TO: Mayor and Members  
Committee of the Whole  
WARD(S) AFFECTED: WARD 2

COMMITTEE DATE: July 6, 2010

SUBJECT/REPORT NO:  
Emergency Generators and Fuel Systems at Central Utilities Plant and Hamilton Place (PW10072) - (Ward 2)

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RECOMMENDATION:

(a) That the City of Hamilton replace the existing diesel generators and associated fuelling systems at Central Utilities Plant (CUP) and Hamilton Place (HP) with Natural Gas Generators in order to come into compliance with the Technical Standards and Safety Act, 2000;

(b) That the cost of the two generators noted in Recommendation (a), estimated at approximately $800,000 be funded from the Unallocated Capital Reserve account 108020.

EXECUTIVE SUMMARY

The Corporate Facilities Management Section (CFM) of the City of Hamilton entered into the Quality Assessed Facility (QAF) program with the Technical Standards and Safety Authority (TSSA) in April 2010. The goal is to demonstrate the City’s commitment to becoming leaders in providing safe, efficient and compliant facilities. The QAF program involves a partnership with the TSSA’s technical experts and City of
Hamilton employees. The TSSA is a regulatory body that has the authority to order changes to systems, levy fines and even shut down unsafe operations when necessary. By engaging in the QAF program, however, the TSSA prefers to focus on prevention and to work with their partners cooperatively to enhance safety and ensure compliance rather than levy orders and fines. The TSSA’s specialization in the administration of safety regulations, combined with its engineering expertise, positions it to offer safety advice in the following areas of technical expertise: fuels; boilers and pressure vessels; elevating devices; operating engineers and power plants; and more under the Technical Standards and Safety Act.

The first phase of this QAF program was to review the emergency generators and associated fuel systems under the Corporate Buildings portfolio. The goal of this Phase was to ensure compliance of all generators and fuel systems to applicable legislation under the jurisdiction of the TSSA. During TSSA assessment and reporting in Copps Coliseum, Hamilton Public Library, Central Utilities Plant and Hamilton Place, a number of non-compliance items were identified, some of which were considered imminent hazards. The TSSA advised that these deficiencies must be corrected as soon as possible to ensure the safety of employees and the public.

Morrison Hershfield, a Building Engineering Sciences firm was retained by the City to perform a review in order to address the deficiencies noted during the QAF Program executed by the TSSA. The upgrading and/or replacement of the existing generators and fuel systems were investigated. A detailed review was carried out in order to verify the viability of the proposed engineering solutions and to identify advantages or potential risks associated with each of them. The recommended options included:

- Complete necessary repairs to the existing fuelling systems at Copps Coliseum and the Hamilton Public Library;
- Replacement of the Diesel Generator with a Natural Gas Generator at Central Utilities Plant; and
- Replacement of the Diesel Generator with a Natural Gas Generator at Hamilton Place.

Necessary repairs to the existing fuelling systems at Copps and Hamilton Public Library are currently underway and are estimated at $120,000. This design and repair will be funded from existing monies contained within previously approved capital works-in-progress accounts (Facility Capital Maintenance Account 3541041532). However, insufficient funds exist in this account to address the deficiencies and non-compliance items at the Central Utility Plant and Hamilton Place sites.

Additional funds are being sought to bring these sites into compliance and to allow the emergency generators to continue operations (which is a requirement of the fire code and absolutely essential to ensuring safe evacuation and life safety in the event of a power outage).

Upon identification of the non-compliant items, the fuelling systems at CUP and Hamilton Place were deemed imminent hazards. Fuelling systems can no longer be
filled and as such the existing systems cannot operate as emergency backup to the respective buildings which is a requirement of the fire code and necessary for ensuring safe evacuation of the building and life safety in the event of a power failure. Temporary portable backup generators have been installed while the issues are addressed. The existing systems at CUP and Hamilton Place have reached the end of their useful life and should be completely replaced.

Alternatives for Consideration - See Page 6

### FINANCIAL / STAFFING / LEGAL IMPLICATIONS

**Financial Implications:**

The cost to replace the existing generator and fuel systems for Central Utilities Plant and Hamilton Place is as per the chart below:

<table>
<thead>
<tr>
<th>Site</th>
<th>Option</th>
<th>Total Estimated Project Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Utilities Plant</td>
<td>Natural Gas Generator Replacement</td>
<td>$610,000</td>
</tr>
<tr>
<td>Hamilton Place</td>
<td>Natural Gas Generator Replacement</td>
<td>$190,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$800,000</strong></td>
</tr>
</tbody>
</table>

The Corporate Facilities capital program 2008 and prior has a completion percentage of approved capital (works-in-progress) in excess of 90%. Therefore, staff were not able to use this as a source of funding and is therefore recommending the City’s Unallocated Capital Reserve as the source. The projected balance of this reserve as at December 31, 2010, after commitments (not including this request) are approximately $14.1 million. Staff will assess and confirm the potential for operating savings, currently estimated at approximately $40,000 and incorporate these savings during the 2011 budget process.

**Central Utilities Plant: Natural Gas Generator Replacement**

This option comprises the replacement of the Generator due to its age and condition including the Diesel fuels system replacement. In this option, the new natural gas generator would be designed to synchronize with the utility in order to allow for “peak shaving or demand response opportunities” to reduce utility costs. A generator with continuous rating of 400 kW will be required which is equivalent to a 500 kW standby generator.

**Hamilton Place: Natural Gas Generator Replacement**

This option comprises the replacement of the Generator due to its age and condition including the Diesel fuels system replacement. In this option, the new natural gas generator would be designed to synchronize with the utility in order to allow for “peak shaving or demand response opportunities” to reduce utility costs. A generator with continuous rating of 60 kW would be required which is equivalent to a 75 kW standby generator.
The Corporate Facilities Management Section (CFM) of the City of Hamilton entered into the Quality Assessed Facility (QAF) program with the Technical Standards and Safety Authority (TSSA) in April 2010. The QAF program involves a partnership with the TSSA’s technical experts and City of Hamilton employees. This partnership represents an effective means to ensure the ongoing safety of workers, occupants and visitors of the facilities as it relates to the Technical Standards and Safety Act and associated regulations. Successful completion of the program provides a QAF designation and confirms to employees and the public that the City of Hamilton is committed to their safety in a proactive manner. It also demonstrates that the organization is a leader in maintaining safe and sound facilities and meeting approved safety standards and methodologies.

The benefits of the program include but are not limited to: reduced risk to the safety of workers, occupants, and visitors of the facility; increased ability to avoid incidents of injuries and associated liabilities; increased operational efficiencies through planned maintenance; avoidance of costly shutdowns or fines; ability to demonstrate the organization’s commitment to safety; a strong partnership between TSSA’s experts and City of Hamilton staff, creating an environment in which people work together for continuous safety and improvement; currency with changing codes, regulations and safety issues; and increased peace of mind, knowing that the Corporation is working to ensure the highest safety and environmental standards.

The TSSA is a regulatory body that has the authority to order changes to facilities, levy fines and even shut down unsafe operations when necessary. By engaging in the QAF program, the TSSA prefers to focus on prevention and work with their partners cooperatively to enhance safety and ensure compliance rather than enforce and issue fines.

A key deliverable of the program is an assessment of the facilities within the defined scope and recommended strategies and corrective actions that must be undertaken in order to ensure that the facilities are safe and compliant environments. The first phase of this QAF program focuses on emergency generators and fuel systems under the CFM portfolio.

During the assessment, the TSSA identified a number of areas of non-compliance at four of the sites investigated. Two of the sites, Central Utilities Plant and Hamilton Place, were deemed imminent hazards and replacements must be undertaken as soon as possible in order to come into compliance and ensure life safety. The other two sites, Copps and Hamilton Public Library, require repairs in order to come into compliance. Emergency Generators are required at these facilities to ensure safe evacuation from the buildings in the event of a power outage.

Additional sites are being assessed as Corporate Facilities moves forward with the QAF Program in partnership with the TSSA.
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POLICY IMPLICATIONS

Replacement of the diesel generators and systems with natural gas equipment is in line with Hamilton’s Corporate Energy Policy as it would help to reduce emissions, maintenance costs and manage utility cost proactively and efficiently through “Peak Shaving” or by entering into a Demand Response Program with the Ontario Power Authority.

RELEVANT CONSULTATION

Corporate Services, Budgets and Finance Division

ANALYSIS / RATIONALE FOR RECOMMENDATION

Central Utilities Plant:
The CUP houses the main utility power, associated transformation and major distribution for the Parking Garage, Art Gallery, Convention Centre and attached Provincial Government Building. The emergency generator located in the CUP provides standby power for life safety systems in all these facilities. The unit is a 600 V, 400 kW Diesel generator located in a dedicated space in the building basement and was installed at the time of construction of the building in 1977.

During the TSSA QAF Program site inspections, it was identified that there are a number of non-compliance items related to changing codes and the deterioration of existing systems, the equipment is not working properly, the fuelling system was not approved for filling, and the system has reached the end of its useful life and should be replaced.

Hamilton Place:
Hamilton Place Theatre receives its own utility feed. Associated transformation and major distribution is located in the basement level. The emergency generator is also located in the basement and is 600 V, 60 kW Diesel generator installed at the time of construction of the building in the mid-1970's. It provides standby power for life safety systems in the facility.

During the TSSA QAF Program site inspections, it was identified that there are a number of non-compliance items related to changing codes and the deterioration of existing systems, the equipment is not working properly, the fuelling system was not approved for filling, and the system has reached the end of its useful life and should be replaced.

Back-up generators are required as part of the Life Safety Systems as outlined in the TSSA assessment and reporting on Hamilton Place and Central Utilities Plant, the fuelling systems in these two facilities can no longer be filled. Consequently, the existing systems cannot operate as emergency back up to the respective buildings which is a requirement of the fire code and necessary for ensuring safe evacuation of the building and life safety in the even of a power failure. In the meantime, as a precautionary
measure, temporary portable generators have been installed while the issues are addressed.

The existing systems are thirty plus years and have reached the end of their useful life and should be completely replaced.

**ALTERNATIVES FOR CONSIDERATION:**

**Central Utilities Plant and Hamilton Place**

**Option #1: Diesel Generator Replacement**

This option comprises the replacement of the Generator due to its age and condition including the diesel fuel system replacement. The Generator system would continue to operate as a standby system.

**Option #2: Diesel Generator (Peak Shaving)**

This option comprises the replacement of the Generator due to its age and condition including the Diesel fuel system replacement similar to Option #1. However, in this option the system would be setup to synchronize and parallel with the utility in order to reduce utility costs during peak consumption periods. This option is not feasible due to the emissions produced and would not qualify for a Certificate of Approval (C of A) to operate this way.

**Option #3: Natural Gas Generator Replacement (Standby)**

This option comprises the replacement of the Generator due to its age and condition with natural gas powered generator.

The major benefits of Option #3 versus over Options #1 and #2 are that there is no need to replace the diesel fuel system which is currently causing problems and in the future fuel deliveries will not be necessary. Also, natural gas is a more secure and reliable way of providing emergency power. In general, natural gas-fired equipment will produce fewer harmful emissions than an equivalent diesel-powered piece of equipment. Annual comprehensive inspections by an OBT1 (Oil Burner Technician) are not required for natural gas generators. Operational costs would be in comparison to that of a diesel generator. In this circumstance, it is approximately $70,000 more for a natural gas option. Natural gas requires more physical space than diesel. However, given the existing generator rooms there is sufficient space to accommodate natural gas generators.

**Benefits of Peak Shaving/ DR3 Programs**

The incremental cost of upgrading the stand-by natural gas generators to a system with capabilities of “Peak Shaving” or Demand Response capabilities are minimal. This will allow the City to utilize an asset that would otherwise be only used in emergency conditions to assist in managing future electricity costs. Staff are currently investigating these options and may be able to reduce electricity cost by as much as $50,000 annually at this locations. This would pay for the incremental cost of the system upgrade within two years.
CORPORATE STRATEGIC PLAN


Financial Sustainability

♦ Replacement of this equipment will: reduce risk to the safety of workers, visitors of the facility and the public thereby increasing the ability to avoid incidents of injuries and associated liabilities; increase operational efficiencies; avoid costly shutdowns; avoid costly fines associated with not being in compliance with regulations and; help reduce maintenance costs and the costs of annual comprehensive inspections.

♦ Further benefits include; Utility Peak Shaving application, which allows staff to manage peak loads, especially during the summer months. As well, the City will play a leadership role in Conservation and Demand Management by entering into a Demand Response Program sponsored by the Ontario Power Authority (OPA)

Intergovernmental Relationships

♦ Meeting the requirements of the QAF Program will help to foster the relationship and continue the partnership formed with the TSSA, a regulatory body that oversees the Technical Standards and Safety Act.

Environmental Stewardship

♦ Replacement of this equipment is in line with Hamilton’s Corporate Energy Policy as it would help to reduce emissions. Natural gas-fired equipment will produce fewer harmful emissions than an equivalent Diesel-powered piece of equipment.

Healthy Community

♦ Replacement of this equipment helps reduce harmful emissions and helps ensure life safety and well being. This adds to creating a healthy community.

APPENDICES / SCHEDULES

None