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SUPPLEMENTAL PIT FIRE CONTROL DELUGE SYSTEM – SPOKANE REGIONAL WASTE TO ENERGY FACILITY

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ABSTRACT

After sixteen years of operation, it became apparent that the pit fire protection system installed during construction of the Spokane Regional Waste to Energy (WTE) Facility (1989-1991) was inadequate. A risk analysis was performed by Creighton Engineering Inc., a fire protection consulting firm, hired by the Spokane Regional Solid Waste System (Regional System) and Wheelabrator Spokane Inc. With input from Spokane County Fire District 10 and the City of Spokane Fire Department, a replacement supplemental fire protection system was designed and ultimately installed. This paper will describe the problems with the once state of the art fire system and the planning, design and installation of the new system.

INTRODUCTION

Fire protection is of paramount importance in any building but becomes even more essential in a waste-to-energy plant where waste is required to be stored in large quantities and the characteristics of the fuel is unknown and cannot be controlled. Given the inability to reduce the risk of fire by eliminating the amount of stored fuel, it is essential to the safety and operation of the facility to have installed a state of the art fire protection system that is reliable and easy to maintain and operate.

DISCUSSION

The Spokane Regional Waste to Energy Facility (Facility) is a typical 800 ton/day mass burn facility designed, constructed and operated by Wheelabrator Spokane Inc. The facility is owned by the Spokane Regional Solid Waste System (System), a department of the City of Spokane, and provides combustion services to the entire Spokane County region. The Facility is the only waste-to-energy plant in the state of Washington and is the largest municipal project in Spokane's history. It is a joint effort between multiple municipal entities and continues to enjoy a cooperative working relationship

between the private and public sector. One unique aspect of the Spokane facility is the way the design allows for both municipal and private citizen vehicles regardless of size to enter and utilize the 2 acre tipping area located within the main building. The Facility's enhanced pit size of 560,000 cubic feet or 5000 ton capacity is sized to accommodate an additional 400 ton/day unit.

During the Facility's construction period (1989-1991), a state of the art fire protection system was installed. The system included 4 pit monitors and a roof deck grid deluge dry sprinkler system. Both items met standard code provisions and were typical of the systems installed in waste to energy facilities at that time. After a series of fires, it became apparent that the existing roof deck grid deluge sprinkler system was inadequate. It had numerous problems and did not prove to be effective and reliable when put to the test of actually battling a blaze. During several fire events at the Facility, the sprinklers were activated but the force of the water coursing through the system resulted in a water hammer which broke apart the pipes delivering the water to the sprinkler heads. Upon further investigation, it was discovered that the breakage may have been caused by several factors. The pipes may not have been initially designed large enough to handle the force of the water or they had degraded over time which compromised their integrity. Another reason for their failure might have been due to air filling the empty pipes when not in use. When the fire protection system was activated and water rushed through the pipes, the air acted as a barrier and the resulting collision between the air and water caused the pipes to vibrate and break. Regardless of the reason, the breakage of the pipes meant the water failed to reach the desired destination necessitating the use of others means to extinguish the fire. During these events, the Facility was fortunate that the fires were contained in the hopper and did not ignite the pit. However, the water which was spilling from the pipes into areas not affected by the fire