



**MWRA ADVISORY BOARD MEETING  
JANUARY 17, 2013  
SAMUEL HADLEY PUBLIC SERVICES BUILDING  
201 BEDFORD STREET, LEXINGTON, MA 02420**

**MINUTES APPROVED AT THE MARCH 21, 2013 MEETING.**

Forty-two people were in attendance, including twenty-four voting members: Michael Rademacher, ARLINGTON; Richard Warrington, BEDFORD; Peter Castanino, BELMONT; Charlie Jewell, BOSTON; Jay Hersey, BROOKLINE; Timothy MacDonald, CAMBRIDGE; Andrew DeSantis, CHELSEA; J.R. Greene and Andy Fisk, GUBERNATORIAL APPOINTEES; Edmund Demko, HINGHAM; Bill Hadley, LEXINGTON; Dan O'Neill, LYNN; Amy McHugh, MARBLEHEAD; Katherine Haynes Dunphy, MILTON; Lou Taverna, NEWTON; Bernie Cooper, NORWOOD; Michael Coffey, QUINCY; Jeff Zager, READING; John DeAmicis, STONEHAM; Carol Antonelli, WAKEFIELD; Patrick Fasanella, WALPOLE; Walter Woods, WELLESLEY; Jeff Bina, WEYMOUTH; Joe Lobeo, WILMINGTON.

Also present: George Burnell and Joe Pato, LEXINGTON; Chuck McCollum, MARBLEHEAD; Joe Welch, NORWOOD; Andreae Downs, WAC; Lexi Dewey, WSCAC; Michael Hornbrook, John Vetere, Dan O'Brien, David Duest, Carl Pawlowski, Kathy Soni and Kevin McCluskey, MWRA STAFF; Joe Favaloro, Matthew Romero, Maggie Kenneally, Cornelia Potter and Mary Ann McClellan, MWRA ADVISORY BOARD STAFF.

**A. APPROVAL OF THE NOVEMBER 15, 2012 MINUTES OF THE ADVISORY BOARD**

Chairman Katherine Haynes Dunphy called the Advisory Board meeting to order at 11:36 a.m. and introduced Lexington Public Works Director Bill Hadley who welcomed everyone to Lexington. A motion was made **TO APPROVE THE NOVEMBER 15, 2012 MINUTES OF THE ADVISORY BOARD**. It was seconded and passed by unanimous vote.

**B. REPORT OF THE EXECUTIVE DIRECTOR**

MWRA Advisory Board Executive Director Joseph Favaloro thanked Bill Hadley and the Town of Lexington for their hospitality in hosting the Advisory Board meeting.

Mr. Favaloro noted the retirement of MWRA Board of Directors member Vincent Mannering, the Executive Director of the Boston Water and Sewer Commission (BWSC). BWSC Chief Financial Officer Henry Vitale will now serve as the Interim Executive Director of BWSC and will serve on the Board as well.

The Environmental Protection Agency has determined that it is not necessary to mail the annual Consumer Confidence Report (CCR) to every household; however, a postcard must be mailed to each household to inform consumers that a hard copy is available and that the information will also be posted online. The consensus of the Executive Committee was that since the overall cost of printing and mailing the CCR was in the \$200,000 range and the postcard printing and mailing was in the \$125,000 range, it is best to just continue with the mailing of the CCR. With the postcard,

additional staff time would be spent in reviewing which consumers would like to receive the CCR by mail, printing up a hard copy and then mailing it at a higher rate of postage, since a smaller mailing would not qualify for the bulk mail rate. When all is said and done, the costs would be the same. Additionally, the Executive Committee felt that this is a good piece to mail to the consumers because it talks about the water quality and allows communities to include a mailing as well.

Mr. Favaloro noted that he would like to have a “Mayor/Manager Corner” for future Advisory Board meetings to help strengthen the ties between the MWRA, Advisory Board and the communities.

**C. PRESENTATION: RESIDUALS – THE NEXT GENERATION OF RESIDUALS MANAGEMENT** – Michael Hornbrook, Chief Operating Officer; John Vetere, Deputy Chief Operating Officer; Dan O’Brien, Director of the Deer Island Treatment Plant; Carl Pawlowski, Manager, Residuals Operations; and Dave Duest, Manager of Process Control

Deer Island Treatment Plant (DITP) Director Dan O’Brien stated that there are close to 17,000 wastewater treatment plants in the United States; only 41 of those plants process more than 100 million gallons per day (MGD). The Deer Island Treatment Plant processes 360 MGD. Staff mentions this because it will be an important factor in the selection of the technology for the next generation of residuals management. There are a number of technologies out there but many of them have not been tested on this large a scale. The program in place now has been reliable; a fundamental goal is to keep it reliable and cost-efficient. Staff wants to ensure that the technologies have been demonstrated, at least on a reasonable scale.

Mr. O’Brien said the DITP’s average flow is 365 MGD and can peak at 1.3 billion gallons per day. Nation-wide, that puts the DITP second behind Detroit for a maximum day and fourth place behind Chicago for an average day. In terms of scale of programs, the DITP is in the top tier.

Within all of these plants, very few have centralized sludge treatment (only 2,000), as the DITP does. Many of these plants produce their sludge on site and have it hauled away and someone else takes care of it. Only 500 plants use anaerobic digestion, which is key to the DITP’s overall program in terms of getting some benefit from the gas from the digestion and also reducing the sludge volumes. Of the 500 plants that have anaerobic digestion, only 100 of them actually make use of the gas, which is a valuable commodity.

Nearly half of the sludge in this country goes to land applications. It gets partially treated and is just spread on the ground. That is not really an option here in the northeast where land is so tight but it is still a popular option in the mid-west; 30% still goes to landfill, almost 20% is incinerated and just about 10% is put to beneficial use, as the MWRA does (fertilizer).

An overview of the plant is a 200-acre site at Deer Island, of which 60 acres has been developed for public access. The remaining 140 acres consists of the plant. There is very little open space on the site, which is another challenge for long range planning.

As the flow comes into the plant from the sewer system, it goes through a physical process called primary treatment where it produces one side stream of sludge called primary (a heavier organic sludge) and then it goes into a biological and physical process, secondary, where it produces another side-stream of sludge, which is more biological in nature and is a bit tougher to deal with. These combined sludges go into the residuals facility.

Every day the plant produces nearly 250 tons of sludge. As it goes through the digestion process, it is reduced to about 100 tons per day. The 100 tons is then sent to the New England Fertilizer Company (NEFCo). A byproduct of the digestion process is methane, which is very similar to natural gas so it has high fuel content. Of the gas that is produced, 97% of it is used on site; that gas meets Deer Island's total heating needs on 76% of the days all year. For total demand, 98% of the heating needs are met so even on those days when the full heating needs are not met, it is only one to two hours that must be supplemented with oil. Overall, the value, from a heating standpoint, is \$15 to \$20 million per year (FY12 value). Following the heating of the boilers, called the heat loop, the gas is also sent through a steam turbine and generates almost \$2 million worth of power from the steam generation.

The primary sludge constitutes about 70% of the quantity and the secondary sludge about 30%. These splits are important because the primary sludge has much more BTU value as an organic product. The sludge goes to digestion for a 15 to 20-day cycle where 60% of the solids are destroyed; it is then pumped through the inter-island tunnel in the reverse direction to the NEFCo plant in Quincy, which is about five miles from Deer Island. NEFCo further processes the sludge by dewatering it, drying it and creating pellets. The pellets are shipped throughout the northeast and east coast for turf farms, golf courses, fertilizer use and cement kilns, where the pellets are used to displace the use of coal as a fuel.

The MWRA is nearing the end of a long-term contract with NEFCo, which expires in December 2015. NEFCo is responsible for all operations and maintenance of the facility in Quincy; however, MWRA owns the facility. Once the sludge reaches the facility, NEFCo assumes responsibility for it. MWRA pays NEFCo a fixed price per ton, up to 90 tons per day. A variable price is paid for amounts over 90 tons per day. It averages out to about \$380 per ton per day, so MWRA is paying NEFCo about \$40,000 per day.

Carl Pawlowski, Manager of Residuals Operations, stated that the MWRA hired a consulting firm to do an assessment of the NEFCo facility looking at critical and non-critical items. The MWRA had identified 700 items on the "critical" list, which were all reviewed; about 10% of the 1,600 non-critical items were reviewed. The consultant also reviewed some of the facility support systems, including the actual architecture, the foundation, water, sewer and electrical service. The condition assessment was completed in 2009. The language in the NEFCo contract states that it must turn the facility over to the MWRA in a condition that is capable of meeting the performance standard. The facility needs to be capable of running 24 hours per day, seven days per week. The results of the condition assessment were very good. The study said the facility was in excellent condition.

The consultant identified three core systems: 1) the dewatering system, which is the centrifuges that mechanically dewater the liquid sludge; 2) dryer trains, which dry the sludge; and 3) the regenerative thermal oxidizers. The condition assessment states that the facility is capable of running an additional 10 to 20 years, as long as the preventive and protective maintenance is maintained.

The consultant recommended that redundancies should be increased to allow continuous operation if something went wrong. Essentially the recommendations were to continue with the aggressive preventive maintenance program. Mr. Pawlowski said NEFCo's maintenance team is aggressive and does an excellent job. The consultant commented that they had never seen a privatized operation where the folks took that much pride. About 80% of NEFCo's staff has been there from the beginning and there is a lot of "ownership" of equipment so they do a good job in maintaining it.

Another recommendation was to continue with the monitoring program. NEFCo has consultants come in to monitor the more vital pieces of equipment. Areas where the consultants found some fault were that some of the control systems and electronics were out of date and they recommended modernizing and replacing the centrifuge and RTO control panels. Actions taken by NEFCo included replacing six of the twelve centrifuge control panels completely, including the back-drive motors. In fact, NEFCo has gotten so much mileage out of the initial installation that they are installing the additional six during 2013.

The entire SCADA system will be updated this spring and drier drum number two was completely replaced. The budget impacts from this condition assessment led staff to the conclusion that the expected replacement cost that had been anticipated can be greatly reduced. The “cost savings” could be directed toward other investments, upgrades, and modernizing of equipment. The capital focus will now shift toward modernization and upgrades that were recommended by the technology assessment.

John DeAmicis asked who owns the equipment. Mr. Pawlowski said the MWRA owns all of the equipment; anything that NEFCo installs becomes the property of the MWRA. NEFCo does have a leased nitrogen system that it uses to blanket the final product. Other than that system, the MWRA owns everything else.

Lou Taverna asked who is paying for the improvements. Mr. Pawlowski said NEFCo is paying for the improvements; they want to earn the next contract.

A member asked if it would be cheaper for the MWRA to run this facility rather than a private company. Mr. Pawlowski said in his opinion, no. Mr. O'Brien said there is a lot more flexibility in the use of NEFCo's employees for different functions than the MWRA has. Initially, the first ten-year contract was privatized because it was a newer technology and the MWRA's existing employees were not familiar with the operation of this type of facility. It went so well that MWRA staff decided to re-bid the contract and NEFCo competitively won the contract again.

Mr. Pawlowski said another important factor is that NEFCo owns the sludge and they market it. NEFCo is a nation-wide firm with nation-wide contacts. If MWRA ran the plant, it would have to get into the wholesale disposal business, which is not really MWRA's business. It is more cost-effective to privatize this function.

Walter Woods noted that there have been two fires at this facility; who has financial responsibility for those fires? Mr. O'Brien said NEFCo had to take on the burden of those costs. NEFCo has its own insurance and the MWRA has a letter of credit if staff wants to call for a special improvement. There is also a \$20 million performance bond if NEFCo should run into financial troubles; MWRA has those protections in place.

Mr. O'Brien stated that a study began in July with the firm of Camp Dresser & McKee; numerous emerging and promising technologies in the residuals field are being reviewed to see if they might have an application at the MWRA's facility. The technologies will be narrowed down to a short list with a goal of trying to improve the MWRA's efficiency and optimization. Staff would like to increase the gas volumes, while at the same time reducing sludge volumes and increasing the amount of green energy that can be produced.

This is not a siting study; the Authority is looking for improvements only at Deer Island or Fore River. Staff is trying to stay within the footprints of the two existing sites. Some considerations are the

money that the MWRA has already invested, two separate locations (Fore River and Deer Island), and very little area for expansion. The MWRA has existing obligations with agencies and cities and towns. Logistics, especially at Deer Island where there is very tough access, are also a consideration. Regulatory issues have to be reviewed. The large scale of the operation will impact which technologies may work for the MWRA. Staff plans to go to the Board with more detailed information on technologies in the spring.

Staff is looking for improvements to the screening operation to improve one fraction of the sludge called scum. It has a high BTU content but it is difficult to deal with because it has a lot of debris in it. If screening efforts can be improved, the MWRA may be able to make more use of that scum and improve the gas.

Another area to be targeted is waste-activated sludge, which is a biological sludge; this sludge generally doesn't have the higher BTU values that the primary sludge has because a lot of the energy is entrained in the sludge and is hard to get out. There are a lot of new technologies that can attack that cell structure within the sludge and get the energy that is entrained in there.

Technologies include "Cambi (thermal hydrolysis)," which is a high temperature, high pressure complex process that attacks the cells, and "OpenCEL (pulsed electric field, cell lysis)," which is an electrical pulse that weakens the cell walls to split the cell open. These are ahead of digestion and are ways to pre-treat the sludge and make it more amenable to digestion.

The current process is in an environment to create naturally occurring bacteria at 98 degrees. There are various forms of digestion that may be amenable to fit into the current physical structure but would change the operation. The thermophylic option would increase the heat by 30 to 40 degrees more, resulting in a much higher rate of cell destruction and better gas production; it would have to be offset with the heating demand.

After digestion, there are a range of options. Currently NEFCo dries with rotary drum dryers, which has been a reliable technique; however, there are a number of alternative drying techniques that might fit well at the Fore River facility. There are numerous options but many will be screened out because they just don't have the track record.

The study will run from July through May. In the February to March timeframe, staff may be able to provide the Board with more information.

David Duest, Manager of Process Control, stated that a new initiative is under consideration called co-digestion is introducing non-sewerage based organic waste into a wastewater treatment process. It would be added directly to an anaerobic digester. The types of material would include source-separated organic food waste. Traditionally this type of waste would end up in composting, landfills, animal feed waste such as pig farms, and, finally, commodity processing such as good quality fats, oils and greases that could be converted into a bio-diesel.

Mass. DEP estimates that there are about 950,000 wet tons of organic waste that are currently in the state and being produced annually, with about 100,000 wet tons going to the other options. DEP wants to divert all the remaining material that goes to landfills to anaerobic digesters or other processes so they can beneficially use the gas or the BTU content that could be generated from these particular materials.

DEP has modified its regulations on the operation of wastewater treatment plants and the solid waste regulations to essentially allow a streamlined process to divert these materials out of the waste stream. They will be implementing a ban in 2014, which will divert these materials from landfills from any commercial or industrial sources that generate greater than one ton per day.

If the MWRA gets this material coming into its facility, and it is a workable process, then it would create additional digester gas; MWRA can use its current combined heat and power sources to actually recover and convert it to energy and won't have to purchase as much electricity off of the grid. In terms of impacts to the MWRA, facilities would be needed for this process. Currently, the MWRA does not have the means to receive materials on Deer Island to actually put the organic waste directly into its digesters. Deer Island's locale would also be a challenge because it is not easily accessible by roadways. Barging could be an option.

The current combining facilities are optimized for thermal generation and some electricity; it might be best to change that slightly for this increased level of digester gas to convert it mostly for energy efficiency. MWRA could gain 30% more electricity by going to a more electricity generated process. All of that will cost money and will be factored into the economic analysis.

A facility would need to be constructed on the island to receive these materials, which would then be blended with the normal wastewater sludge. Early planning would allow for up to 20%, so it would be about 50 dry tons per day, which could equate to about 100,000 gallons a day.

Issues that need to be addressed would be an evaluation of the impacts to the overall Deer Island process, which must comply with its NPDES permit. The quality of the pellets would have to be evaluated; studies to date have shown that the pellet quality will probably improve. Wastewater processes shouldn't be affected but there are things that need to be looked at. Will co-digesting create potential odors? It definitely will because it will be rotting material that is coming into the facility. Facilities on the island would have to be designed to handle odor issues. Logistics obviously would be an issue, as well as the financial impact.

Mr. Favaloro stated that he understood that co-digestion is something that the Commonwealth of Massachusetts is interested in; however, over the past 25 years, when the MWRA has done something with the Commonwealth, it has been the MWRA that has had to pay the price. It shouldn't be about the financial impact, it should be about MWRA beneficial gains with a lot of zeros, or it isn't worth the MWRA's while. MWRA gets little out of this and the state gets another press release. Mr. Favaloro continued that he understood this is "green" and is a wonderful project but there are 2.5 million ratepayers that it isn't going to be wonderful for. Breaking even is not a huge gain. Electrical generation is a gain. The bar needs to be set high. It is critical that the studies and assessments are done in a framework with that in mind, not based on impacts but on gains. Mr. Hornbrook stated that the MWRA is absolutely on the same page.

Chairman Dunphy noted that there would be issues in trucking through Winthrop; however, issues will still occur even if barging is implemented. The MWRA would still have to unload the material at some location or locations; would there have to be storage at those locations? Mr. O'Brien stated that those details still have to be worked out. MWRA still has available barge facilities at Deer Island with an existing pier facility. The other end of the operation would be the vendor's problem in terms of siting. Similar to NEFCo, the vendor would be responsible when it receives the sludge. Chairman Dunphy said the community may want some sort of mitigation.

Andreae Downs asked about the timeline for co-digestion. Mr. O'Brien said currently there is a feasibility study as to what would have to be done on island to incorporate co-digestion into the process. Concurrent with that is a bench-scale study at UMass Amherst on co-digestion that is scheduled to be completed in June. If the Board approves the co-digestion process, MWRA would go out with a request for proposals to solicit vendors for the pilot study, which would probably be put into place at the back end of 2013 and be online at the beginning of 2014 for the pilot program, which would run from one to three years.

Andrew Fisk asked if the Authority expects to have bidders other than NEFCo. Mr. O'Brien stated that this is a very specialized field. NEFCo's biggest competitor is Synagro, which has the largest market share; however, they are in deep financial trouble. There were three bidders in the last bidding process. There are not a lot of companies out there unless new ones emerge because there is money to be made in drying. NEFCo's profit level is about 10%, which is reasonable because they take a lot of risk.

Mr. Favaloro said that he understands the reasons for the feasibility study and he supports it. He asked how much the state is contributing to the study and how many Authority hours need to be utilized for the study. Mr. O'Brien stated that he didn't have a figure on how many staff hours have been used. It was an element of the MWRA's study from day one because it is a new initiative. Co-digestion, admittedly, got additional attention when these new regulations came out. In terms of dollars, the CDM feasibility study is \$75,000; the U-Mass/Amherst study is \$100,000; the state has given \$60,000 to offset those costs.

Mr. Favaloro noted that the third item that was 9c'd by the Governor was Debt Service Assistance. It is a two-way street and the Advisory Board wants to assure that it remains a two-way street.

#### **D. COMMITTEE REPORTS**

**Executive Committee** – Katherine Haynes Dunphy

##### **❖ ECONOMIC DEVELOPMENT REPORT / LEGISLATIVE UPDATE**

Mr. Favaloro stated that the Economic Development Report and the Legislative Update are interwoven. To bring attention to the Advisory Board's legislative initiatives for funding, staff felt that it would be best to deliver a study on the benefits that water and sewer infrastructure can bring to communities in terms of economic development. The Collins Center of UMass Boston has been hired by the Advisory Board to do an analysis of the ties between water and wastewater investment and economic development growth, regionally and locally. Staff hopes to have the report by early March. The report will quantify what the dollar investments in water and wastewater infrastructure would bring in terms of economic growth.

To further that study, a survey will be issued through Constant Contact to the communities. The questions are as follows: Have there been water and wastewater projects in your community that have led to economic growth? (Define what that economic growth is.) Conversely, have there been restraints to your water and wastewater system that have denied economic growth in your community? Staff would like to have this information to make a stronger argument for funding.

Transportation has taken over the entire legislative field. It has been a challenge to get the Advisory Board's legislative package through the legislature. Senate President Murray's district is impacted by a significant environmental issue on Cape Cod in regard to the Clean Water Act. The Senate

President, as part of her inaugural address, stated that water and wastewater issues need to be addressed.

The Advisory Board has proposed two new initiatives; one is an initiative for \$100 million for economic development and the second is getting a piece of the online sales tax. It was a challenge to attach a dollar figure to the economic development bill. The language has been changed and when the economic development study is completed by the Collins Center, it will be given to the House and Senate Clerk's offices to be distributed to the proper committees for analysis.

**Finance Committee** – Bernard Cooper

❖ **CIP AND CEB UPDATE**

Matthew Romero, Manager for Finance & Policy Review, stated on the Current Expense Budget (CEB), the Authority is \$3.1 million, or 1%, under-spent related to under-spending in Wages and Salaries and other small line items. The defeasance account currently contains \$6.2 million; last year, the Authority took surpluses from debt service related line items and put it into the defeasance account to ensure that it was clear that these funds would be used for rate relief.

For the Capital Improvement Plan (CIP), the Authority is \$14.8 million, or 20%, over spent, which is related to the community assistance programs. This does not affect the five-year capital spending cap, which the Authority is well under.

For the FY14 review, staff is about to begin reviewing the backup documents for the CIP and will schedule briefings with Authority staff. In the coming months, staff will bring forward its strategy for both the CIP and CEB.

**Operations Committee** – Lou Taverna

❖ **STATUS OF WASTEWATER METERING AND WHOLESALE WATER METHODOLOGY DISCUSSIONS**

Mr. Favaloro stated that the next operations Committee meeting is Tuesday, January 22, at Newton City Hall. On the sewer side, the Authority will be bringing a plan for unmetered areas and a preferred plan for wastewater meters. On the water side, the committee is still on the front end of discussions in regard to water rate methodologies and fees.

**E. ADJOURNMENT**

**A MOTION WAS MADE TO ADJOURN THE MEETING AT 1:13 P.M.** It was seconded and passed by unanimous vote.

Respectfully submitted,



William Hadley, Secretary