

STAFF REPORT ADDENDUM

In the matter of
Wanaque Water System

Request for Reevaluation
of the Wanaque Water
System Safe Yield

A draft Staff Report, dated February 11, 2009, was prepared by the Bureau of Water Allocation on the North Jersey District Water Supply Commission (NJDWSC) request to increase the safe yield of the Wanaque Water System to 208 million gallons per day (MGD). The following are the Bureau's responses to the key comments on the draft Staff Report submitted by NJDWSC.

1. NJDWSC Comment: In connection with the renewal of the NJDWSC's Water Allocation Permits, the NJDEP raised the issue of the safe yield of the Wanaque Water System. Prior to the renewal of its permit, the NJDWSC presented the NJDEP with a safe yield study demonstrating the appropriate safe yield for the Wanaque Water System, as opposed to the NJDEP's safe yield determination, which was based solely on the NJDWSC's contractual allocations. The NJDEP raised the issue of safe yield during the permit renewal process and that issue should have been fully and finally dealt with within the context of that permit renewal and before a final permit was issued, not as part of a "Request for Reevaluation of Wanaque Water System Safe Yield," as characterized by the NJDEP now.

Department Response: It is appropriate for Department staff to raise the issue of safe yield when renewing a surface water supply reservoir system's water allocation permits. In New Jersey, for surface water supply reservoir systems who's owners contract to provide water supply, the maximum contractual allocations are generally based on the Department approved safe yield estimate for the system. A review of Department files indicates that the NJDWSC's contractual allocations of 173 million gallons per day (mgd) for the Wanaque Water System appear to be based on a State safe yield estimate of 94 mgd for the NJDWSC Wanaque system at the end of the 1960's drought plus the safe yield estimate of 79 mgd from the August 11, 1975 joint application by the NJDWSC and Hackensack Water Company for what later became the Wanaque South Project. The NJDWSC filed a report with the Department on December 12, 2005 requesting approval of 208 mgd as the Wanaque Water System safe yield. This is a request for reevaluation of the Wanaque Water System safe yield regardless of whether it is considered as a part

of the water allocation permit renewal process or as a separate action. As was discussed at meetings regarding draft permit renewals, the renewals did not require public notice or the opportunity for a public hearing. Consequently the Department did not believe that it was appropriate to allow renewal permit issuance to be delayed by the safe yield reevaluation request, which remained to be reviewed by the Department and, if proposed for approval of a safe yield of other than 173 mgd, would have been subject to public notice and the opportunity for a public hearing.

2. NJDWSC Comment: As has been demonstrated numerous times by the NJDWSC, the drought of record for water supply planning purposes in the State of New Jersey is the drought of 1964-65 and NJDEP is attempting to change the definition of the drought of record by allowing man-made regulations to define a hydrologic event or create "artificial" droughts.

Department Response: The relevant issue is not water supply planning but rather NJDWSC's request for reevaluation of the safe yield of the Wanaque Water System. There is no official "drought of record" or statutory or regulatory definition of "drought of record" for purposes of determining the safe yield of water supply systems, such as the Wanaque Water System, in the State of New Jersey. The Water Supply Allocation Permit Rules at N.J.A.C. 7:19-1.1 et seq. do indicate that "Drought" means a condition of dryness due to lower than normal precipitation, resulting in reduced stream flows, reduced soil moisture and/or a lowering of the potentiometric surface in wells. The comment is interpreted to mean that, based on tables and graphs submitted by NJDWSC as described below, the drought years of 1964-65 should be used as the most severe drought of record and that regulatory restrictions should not be considered to determine the safe yield of the Wanaque Water System, as well as other surface water supply reservoir systems in the State.

It is the Department's position that, within the Wanaque Water System's period of record, the most severe drought of record for the system is the drought that produces the least water supply yield for that system, on a maintainable basis (without interruption on a daily basis), and that this yield is the safe yield of the system. When determined in this way, the most severe drought of record for different surface water supply reservoir systems may occur at different times. Also, future droughts may become the most severe of record for particular surface water supply reservoir systems over time. The reference to the most severe drought of record rather a specific drought in the Water Supply Management Act and the Water Supply Allocation Permit Rules supports this approach. This approach uses applicable regulatory restrictions, as well as limitations of the purveyor's own operating plans, and physical limitations of the particular reservoir system in a consistent way to both determine the most severe drought of record and to estimate safe yield. NJDWSC's Wanaque Reservoir Safe Yield and Two Bridges – Ramapo Diversion Simulation Model (Wanaque Model) is designed to determine the most severe drought of record and estimate safe yield in this way because it evaluates a daily period of record from October 1919 through December 2003 rather than just 1964-1965. As submitted for the current safe yield evaluation, the Wanaque Model initially indicated that the 1960's drought was the most severe drought of record for the Wanaque Water System. NJDWSC was then advised by the Department of modeling issues that resulted in NJDWSC's models indicating that the 1960's drought was not the most severe

drought of record. It was only then that NJDWSC abandoned the approach that the Department is using now. From this perspective, it is NJDWSC that is attempting to change how the most severe drought of record is determined.

In relation to this comment, NJDWSC has submitted a table indicating that United States Geological Survey (USGS) reported total stream flows at Little Falls on the Passaic River, adjusted with actual Passaic Valley Water Commission (PVWC) and NJDWSC diversions, are less in 1964-1965 than in 1998-1999 or 2001-2002. The table also indicates that the portions of the flows during the months of July and August are less in 1964-1965 than in 1998-1999 or 2001-2002. A second table submitted by NJDWSC indicates that the amount of water above the passing flow requirements at the Ramapo and Two Bridges pumping stations during the months of July and August is less in 1964-1965 than in 1998-1999 or 2001-2002. Two graphs submitted by NJDWSC appear to show daily stream flow data related to the second table, except that July and August of 1998 and 1999 are omitted. Diversions at the Ramapo and Two Bridges pumping stations for the Wanaque Water System during the months of July and August are currently prohibited by the applicable water allocation permits. The tables and graphs also lack consideration of many other important factors that are needed to determine the sustainable supplies of the Wanaque Water System during the 3 droughts. *(Note that the terms "sustainable supplies" or "sustainable supply" as used here have a meaning similar to "safe yields" or "safe yield" respectively except that they are based on only a portion of the Wanaque Water System's period of record rather than the entire period of record.)* For example, the flows and quantities of water are not determined for the period of time during each drought that determines the sustainable supply, referred to as the critical drawdown period (critical duration) of the reservoirs. The critical drawdown periods are, in part, determined by the usable storage capacity of the reservoirs. Note that this is a physical limitation and not a regulatory restriction. Also, in NJDWSC's Wanaque Model, more recent increased wastewater flows are added to 1960's drought stream flows but this factor is not included in the tables and graphs. Because of complicating factors such as these, and others, both the most severe drought of record and safe yield of the Wanaque Water System need to be determined using a computer model that simulates the flow of water through the system and its watersheds, and the storage of water in the system's reservoirs during the system's period of record. The model must be capable of determining the drought that produces the least water supply yield for that system on a maintainable basis. The alternate approach now being suggested by NJDWSC would use a drought with a higher sustainable supply, and would result in the estimation of a higher safe yield. NJDWSC's new approach to estimating safe yield is inherently less safe than the Department's. The Department does not believe that NJDWSC's new approach is consistent with the spirit of the Water Supply Management Act (N.J.S.A. 58:1A-1), which defines safe yield as that maintainable yield of water from a surface or ground water source or sources which is available continuously during projected future conditions, including a repetition of the most severe drought of record, without creating undesirable effects, as determined by the Department. The use of the words "most severe" indicate that safe yield should be estimated in a very conservative and safe way.

The statutory definition of safe yield that references the "most severe drought of record" was approved in 1981. By 1984, the New Jersey Institute of Technology was determining the droughts of record and estimating safe yields for the major water

purveyors in the Passaic River basin, including for NJDWSC's Wanaque Water System, using an approach very similar to what the Department is using now.

It is acknowledged that before the early 1980's, data and computational limitations usually made it impractical to analyze entire periods of record when estimating safe yields and analyses frequently focused on one to several recognized severe drought periods. Under such conditions, assumptions were sometimes made that the 1960's drought was the worst of record. In part, this was because State safe yield estimates for New Jersey's six major surface water supply systems at the end of the 1960's drought did identify that drought as the worst of record for those systems overall at that time. However, with modern computers and information systems, the past data and computational limitations can now be overcome and new safe yield estimates can now be based on evaluations of entire periods of record.

3. NJDWSC Comment: "Design Drought" is a term recently created by NJDEP and does not appear in any New Jersey Statutes or the definition of Safe Yield. This term should not appear in our permit or the staff report until the date such term is recognized in New Jersey Statutes or official regulations.

Department Response: The term "Design Drought" has been removed from the final staff report.

4. NJDWSC Comment: While the NJDWSC is not asking that the dissolved oxygen pumping limitation be removed from its permit, as a result of improved Passaic River water quality, the dissolved oxygen permit limitation is no longer a valid restricting factor for Wanaque South Project operations, and there is no longer any rationale for restricting summer pumping because of it. Initiatives taken by NJDEP, such as the TMDL process and related regulations, will result in further improvement of water quality in the Passaic River. Continued restrictions concerning summer pumping, even during times of river flooding when reservoirs are down and the public would benefit from additional water storage opportunities, is untenable.

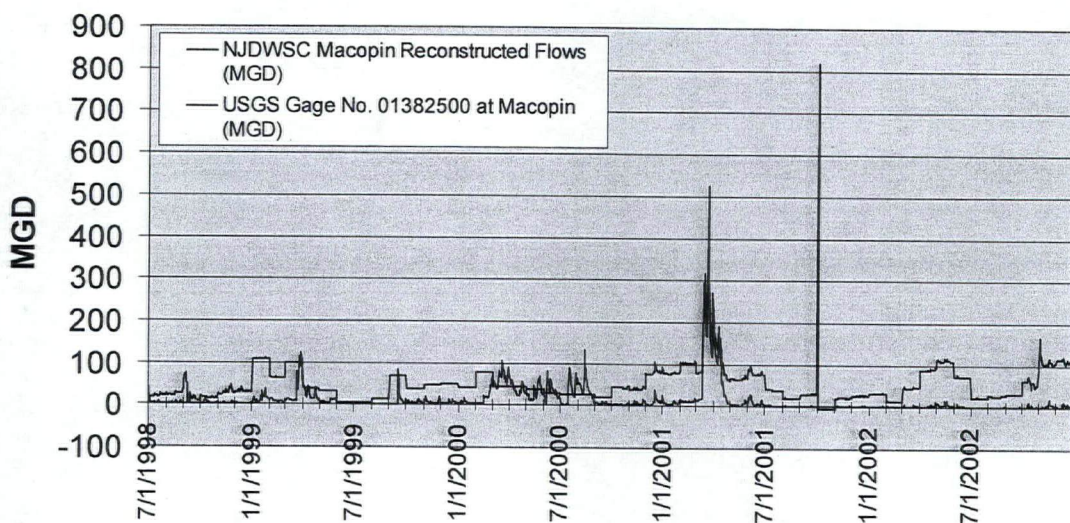
Department Response: As indicated in the draft and final staff reports, the Department has independent access to USGS monitoring data for surface water quality parameters near the NJDWSC diversions from the Passaic, Pompton, and Ramapo rivers and has verified that the dissolved oxygen parameter has improved since 1984. For NJDWSC safe yield modeling purposes (excluding July and August), water quality has improved to the extent that the dissolved oxygen permit limitations do not pose significant diversion restrictions during times when the quantities of stream flow are at levels high enough to pump and still meet passing flow requirements. The diversion restrictions from July 1 through August 31 of each year for NJDWSC and United Water New Jersey (UWNJ) at the Ramapo River and Two Bridges pumping stations remain in effect. The Passaic TMDL is based on these restrictions being in effect. Removing these restrictions would alter the TMDL outcome. If the NJDWSC would like the Department to consider removal of the pumping restrictions during July and August, the NJDWSC and UWNJ should submit appropriate applications for major modifications of the applicable water allocation permits and provide detailed justification, including consideration of water quality impacts related to nutrients.

5. NJDWSC Comment: The stream flow data posted on the USGS website was used to develop the Passaic River Basin reconstructed flow including 2001-2003. Years after the flow reconstruction task was completed, the USGS realized some of the flow data posted on its website covering late 2001 and early 2002 was incorrect and altered that data significantly. The problem within the reconstructed flow data is limited to that period from late 2001 to early 2002 and was the result of the USGS altering their website posted flow data. Due to this data error, the NJDWSC provided the NJDEP with a corrected Excel spreadsheet as a means of addressing the period in question, the drought of 2001-02.

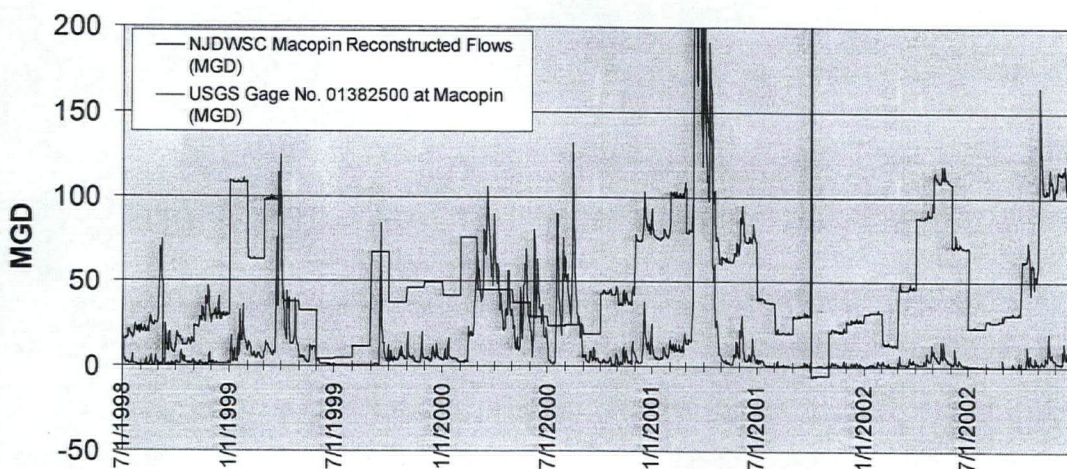
Department Response: A representative of USGS has advised the Department that there have been no alterations to final approved published data for daily surface water flows at the USGS gages on the Passaic River at Little Falls (No. 01389500), the Pompton River at Pompton Plains (No. 01388500), and the Passaic River at Pine Brook (No. 01381900) for the period from late 2001 through early 2002. However, there were significant differences between provisional real-time data and final approved data and this is probably what the NJDWSC is referring to. As a part of USGS's normal procedures, field measurements of surface water flows are made at the gages throughout the year and then the gage's stage-discharge relationships and flow records are adjusted on a yearly basis.

The issues with the NJDWSC daily reconstructed surface water flow data for the Wanaque Model are not limited to the period from late 2001 to early 2002. This can be seen in some of the graphs in the analysis attached to the Department's July 1, 2008 letter to the NJDWSC. Two additional graphs comparing the NJDWSC's daily reconstructed surface water flow data for the Pequannock River at the Macopin Intake Dam with daily flows observed at the USGS gage No. 01382500 at that location from July 1, 1998 to December 31, 2002 are provided below. It can be seen that the NJDWSC reconstructed flows are significantly higher than USGS gage flows for much of the time, not just the period from late 2001 to early 2002. For example, during August 1998 through January 1999, in the midst of the 1998-1999 drought, the total reconstructed flow is approximately 6.38 Billion Gallons (34.7 mgd) higher on average than the total USGS gage flow. This is during a time period when, based on USGS data, average demand on the City of Newark Pequannock River Reservoir System was about 47.6 mgd, which is less than the approved safe yield of the system, and the system's downstream reservoir was not spilling. The total reconstructed flow should be based on diverting the approved safe yield of the Pequannock River Reservoir System and should not be greater than the total USGS gage flow during this time period.

Pequannock River at Macopin



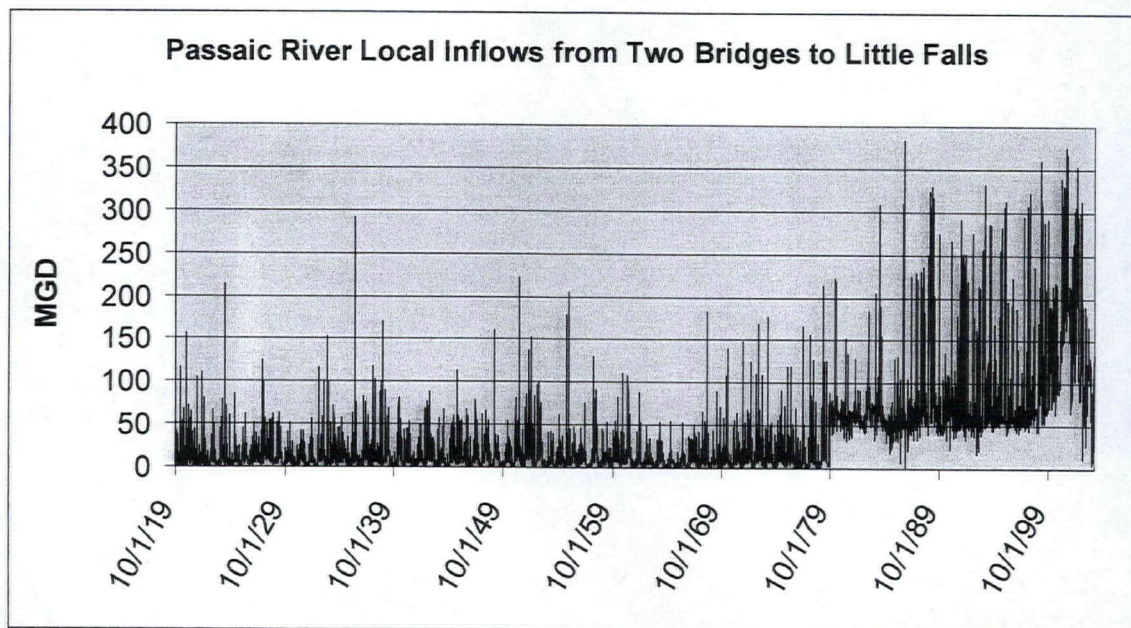
Pequannock River at Macopin



NJDWSC's daily reconstructed surface water flows for the Ramapo River at Pompton Lake are equal to the daily flows observed at the USGS Gage No. 01388000 at that location for every day during calendar year 2000. There were no actual diversions reported at the Ramapo River Pumping Station at that location during calendar year 2000. Treated wastewater discharge flows should be subtracted from the USGS gage flows in order to calculate reconstructed flows because the NJDWSC Wanaque Model adds 6.33 mgd of treated wastewater flow back to the reconstructed flows. This wastewater discharge quantity is from a 2001 USGS report and is based on 1993 through 1996 data, so calendar year 2000 USGS gage flows should include at least this amount of wastewater flow. The fact that treated wastewater discharge flows are not subtracted indicates that wastewater flows are being double-counted in the NJDWSC Wanaque

Model during calendar year 2000. This issue can not be explained by alteration of stream flow data posted on the USGS website.

One of the issues with the NJDWSC daily reconstructed surface water flow data for the Wanaque Model is with local inflows to the Passaic River between Two Bridges and Little Falls. These local inflows were calculated on a daily basis by subtracting the sum of daily reconstructed surface water flows at Two Bridges (Wanaque Model Control Points 50 and 60) from the daily reconstructed surface water flows at Little Falls (Wanaque Model Control Point 29). As shown in the analysis attached to the Department's July 1, 2008 letter to the NJDWSC, these local inflows were significantly overestimated during the time period April 1, 2001 through March 31, 2002. Below is a graph of the calculated local inflows into the Passaic River between two Bridges and Little Falls from October 1, 1919 through December 31, 2003.



It can be seen that there is a significant increase in calculated local inflows beginning on October 1, 1979 and extending through the 2001-2002 drought. This is an indication that the issues with the NJDWSC daily reconstructed surface water flow data may extend from the 2001-2002 drought back to October 1, 1979. The reason for the increase in calculated local inflows has not been explained.

6. NJDWSC Comment: The NJDEP has studied at great length and accepted the Wanaque Model and its reconstructed stream flow data from 1919 through 1979 (including the 1964-65 drought of record). In the December 2008 Draft New Jersey Water Supply Master Plan, NJDEP states it initiated a contract with USGS to identify control points and determine methodology to reconstruct stream flows within the Passaic and Hackensack River Basins. It also states that upon completion of that first phase (control point identification and methodology) expected in 2009, a second phase would consist of the development of the naturalized flow data within the Passaic and Hackensack River

Basins for the period from 1922 through 2007. If USGS is currently under contract to produce this dataset, why is NJDEP asking NJDWSC to do the same?

Department Response: The Department requested the subject data from NJDWSC as a part of its review of the NJDWSC's request for approval of an increased safe yield for the Wanaque Water System. This data must already exist or have existed because the NJDWSC and/or its consultants used this data to create the reconstructed flow record and time series inputs for all of the control points in NJDWSC's Wanaque Model. Therefore, the Department did not request NJDWSC to produce new data, but rather to submit its existing data. The Department made this request to provide NJDWSC with an opportunity to submit its data and possibly obtain approval of an increased safe yield for the Wanaque Water System without having to wait for the Department and USGS to produce new data and complete a new modeling effort.

With regard to NJDWSC's daily reconstructed surface water flow data from 1919 through 1979, the Department has a report entitled "DOCUMENTATION OF PASSAIC RIVER BASIN DAILY NATURAL FLOW DATA DEVELOPMENT", prepared by Clinton Bogart Associates and dated May, 1982. This report contains partial documentation of the methodologies for the natural flows used to create the reconstructed flow record and time series inputs for the Wanaque model, through September 30, 1979, but does not contain the associated raw data, daily calculations or the actual natural flow data. The Department does not have these raw data, daily calculations and natural flow data and wants to review the same before fully accepting the reconstructed surface water flow data for the time period from October 1, 1919 through September 30, 1979. This also applies to the reconstructed surface water flow data from October 1, 1979 through December 31, 2003. The Department also wants NJDWSC's explanation and justification for the methodologies used to create the natural and reconstructed stream flow data for the time period from October 1, 1979 through December 31, 2003.

7. NJDWSC Comment: On April 14, 2009, a meeting was held at NJDEP's main office, 401 East State Street, in Trenton, New Jersey for the purpose of reviewing NJDWSC's Microsoft Excel spreadsheet model which confirmed a sustainable supply of 191 to 196 mgd for the Wanaque Water System during the period of 2001-02, while meeting all NJDEP imposed water quantity and quality permit limitations. As verified in that meeting, a water allocation in the 191 to 196 mgd range at the present time would enable the NJDWSC to meet its current contractual obligations and increased public drinking water demand for the 20 year life of the permit. Importantly, such an allocation would enable the Commission to support the State of New Jersey Smart Growth and State Development and Redevelopment Master Plan Goals, as well as meeting its contractual obligations. A formal safe yield determination, which the Commission believes is significantly greater than this number, could be worked out at a later date.

Department Response: The Department recognizes and is concerned about the need for additional water supplies to serve increased public water demand in the future. This is why the Department is reviewing NJDWSC's request for reevaluation of the Wanaque Water System's safe yield and has requested the basis of the daily reconstructed surface water flow data for the NJDWSC Wanaque Model. Department records of approved contractual obligations for the NJDWSC indicate that they are equal to the previously

approved safe yield of 173 mgd for the Wanaque Water System. The current demand on the Wanaque Water System is about 130 mgd. It might be possible for the NJDWSC to identify its customers that are not using their full contracted amounts and to renegotiate these approved contractual obligations to provide additional water for actual use. Beyond this, the Department can only approve a safe yield and associated contractual obligations for the Wanaque Water System if they will provide a sufficiently reliable water supply that will protect the health, safety and welfare of the users of that safe yield under severe drought conditions. A major requirement to establish sufficient reliability is that the safe yield must be based on conditions analogous to a repeat of the most severe drought of record in accordance with the definition of safe yield in the Water Supply Management Act, P.L. 1981, C. 262 (N.J.S.A. 58:1A). As previously explained, the Department believes that, within the Wanaque Water System's period of record, the most severe drought of record for the system is the drought that produces the least water supply yield for that system, on a maintainable basis. The Wanaque Water System's period of record, based on the NJDWSC Wanaque Model and daily reconstructed surface water flow record is from October 1, 1919 through December 31, 2003. Examination of the NJDWSC reconstructed flow data indicates that the issues with the data during the 2001-2002 drought are not limited to that time period and may extend back to October 1, 1979. As a result, the Department has reason to believe that the NJDWSC Wanaque Model may significantly overestimate the sustainable supply of the Wanaque Water System during the period from October 1, 1979 through December 31, 2003. Also, because the NJDWSC has not provided the complete basis of the reconstructed flow data, the Department is not able to confirm their validity for the time period October 1, 1919 through September 30, 1979. Because of the issues with the basis of the reconstructed flow data for the NJDWSC Wanaque Model, it can not be demonstrated that any associated safe yield estimate meets the requirement that it be based on conditions analogous to a repeat of the most severe drought of record.

The NJDWSC Excel spreadsheet model only helped to reduce uncertainty for the drought years 2001 and 2002 and still has a possibly significant uncertainty that has not been addressed. The NJDWSC Excel spreadsheet model does not address the issues with the basis of the reconstructed flow data for the NJDWSC Wanaque Model prior to year 2001 and does not demonstrate that any associated sustainable supply during years 2001 and 2002 is a safe yield based on conditions analogous to a repeat of the most severe drought of record.

On April 14, 2009 a meeting was held between representatives of the Bureau of Water Allocation, North Jersey District Water Supply Commission and United Water New Jersey to discuss the Wanaque Water system safe yield reevaluation. A summary of the meeting was submitted by letter dated April 28, 2009, from DeCotiis, Fitzpatrick, Cole & Wisler, LLP. The Bureau's comments on the meeting summary are detailed below.

1. On the first page of the meeting summary, it is indicated that the Department's Safe Yield Draft Staff Report regarding the Wanaque Water System was dated February 13, 2009. The referenced draft staff report was actually dated February 11, 2009 and was sent to the North Jersey District Water Supply Commission (NJDWSC) with a letter dated February 13, 2009.

2. On page No. 2 of the meeting summary, it is indicated that Mr. Dag Madara of the NJDWSC explained that the lowest intake of the Wanaque Reservoir is at elevation 216 feet and that the dead storage of the Wanaque Water System is estimated to be 0.22 billion gallons. This accurately represents the discussion at the meeting. However, it should be noted that later submissions by the NJDWSC estimated that total dead storage in the Wanaque Water System is 0.282 billion gallons and includes 0.142 billion gallons of dead storage in the Wanaque Reservoir, based on a lowest intake elevation of 222 feet above sea level (ASL), and 0.140 billion gallons of dead storage in Monksville Reservoir, based on a lowest intake elevation of 314.5 feet ASL.

3. On page No. 4 of the meeting summary, it is indicated that: the NJDWSC demonstrated that the drought of record is the 1964-65 drought and that man-made restrictions to diversions do not constitute a "drought of record" especially when NJDEP modified those restrictions during the drought of 2001-02 to allow NJDWSC to gain beneficial use of available water; and that it is a scientific fact that the drought of 1964-65 is the drought of record. The Department does not agree that the NJDWSC has demonstrated which drought is the most severe drought of record for purposes of estimating the safe yield of the Wanaque Water System. Because the most severe drought of record for this purpose has not been determined, it is not a scientific fact. This is further explained in the Department's responses to the NJDWSC's key comments on the Department's February 11, 2009 draft staff report regarding the Wanaque Water System safe yield. The Department believes that, for the purpose of estimating the safe yield of surface water supply reservoir systems, the most severe drought of record for a particular system is the drought, within the system's period of record, that produces the least water supply yield for that system on a maintainable basis (without interruption on a daily basis). Although a drought is a hydrologic event, for this purpose the most severe drought of record is based on the period of record of the particular surface water supply reservoir system and is determined using applicable regulatory restrictions as well as limitations of the purveyors own operating plans and physical limitations of the system. When determined in this way, the most severe droughts of record for different surface water supply reservoir systems may occur at different times. The Department believes that this is why the Water Supply Management Act and the Water Supply Allocation Permit Rules refer to the most severe drought of record rather than referring to a specific drought. The relaxation of regulatory restrictions, including passing flow requirements, as well as demand reductions during drought are reserved to provide a margin of safety and compensate for uncertainties in the safe yield estimate, including the possibility that a drought more severe than the most severe drought of record may occur. The Department believes that this is in accordance with the definition of safe yield in the Water Supply Management Act.

4. On page No. 4 of the meeting summary, the following is stated:

"Both Mr. Grabowski and Mr. Hudgins believed that 17.6 mgd is the required passing flow at Two Bridges in addition to PVWC's draw either at Two Bridges, Little Falls, or a combination of both. Messrs. Grabowski and Hudgins didn't think there was a 17.6 mgd passing flow requirement at Little Falls, and therefore

PVWC could divert as much as they need up to their permitted 75 mgd without concern as to the downstream flow."

This is not precisely what Messrs. Grabowski and Hudgins believe. In order to help clarify this issue, applicable wording from the September 6, 2006 staff report for renewal of the Passaic Valley Water Commission's (PVWC's) Water Allocation Permit No. 040001 (program interest ID 5099X) is provided below.

No diversion should occur from the Two Bridges pump station when the stream flow at the confluence of the Pompton and Passaic Rivers falls below 27.2 cfs (17.6 mgd).

There is no flow gage located at the Two Bridges pumping station. The passing flow is calculated from the USGS flow gage located below PVWC's Little Falls intake. The passing flow is calculated at Two Bridges by adding the actual flow measured by the gage to the diversion amount by PVWC at Little Falls.

If the flow at Two Bridges falls below 143.3 cfs, and PVWC is not diverting their entire 75 mgd allocation from Two Bridges and Little Falls, then NJDWSC would be allowed to divert the difference of flows between the actual diversion by PVWC and their allocation of 75 mgd after passing 27.2 cfs at Little Falls. NJDWSC and/or UWNJ should notify PVWC of their intent to divert any of PVWC's unused allocation below the Two Bridges passing flow of 143.3 cfs.

PVWC has had no passing flow requirements set within their allocation permit at the Little Falls diversion location. Pursuant to N.J.S.A. 58:2-1 et seq. and N.J.A.C. 7:19-4.6(e) PVWC has an established minimum passing flow of 89 cfs for excess diversion purposes.

A conditional Water Quality Certification was issued to PVWC on August 8, 1988. The certification requires PVWC to maintain a minimum passing flow of 85 cfs through Beatties Dam (Little Falls) for the operation of the hydroelectric plant.

5. On page No. 5 of the meeting summary, it is indicated that Department staff reiterated a few issues discussed during this meeting, including the following:
 - It is man-made regulations that would essentially make 2001-02 the worst drought to the Wanaque Reservoir System; and
 - Hydrologically speaking the drought of record remains at 1964-65.

The Department's representatives at the meeting do not recall saying these things as they are stated in the meeting summary. The Department does believe that, for the purpose of estimating the safe yield of the Wanaque Water System, the most severe drought of record for the system is the drought within the system's period of record for which the system produces the least water supply yield on a maintainable basis and that that this drought should be determined using applicable regulatory restrictions as well as

limitations of the purveyors own operating plans and physical limitations of the Wanaque Water System. The Department acknowledges that attachment B to the meeting summary indicates that the USGS reported Passaic River runoff at Little Falls, adjusted with actual PVWC and NJDWSC diversions shows that there was less total runoff during 1964 and 1965, than in 1998 and 1999, or in 2001 and 2002. However, the Department does not believe that this information alone can be used to determine the most severe drought of record for purposes of estimating the safe yield of the Wanaque Water System.

6. On page No. 5 of the meeting summary, Dr. Najarian recommends that the Department should not consider short periods of drought such as 2001-02 when determining the drought of record. The Department believes that the safe yield of the Wanaque Water System must be based on data from the system's period of record and must be demonstrated to be available continuously (again, without interruption on a daily basis) during projected conditions over that period of record, including a repetition of the most severe drought of record. The Department believes that, for the purpose of estimating the safe yield of the Wanaque Water System, the most severe drought of record for the system is the drought within the system's period of record for which the system produces the least water supply yield on a maintainable basis and that that this drought should be determined using applicable regulatory restrictions as well as limitations of the purveyors own operating plans and physical limitations of the Wanaque Water System. In order to insure that the safe yield is available continuously during projected conditions over the system's period of record, periods of drought such as 2001-2002 must be considered when determining the most severe drought of record for the Wanaque Water System.
7. On page No. 6 of the meeting summary, it is indicated that Dr. Tao made the point that in 2001-2002, the safe yield of NJDWSC would be approximately 230 mgd if there were no summer pumping restrictions. When the Department modified NJDWSC's updated Microsoft Excel spreadsheet model to allow diversions at the Ramapo River and Two Bridges pumping stations during the months of July and August, and used a permitted passing flow of 0 mgd (in effect at the time of the April 14, 2009 meeting) for the Pequannock River Reservoir System and a total dead storage of 0.282 billion gallons, the sustainable supply of the Wanaque Water System during the 2001-2002 drought was estimated to be about 216 mgd. The term "sustainable supply" as used here has a meaning similar to safe yield except that it is based on only a portion of the Wanaque Water System's period of record rather than the entire period of record. Because a sustainable supply is based on only a portion of the system's period of record, it is not necessarily the safe yield of the system.
8. On page No. 6 of the meeting summary, it is indicated that Mr. Grabowski advised that the reported reservoir water elevation data could be used to calculate the natural runoff into Greenwood Lake and that Mr. Grabowski stated that he never used reservoir volume to calculate natural inflow. Mr. Grabowski would like to clarify that he was saying that reported Greenwood Lake water surface elevation data could be used to determine that the lake level was at or below the spillway crest during the entire critical drawdown period indicated in the original version of the NJDWSC Excel spreadsheet model that was submitted to the Department. As a result, the model could be simplified by assuming

that the only outflow from Greenwood Lake during the critical drawdown period was the passing flow requirement of 3 mgd.

9. Mr. Grabowski indicated at the meeting that he would like to have the basis of the reconstructed stream flow data for the NJDWSC Wanaque Model.
10. From the Department's perspective, the purpose of the meeting was to listen to NJDWSC's presentation regarding their updated Microsoft Excel spreadsheet model which estimates the sustainable supply of the Wanaque Water System during the drought of 2001-2002. The Department's representatives had not reviewed the updated spreadsheet model at the time of the meeting and were not prepared to reach any conclusions regarding the updated model or the safe yield of the Wanaque Water System at the meeting. Any lack of statements by the Department's representatives regarding statements made by or information presented by representatives of NJDWSC or United Water New Jersey at the meeting should not be interpreted as agreement with or approval of any of the statements or information.