BETHPAGE WATER DISTRICT

PLANT NO. 4 STRATEGIC PLAN

OU-3 ALTERNATIVE

UPDATED SEPTEMBER 15, 2011

Recent Background:

In April 2008, Arcadis on behalf of Northrop Grumman Corp. (NGC) provided the District with results from vertical profile boring (VPB) 116 which revealed approximately 1,900 ppb TCE at the same depth as the two supply wells at Plant 4. As this location was directly upgradient of the public supply wells and is of significant threat, NGC felt compelled to provide the data to the District prior to the completion of the OU-3 remedial investigation. The District increased monitoring frequency and limited the site to one well in operation to the extent practical.

In early 2009, the District proceeded with the engineering study and design for VOC treatment upgrade based on the VPB 116 data results. A second air stripping facility was planned such that one tower treated one well. The preliminary capital cost of the project was estimated at $3.7 million. The District did not have the funds available, so this project was included in the 2009 capital improvement plan which obtained municipal bonding.

At a meeting dated November 16, 2009, H2M and the District met with Arcadis and NGC. The purpose of the meeting was for NGC to present the comprehensive data that was included in the October 22, 2009 OU-3 remedial investigation report. Previously, the District had only seen data from VPB 116 in April 2008 and VPB 104 in June 2007. The data revealed that a significant contamination plume, with TVOC concentrations in groundwater at approximately 10,000 ppb, was directly upgradient of the supply wells and had a path

towards the wells. NGC and Arcadis indicated that immediate action was necessary and upgrades had to be in place to address the threat and minimize the risk of losing the facility to contamination.

Action Items

The previous engineering study approved by the NCDH was no longer valid, as the design influent was woefully inadequate. H2M revised the engineering study and obtained new NCDH approval. Preliminary data showed that a GAC polishing system was required in addition to the second air stripping system.

In the interest of expediting the air stripping project, H2M met with industry contractors on November 23, 2009 to review the current design documents and seek pricing to perform demolition, excavation and concrete work immediately in an attempt to complete the clearwell and foundation work prior to the winter weather and limitation of proceeding with this type of work. With this effort, having the treatment system operational by the summer 2010 pumping season was very unlikely.

With the long term requirement for GAC polishing, the District proceeded with the polishing system immediately to provide adequate wellhead protection in the short term.

The second air stripping facility is currently completing construction and will be placed on line October 2011.

The level of threat by this excessive contamination will likely result in the long term loss of this facility as a public drinking water facility. The replacement of lost capacity will be necessary. The District has undertaken a preliminary study for the replacement of Plant 4. Preliminarily, the replacement of lost capacity could be achieved through a well at South Park Drive, of which the District has obtained legal access from NYS Parks (we are waiting for the NYSDEC to approve the well permit application – which has been in for 3 months), a second well at BGD, a ground storage tank and booster pumping facility at BGD, and

transmission improvements to facilitate the required distribution capacity of the system. The replacement of the lost capacity from Plant 4 can be completed in about 3 years.

Once replacement capacity is achieved, the District would have a treatment system in place at Plant 4 that would serve a great purpose for remediating the groundwater contamination plume at the leading edge. The District could reach agreement with NGC to lease the site for the period necessary to completely remediate the plume, with the site then being returned to the District. This would save NGC $10+ million in not having to construct its own pump and treat groundwater remediation systems, which it otherwise will have to do to restore the aquifer.

Additional Work Required to Convert Plant 4 from Potable to Remedial

Plant 4 has full and complete facilities already in place for groundwater remediation. We envision the following work being required to complete the facility in providing hydraulic control and remediation of the OU-3 plume:

- Modify existing pumping rates – the current pumping rates of 2 pumps at 2.0 MGD each may be more than is required for hydraulic containment of the deep portion of the plume.

- Drill new shallower extraction well – there is a shallower component to the plume that must be captured. A shallower extraction well can be drilled on the Plant 4 property and the withdrawal treated through the existing treatment system.

- Provide air discharge treatment – the existing system does not currently include vapor phase treatment. The air discharges of the existing towers would have to be modified so that the exhaust could be ducted to vapor phase treatment. Space is available for the addition of vapor phase treatment.

- Site piping modifications – the existing on-site piping includes a 16" transmission main that must be kept in service. The treatment system discharge would be disconnected from the 16" main for diversion of the treated water to recharge.

- Recharge of treated water – the biggest challenge with a treatment system of this capacity. However, there is a fantastic opportunity to include a "green" initiative to the project. A water reclamation approach can be used in cooperation between two NYS agencies. The Bethpage State Park is home to five golf courses which use groundwater for irrigation through pumping wells. The Park is only about 2,400 feet from Plant 4. A great potential exists to impound the system discharge water at the Park and use the water for irrigation. This would save a significant amount of energy use annually, and would show the state as a leader by example in sustainability.

Preliminary Capital Cost Opinions

Although a more detailed analysis must be performed to determine the detailed cost of implementing this strategy, we have conducted a preliminary review of the work done by the District to date, the action items the District will be undertaking to replace Plant 4 capacity, and the facility additions necessary to convert the plant from a potable plant to a remediation plant. In addition, the District has also spent and will continue to spend public funds for treatment at Plant 6, which would need to be included in the overall cost of the program.

Bethpage Water District Cost Recovery – Plants 4 and 6	
Plant 4 treatment facility for potable use	$7,000,000
Plant 6 treatment facility for potable use	$3,000,000
Costs for Replacement Capacity of Plant 4	
NYS Parks charge for South Park Drive well property	$ 600,000
New well at South Park Drive	$3,000,000
Second well at BGD	$2,500,000
Water storage tank and booster station at BGD	$4,000,000
Transmission improvements	$2,500,000
Costs for Conversion of Plant 4 from Potable to Remedial	
Construction shallow extraction well and systems	$ 700,000
Vapor phase treatment	$1,500,000
Discharge piping to Park	$1,000,000
Impoundment and pumping station at Park	$3,000,000
TOTAL	$28,500,000

The costs for Plants 4 and 6 of $10,000,000 are the responsibility of NGC as the result of the groundwater contamination anyway to maintain the Water District facilities as potable drinking water facilities, leaving $18,500,000. The replacement capacity of Plant 4 is a likely future cost to NGC should the future hold that the plant cannot continue to operate as a drinking water facility, so the cost of $12,600,000 could be a NGC cost anyway. The remaining $6,200,000 can then be viewed as the remediation system capital cost for the OU-3 remedy.

Clear Advantages of This Alternative to All Other OU-3 FS Alternatives

Most Protective of Public Health – New drinking water supply would be developed in more pristine areas outside of the impact of the OU-2/OU-3 plumes. No risk of a treatment system failure at Plant 4 to directly affect public health by an MCL violation of the NYS Sanitary Code.

Most Protective of the Environment – The facility is located at the leading edge of the OU-3 plume, with existing wells screened in the path of the majority of the plume. With the addition of the shallower on site well, hydraulic containment and remediation of the plume will be optimized.

Most Time Effective – Using GM-38 as the example, it will take about 10 years to implement another meaningful alternative (not Alternative 3). Plant 4 is achieving the bulk of the remediation effort now, and in about 3 years time, can be shifted to a full remediation facility.

Most Cost Effective – Given the requirement for NGC to pay for treatment facility improvements anyway, the real cost of this alternative is significantly less than any other meaningful alternative.

Sustainability Leadership – The potential water reclamation and "green" aspect of this alternative will be an enormous energy saver. NYS will demonstrate leadership in its awareness and actions in both water and energy efficiency.

Governmental Cooperation – NYSDEC, NYS Parks and Water Districts cooperate to achieve the most effective solution in the interests of protecting public health and the environment.