



PECO ENERGY

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March 25, 1994

Robert Bauer, Jr.  
Department of Environmental Resources  
Bureau of Water Quality Management  
Suite 6010, Lee Park  
555 North Lane  
Conshohocken, PA 19428

SUBJECT: Limerick Generating Station, Units 1 and 2  
Two Noncompliances of NPDES Permit No. PA-0051926,  
1. Discharge 001 Total Zinc Concentrations in  
Excess of Maximum Daily Limitations, and  
2. Cooling Tower Water Discharge at Storm Water  
Outfall 021.

Dear Mr. Bauer:

Description of the Events:

On February 4, 1994, the Discharge 001 maximum daily limit of 1.0 mg/l total zinc was exceeded, since a value of 1.75 mg/l was present. This condition resulted from a low pH transient in the Unit 2 cooling tower water system.

Prior to the occurrence of the first noncompliance, as part of the Unit 1 refueling outage that started on February 4, 1994, the Unit 1 cooling tower water was to be pumped over to the Unit 2 cooling tower in lieu of makeup water from the river. This process would not only expedite draining, but also minimize the potential for overwhelming the blowdown line during normal bottom draining of the cooling tower. Since the Unit 1 cooling tower water was more concentrated than the river water, its use in the Unit 2 cooling tower could have resulted in a highly concentrated condition. Therefore, adjustments to the water chemistry (i.e., the injection of acid for pH control) for both cooling towers were being implemented in an attempt to avoid exceeding the permit limitations, and to prevent the fouling of plant systems.

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March 25, 1994

Page Two

During the week of February 4, 1994, numerous actions were taken to adjust the water chemistry of the cooling towers. Both cooling towers were deconcentrated, and scaling and corrosion inhibitor product additions were decreased, then ceased entirely. Throughout the week, the Unit 2 circulating water system pH was also decreased towards a target value of 7.0. On February 3, 1994, prior to transferring water from the Unit 1 cooling tower to the Unit 2 cooling tower, the Unit 2 cooling tower pH was identified to be 7.5, and therefore, the acid injection system addition rate was increased 10%. By approximately 0800 hours on February 4, 1994, pH had unexpectedly dropped to 5.97. This low pH condition significantly increased the solubility of zinc that had been previously deposited in the plant systems. While the blowdown from the Unit 1 cooling tower provided sufficient buffering to maintain the pH limitations at Discharge 001, zinc limitations were still exceeded.

Immediate corrective actions involved the isolation of the acid injection system, maintaining high cooling tower blowdown rates to minimize further concentration increase, and more frequent pH monitoring. Since zinc was not being added due to the outage preparations, no action was required in this regard. As of 2350 hours on February 5, 1994, the total zinc concentration at Discharge 001 was 0.9 mg/l, and within the permit limitations.

On February 22, 1994, a second noncompliance occurred when cooling tower water was discharged via the storm water Outfall 021 instead of being released to Discharge 001. On February 21, 1994, Operations personnel discovered that rainwater flow was flooding the Unit 1 cooling tower chemical injection system building sump pump pit. This overwhelming rainwater flow resulted from a combination of the snow melting and the heavy rain precipitation. Since the normal sump pump was out of service, a temporary pump was installed to discharge the rainwater to a nearby normal waste water system manhole. Later, on February 21, 1994, Operations personnel discovered that the normal waste water system manhole had become blocked with debris, due to outage activities being performed on the Unit 1 cooling tower. Operations personnel then notified Chemistry personnel of the problem. An analysis and inspection of the water collecting in the sump pump pit verified it to be rainwater. From this conclusion, Operations personnel were then given permission to discharge the rainwater collecting in the sump pump pit into the storm water drainage system. This action resulted in the rainwater being discharged to Outfall 021.

March 25, 1994

Page Three

In a followup inspection on February 22, 1994, Operations personnel identified that the input flow to the sump pump pit had continued, despite the fact that precipitation had stopped and outside ambient temperatures had dropped below freezing. Upon further inspection, Operations personnel discovered the input source to be a cracked service water (SW) system valve that had apparently frozen overnight. Chemistry personnel were again notified and an analysis and inspection of the water being discharged through Outfall 021 verified it to be free of oil sheen, and of typical chemistry make-up for cooling tower water. By 2030 hours on February 22, 1994, after additional provisions were made, the temporary pump flow was routed to the Unit 1 cooling tower blowdown line, thereby terminating the discharge to Outfall 021.

Cause of the Noncompliance:

The primary cause of the first noncompliance was less than adequate monitoring of the Unit 2 circulating water system pH during the outage preparations. This was due in part to the lack of procedural guidance to ensure more frequent monitoring is performed as pH approaches 7.0. In addition, since the activity of pumping one Unit's cooling tower water to another cooling tower was relatively new, the chemistry related considerations were not fully addressed in a procedure.

A second cause of the first noncompliance was the lack of reliable automatic controls on the acid injection system. While the system was recently modified to enable automatic operation (i.e., in response to a previous pH excursion and zinc violation), the equipment has been unreliable due to less than adequate cleaning and maintenance of the pH probes. Therefore, the system was placed in manual operation prior to the occurrence of the second noncompliance.

The primary cause of the second noncompliance was the material failure of a SW system valve. Contributing causes were the obstructed normal waste system manhole, and the inappropriate action of directing this overflow to the storm water system and Outfall 021.

March 25, 1994

Page Four

Prevention of Future Occurrences:

To preclude the recurrence of the first event, Chemistry sampling and analysis procedures will be revised by May 1, 1994, to require more frequent monitoring of the circulating water system pH when pH is less than 7.5, and the acid injection system is in the manual mode of operation. Additional procedural guidance will also be added to the

cooling tower draining procedure prior to the next refueling outage, to address water chemistry considerations. To enable regular utilization of the automatic controls for the acid injection system, corrective maintenance will be performed to replace the pH probes, and a periodic cleaning and maintenance program will be established by July 1, 1994.

In response to the second noncompliance, the defective SW system valve has been replaced, and measures have been initiated to correct the normal waste system obstruction. As part of our NPDES permit renewal process, we have previously requested approval for periodic monitored releases of cooling tower water from Outfall 021, due to its close proximity to both basins. Since this request is still being evaluated, a site wide communication will be provided to reinforce with site personnel the restrictions on discharges via storm water outfalls.

If you have any questions please contact Jim Kantner at 327-1200 extension 3400.

Sincerely,

*Walter A. MacFaulstich*  
for Robert W. Bayee

CGD/SCD:cah

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