costs.
7. Economic risk to benefit ratios were calculated using the national population in order to use meaningful numbers. The national numbers were then applied to the Wyoming population.
8. The numeric values calculated could vary from one half to twice the values of the numbers presented with the results gathered from additional detailed research. However that variation should not be significant to the decision making process of the Council, given the size of the numbers.

ECONOMIC RISK TO BENEFIT RATIO

Service Connection Containment of all new residential and domestic connections (this practice is mandated by the 2003 version of Chapter 12, DEQ/WQD Rules and Regulations)

US Population, 2000 Census	281,000,000
US Dwellings of 4 units of less, 2000 Census	105,000,000
Waterborne disease outbreaks 2001-02	31
Illnesses	1020
Deaths	7
Fraction caused by distribution systems	57%
Annual National Casualty Rates without residential containment	
Deaths (defacto EPA Standard 1 per million)	1 per 70 million
Illnesses (defacto common standard 1 per 10 thousand)	1 per 500 thousand
Cost of containment of residential or domestic service connection	\$500
Life of service connection	40 years
Maintenance cost	\$120 / 10 years
Risk to Benefit Ratio (Wyoming Ratio the same as National Ratio)	
Cost per death prevented	\$1.3 billion
Cost per illness prevented	\$700 thousand
Predicted Wyoming Casualty Rates without residential containment	
Deaths	1 per 143 years
Illnesses	1 per year
Projected Wyoming Costs	
Simple annualized installation cost	\$2,850,000
Annual maintenance cost	\$2,736,000
Total annual cost for residential containment	\$5,586,000
Annual cost for hazard classification surveys (proposed change)	\$3,420,000

For comparison, Wyoming's highway fatality rate averages 170 per year, which is 1 per 3000 residents. In 2003 Wyoming had the lowest number of fire deaths in the nation and the lowest rate per capita, 1 per 500,000.

Wyoming Averages
 Costs of 8" diameter water line
 Service Connections / 1000 ft

			Cost		Cost	TAPs	Backflow	Backflow	Percent	Percent
	Project	L F	Pipe	Number	Pipe	per	Cost @	Cost @	Backflow	Backflow
Entity	Cost	Pipe	per	Services	per	1000 lf	\$300/unit	\$500/unit	to Total	to Total
			L F			1000 lf			Costs	Costs
									\$300/unit	\$500/unit
Etna Water & Sewer District	\$234,000	7,400	\$ 32	52	31,621.62	7	\$ 2,108	\$ 3,514	6.7%	11.1%
City of Casper	\$835,000	8,000	\$ 104	164	104,375.00	21	\$ 6,150	\$ 10,250	5.9%	9.8%
City of Casper	\$1,628,000	21,500	\$ 76	323	75,720.93	15	\$ 4,507	\$ 7,512	6.0%	9.9%
North Alpine I&S District	\$332,000	5,200	\$ 64	88	63,846.15	17	\$ 5,077	\$ 8,462	8.0%	13.3%
City of Cody	\$150,000	1,600	\$ 94	37	93,750.00	23	\$ 6,938	\$ 11,563	7.4%	12.3%
City of Casper (8" diameter)	\$1,714,950	19,700	\$ 87	333	87,053.30	17	\$ 5,071	\$ 8,452	5.8%	9.7%
						18.5		Averages	6.6%	11.0%

For Refence Purposes:

Use 8" diameter pipe at \$90,000 per 1000 lf;
 Residential backflow installation at 18.5
 service/1000 ft, and \$500 per service. Cost per
 1000 lf with residential service containment =
 \$90,000 + \$9,250 or \$99,250 per 1000 lf. This
 represents a 10.3% increase in cost of construction.