MEMORDANDUM

TO: Delaware Water Supply Coordinating Council

FROM: Gerald Kauffman

DATE: February 20, 2009

SUBJECT: Water Supply Self-Sufficiency Projections

Enclosed are water supply and demand data to support projected water demands for 2012 for public water utilities in northern New Castle County. According to Chapter 14, the Delaware Self-Sufficient Water Supply Act, on or before March 1 of each reporting year (2009), the Water Supply Coordinating Council shall determine, publish, and transmit to the Public Service Commission for the following projected year (2012) the project water demand for each water utility.

The self-sufficiency subcommittee met at the offices of the University of Delaware Water Resources Agency on February 12, 2009 and agreed that the maximum monthly demands for each water utility for the five year period (2004-2008) would be used to estimate projected maximum water demands for 2009. Water demands are projected to 2012 based on 0.17% per year increase in population forecast for northern New Castle County by the Delaware Population Consortium. Table 6 summarizes the maximum monthly water demands projected for 2009 and 2012.

At the February 20, 2009 Water Supply Coordinating Council meeting, the WSCC voted to approve the water demand projections and recommended forwarding the projections to the Public Service Commission.

Table 1 Maximum monthly water demands recorded in northern New Castle County

Purveyor	***2001***	***2002***	***2003***	***2004***	***2005***	***2006***	***2007***	***2008***	***2005 base demand***	***2010 projected demand***	***2020 projected demand***
City of Wilmington	29.1	25.5	23.8	25.1	26.4	23.7	21.4	21.1	28.6	29.1	29.6
Artesian Water Co.	21.6	23.0	20.2	20.9	21.6	22.8	21.8	22.1	23.0	23.4	23.8
United Water Del.	24.0	25.1	22.9	22.0	25.4*	24.4*	23.3	21.7	23.3	23.7	24.1
City of Newark	4.8	4.3	4.0	3.6	4.1	4.4	4.1	4.1	4.8	4.9	5.0
New Castle MSC	0.7	1.1	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.8
subtotal	80.2	79.0	71.2	69.1	77.7	77.0	71.1	69.5	80.2	81.7	83.3
- interconnections	- 2.7	- 3.5	- 1.7	- 1.3	- 0.9	-1.7	-0.3	0.0			
Total (mgd)	77.5	75.5	69.5	67.8	76.8	75.3	70.8	69.5	80.2	81.7	83.3

* UWD demands are readjusted based on corrected CWA interconnections and industry closures.

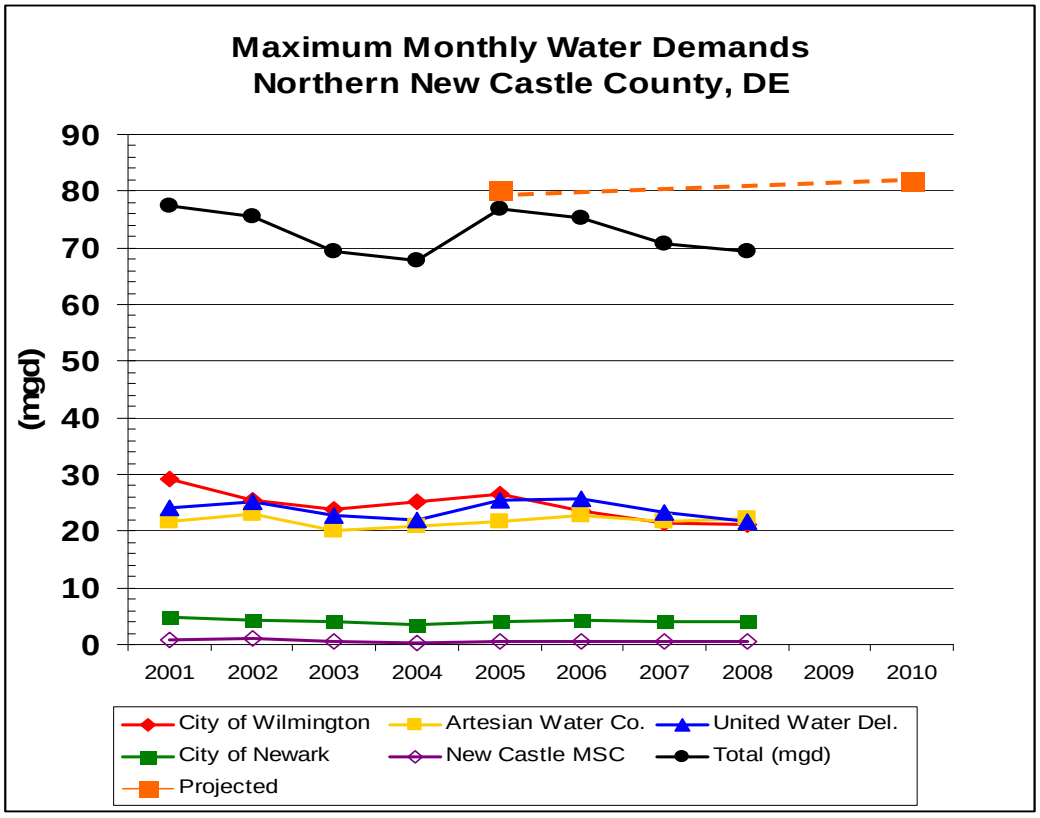

Table 2 Updated water supply/demand projections for northern New Castle County (Jan 2009)

Year/Scenario	*Supply (mgd)*	*Demand (mgd)*	*Surplus / Deficit*	
			mgd	*mg**
2005				
1. Existing: No 7Q10 passby on Brandywine Creek at Wilmington. 7Q10 passby on White Clay Creek at Newark.	100.5	80.2	20.3	1,522
2. Future: 7Q10 passby along Brandywine Creek and along White Clay Creek at Newark.	91.0	80.2	10.8	810
2010				
1. Existing: No 7Q10 passby on Brandywine Creek at Wilmington. 7Q10 passby on White Clay Creek at Newark	103.5	81.7	21.8	1,635
2. Future: 7Q10 passby along Brandywine Creek and along White Clay Creek at Newark.	94.0	81.7	12.3	922
2020				
1. Existing: No 7Q10 passby on Brandywine Creek at Wilmington. 7Q10 passby on White Clay Creek at Newark.	103.5	83.3	20.2	1,515
2. Future: 7Q10 passby along Brandywine Creek and along White Clay Creek at Newark.	94.0	83.3	10.7	802

* Volume calculated assuming a 75-day drought period. 7Q10 passby flow along the Brandywine Creek at Wilmington = 49 mgd. 7Q10 passby flow along the White Clay Creek at Newark = 14 mgd.

Table 3 Scenario 1: Existing regulatory condition as of Jan 2009
No 7Q10 instream flow standard along the Brandywine Creek at Wilmington. Instream standard with minimum flow depth and chloride provisions in effect along the White Clay Creek at Stanton and 7Q10 instream flow standard in effect at Newark.
Maximum monthly demands recorded as of Jan 2009.

Purveyor	*2005*			*2010*			*2020*		
	Supply	***Max Monthly Demand***	***Surplus/ Deficit +/-***	***Supply***	***Max Monthly Demand***	***Surplus/ Deficit +/-***	***Supply***	***Max Monthly Demand***	***Surplus/ Deficit +/-***
Artesian	29.0	23.0	6.0	29.0	23.4	5.6	29.0	23.8	5.2
Groundwater	24.3			24.3			24.3		
CWA Interconn.	3.0			3.0			3.0		
ASR wells	1.7			1.7			1.7		
United Water DE	25.8	23.3	2.5	26.8	23.7	3.1	26.8	24.1	1.7
Stanton WTP	19.3			19.3			19.3		
Hoopes Contract	2.7			2.7			2.7		
Christiana WTP	3.0			3.0			3.0		
ASR well				1.0			1.0		
CWA Interconn.	0.8			0.8			0.8		
Wilmington	36.3	28.6	7.7	38.3	29.1	9.2	38.3	29.6	8.7
Brandywine Creek	15.0			15.0			15.0		
Hoopes Reservoir	21.3			21.3			21.3		
Raise Hoopes Res.				2.0			2.0		
Newark	7.8	4.8	3.0	7.8	4.9	2.9	7.8	5.0	3.8
White Clay WTP	0.0			0.0			0.0		
Newark Reservoir	4.0			4.0			4.0		
Groundwater	3.8			3.8			3.8		
New Castle MSC	1.6	0.5	1.1	1.6	0.6	1.0	1.6	0.8	0.8
SUBTOTAL	100.5	80.2	20.3	103.5	81.7	21.8	103.5	83.3	20.2

Water supply available during drought of record conditions (75 days) with existing regulatory condition:

- No minimum instream flow standards in effect along the Brandywine Creek at Wilmington.
- Minimum depth flow standard in effect along White Clay Creek at Stanton, 7Q10 passby in effect on White Clay Creek at Newark (14 mgd). The 7Q10 flow is the low flow likely to occur for 7 days in a row once every 10 years.
- Groundwater supplies permitted by DNREC allocation permit as per drought of record (2002) conditions.
- Transfers from Chester Water Authority are accounted for as per Delaware Water Supply Self Sufficiency Act of 2003.
- Useable capacity Hoopes Reservoir = 1800 mg over 75 days (24 mgd). Raise reservoir 2 ft. provides additional 150 mg (2 mgd).
- Useable capacity Newark Reservoir = 300 mg over 75 days (4 mgd).
- Drought of record low streamflows observed during 2002 drought: Brandywine Creek = 21 mgd (8/21/02), White Clay Cr. at Stanton (w/o Hoopes Reservoir Releases) = 6.8 mgd (8/15/02).
- Maximum monthly demands recorded by water purveyors as of 2005, projected out to 2020 at rate similar to Delaware Population Consortium projections. Population increase 3 percent in northern New Castle County from 2005 to 2020.
- UWD Tidal Capture Structure provides 14 mgd plus 5.3 mgd from incoming tide 18 hours per day providing one foot minimum depth in creek. Hoopes Reservoir release reduces chlorides below 250 ppm at TCS during low flow (< 17 mgd). Contract with Wilmington provides up to 200 mg from Hoopes Reservoir to UWD or 2.7 mgd average over 75-day drought.

Table 4 Scenario 2: Future regulatory condition
(hypothetical most conservative scenario)
7Q10 instream flow standard in effect on the Brandywine Creek at Wilmington. Instream standard with minimum flow depth and chloride provisions in effect along the White Clay Creek at Stanton and 7Q10 standard in effect at Newark.
Maximum monthly demands recorded as of Jan 2009.

Purveyor	*2005*			*2010*			*2020*		
	Supply	***Max Monthly Demand***	***Surplus/ Deficit +/-***	***Supply***	***Max Monthly Demand***	***Surplus/ Deficit +/-***	***Supply***	***Max Monthly Demand***	***Surplus/ Deficit +/-***
Artesian	29.0	23.0	6.0	29.0	23.4	5.6	29.0	23.8	5.2
Groundwater	24.3			24.3			24.3		
CWA Interconn.	3.0			3.0			3.0		
ASR	1.7			1.7			1.7		
United Water DE	23.1	23.3	- 0.2	24.1	23.7	0.4	24.1	24.1	0.0
Stanton WTP	19.3			19.3			19.3		
Hoopes Contract	0.0			0.0			0.0		
Christina WTP	3.0			3.0			3.0		
ASR				1.0			1.0		
CWA Interconn.	0.8			0.8			0.8		
Wilmington	29.5	28.6	0.9	31.5	29.1	2.4	31.5	29.6	1.9
Brandywine Creek	5.5			5.5			5.5		
Hoopes Reservoir	24.0			24.0			24.0		
Raise Hoopes Res.				2.0			2.0		
Newark	7.8	4.8	3.0	7.8	4.9	2.9	7.8	5.0	2.8
White Clay WTP	0.0			0.0			0.0		
Newark Reservoir	4.0			4.0			4.0		
Groundwater	3.8			3.8			3.8		
New Castle MSC	1.6	0.5	1.1	1.6	0.6	1.0	1.6	0.8	0.8
SUBTOTAL	91.0	80.2	10.8	94.0	81.7	12.3	94.0	83.3	10.7

Water supply available during drought of record conditions (75 days) with existing regulatory condition:

- 7Q10 minimum instream flow standard in effect along the Brandywine Creek at Wilmington (49 mgd).
- Minimum depth flow standard in effect along White Clay Creek at Stanton, 7Q10 passby in effect on White Clay Creek at Newark (14mgd). The 7Q10 flow is the low flow likely to occur for 7 days in a row once every 10 years.
- Groundwater supplies permitted by DNREC allocation permit as per drought of record (2002) conditions.
- Transfers from Chester Water Authority are accounted for as per Delaware Water Supply Self Sufficiency Act of 2003.
- Useable capacity Hoopes Reservoir = 1800 mg over 75 days (24 mgd). Raise reservoir 2 ft. provides additional 150 mg (2 mgd)
- Useable capacity Newark Reservoir = 300 mg over 75 days (4 mgd).
- Drought of record low streamflows observed during 2002 drought: Brandywine Creek = 21 mgd (8/21/02), White Clay Cr. at Stanton (w/o Hoopes Reservoir Releases) = 6.8 mgd (8/15/02).
- Maximum monthly demands recorded by water purveyors as of 2005, projected out to 2020 at rate similar to Delaware Population Consortium projections. Population increase 3 percent in northern New Castle County from 2005 to 2020.
- UWD Tidal Capture Structure provides 14 mgd plus 5.3 mgd from incoming tide 18 hours per day providing one foot minimum depth in creek. Hoopes Reservoir release reduces chlorides below 250 ppm at TCS during low flow (< 17 mgd). Contract with Wilmington provides up to 200 mg from Hoopes Reservoir to UWD or 2.7 mgd average over 75-day drought.

Table 5 Maximum monthly water demands for northern New Castle County (1999-2008)

Purveyor	*1999*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*
June (mgd)									
City of Wilmington		26.2	24.3	21.5	23.0	25.0	18.7	21.4	19.7
Artesian Water Co.		20.5	20.9	18.5	20.9	21.6	20.0	21.8	20.6
United Water Del.		21.9	24.3	22.5	21.2	24.0	22.1	23.3	21.2
City of Newark		3.8	4.1	3.5	3.5	4.0	3.9	4.0	3.8
New Castle MSC		0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5
Subtotal		72.7	74	66.4	69.1	74.9	65.2	70.9	65.8
- interconnections		*-1.7*	*-1.8*	*-1.7*	*-1.3*	*-2.8*	*-0.9*	*-0.2*	*0.0*
TOTAL		71.9	72.2	64.7	67.8	72.1	64.3	70.7	65.8
July(mgd)									
City of Wilmington	32.2	26.9	25.5	23.8	23.4	25.7	18.3	21.3	20.8
Artesian Water Co.	23.1	21.1	23.0	20.2	19.3	21.1	19.3	20.7	22.1
United Water Del.	25.5	23.4	25.1	22.9	22.0	24.9	22.6	22.2	21.7
City of Newark	4.9	4.3	4.3	3.8	3.5	4.0	3.7	3.9	3.9
New Castle MSC	1.2	0.5	1.1	0.5	0.4	0.4	0.4	0.5	0.5
Subtotal	87.0	76.2	79.0	71.2	68.6	76.1	64.3	70.7	69.0
- interconnections	*-4.3*	*-1.5*	*-3.5*	*-1.7*	*-0.8*	*-2.5*	*-0.8*	*-0.3*	*-0.0*
TOTAL	82.6	74.8	75.5	69.5	67.8	73.6	65.8	70.4	69.0
August (mgd)									
City of Wilmington	27.8	29.1	24.4	23.3	25.1	26.4	23.7	21.0	21.1
Artesian Water Co.	17.8	21.6	19.8	19.2	18.2	21.3	22.8	20.5	20.8
United Water Del.	20.6	24.0	23.8	21.2	21.3	25.4	25.6	22.4	20.7
City of Newark	3.9	4.8	4.2	4.0	3.6	4.1	4.4	4.1	4.1
New Castle MSC	0.6	0.7	1.0	0.4	0.4	0.5	0.5	0.5	0.5
Subtotal	70.7	80.2	73.3	68.2	68.5	77.7	77.0	68.5	67.2
minus Delaware Interconnections	*-2.8*	*-2.7*	*-4.6*	*-1.1*	*-1.5*	*-0.9*	*-1.7*	*-0.1*	*-0.0*
TOTAL	67.8	77.5	68.7	67.1	67.0	76.8	75.3	68.4	67.2

Table 6 Water upply and demand projections for northern New Castle County through 2012

Purveyor	*2009 Projections*			*2012 Projections*		
	Supply (mgd)	*Demand (mgd)*	*Surplus (mgd)*	*Supply (mgd)*	*Demand (mgd)*	*Surplus (mgd)*
Artesian	29.0	22.8	6.2	29.0	22.9	6.1
United Water Delaware	26.8	24.4	2.4	26.8	24.5	2.3
Wilmington	38.3	26.4	11.9	38.3	26.5	11.8
Newark	7.8	4.4	3.4	7.8	4.5	3.3
New Castle MSC	1.6	0.5	1.1	1.6	0.6	1.0
Total	103.5	78.5	25.0	103.5	79.0	24.5

* Water demands for 2009 represent the peak maximum monthly demand recorded by each purveyor for the 5 year period 2004 – 2008. Water demands for 2012 projected based on 0.17% per year increase in population forecast for northern New Castle County by the Delaware Population Consortium.