PETERS TOWNSHIP SANITARY AUTHORITY

111 BELL DRIVE
McMURRAY, PA 15317-3415
PHONE: 724-941-6709
FAX: 724-941-2283
Web Site: ptsaonline.org

James J. Miskis, Manager
Mark A. Chucuddy, Asst. Manager
Gary A. Parks, Special Projects Manager
Patricia L. Mowry, Financial Controller
Diane L. Gregor, Admin. Assistant

AGENDA

SECOND REGULAR MEETING **April 23, 2013**

ROLL CALL:

OTHER BUSINESS:

1. Donaldson's Crossroads WPCP Replacement Plant Design and Permitting Phase Engineering Alternative Analysis Presentation

ADJOURNMENT:

PETERS TOWNSHIP SANITARY AUTHORITY

111 BELL DRIVE
McMURRAY, PA 15317-3415
PHONE: 724-941-6709
FAX: 724-941-2283
Web Site: ptsaonline.org

James J. Miskis, Manager
Mark A. Chucuddy, Asst. Manager
Gary A. Parks, Special Projects Manager
Patricia L. Mowry, Financial Controller
Diane L. Gregor, Administrative Assistant

SECOND REGULAR MONTHLY MEETING **April 23, 2013**

ROLL CALL:

The second regularly scheduled April meeting of the Peters Township Sanitary Authority was called to order at 7:00 p.m. by the Chairman. Board members present were David G. Blazek, Terrence G. Byrne, Eric S. Grimm, and Rebecca W. Kaminsky. Also present were James J. Miskis, Manager, Mark A. Chucuddy, Assistant Manager, Patricia L. Mowry, Financial Controller. Absent from the meeting was Michael P. Crall, Board member.

VISITORS:

Jason E. Stanton and Ryan Contestabile, Lennon Smith Souleret Engineering, Inc., and Jamie Gellner, from Hazen and Sawyer, attended pertaining to the Donaldsons Crossroads WPCP Replacement Project Alternative Analysis.

Mr. Stanton and Mr. Gellner presented the findings of the Donaldsons Crossroads WPCP Replacement Project Alternative Analysis. The objective of the presentation was to provide the Board with information to make a selection of one of the remaining recommended alternatives in order to move forward with the plant design. A copy of Power Point presentation is on file.

The presentation consisted of an overview of the background, project objectives, financial planning, and deliberations of the viable alternatives.

Mr. Stanton reported on the status of the pre-design tasks; Task 1A.Project Management Plan, and Task 1B. Project Initiation Meeting are completed; Task 1C. Survey and Utility Coordination is 75% complete; Task 1D. Permit Coordination and Application, while the majority of this task is not started, the sub-task for the flood plain analysis is completed; Task 1E. Geotechnical Investigations has not started; Task 1F. Design Schedule is ongoing; Task 1G. Alternative Evaluation Report is being presented tonight and considered almost complete; and Task 1H. Basis of Design Report is approximately 50% complete.

Mr. Stanton described the final draft Alternative Evaluation Report, copies of which have been provided to Management and all Board members. The report consists of two separately bound volumes. Volume 1 is the body of the report, with cost related information in its appendices. Volume 2 consists of the technical memorandums prepared for each unit process, establishing the design criteria.

The alternative analysis included detailed evaluation of twenty combinations of unit processes, biological treatment, biosolids stabilization and disinfection among others with emphasis on capital cost control and life cycle costing. Alternative combinations were eliminated from further consideration utilizing an iterative process primarily based on net present worth. The

recommended lowest capital construction cost alternative and the lowest net preset worth alternative over a 50-year life cycle, will be discussed in depth.

Mr. Stanton presented a secondary treatment and solids handling alternative matrix outlining the four major alternatives which consist of Conventional Activated Sludge with Aerobic Digestion, Conventional Activated Sludge with Interchange BioReactor (IBR), Vertical Loop Reactor with Aerobic Digestion, and Vertical Loop Reactor with IBR. The Authority uses the of Conventional Activated Sludge with Aerobic Digestion process at its two exiting treatment plants, and is very comfortable and knowledgeable with this process. The Vertical Loop Reactor process is a variation of the activated sludge process, optimized for low energy use and low waste biosolids production. Its key features include rotating disc aerators at the surface of and at the front of the tanks which provide dissolved oxygen and mixing through agitation of the wastewater, and a horizontal baffle the length and width of the tanks which provides for increased contact time for the air bubbles below the surface from coarse bubble diffusers near the end of the tank. The Interchange BioReactor process (IBR) is a biosolids stabilization process, also called Cannibal which is a patented process, that works in tandem with the activated sludge process to generate significantly less biosolids than aerobic digestion, thereby reducing biosolids trucking and disposal cost.

Mr. Stanton and Mr. Gellner facilitated detailed discussion on the floodplain analysis, effluent quality requirements, design criteria for each of the unit processes and schematic overviews pertaining to both biological processes under dry weather and wet weather operations. Detailed discussion was also had on digestion unit processes including adaptive re-use of the existing in-ground concrete tankage as a cost control measure.

Mr. Gellner reported on the findings of the detailed in-situ sampling program conducted by the Authority in October 2012.

Mr. Gellner described the odor control findings and recommendations. The technologies evaluated included Chemical Scrubbing, Carbon Absorption, and Biofiltration. Carbon absorption has the lowest capital cost as well as the lowest operating cost, and is recommended. Based on dispersion modeling and Hazen and Sawyer's experience, the Headworks Building should be ventilated to a carbon adsorption column. The aerobic digesters, if selected, should be covered, however treatment would not be required. If the IBR process is selected, due to its sequencing of air supply off for prolonged periods, covering and treatment to a carbon adsorption unit is recommended and is included in the cost data.

Mr. Stanton explained that the alternative analysis was approached in an iterative process via a series of "Sweeps", with each Sweep eliminating alternatives based primarily on net present worth costs over a 50-year life cycle. The total net present worth value took into consideration financing costs associated with the alternatives as well as operating costs such as electric/natural gas consumption, biosolids hauling/disposal, routine maintenance, special maintenance (e.g. blower replacement, diffuser cleaning) and individual equipment replacement at varying useful lives.

After the design criteria was established and initial capital construction cost estimates were determined and cost control concepts deployed, the First Sweep focused on the evaluation of raw influent pumping verses gravity flow. One of the project objectives was to avoid raw sewage pumping if possible due to the potential for equipment or power failures which could lead to raw sewage bypasses to the receiving stream or sewage basement backups. In order to avoid raw influent pumping the treatment tanks have to be placed lower in elevation and into bedrock, increasing costs for rock removal. Also, higher concrete walls are required to place the top of walls

above the 100-year flood elevation to keep the flood waters out of the tanks. Effluent pumping is also required to lift the treated wastewater above flood elevations greater than the 25-year flood. Effluent pumping however is also required for the raw influent pumping alternative because of the Authority's commitment in the Zoning Special Exception to not construct the tanks out of ground more than just several feet in order to have an aesthetically acceptable appearance.
The advantage to raw influent pumping is that it avoids the expense associated with rock removal and higher concrete walls, however its life cycle costs due to power expense, and maintenance and equipment replacement expense over a 50-year life almost completely offset the gravity flow alternative's higher capital cost. The lowest cost raw influent pumping alternative, which would use screw pumps, is $600,000 less expensive than the lowest cost gravity alternative. However, the 50-year life cycle costs for the gravity alternative is $0, whereas the pumping alternative life cycle costs are $720,000 over the 50-year life. After accounting for the financing expense for the higher capital cost gravity alternative, the Life Cycle Net Present Worth difference is only $37,000 more the gravity alternative. Therefore, the raw influent pumping alternative and gravity alternative are considered financially equivalent.

The Board deliberated other factors including the potential for more odors associated with raw sewage pumping, the risk of pump failures which could result in sewage bypasses to the stream or backup into basements, and if screw pumps were selected, lower bearing replacement would be beyond the capabilities of staff, requiring contracted repairs. Mr. Miskis stressed the Authority's existing staffing is based on not having raw sewage pumping at the treatment plants. While the existing DC plant has a raw sewage pump station for 50% of dry weather flow, if a failure occurs, flow is automatically directed to the in-ground plant. If the new plant has a raw sewage pump station there will be increased staffing demands, including mandatory callout requirements in the union contract. Mr. Stanton and Mr. Miskis both recommended the gravity alternative despite the higher capital cost. The Board concurred.

Disinfection alternatives evaluated included Ultraviolet (UV) Disinfection and Sodium Hypochlorite (i.e. chlorine bleach). Sodium Hypochlorite has the lower capital cost, as well as lowest Net Present Worth by $535,000 based on 50-year life cycle costs. UV also has operating costs risks associated with uncertainty as to future power costs, and operational concerns associated with algae that grow in the final clarifiers' trough and weirs which have to be periodically cleaned. With UV disinfection preventive measures have to be included to keep the algae from accumulating on the UV tubes, which consists of a tight array of tubes submerged in the clarifier effluent. To prevent the algae growth the clarifier weirs and effluent troughs need to be covered, adding cost. Furthermore, with Sodium Hypochlorite there is a chlorine contact tank, which traps the algae cleaned from the clarifier weirs, preventing its escape to the receiving stream. Two other items noted by Mr. Stanton included the need to retain some level of chlorination of the Return Activated Sludge to assist with settleability and use of sodium hypochlorite use meets a key project objective by eliminating the use of chlorine gas. Based on both cost concerns and operational concerns Sodium Hypochlorite is recommended. The Board concurred.

Other significant recommendations for cost control including deleting grit and grease removal, deleting solar panels, and the use of square clarifiers which allow common wall construction with each other and the aeration tanks. While square clarifier solids separation performance is considered not as good as circular clarifiers due to hydraulic imbalances in square clarifiers, the modified square clarifiers in use at the Brush Run plant are performing exceptionally well. The capital cost savings by using the square clarifiers instead of circular clarifiers is approximately $340,000.

The Second Sweep focused on the biological process for wastewater treatment and biosolids stabilization. Mr. Stanton described and compared the Conventional Activated Sludge alternative and Vertical Loop Reactor alternative. Both treatment processes would meet the Authority's objectives and the NPDES Permit's discharge limits. Both alternatives are also readily adaptable to future nutrient limits. The Conventional Activated Sludge alternative offers the lowest capital cost a $2,044,000 (aeration tanks, and associated equipment), whereas, the Vertical Loop Reactor alternative's capital cost is $2,305,000. However, the Vertical Loop Reactor's 50-year life cycle costs are $556,000 lower.

Next the life cycle costs for Aerobic Digestion and the Interchange BioReactor alternatives were compared. When combined with the Vertical Loop Reactor, the IBR process's 50-year life cycle costs is $1,000,000 less than the Conventional Activated Sludge coupled with Aerobic Digestion alternative. The VLR/IBR process 50-year life cycle cost is $635,000 lower than the Conventional Activated sludge process with the IBR.

Combining the biological alternatives and the alternative of re-using the existing in-ground tanks or construct new tanks for biosolids stabilization the following matrix of Net Present Worth cost alternatives summary is arrived at (Summarized from Table 3-54 and 3-55 of report):

Biological/Solids Net Present Worth Matrix				
Biological Alternative	CAS	CAS	VLR	VLR
Biosolids Alternative Digestion	New Digester	Re-use Existing for Digesters	New Digesters	Re-use Existing for Digesters
Alternative No.	**D**	**E**	**J**	**K**
Net Present Worth	$13,672,000	$13,377,000	$13,670,000	$13,375,000
Biological Alternative	VLR	VLR	CAS	CAS
Biosolids Alternative IBR	New IBR	Re-use Existing for IBR	New IBR	Re-use Existing for IBR
Alternative No.	**S**	**T**	**O**	**P**
Net Present Worth	$12,741,000	$12,650,000	$13,370,000	$13,290,000

CAS = Conventional Activated Sludge
VLR = Vertical Loop Reactor
IBR = Interchange BioReactor

The Conventional Activated Sludge with Aerobic Digestion alternative lowest Net Present Worth cost alternative is Alternative E at $13,377,000, which includes re-use of the existing in-ground tanks as the aerobic digesters. The wall height of these existing tanks will need to be raised three feet to protect from the 25-year flood.

The overall lowest Net Present Worth alternative is Alternative T, Vertical Loop Reactor with IBR at $12,650,000, which is $727,000 lower than Alternative E. Mr. Gellner pointed out that in order to realize the operating savings the process requires to be operated under certain low dissolved oxygen conditions, especially to achieve the projected reduction in biosolids production. The process would be a completely different operating process and there would be a learning curve for staff and Management. In addition, the Authority would then have two treatment plants with different operating philosophies. Ms. Kaminsky asked Management if it would be acceptable to them if a process out of their comfort zone were selected? Mr. Miskis replied that while the 50-year life cycle savings of $727,000 is significant, on an annual average basis the savings are $14,500/year. Management's expectations of the savings by going to the IBR process were

significantly higher, on the order of $40,000 to $50,000/year. If that had been the case, even if some of the savings did not materialize, there might still be $30,000/year in operational savings. With the projected savings at only $14,500/year on average, there is a chance that there may not be any savings at all. That being the case Mr. Miskis indicated his recommendation was to stay with the treatment process we are comfortable with, Conventional Activated Sludge with Aerobic Digestion. It is also the lower capital cost alternative by $800,000, and since we are over our capital budget that has weight. The Board generally concurred.

Mr. Stanton then discussed the advantages and disadvantages of adaptive re-use of the existing in-ground tanks for digestion verses construction of new aerobic digestion tanks adjacent to the new aeration tanks. Re-use of the above ground package plant was not considered viable due to the cost to rehabilitate the tanks, including addressing the tilt of the tank and stabilizing the subsurface to prevent future settlement. The cost savings by adaptive re-use of the in-ground tanks would be approximately $281,000. The Board deliberated the matter extensively. The existing tanks were constructed in 1964 and in the early 1970s, making them 40 to 50 years old. Based on a visual inspection they appear to be in good shape. However, there is a unquantifiable cost risk associated with the rehabilitation because detail design of re-use of the tanks needs to occur. Something may be discovered that may add to the cost. In addition, the contractor bids maybe higher because of the unknown factors with the tanks. If the existing tanks are utilized the entire treatment process would be split between the two sites, which would be an operational disadvantage. Utilization of the existing tanks, with the addition of three feet of wall height, would only protect to the 25-year flood level, whereas, the new tanks located on the Legion site would be protected to the 100-year flood level. The Board consensus was to proceed with design based on constructing new aerobic digesters on the Legion site. The value of having the new tanks and everything on one site outweighed the potential cost savings, after considering all the unknowns associated with re-use of the existing in-ground tanks.

The Board after the deliberation of the aforementioned topics listed as well as other items the consensus was to proceed with the Alternative D, Conventional Activated Sludge with Aerobic Digestion with new digestion tanks for an estimated total construction cost of $14.7 million. This value is in projected 2015 dollars. This is over the Authority's construction budget objective of $13 million, however, there is $1.27 million of contingency in the construction estimate, and even if the contingency has to be used the anticipated monthly cost to our customers would still we slightly less than monthly rate of $47 projected in the Act 537 Plan (with a Pennvest loan) because the 537 Plan estimate had not anticipated that the Authority would pay all engineering fees with surplus funds, which we are in the process of accomplishing.

Mr. Stanton will make the necessary revisions and deliver the final report to the Authority.

A Motion was made by Mr. Grimm and seconded by Mrs. Kaminsky to adjourn the meeting at 10:17 p.m. The Motion carried unanimously.

Respectfully Submitted,

Patricia L Mowry

MOTIONS SUMMARY

MOTION NO.	MOVED	SECOND	MOTION SUMMARY TABLE	VOTE
1	Grimm	Kaminsky	Adjourn meeting at 10:17 pm	Unanimous