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PALM BEACH COUNTY WTE EXPANSION MODEL

Thomas M. Henderson
Malcolm Pirnie, Inc.
West Palm Beach, Florida, USA

Leah K. Richter
Malcolm Pirnie, Inc.
Plantation, Florida, USA

ABSTRACT

Palm Beach County (Florida) Solid Waste Authority built an integrated solid waste management system in the 1980s and 1990s around an 1,800 tpd Refuse Derived Fuel (RDF) Waste-to-Energy (WTE) facility. The system included a network of five regional transfer stations, Subtitle D sanitary landfill, recovered materials processing facility, composting facility, metals processing facility and household hazardous waste collection program.

The WTE, which became operational in 1989, was built with two 900 tpd RDF combustion units. Space was provided for the addition of a third combustion unit, a second turbine-generator and an extra flue was installed in the facility's stack.

By 2004, the WTE was fifteen years old. It had been running at over 125% availability and well above its nominal capacity for almost a decade. Landfill capacity was being consumed at a rate which would see it filled in less than 20 years. The County had been hit with repeated hurricanes in recent years and the County's population was continuing to grow making landfill capacity projections far from certain.

The Authority began an assessment of its long term capacity options which included renovation of its existing WTE facility, expansion of that facility, development of a new WTE facility, development of a new Subtitle D Landfill and several out-of-county options.

This paper will focus on the results of this assessment with emphasis on the current efforts to develop a new Mass Burn WTE facility with a capacity of 3,000 tpd and a commercial operations date of 2015. It will be the largest new WTE built in North America in more than 20 years. The choice of Mass Burn technology, facility and combustion module sizing, air pollution control technology, facility site selection, environmental permitting, public outreach program, project financing and procurement and contracting approach will be discussed.

INTRODUCTION

The Solid Waste Authority of Palm Beach County (Florida) was established by special act of the Florida Legislature in

1975 with a mandate to provide for the safe and sanitary processing and disposal of solid and hazardous waste countywide. Palm Beach County is located on the southeast coast of the State of Florida. Encompassing an area of 2,286 square miles, it is Florida's largest county. The County has 38 incorporated municipalities including wealthy coastal communities including Palm Beach, Jupiter and Boca Raton, equestrian centered Wellington and golfing haven Palm Beach Gardens. It also has a large agricultural area and significant state and federal conservation areas including the Loxahatchee National Wildlife Refuge.

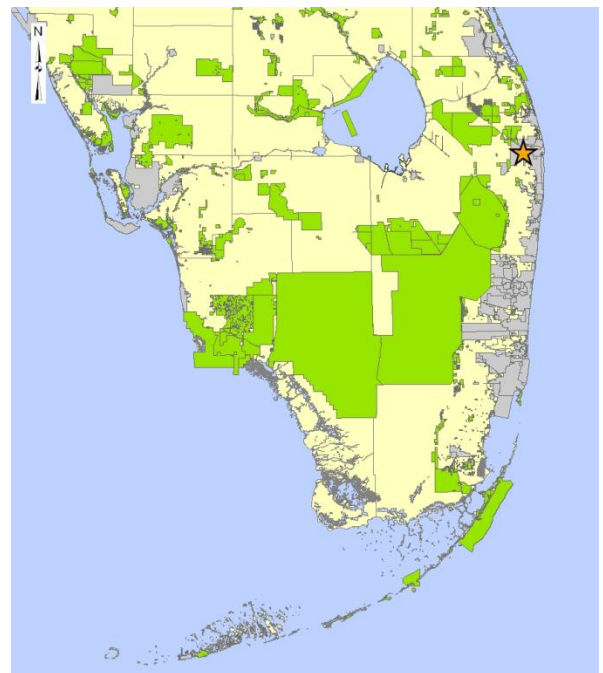


Figure 1. Location Map

When established in 1909, Palm Beach County had a population of less than 6,000. By 1975 when the Authority was created, the estimated population had grown to 475,000. The estimated population today is 1.3 million and it is projected to increase to 1.6 million by 2030¹. Rapid growth in solid waste along with population and urban development along with a splintered political structure provided the impetus for creation of the Authority.

In its early years, the Authority developed plans for an integrated countywide system of large commercial transfer stations feeding two regional waste processing and disposal sites. It acquired several existing operating transfer stations and landfills and sites for additional new transfer stations, processing facilities and landfills. This included two sites of more than 1,000 acres each in the north and south regions of the County for large WTE facilities and landfills.

In its second decade, the Authority built or rebuilt five regional transfer stations to feed facilities constructed at the north county processing and disposal site, the 1,320 acre complex now known as the Palm Beach County Renewable Energy Park (Energy Park). The Energy Park ultimately included an 1,800 tpd RDF WTE facility, 50 million cubic yard capacity Subtitle D sanitary landfill, recovered materials processing facility for both commercial and residential recyclables, yard waste and wastewater sludge composting facility, wastewater sludge pelletizer facility, metals processing facility, and household hazardous waste drop-off and short-term storage facility, as well as administrative offices. Due to local opposition, the south site was never developed and was ultimately exchanged in 1996 for a 1,600 acre site for a future landfill in the agricultural western region of the County.

NORTH COUNTY RESOURCE RECOVERY FACILITY

The Subtitle D landfill opened at the Energy Park in 1985. During the first year of operation it handled 955,000 tons of Municipal Solid Waste (MSW). Four years later in 1989, the Authority began operating the North County Resource Recovery Facility (NCRRF). The NCRRF is an 1,800 tpd RDF WTE facility consisting of a scale house, waste receiving and storage building, three (3) RDF processing lines including primary and secondary shredders, trommel screen and metals recovery equipment, RDF storage building, two 900 tpd water wall steam generation boilers with spray dryer absorbers and electrostatic precipitators, and a 62 MW steam turbine generator.

The NCRRF design provided for the future addition of a third boiler and second turbine generator. A third flue was installed in the stack. Planners anticipated additional capacity would be needed during the life of the facility even with the development of a second WTE at the south regional site. It was less than five years before the NCRRF reached full capacity. When the second WTE in the south was not developed, the NCRRF was pushed to process more and more waste. During

¹University of Florida Bureau of Economic and Business Research (2009).

its first 15 years of operation it processed more than 11 million tons of municipal solid waste (MSW) and generated 4.5 MWH of electricity. This is about 127% of nominal capacity. The adjacent 334 acre sanitary landfill was also required to use capacity at a higher rate than planned as more and more unprocessed MSW, RDF processing plant residue and ash was received. Continued population growth and a series of hurricanes which hit the County in 2003, 2004 and 2005 also strained the capacity of the system.

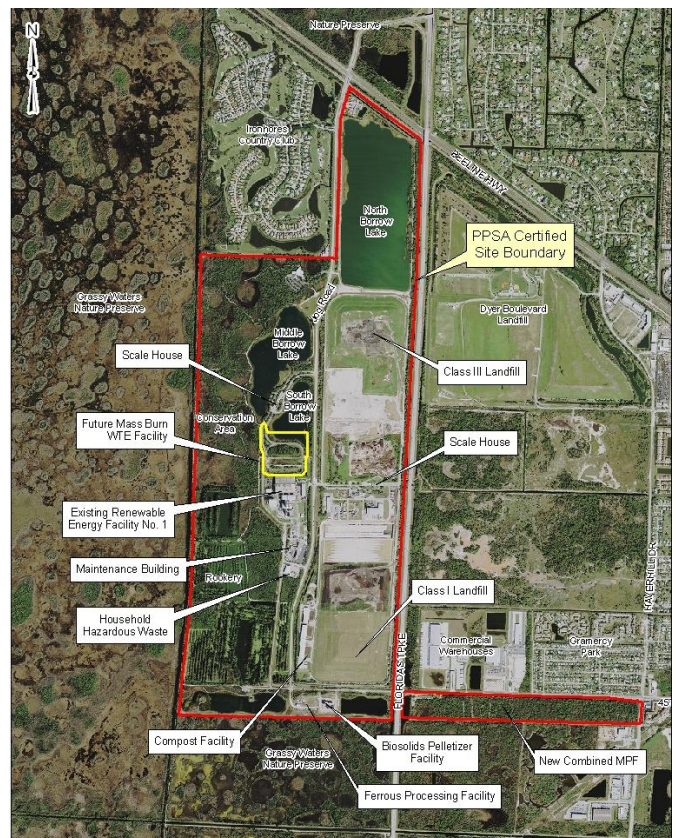


Figure 2. Palm Beach Renewable Energy Park

PLANNING FOR THE NEXT TWENTY YEARS

By 2005, the Authority was handling approximately 1,920,000 tons of MSW annually, twice what it did just 20 years earlier. More unprocessed MSW was going to landfill than to the WTE and projections showed the landfill had less than 20 years of life.

As it had done more than 30 years before, the Authority began a full assessment of its long term options. A number of alternatives were developed based on six basic principles. These principles were:

1. Waste generated in the County should be processed and disposed of in the County;
2. Processing and disposal solutions should utilize proven state of the art processes;
3. Solutions should be protective of human health and the sensitive Southeast Florida environment;

4. Solutions should conserve resources;
5. New processing facilities should be publicly owned but be developed and operated in partnership with experienced private firms; and
6. Solutions should be cost effective and long term in nature.

The alternatives developed and evaluated by the Authority in 2005 and 2006 included the following:

1. Renovation of the existing NCRRF to extend its service life for an additional twenty to thirty years;
2. Development of a new Subtitle D Landfill on the west county site acquired in the 1990's;
3. Expansion of the existing NCRRF including the addition of a third boiler and second turbine generator;
4. Development of a new WTE facility utilizing Mass Burn technology;
5. Development of a new WTE facility utilizing a technology other than RDF or Mass Burn; and
6. Out of County WTE or Landfill.

Staff of the Authority recommended and the Governing Board (Board), which is composed of the County's seven elected Commissioners, authorized moving forward immediately with the first two alternatives, renovation of the existing NCRRF and development of a new western landfill. Expansion of the NCRRF plant was not pursued because it would not provide enough additional capacity to be a long term solution. The Board voted to explore further the feasibility of a new Mass Burn WTE. It rejected use of other potential technologies as none had been demonstrated to be commercially viable on a scale large enough to reliably manage the Authority's long term additional capacity needs. Out of County alternatives were rejected because of the financial and environmental cost of transporting waste out of the county as well as the Authority's desire to handle what it can locally.

RENOVATION OF NCRRF

Over the next two years, the Authority negotiated a 20-year extension of the operating agreement with the operator of NCRRF, Palm Beach Resource Recovery Corporation (PBRRC), a subsidiary of Babcock and Wilcox (B&W), which called for each party to undertake major renovations of the facility. PBRRC agreed to renovate the RDF processing facility. Authority agreed to replace the two RDF fired boilers and air pollution control equipment, replace and upgrade the distributed processing system, and upgrade a number of auxiliary systems. The engineering, procurement and construction firm of BE&K Construction Company, LLC (BE&K) was competitively selected to install the boilers and design, supply and construct the balance of the renovations and improvements. The replacement boilers would be supplied by B&W, the original equipment manufacturer. The Authority also renegotiated its power sales agreement with the local investor owned utility, Florida Power & Light Company (FPL). The original agreement for both capacity and energy was due to expire April 1, 2010. The renegotiated agreement extends the term to April 1, 2032, with reduced capacity payments

beginning in 2012 after renovations are completed. The Authority retained the ownership of any "green energy" related (REC's & GHG) credits.

The operation and maintenance agreement extension was signed in July 2007. The boiler purchase was finalized in March 2008. The Engineering, Procurement and Construction Services (EPC) Contract with BE&K was executed in January 2009. The renegotiated power sales agreement with FPL was signed in March 2009 after approval by the Florida Public Service Commission.

Initial on site construction activities began in November 2009. Renovation work is being sequenced so one boiler train will always remain in operation to reduce the impact to the Authority's landfill and maximize electrical production and revenues during the renovation period. The first boiler unit is scheduled to be off line for replacement from April 1, 2010 to August 31, 2010. During that period, the existing boiler, spray dry absorber and electrostatic precipitator will be demolished. They will be replaced with a new boiler, new spray dry absorber and baghouse. A new urea injection system for control of Nitrogen Oxides (NOx) and carbon injection systems for control of Mercury (Hg) will also be added. The second boiler train is scheduled to be off line for the same work from October 1, 2010 to February 14, 2011. Total cost of the renovations is estimated to be \$205 million which has been funded through the issuance of improvement revenue bonds. It is expected these renovations will extend the life of the NCRRF for an additional twenty to thirty years.

EXPANDED PROCESSING AND DISPOSAL CAPACITY

At the same time as the Authority moved ahead with renovation of the NCRRF, it began work on development of a new Subtitle D Landfill in the western part of the County. As noted earlier, it had acquired a 1,600 acre site in 1996 in an exchange for the site it had hoped to develop in the southern part of the County. The site is part of a vast agricultural area in the western part of the County which is former everglades wetlands used for the production of sugar cane and winter vegetables. The site continues to be used by its former owner to grow sugar cane. It is adjacent to the Loxahatchee National Wildlife Refuge and several projects being developed by state water resource managers as part of efforts to restore clean water flow to the Refuge and Everglades National Park. Opposition to development of the site as a major new landfill was almost immediate. Federal and state land managers and local environmental groups were unanimous in opposition. Confronted with this opposition, the Board voted in February 2007 to look at alternative landfill sites in the western part of the County. The Authority looked at a number of alternative sites for the landfill but no consensus site was found. The Board subsequently delayed the selection of an alternative site several times and ultimately voted in October 2009 to indefinitely postpone development of a new landfill. It continues to pursue identification of a site which can be reserved for a future landfill.



Figure 3. NCRRF(left) and Preliminary Concept of New WTE

EXPANDED WTE CAPACITY

In February 2007, the Board voted to explore the potential for a new WTE which would begin operation in 2017. Considering the EPA confirmed environmental benefits of waste-to-energy over landfilling and the recognition of waste to energy as a renewable energy, the Board voted to move ahead with a new Mass Burn WTE immediately north of the existing NCRRF on the Energy Park site in March of 2008. To maximize the capacity of the existing landfill and forestall the development of a new landfill the Board also instructed staff to accelerate the project schedule with a new operational target date of 2015. This decision was reaffirmed in November 2008 after Malcolm Pirnie, Inc., the Authority's Consulting Engineer, found the project and Energy Park site to be feasible. The Board also reaffirmed at that time the use of Mass Burn technology and authorized issuance of a Request for Qualifications (RFQ) for a full service design/build/operator. A RFQ was issued in December 2008. The Authority received Qualification Statements from six potential proposers in March 2009. Three respondents were found to be qualified, Babcock and Wilcox Power Generation Group, Covanta Energy and Wheelabrator Technologies. The Board ratified the qualification of those three potential Proposers in June 2009. Draft RFPs were issued to the three qualified potential proposers for review and comment in July and December 2009. A final RFP was approved by the Board and issued to the three qualified proposal firms in February 2010. Proposals are due in June 2010. The RFP consists of instructions on preparation of Proposals, proposal forms, an Excel model for evaluation of cost proposals, a design criteria package, and design/build and operating agreements.

During the initial site feasibility study, Malcolm Pirnie, Inc. developed a draft conceptual design for a 3,000 tpd Mass Burn WTE to be located on approximately 28 acres immediately north of the existing NCRRF. This location was selected because the Authority already owned the site; required land use approvals were already in place; there would be no need to change transportation or traffic patterns; most of the infrastructure required for a WTE already existed including roads, utilities and electric transmission interconnection; and landfill and metals processing facilities for recycling or

disposal of residues already exist at the Energy Park. The plant was sized at 3,000 tpd based on the anticipated waste available during the period from 2015 and 2025 after reviewing Authority data from 1985 through 2007. Other design considerations included the need to accommodate most of waste being received on Authority transfer vehicles (a wider tipping floor); desire to minimize landfilling of unprocessed waste (a large waste storage pit); lower construction and maintenance costs (three 1,000 tpd vs. four 750 tpd combustion trains); state of art process controls; advanced air pollution controls; and maximized energy and materials recovery.

The initial feasibility study included a review of the physical characteristics of the site including a geotechnical assessment; stormwater management requirements; process and potable water demands, sources and limitations; air quality issues; regulatory review issues; and schedule, cost and financing factors. No fatal flaws were identified based upon the results of the analysis and review.

WTE DEVELOPMENT APPROACH

The adoption of a goal of having the new Mass Burn WTE operational in 2015 by the Board in March 2008, led the Authority to utilize a development approach which has several tracks being under taken at the same time. Preliminary design, procurement and permitting tracks were all begun and are being pursued simultaneously. The conceptual design formed the basis for the preparation of the detailed Design Criteria Package included in the RFP and for preparation of environmental permit applications. Feedback from the three potential proposers during RFP draft reviews was used to refine the Design Criteria Package and permit applications particularly in the areas of the boiler design, air pollution control and air dispersal modeling parameters. The RFP drafts also included a draft Design/Build Contract and draft Operation and Maintenance Agreement. Feedback on these documents allowed them to be refined in a competitive environment. Proposals, due in June 2010, will be based on complete contract documents. The Authority intends to execute these documents with the successful proposer without substantive changes. The proposals will be evaluated on technical merit and cost alone.

The master project schedule has the award to the successful proposer being made in October 2010. Contracts will be executed and a limited notice to proceed for final project design will be given shortly thereafter. A second notice to proceed is planned to be given when environmental approvals are received. It will cover procurement of long lead items including the turbine generator. This is anticipated during the spring of 2011. A notice to proceed for construction will be given when all financing is in place. This is scheduled for later in 2011 or 2012 depending upon the demands of the project and bond markets.

CHOICE OF MASS BURN TECHNOLOGY

The Authority sees itself primarily as a service provider. As such it seeks to employ state of the art proven solutions. It has a history of innovation in solid waste management but not

experimentation. In approaching the choice of technology for its new WTE, the Authority wanted to employ technology which had been proven over a number of years at the scale required. Two basic technological alternatives met these criteria, RDF and Mass Burn. The Authority had many years of experience with RDF as the owner of one of the largest and most successful RDF facilities in the world. Since the decision to use RDF for the NCRRF in the early 1980's, most new WTE have been of the Mass Burn type. There have been a number of reasons for this including source separation of recyclables becoming more popular, lower construction and operating costs, smaller site foot prints, more potential suppliers and less residue requiring disposal. For all of these reasons, the Authority chose to specify Mass Burn for its new WTE in 2007 and reaffirmed this decision in 2008 and 2009.

CONTRACTING CHOICE

The Authority has from its early years owned all of its facilities. It has operated its own transfer stations and landfills but has used a design/build/operate contracting approach for most of the waste processing facilities built at the Energy Park. The NCRRF was designed and built by Bechtel and operated by PBRRC. The Recovered Materials Processing Facility which handles source separated recyclables, the Ferrous Processing Facility which cleans and prepares ferrous metals recovered from all the Authority facilities and programs and Pelletizer Facility which dries and pelletizes wastewater sludge for use in fertilizer were design/build/operate projects. With this familiarity and success with this approach around North America for similar large WTE projects, it was an easy choice for the Authority to elect use of the design/build/operate approach for the new WTE project.



Figure 4. Northeast Elevation Concept of New WTE

FACILITY AND COMBUSTION MODULE SIZING

The size of the new WTE and combustion modules to be used was reviewed several times during the development of the project. Based on an initial review in 2007 and development of a conceptual design in 2008, the RFQ assumed the facility would be a 3,000 tpd Mass Burn facility with three 1,000 tpd modules. This was reevaluated in early 2009 and again in the fall of 2009. In both instances a drop in the quantity of MSW being handled by the Authority due to prolonged downturn in the economy was a primary factor in the overall facility size review. A desire to have modules sized to assure competition among the three pre-qualified proposers and operating reliability were also factors in the reevaluation of the module size.

The Authority affirmed the 3,000 tpd facility size because of a desire for a long term solution that maximizes the life of its existing landfill. Current projections have the life of the Authority's landfill extending well into the 2040's assuming the new WTE comes on line in 2015. It will be evaluating use of residue from RFP processing and attracting MSW from other South Florida counties, if necessary, to fill the facility. The Authority also decided to stay with 1,000 tpd combustion modules. The three pre-qualified proposers, B&W using Vølund, Covanta using Martin and Wheelabrator using von Roll grates, all indicated they were able to supply either 750 or 1,000 tpd module but recommended the larger units because of lower initial construction and ongoing operating and maintenance costs. The larger units also allowed for a smaller boiler building. The smaller building resulted in improved air modeling dispersal results as well.

PERMITTING AND APC TECHNOLOGY

In Florida, all local, regional, state and delegated federal permitting is coordinated through the Florida Department of Environmental Protection (FDEP) Power Plant Siting Certification (PPSC) process. This streamlines the permitting process with one permit application and one set of reviews and hearings. Land use, need and necessity and environmental issues are all addressed. Applicants do not avoid regulatory requirements but are provided a forum with a set of know procedures and timelines. All power plants rated at 75 MW or larger have had to go through this mandatory process since 1973. It is optional for smaller power plants but most applicants elect to utilize it. The Energy Park was certified by the FDEP through the PPSC in 1986 for initial construction of the NCRRF. That certification was subsequently amended or modified as other facilities were built. The new Mass Burn WTE is being treated by FDEP as a major modification to an existing site certification rather than a new site. This is similar to the way additional new units are handled at commercial power stations.

Malcolm Pirnie, Inc. has been drafting the PPSC and the Prevention of Significant Deterioration (PSD) air construction permit applications concurrently with the preparation of the RFP. These applications are scheduled to be submitted to

FDEP during the spring of 2010. The PPSC process including PSD typically takes a year to 14 months to complete.

The RFP Design Criteria and PPSC/PSD applications call for the use of Best Available Control (BACT) technology to minimize air pollutant emissions. The three potential proposers reviewed and commented on the RFP Design Criteria including permit limits. Some modifications were made to allow for innovative design approaches that proposers may want to offer. BACT has been defined to include advanced combustion controls, selective non-catalytic reduction (SNCR) using either urea or ammonia injection for Nitrogen Oxide (NOx) control, carbon injection for Mercury (Hg) control, a spray dry absorber (SDA) for acid gases control and baghouse for particulate control. If accepted by FDEP, the new WTE will have lower permit limits than any other WTE in Florida for NOx, SO₂ and Mercury. A summary of BACT for air pollutants subject to PSD review plus Mercury, a pollutant of particular concern in Florida, along with proposed emission limits are listed in Table 1. Class I and Class II Air Modeling to be submitted with the PPSA/PSD applications demonstrates the project will have no significant impact on human health or the environment. All Environmental Protection Agency (EPA) Criteria Air Pollutants were found to be below their Significant Impact Level (SIL) concentrations. A human health and ecological risk assessment found no pollutant deposition levels at levels to be of concern.

**Table 1
BACT Summary**

Pollutant	Proposed Emission Rate (at 7% O dry basis)	Proposed Control Technology
No _x	100 ppmv (24-hr); 85 ppmv (12-month)	Selective Non-Catalytic Reduction
SO ₂	24 ppmv (24-hr) or 80% reduction	Spray Dryer Absorber (with Fabric Filter)
HCl	20 ppmv or 95% reduction	
Fluorides (as HF)	3.5 ppmv	
Sulfuric Acid Mist	5 ppmv	
PM, PM ₁₀ , PM _{2.5} and MWC Metals	12 mg/dscm	Fabric Filter
Lead	140 µg/dscm	
CO	100 ppmv (4-hr); 80 ppmv (30-day)	Design and Good Combustion Practices
VOCs	7 ppmv	
MWC Organics (as Dioxins/Furans)	13 ng/dscm	
Mercury	25 µg/dscm or 85% reduction (quarterly test); 15 µg/dscm (12- month average)	Activated Carbon Injection (with Fabric Filter)

SITE SELECTION AND PUBLIC OUTREACH

The Authority chose the Energy Park site for the new WTE in large part because of the advantages associated with being near the existing NCRRF and other Energy park facilities. Among the major advantages of the site are the following:

1. It is already owned by the Authority;
2. It is already certified as a power plant site under the PPSC;
3. All of the waste to be processed is already coming to the site-no significant increases in traffic or new road construction will be required;
4. All utilities, water, sanitary sewer, natural gas, telecommunication, and interconnection to the electrical transmission grid, are already available;
5. Residue landfilling and recovered metals processing capacity already exists; and
6. The Authority's long and successful track record as a "Good Neighbor" to surrounding communities.

No other site in the County was identified which would not require a change to the County's Comprehensive Plan and Unified Land Development Code. Even if required changes could be obtained for a site, it would have to be purchased and expensive infrastructure improvements made that are not necessary at the Energy Park site.

Once the decision was made to proceed with development of the new WTE at the Energy Park site, the Authority initiated an extensive public outreach program which included meeting with nearby residents and elected and appointed officials from cities which would be potentially affected. In addition, a variety of printed and web based media materials to inform the public of the project and a set of "Frequently Asked Questions" were also prepared. The Authority first meeting was with the closest community, the Ironhorse Country Club which borders the Energy Park about three quarters of a mile north of the proposed plant, and moved outward. While they recognized the benefits of WTE over landfilling, the Ironhorse residents voiced concerns about the visibility of the new WTE's stack and noise and air quality impacts. The Authority committed to make every effort to mitigate the impacts of the project.

Because of the Authority's more than 20-year track record of active involvement in the local community, most residents and city officials had either a positive or at least a wait and see response to plans. Many of the positive responses were based on the large number of jobs which would be created during construction, the anticipated reduction in odor as less MSW is landfilled and the significant amount of renewable energy the project will generate.

During the development of the Design Criteria, Malcolm Pirnie, Inc. focused on ways of mitigating potential impacts. Minimizing potential air impacts was addressed through BACT. Design features to minimize odor and noise impacts were incorporated into the design. A noise study was also conducted to identify current sources of noise which might be better mitigated and to establish a base line for future comparison.

Considerable effort was placed on reducing the visual impact of the new stack to the Ironhorse community, the

Authority's neighbor to the north. A conventional design using Good Engineering Practices (GEP) would have called for a stack 50 feet in diameter and 385 feet tall. This would have created a significant visual impact for many living at Ironhorse. The impact was reduced in the final conceptual design by making the stack oblong, only 26 feet wide when viewed from the North, and shortened to 310 feet. Using 3-D CAD technology, the Authority was able to show the dramatic reduction in visual impact of the shorter oval stack design to the Ironhorse community. See Figures 5 and 6.



Figure 5. GEP Stack from 17th tee at Ironhorse



Figure 6. Shorter Oblong Stack from 17th tee at Ironhorse

The overall aesthetics and architectural treatment of the proposed facility also received much attention. Malcolm Pirmie, Inc. worked with the Michael Singer Inc. to develop a conceptual design package which was provided the three qualified proposers. The packages included concepts for making the facility more environmentally friendly and visually appealing. Use of colored and angled metal and transparent wall panels, day lighting, green walls and water harvesting were among the ideas presented. A \$12 million allowance was included in the project budget for treatments beyond the base proposals. A number of sustainable ideas were built into the base Design Criteria including rain harvesting. A two million gallon storage tank has been included in the project for rain

water collected off roofs of new facility buildings and part of the existing NCRRF tipping building. The package also included an educational and visitors center. The Board set a goal of obtaining LEED Platinum certification for the Administrative Building and the educational and visitors center.

POWER SALES AGREEMENT

The new WTE will be generating electrical power for both internal use and sale. The Design Criteria anticipates a steam turbine generator with a gross generating capacity of about 97 MW. The new WTE will be interconnected to the FPL electrical power grid through the substation at the NCRRF. The Authority does not, however, at this time plan to enter into a long term power sales agreement with FPL or other potential power purchaser. This is based on the current economic environment where both long term capacity and energy rates are very low, the uncertain value of potential "green energy" credits and ability of the Authority to finance the new WTE without such a contract. The later is the result of having the revenue certainty associated with the renegotiated power sales agreement for the NCRRF, commercial waste tipping fee revenues and the ability to assess a non- ad valorem on all improved properties in the County based on the properties solid waste generation rate.

PROJECT FINANCING

The new WTE facility is being financed through a series of three bond sales. The first sold in April 2009 was for \$22 million and covered the cost of preliminary planning and design, procurement, permitting and initial site work. A second issue is planned for October or November 2010 after selection of a project vendor and will cover the cost of final design and long lead items. It is estimated this second issue will be for \$120 million. The third bond issue in 2011 or 2012 will cover the cost of the balance of the construction. It is estimated to total \$620 million. The total project cost is estimated at \$762 million or \$254,000 per ton of daily nameplate capacity. This staggered financing program has been designed to reduce the Authority's borrowing costs and to provide more level debt service payments. Delaying the largest bond issue will reduce a potential rate spike as some existing debt will be retired in 2012 and 2013. Keeping the project affordable is even more important than ever in the current economic climate. Repayment of the bonds will be from revenues of the Authority which includes revenues from the sale of electricity, recovered materials, commercial tipping fees and non-ad valorem assessments. The current annual non-ad valorem assessment for a single family homeowner is \$156. This assessment will increase to only \$180 to \$185 per year in 2015 with development of the new WTE.

CONCLUSIONS

The Palm Beach County Solid Waste Authority is building upon its successful integrated waste management system to provide for many more years of safe and cost effective disposal of MSW. At the mid-point in the development of the new

WTE, the Authority still must complete the procurement process, win environmental approvals and complete financing. Using proven approaches in innovative manners, the Authority is confident it will be able to develop the largest new WTE in North America in more than 20 years and continue to be a leader in the responsible management of solid waste for decades to come.

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Figure7. East Elevation, Day and Night, Concept of New WTE

