October 12, 2005

Internal Audit Report 2005-12
Fuel Controls
Municipal Light and Power

Introduction. Municipal Light and Power (ML&P) is a Municipality of Anchorage (Municipality) owned power company that was acquired in 1943. ML&P operates two generation stations that provide power to its customers in Anchorage. Both plants have been experiencing variability or inaccuracies of their diesel fuel (fuel) inventory since at least 1999 when new metering was initiated. Each month ML&P calculates its fuel inventory based on quantities received and consumed, and compares this total to measured inventory to aid their spill prevention measures. An error in the measurement process, spreadsheet calculations or consumption volumes could cause the fuel inventory to be inaccurate. Although fuel inventory discrepancies may appear to be insignificant, they may help preclude detection of a fuel leak.

Plant #1, also known as the Hank Nikkels Power Plant, is ML&P's original power plant that operates and maintains natural gas powered production equipment and facilities, providing power for peak usage periods as well as standby power. The plant has two 105,000 gallon fuel tanks that are utilized for backup in the event of a disruption of their natural gas supply. Since 1999, the highest recorded volume of fuel in their inventory was 192,405 gallons. Also, since 1999 to the present, Plant #1 has experienced fuel inventory variability ranging from a loss of 739 gallons to a net gain of 322 gallons. While the fuel inventory did contain some variability, it was within an acceptable range that did not require further analysis.

Plant #2, also known as the George M. Sullivan Power Plant, has been in operation since 1975. Plant personnel operate and maintain natural gas powered production equipment and facilities on

a 24-hour basis. The plant has two 1,000,000 gallon fuel tanks that are utilized for backup in the event of a disruption of their natural gas supply. Since 1999, the highest recorded volume of fuel in their inventory was 888,636 gallons. Also, since 1999 to the present, Plant #2 has been experiencing fuel inventory differences ranging from a loss of 119 gallons to a loss of 5,143 gallons. These fuel differences have been growing since at least 1999 and required analysis to determine the source of error.

Objective and Scope. The objective of this audit was to determine the adequacy of controls over fuel inventory at ML&P's Plants #1 and #2. The audit included the review of 1999 through 2005 generation and fuel oil reports, the Policy and Procedures for fuel oil gauging, and the processes utilized for monitoring fuel consumption. We also reviewed a 2001 engineering report concerning the fuel measurement process at Plant #2, conducted interviews with ML&P personnel, documented the measurement process with on-site verification, and walked the fuel lines.

The audit was conducted in accordance with generally accepted government auditing standards, except for the requirement of an external quality control review, and accordingly, included tests of records and such other auditing procedures as we considered necessary in the circumstances. The audit was performed during the period of July through August 2005. The audit was requested by the Administration.

Overall Evaluation. ML&P's controls over fuel inventory appear reasonably sound. However, our review revealed fuel consumed by the #5 prestart engine was not deducted from the inventory, thus overstating the record balance of fuel and decreasing the likelihood of a fuel leak. In addition, the spreadsheets utilized for inventory control contained errors that exacerbated their fuel discrepancy. Also, the ML&P Standard Operating Procedure for Fuel Oil Gauging (measurement) (Procedure 45-2) did not contain the same gauging methodology as prescribed by the manufacturer of the equipment.

FINDINGS AND RECOMMENDATIONS

1. Fuel Inventory Inaccurate.

a. **Finding.** Fuel consumption for a prestart engine at Plant #2 was not included in fuel inventory calculations. As a result, ML&P's computed fuel inventory loss at Plant #2 has been growing (Exhibit 1), resulting in some concern of a potential fuel leak.

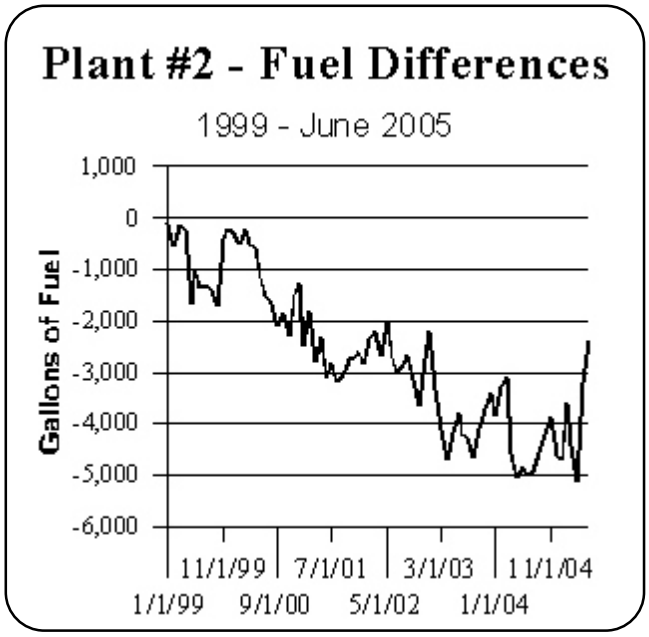

Exhibit 1

Each month, ML&P calculates its fuel inventory based on quantities received and consumed, and compares this total to measured inventory to aid their spill prevention measures. ML&P uses a prestart engine to help start its #5 turbine. In October 2002, ML&P replaced an aging #5 prestart engine with a newer one. Fuel consumed by this new prestart engine and its predecessor was never included in inventory

calculations. Therefore, since November 2002 to June 2005, a cumulative total of 2,207 gallons of fuel has been excluded from inventory calculations.

ML&P staff decided not to deduct the #5 prestart engine's monthly consumption quantities because they believed the consumption amount to be insignificant. They also thought that it would be too difficult to enter the data into a spreadsheet containing complex formulas, links and macros. However, if the fuel consumption of the #5 prestart engine is deducted from the monthly inventory after making adjustments for undocumented usage, the fuel difference becomes less significant.

b. **Recommendation.** The Generation Manager should ensure that the fuel consumed by the #5 prestart engine is deducted from the monthly inventory.

c. **Management Comments.** Management stated, "Management concurs that the fuel consumption for the Unit #5 pre-start engine should be included in the monthly fuel usage and ML&P has started that as of September 2005. This should prevent future accumulation of fuel discrepancies for this usage."

d. **Evaluation of Management Comments.** Management comments were responsive to the audit finding and recommendation.

2. Fuel Inventory Spreadsheets Contained Errors.

a. **Finding.** The spreadsheet used for tracking the fuel inventory had several errors that contributed to inaccuracies. For example, the fuel record spreadsheets for December 2002 and January 2003 had the same measured tank value of 843,284 gallons, but this was impossible since 4,746 gallons were consumed in January 2003. In addition, in April 2005, a fuel meter reading at Plant #2 was entered as having 15 barrels, or 756 gallons, go through it. A barrel is measured as 42 gallons; thus the

accurate number of gallons that should have been recorded was 630. According to ML&P staff, the "756" was probably typed in, thus overriding the formula. The reporting process consisted of unprotected spreadsheets with information that was keyed in repeatedly by different employees, thus resulting in errors.

b. **Recommendation.** The Generation Manager should review the data input methodology and insure accurate data is input into the inventory accounting system.

c. **Management Comments.** Management stated, "Management concurs that the process for reporting the fuel consumption should be revised. The information was recorded by several people for different reports, each which cause the potential for errors. (It should be noted that errors such as the one indicated, where the beginning and ending balance were the same even though 4,746 gallons had been consumed, was caught by accounting and the correct usage was recorded on the accounting inventory records.) Generation is working with the ML&P IT staff to have the information entered once into a database from which all reports could pull the information. The information on the database will be secured so it cannot be changed without proper authorization."

d. **Evaluation of Management Comments.** Management comments were responsive to the audit finding and recommendation.

3. **Incomplete Standard Operating Procedure.**

a. **Finding.** Even though ML&P's physical inventory for fuel measurement was reasonably accurate, some improvements could be made to their standard operating procedure. Procedure 45-2 was incomplete and did not adhere to the manufacturer's operating instructions. For example, the instructions mandated a period of at least two minutes for the thermometer to stabilize in the fuel, yet this was never mentioned

in the procedure. In addition, discussions with two plant employees revealed a misunderstanding of the amount of time required to record a temperature. To illustrate the importance of accurate temperature measurement, a temperature difference of only ½ degree in a full tank would result in an error of approximately 400 gallons.

Also, a review of the fuel measurement form, contained in Procedure 45-2, indicated a potential for error because the form did not help easily identify the fuel's midpoint. The midpoint is important when measuring the fuel temperature.

b. **Recommendation.** The Generation Manager should ensure ML&P's Standard Operating Procedure 45-2 is rewritten to adhere to manufacturers recommendations for gauging tanks.

c. **Management Comments.** Management stated, "Management concurs that the Standard Operating Procedure 45-2 should be rewritten to include adhering to the manufacturer's recommendations for utilizing the tank gauge in use at the time. Rewriting this procedure should alleviate misunderstanding as to how long and where to take the temperature measurements of the fuel in the tank. Manufacturer's recommendations will be checked when re-writing this procedure."

d. **Evaluation of Management Comments.** Management comments were responsive to the audit finding and recommendation.

Discussion With Responsible Officials. The results of this audit were discussed with appropriate Municipal officials on August 22, 2005.

Audit Staff:
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