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SAANICH PENINSULA WASTEWATER COMMISSION

Notice of Meeting on **Thursday, November 21, 2013 at 9:15 am**
Saanich Peninsula Treatment Plant Meeting Room, 9055 Mainwaring Road, North Saanich, BC

G. Orr	M. Lougher-Goodey	J. Bill	A. Bryson
T. Daly	M. Doehnel	Z. King	M. Loveless
J. MacGowan	E. McMurphy	Pauquachin First Nation	M. Williams

AGENDA

1. Approval of Agenda
2. Adoption of Minutes of June 20, 2013
3. Chair's Remarks
4. Review of Task List of June 20, 2013
5. 2014 Capital and Operating Budget
6. Saanich Peninsula Treatment Plant Wastewater and Marine Environment Program 2012 Annual Report and Update on Technical Water Quality Review Panel Activities
7. Thermal Energy Recovery System – System Improvement and Optimization Plan Update
8. New Business
9. Adjournment

Distribution:

Staff / Town Halls, etc.

R. Lapham
D. Green
G. Harris
C. Lowe
L. Hutcheson
A. Liu
D. Lokken
C. Mitchell
A. Orr
J. Poncelet
T. Robbins
P. Sparanese
D. Robson
D. Telford
M. Montague
Commission file
P. Robbins, Central Saanich
D. McAllister, Central Saanich
R. Buchan, North Saanich
P. O'Reilly, North Saanich
Chief W. Morris, Tsartlip

To ensure a quorum, advise Margaret at 250.474.9606 if you or your alternate cannot attend.

1449153

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Minutes of a Meeting of the Saanich Peninsula Wastewater Commission
Held June 20, 2013 in the Saanich Peninsula Treatment Plant Meeting Room
9055 Mainwaring Road, North Saanich, BC

PRESENT: **Commissioners:** G. Orr (Chair), M. Lougher-Goodey (Vice-Chair), A. Bryson, T. Daly, M. Doehnel, Z. King, M. Loveless, J. MacGowan, E. McMurphy, M. Williams
Staff: T. Robbins, General Manager, Integrated Water Services; D. Telford, Senior Manager, Environmental Engineering; A. Lui, Manager, Environmental Engineering; D. Green, Environmental Science Officer 4; M. Montague (recorder)
Also present: P. O'Reilly, North Saanich
ABSENT: J. Bill

The meeting was called to order at 9:32 am.

1. APPROVAL OF AGENDA

MOVED by Commissioner Loveless, **SECONDED** by Commissioner Lougher-Goodey,
that the Saanich Peninsula Wastewater Commission approve the agenda as circulated.

CARRIED

2. ADOPTION OF MINUTES

MOVED by Commissioner Loveless, **SECONDED** by Commissioner MacGowan,
that the Saanich Peninsula Wastewater Commission adopt the minutes of the February 21, 2013 meeting as previously circulated.

CARRIED

3. CHAIR'S REMARKS

The Chair noted that:

- At the CRD Board meeting held June 12, 2013 concern was expressed about reconsidering the policy decision to not apply biosolids to land because of the risks to the environment. A motion was made to direct staff to bring forward a report outlining the economic, social and environmental implications for both the core area liquid waste management program and other regional impacts to the Board for reconsideration of the sludge and biosolids management policy for the region.
- The final report on the energy audit was presented to the Peninsula Recreation Commission on March 28. The Commission requested staff to provide information on potential funding options and timelines of the recommendations from the Energy Audit, and identify priorities for the implementation of the recommendations from the Energy Audit and follow-up with BC Hydro to obtain details as to what they may partially fund from the recommendations.

4. REVIEW OF TASK LIST OF FEBRUARY 21, 2013

The task list was reviewed.

Regarding Item 1 of the task list entitled Saanich Peninsula On-site Septage,
MOVED by Commissioner Bryson, **SECONDED** by Commissioner MacGowan,
that the Saanich Peninsula Wastewater Commission request further information regarding revenue projections, a closer estimate of what capital costs would be regarding direct connections and mitigating impacts on the neighbourhood, and that a risk analysis be conducted.

CARRIED

5. SAANICH PENINSULA STORMWATER SOURCE CONTROL SERVICE ESTABLISHING BYLAW

D. Green spoke to the report.

MOVED by Commissioner Lougher-Goodey, **SECONDED** by Commissioner Loveless,
that the Saanich Peninsula Wastewater Commission recommend to the CRD Board that Bylaw No. 3906 "Saanich Peninsula Stormwater Source Control Service Establishment Bylaw No. 1, 2013 be introduced and read a first and second time, and read a third time.

CARRIED

6. SAANICH PENINSULA STORMWATER QUALITY ANNUAL REPORT – 2012

Following discussion of the report, it was suggested that sediment sampling and analysis at discharges be discontinued where low chemical contaminant levels have been confirmed, but that they are sampled at least once every five years as part of a long-term strategy to monitor for changes.

MOVED by Commissioner Loveless, **SECONDED** by Commissioner Lougher-Goodey,
that the Saanich Peninsula Wastewater Commission:

1. receive the executive summary of the *Saanich Peninsula Stormwater Quality Annual Report – 2012* for information;
2. endorse the program recommendations on pages vi and vii of the attached executive summary, as amended, and encourage the jurisdictions involved to continue their stormwater quality improvement work; and
3. forward copies of the report *Saanich Peninsula Stormwater Quality Annual Report – 2012* to the participating municipalities of the District of Central Saanich, the District of North Saanich and the Town of Sidney.

CARRIED

7. THERMAL ENERGY RECOVERY SYSTEM – SYSTEM IMPROVEMENT UPDATE

MOVED by Commissioner Loveless, **SECONDED** by Commissioner Bryson,
that the Saanich Peninsula Wastewater Commission receive the report for information.

CARRIED

D. Telford provided an update on the Panorama Recreation thermal energy recovery system. Commissioner Bryson enquired whether there is an opportunity, under a PhD program through universities or institutions, for someone writing their thesis to focus on this system and create a reporting function in order to capture some of the lessons learned throughout this project.

MOVED by Commissioner Bryson, **SECONDED** by Commissioner Lougher-Goodey,
that the Saanich Peninsula Wastewater Commission direct staff to communicate with the appropriate faculty at local institutions about this project and the opportunity for someone looking for a topic for their thesis.

CARRIED

8. NEW BUSINESS

- It was noted that there were a number of speakers at the last CRD Board meeting that spoke against the Viewfield Road site in Esquimalt for a biosolids facility.

9. ADJOURNMENT

MOVED by Commissioner King, **SECONDED** by Commissioner Lougher-Goodey,
that the Saanich Peninsula Wastewater Commission meeting be adjourned at 10:53 am.

CARRIED

CHAIR

SAANICH PENINSULA WASTEWATER COMMISSION
Meeting held June 20, 2013

TASK LIST

	TASK	ACTION	STATUS
1.	**Saanich Peninsula On-site Septage** Report back to the Commission as to what the cost and practical implications would be in order to perform the investigative work on potential septage receiving at the Saanich Peninsula treatment plant.	T. Robbins	November
2.	**Saanich Peninsula Stormwater Monitoring Program** Redirect program resources by reducing ambient shoreline monitoring efforts in 2013 as required to investigate potential contaminant sources associated with current high-rated discharges and report back to the Commission in early 2014.	G. Harris	Ongoing
3.	**Thermal Energy Recovery System – Performance Optimization Plan** a) Add a new item in the 5 year capital plan to include the integration and optimization of heat recovery and pool heating systems in the amount of $20,000, should it be needed. b) Proceed with improvement opportunities 1, 3 and 5; report back to the Commission once they are completed; and request further direction on the other improvement opportunities. c) Provide an update on improvement opportunities 3 and 4 at the next meeting.	A. Liu A. Liu A. Liu	Ongoing November November
4.	**2013 Operating and Capital Budget** Provide a report clarifying the Source Control Stormwater budget.	G. Harris	

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REPORT TO SAANICH PENINSULA WASTEWATER COMMISSION
MEETING OF THURSDAY, NOVEMBER 21, 2013

SUBJECT 2014 OPERATING AND CAPITAL BUDGET

ISSUE

This report provides a synopsis of the 2014 operating and capital budget, highlighting the proposed significant changes. The report generally follows the sequence of information provided in the draft budget document.

BACKGROUND

2013 Operating Expenditures and Revenue

The actual 2013 overall operating expense is estimated to be under budget by $321,984 primarily due to lower expenditures on equipment and structure repairs, labour costs and contract for services costs. The 2013 capital reserve fund transfer was increased by $348,551 to balance the projected year end budget.

Although the operating expenses are almost entirely funded through requisition based on each participant's percentage of total wastewater input, the District Energy System is projected to generate $120,000 in revenue from the sale of energy to the Panorama Recreation Centre.

2014 Operating Expense

A net 5.35% decrease in the 2014 operating expense in the amount of $165,405 is planned and results primarily from an adjustment to labour and contract for services costs and adjustments to some of the operating expenses, including electricity cost increases.

2014 Operating Revenue

As noted previously, although the operating expenses are almost entirely funded through requisition based on each participant's percentage of total wastewater input, the District Energy System is projected to generate $120,000 in revenue from the sale of energy to the Panorama Recreation Centre in 2014. 2014 cost sharing percentages based on prior year flows are being finalized, and are not expected to change significantly from the 2013 cost sharing figures. The overall requisition for 2014 is $61,931 which equates to a 1.95% increase.

2014 Capital Budget

The planned capital expenditures for 2014 total $690,000 funded from capital reserves. The 2014 capital program consists of six new projects, mostly related to upgrades to treatment plant equipment that is at the end of the service life, including replacing the treatment plant roof membrane, replacing the biofilter structure, and installing a corrosion protection system on the Bazan Bay outfall.

The planned transfer to the capital reserve fund in 2014 is $393,050. At year end 2013, the capital reserve fund balance is estimated to be $1,979,286. Other funding sources available for capital expenditures include the Development Cost Charge reserve fund in the amount of $749,789 and an equipment replacement fund with a balance of $736,054.

Saanich Peninsula Wastewater Debt

The Saanich Peninsula Wastewater Capital Debt expenditures decrease by $540,629 in 2014. The remaining debt will be retired in 2016.

Saanich Peninsula Environmental Programs

The programs and service levels for the Saanich Peninsula Liquid Waste Management Plan administration and Stormwater Quality Management and Source Control are intended to remain unchanged for 2014 and are projected to be on budget for 2013.

RECOMMENDATIONS

That the Saanich Peninsula Wastewater Commission recommend that the CRD Board:

1. Approve the 2014 Operating and Capital Budget;

2. Approve the 2014 debt budget;

3. Approve the 2014Environmental Services program budgets that are incorporated in the Saanich Peninsula Wastewater service, including Liquid Waste Management Plan Implementation, Saanich Peninsula Stormwater Quality Management, and Saanich Peninsula Source Control Stormwater; and

4. Balance the 2013 actual revenue and expense on the transfer to capital reserve fund.

Ted Robbins, BSc, CTech
General Manager, Integrated Water Services

TR:mm

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REPORT TO SAANICH PENINSULA WASTEWATER COMMISSION
MEETING OF THURSDAY, NOVEMBER 21, 2013

SUBJECT **SAANICH PENINSULA TREATMENT PLANT WASTEWATER AND MARINE ENVIRONMENT PROGRAM 2012 ANNUAL REPORT AND UPDATE ON TECHNICAL WATER QUALITY REVIEW PANEL ACTIVITIES**

ISSUE

The Capital Regional District (CRD) discharges municipal wastewater from the Saanich Peninsula Treatment Plant (SPTP). Regulatory requirements include assessment of potential impacts of the outfall on the marine receiving environment by the Wastewater and Marine Environment program (WMEP). This report presents the results of the 2012 program.

The SPTP Technical Water Quality Review Panel (TWQRP) was resurrected by the Commission in 2011 and given the mandate to determine the need for effluent disinfection at the treatment plant. This report also summarizes the panel's activities since September 2012.

BACKGROUND

The Saanich Peninsula Liquid Waste Management Plan contains a commitment to carry out a monitoring program for the treatment plant and report to the Ministry of Environment (MOE). The program was developed in collaboration with the Marine Monitoring Advisory Group (MMAG) and implemented in 2004. The 2012 program consisted of the following components:

- regular (daily, weekly and monthly) analysis of wastewater for regulatory compliance parameters, treatment plant performance and quarterly analysis for priority substances
- monthly analysis of biosolids for fecal coliforms, golden nematodes and metals (only when produced)
- monthly monitoring of receiving waters for fecal coliforms and nutrients

The executive summary of the report, *Saanich Peninsula Treatment Plant Wastewater and Marine Environment Program 2012 Annual Report*, by the CRD Environmental Protection division, is attached as Appendix A. The complete report is available on request from the CRD Parks & Environmental Services department.

Upon recommendation by the original panel to reconvene after 10 years of plant operation, the Commission resurrected the TWQRP in 2011 and delegated those responsibilities to MMAG with support from CRD staff. Panel membership was extended beyond MMAG and invitations were sent out for representatives from Environment Canada, local First Nations and other relevant agencies.

The federal government declined to participate on the panel. Currently, the federal government regulates wastewater outfalls through the relatively new *Wastewater Systems Effluent Regulations* under the *Fisheries Act*. These regulations have no requirements with respect to the need for disinfection. The federal government is also responsible for the protection of

shellfish resources through the *Canadian Shellfish Sanitation Program*. However, this program only comes into play when there are significant native shellfish resources or mariculture potential in the specific area of interest. To date, no significant shellfish resources or mariculture proposals have been identified within the area of impact for the SPTP outfall.

The Tsawout First Nation and representatives from this community expressed interest in participating. Program staff are also working with the Manager, Aboriginal Initiatives to invite other First Nations with interests in the Bazan Bay area. These efforts are ongoing.

As reported in September 2012, staff engaged a consultant to review surface water monitoring results and identify any increasing or decreasing trends in bacteriological indicators. This assessment will ultimately be the foundation of the panel's decision-making process. The panel reviewed the consultants report in 2012 and asked staff to determine if there are additional external sources of surface water data for Bazan Bay, and to include data from other outfalls in the area and any samples collected by Island Health (formerly Vancouver Island Health Authority). This data compilation is ongoing and an update will be provided at a later date.

ALTERNATIVES

That the Saanich Peninsula Wastewater Commission:

1. receive the Technical Water Quality Review Panel progress update for information;

2. a) receive the *Saanich Peninsula Treatment Plant Wastewater and Marine Environment Program 2012 Annual Report* for information; and

   b) forward a copy of the report *Saanich Peninsula Treatment Plant Wastewater and Marine Environment Program 2012 Annual Report* to the Ministry of Environment.

3. not receive the *Saanich Peninsula Treatment Plant Wastewater and Marine Environment Program 2012 Annual Report* and its recommendations.

SOCIAL IMPLICATIONS

Staff continue efforts to engage First Nation communities with interests in the Bazan Bay area through invitations to participate in the review panel. Any signficant First Nation shellfish resources identified through the review process must be considered when assessing the need for disinfection.

ENVIRONMENTAL IMPLICATIONS

The 2012 WMEP sampling design was similar to previous years, with the addition of the required four-year seafloor monitoring component (i.e., 2004, 2008, 2012, etc.). Historically the program design is reviewed and approved by the MMAG however, based on a collaborative review undertaken by CRD and MOE staff in 2011/2012, program changes were made to satisfy new regulatory expectations and implemented in January 2013. These changes are summarized in Appendix B. The monitoring results indicated that the plant and its discharge are in compliance with the regulatory framework.

The results of the seafloor monitoring component are only partially available at this time. Assessment of the available sediment chemistry results is provided in the 2012 annual report. A more comprehensive assessment, including the benthic invertebrate data, will be provided in next year's annual report.

To date, the information does not indicate any need for effluent disinfection at the SPTP however, assessments are ongoing.

FINANCIAL IMPLICATIONS

The routine components of the program are included in the annual budget, including the seafloor monitoring component which is required every four years. The revised program implemented in 2013 was designed from a cost-neutral standpoint and no budget increases are necessary for its implementation. All review panel activities are included in the annual budget.

CONCLUSIONS

The Saanich Peninsula Treatment Plant effluent quality met all operating objectives and regulatory monitoring requirements on all sampling dates in 2012. Effluent and seafloor sediment quality monitoring indicated low potential for negative effects on the marine receiving environment from the discharge. Surface water fecal coliform data indicated low potential for health effects from recreation activities or shellfish harvesting near the outfall. Nutrient concentrations showed no effect from the discharge and were within expected ranges.

It is anticipated that the review panel will conclude their assessment and report to the Commission in 2014.

RECOMMENDATIONS

That the Saanich Peninsula Wastewater Commission:

1. receive the Technical Water Quality Review Panel progress update for information;

2. a) receive the *Saanich Peninsula Treatment Plant Wastewater and Marine Environment Program 2012 Annual Report* for information; and

   b) forward a copy of the *Saanich Peninsula Treatment Plant Wastewater and Marine Environment Program 2012 Annual Report* to the Ministry of Environment.

Glenn Harris, Ph.D., R.P.Bio.
Senior Manager, Environmental Protection

Ted Robbins
General Manager, Integrated Water Services
Concurrence

CL:cam
Attachment: 1

SAANICH PENINSULA TREATMENT PLANT
WASTEWATER AND MARINE ENVIRONMENT PROGRAM
2012 ANNUAL REPORT

EXECUTIVE SUMMARY

The Capital Regional District (CRD) has been operating the Saanich Peninsula Treatment Plant (SPTP) since February 2000. The treatment plant serves North Saanich, Central Saanich and the Town of Sidney, as well as the Victoria International Airport, the Institute of Ocean Sciences and the Tseycum and Pauquachin First Nations communities. It is a conventional secondary level wastewater treatment plant which has periodically produced Class A biosolids. The plant has been in operation since 2000. The treatment plant discharges into the marine receiving environment (Bazan Bay) through an outfall located approximately 1,580 metres from the shoreline at a depth of 30 metres.

As part of the Saanich Peninsula Liquid Waste Management Plan (LWMP), the CRD committed to develop a long-term monitoring program. CRD Environmental Sustainability staff reviewed the pre-discharge monitoring data (1998 to 2000), in conjunction with the post-discharge monitoring results (2000 to 2003), and developed the long-term monitoring program in consultation with the Marine Monitoring Advisory Group (MMAG). This program has been in place since 2004. A more recent review of the program was conducted in 2011 and 2012 in collaboration with BC Ministry of Environment (MOE) staff to determine whether revisions are necessary to satisfy changing regulatory monitoring expectations.

The 2012 Wastewater and Marine Environment Program consisted of the following components:

- daily, weekly and monthly analysis of wastewater for compliance monitoring and treatment plant performance parameters, and quarterly analysis for priority substances
- monthly surface water monitoring at two stations for nutrients and fecal coliforms

A revised monitoring program, based on the collaborative CRD/MOE review, was implemented in January 2013. The initial results of this new monitoring program will be presented in next year's annual report.

WASTEWATER MONITORING

Compliance Monitoring and Treatment Plant Performance

The CRD conducted wastewater monitoring on a regular basis to profile the chemical and physical constituents of influent and effluent and determine concentrations relative to regulatory limits. Parameters monitored for compliance with the operational certificate under the Saanich Peninsula LWMP were below the effluent regulatory limits. Influent and effluent quality was within expected ranges and met all treatment plant operating objectives.

Priority Substances

In addition to the compliance and treatment plant performance monitoring, over 200 substances were analyzed in the SPTP influent and effluent. These substances were monitored to more comprehensively assess risks of the wastewater discharge to organisms living in the marine environment around the outfall. More than half of these (~60%) were below chosen analytical detection limits in 2012. Substances that were detected above analytical detection limits in more than 50% of samples included most of the conventional variables, metals (both total and dissolved), total phenols and some polycyclic aromatic hydrocarbons (PAH). Most substances were below BC and Canadian Water Quality Guidelines (WQG), even in undiluted effluent. Only weak acid dissociable cyanide, chromium IV, copper, iron and zinc exceeded guidelines in undiluted effluent. However, WQG must be met outside of the initial dilution zone (IDZ) (i.e., an area with a radius of approximately 100 metres around the outfall). To predict levels at the edge of the IDZ, estimated minimum initial dilution factors were applied to all parameters. All substances were predicted to be below WQG after the application of this dilution factor, including those

substances that were above guidelines in undiluted effluent. As a result, it is not likely that significant effects on aquatic life will occur from the substances being discharged.

BIOSOLIDS MONITORING

No biosolids were produced at the SPTP in 2012. All sludge generated at the facility was disposed of at the Hartland landfill. As such, there was no biosolids monitoring in 2012.

SURFACE WATER MONITORING

Fecal Coliforms

Similar to previous years, surface water fecal coliform results were low at stations in Bazan Bay, with annual geometric means of less than 2 CFU/100 mL for each station in 2012. There were no elevated fecal coliform concentrations (e.g., above 200 CFU/100 mL) observed at any station on any sampling date.

Overall, results indicate that adverse health effects from recreational primary contact activities and shellfish harvesting are not expected. However, an area of approximately 3.75 km^2 around the outfall is closed for shellfish harvesting as standard Fisheries and Oceans Canada (DFO) procedure near industrial and sanitary wastewater outfalls. Shellfish closures have a minimum radius around an outfall of 300 metres, but closure areas are usually larger near bigger urban centres, such as for the SPTP outfall, where there are other potential sources of bacterial contamination in addition to the wastewater outfall (e.g., stormwater discharges).

Nutrients

There were no distinguishable differences in nutrient concentrations in 2012 between the station immediately above the outfall terminus and the station monitored as a reference. Results were within the ranges measured in previous years and those of the pre- and post-discharge assessment programs. As was observed in previous monitoring years, high variability, both spatially and temporally, was evident in the data. Fluctuations in nutrient concentrations are attributed to natural variation in the study area. Overall, there was no evidence of an effect on nutrient concentrations in the receiving environment from the SPTP discharge.

SEAFLOOR

Seafloor monitoring was conducted in 2012. Due to delays with the benthic invertebrate taxonomic consultant, results for this monitoring component are not yet available. Results will be presented in the next year's annual report.

The concurrently collected sediment chemistry data is available and concentrations in 2012 were similar to levels measured in previous years. There were no exceedances of the applicable sediment criteria set to protect marine life. Overall, the data indicate sediment quality has not likely been significantly affected by the outfall and risks to organisms living near the seafloor around the outfall are low.

OVERALL ASSESSMENT

Based on tests used to monitor effluent quality, surface waters and the seafloor sediment quality in 2012, no significant adverse effects from the SPTP discharge on the receiving environment were detected. Results were similar to previous years. Influent and effluent quality was within expected ranges and met all regulatory limits and operating certificate compliance requirements on all sampling dates. All substances for which there are BC WQG met these guidelines when the estimated minimum initial environmental dilution of the effluent was factored in, indicating that the predicted levels of substances in the environment were not likely to be at concentrations of concern to aquatic life. Surface water fecal coliform data indicated that adverse health effects on recreational activities or shellfish consumers were not expected. Surface water nutrient concentrations were within ranges measured in previous monitoring programs and showed no detectable effect from the discharge. Finally, sediment quality has

not likely been significantly affected by the outfall, based on observations of similar concentrations relative to previous years as well as a lack of sediment criteria exceedances.

Appendix B - Revisions to the Saanich Peninsula Treatment Plant Wastewater and Marine Environment Program sampling design

Component	Previous Program (2001 to 2012)	Revised Program (2013 and ongoing)
Wastewater	Quarterly Influent and Effluent Monitoring	Quarterly Influent and Effluent Monitoring
	Quarterly extra sampling for substances of concern	Quarterly extra sampling for substances of concern
		Annual acute and chronic toxicity testing[1]
Surface Water	26 surface stations sampled monthly for bacteriology[2]	15 surface stations sampled 5 times in 30 days in January and July for bacteriology[2]
	2 of the surface stations sampled for depth integrated nutrients and conventionals (Outfall and Reference) monthly	2 of the surface stations (Outfall and Reference) sampled at 3 depths, 5 times in 30 days in January and July for nutrients and conventional parameters
		4 IDZ stations sampled at 3 depths, 5 times in 30 days in January and July for bacteriology
		4 IDZ stations sampled at 3 depths, 1 time in 30 days in January and July for nutrients and metals
Seafloor	2 stations sampled every 4 years for benthic community structure and sediment chemistry[3]	2 stations sampled every 4 years for benthic community structure and sediment chemistry[3]

Notes:

[1] **ACUTE**
Rainbow Trout LC50
Dahpnia Magna LC50
CHRONIC
Rainbow Trout Survival & Hatching Success
Echinoderm fertilization
7-day Ceriodaphnia
7-day top smelt

[2] Fecal coliforms and Enterococci

[3] There have been no exceedences to any sediment quality guidelines around the SPTP outfall in 1999, 2004 or 2008. Therefore, sediment toxicity and bioaccumulation testing have not been proposed for the SPTP.

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REPORT TO SAANICH PENINSULA WASTEWATER COMMISSION
MEETING OF THURSDAY, NOVEMBER 21, 2013

SUBJECT **THERMAL ENERGY RECOVERY SYSTEM – SYSTEM IMPROVEMENT AND OPTIMIZATION PLAN UPDATE**

ISSUE

At its meeting of February 21, 2013, the Saanich Peninsula Wastewater Commission (SPWWC) directed staff to proceed with the three system improvements identified in the Performance Optimization Plan dated February 21, 2013.

BACKGROUND

The Saanich Peninsula wastewater treatment plant (SPWWTP) heat recovery system was commissioned in February 2011 and has supplied treatment plant effluent waste heat to the Panorama Recreation Centre (PanRec) for heating its swimming pools since then. In the ongoing piloting and optimization of the heat recovery system performance, six areas were identified in the Performance Optimization Plan as opportunities for operational improvement and data management.

The SPWWC, at its February 21, 2013 meeting, directed staff to proceed with the following three improvements:

- Item 1 – Mini-plant Energy Cost Reduction
- Item 3 – Waste Heat Metering
- Item 5 – By-pass Strainer Corrosion Protection

Items 1 and 5 were implemented in March and May; the results were reported to the SPWWC at its June 20, 2013 meeting.

Update of System Improvement

Item 3 – Waste Heat Metering

The energy billings to PanRec are based on the energy (BTU) meter reading at the mini-plant. In late September 2011, it was determined that the BTU meter should have been installed on the output side of the heat pump rather than the input side, where it is presently located. Due to the significant estimated cost for relocating the BTU meter, it was decided that a compensation calculation could be used to determine the energy supplied to PanRec. The compensation calculation was considered to be a reasonable solution, but did represent a level of uncertainty in the billing amount to PanRec.

With the assistance of PanRec staff, an alternative location was found for installing the new BTU at a reduced cost compared to the previous proposed location.

The new BTU meter was commissioned on July 31, 2013 and data was collected for approximately 17 days. After that there were various problems experienced with the SCADA system and the new BTU meter during the months of August, September and October. In addition, in September there was a scheduled shut down of the pools for two weeks and therefore a very limited amount of reliable data can be collected. However, based on the data collected, the energy readings from the new BTU meter are within 2% as compared to the values obtained by the compensation calculation. Since this observation was based on limited data, a comprehensive review will be conducted when a full year's data is available. Staff is also currently reviewing the SCADA programming to ensure that all the monitoring data is integrated properly.

Update on Optimization Plan

There were six areas identified in the Performance Optimization Plan as opportunities for operational improvement and data management. Three improvements have been completed and the results were reported to the SPWWC. The update on the remaining three system improvement areas is as follows:

Item 2 – Heat Exchanger Building Electricity Metering

As reported at the February 2013 SPWWC meeting, the estimated cost for a separate power feed to the building and installation of a BC Hydro billing meter system would be $24,000. There is no economic benefit to be derived from having separate billing meters that would justify the capital expenditure required.

Staff has added a programming step to the SCADA system which now generates a monthly electrical power consumption report from the heat exchanger building. The cost of the power is manually calculated and transferred from the treatment plant cost centre to the heat recovery system cost centre.

Item 4 – Integration and Optimization of Heat Recovery System and Pool Heating System

The design intent was to harmonize the heat recovery system with the existing pool heating system. During the commissioning phase staff noticed the heat recovery system and the pool heating system had not been integrated properly. After the trouble-shooting investigation in November 2011, it was decided that the ice rink and HVAC heat pumps should be taken offline and the heat recovery system be used as the primary source for the pool with the pool gas boilers providing backup. This operating arrangement has been performing very well in meeting the pool's heating needs.

In October 2012, PanRec staff retained Stantec Consulting to conduct an energy study of the overall recreation facility and also to determine the practicality and cost of expanding the current mini-plant thermal energy loop to include serving the ice rink area. This review confirmed that there are some design deficiencies existing in the original pool heating system which impact on the integration of the two heating systems. Stantec identified the following three possibilities that could potentially lead to poor performance and premature failure of the ice rink and HVAC heat pumps when used to supply heat to the pool:

- short circuiting of heated water from outlet to inlet side of the heat pumps
- excess system capacity when operating at partial loading
- issue with commissioning or control sequences

The actual problem is likely a combination of these possibilities and the addition of the mini-plant heat pump may have increased the possibility for short circuiting.

Stantec's study recommends that further investigation should be done before any further system changes are made to re-introduce the ice rink and HVAC heat pumps back into the pool heating loop system.

Based on the results from Stantec's study, staff from PanRec and Environmental Engineering initiated a system operation optimization action plan focussing on solving the identified problems in a systematic manner. Staff also invited the waste heat recovery system supplier (Trane Northwest) technical personnel to be part of the action team.

Several meetings were held at PanRec to analyze the system design concept, encountered problems and develop possible solutions. The following actions were implemented:

- Pool heating loop temperature was lowered to minimize the short circuiting of heated water.
- Mini-plant operating sequences were adjusted.
- Pool heating loop control system was de-coupled from the mini-plant control system.
- Pool temperature control sensor was relocated to reduce heat demand spiking.

The above actions have significantly improved the mini-plant and pool heating system overall performance.

The short circuiting of heated water from outlet to inlet side of the heat pumps has been reduced to minimal. According to the design consultant (DEC Design) the short circuiting could be eliminated by installing a 3-way valve on the pool heating loop. However, based on Stantec's review, this installation with other modifications needed to prevent the short circuiting of heated water could cost approximately $56,000 with a payback time over five years.

A cost benefit analysis is needed to determine if the installation of the 3-way valve on the pool heating loop to allow re-introducing the ice rink heat pump is economically viable. Currently, PanRec is planning to replace the ice plant with another high efficiency system. The waste heat from the ice plant could potentially be better utilized at the ice rink areas for hot water system.

Item 6 – Pool Heating System Gas Consumption Metering

The existing gas meter is serving both the pool and arena areas. The pool heating gas consumption cannot be measured separately for monitoring purposes. PanRec is currently planning to upgrade their ice plant domestic hot water system serving the arena. A separate gas meter can be installed during this hot water system improvement and gas consumption can be measured for the arena area. By subtracting the amount from the existing gas meter, the gas consumption by the pool heating system can be determined.

ECONOMIC IMPLICATIONS

Items 1, 3 and 5 identified in the Performance Optimization Plan have been implemented with the revenue generated from 2012.

CONCLUSION

Implementation of improvement items 1, 3 and 5 has reduced operating costs and increased the accuracy of the energy billing amount to PanRec.

Based on current conditions, the other items identified in the Performance Optimization Plan do not need to be implemented.

RECOMMENDATION

That the Saanich Peninsula Wastewater Commission receive the staff report for information.

Dan Telford, PEng
Senior Manager, Environmental Engineering
Parks and Environmental Services

Ted Robbins, BSc, CTech
General Manager, Integrated Water Services
Concurrence

AL:jt