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Mr. Kevin Kolevar
Director
Office of Electricity Delivery and Energy Reliability
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Mr. Kolevar:

Thank you again for meeting with me and others from Pepco on November 1 to discuss the threat to electric reliability for the Nation's Capital as a result of the shutdown of the Potomac River Power Plant ("Potomac River"). This letter responds to requests for information made by Department of Energy (DOE) personnel at our meeting about how to restart Potomac River as quickly as possible after a shutdown.

Our conclusion is that there are few steps that would result in start-up times substantially shorter than 11 hours. We have requested the Federal Energy Regulatory Commission (FERC) and DOE to order that all five units at Potomac River be available to start within 11 hours under certain emergency conditions. The best outcome would be for Potomac River to be running or available to run as it was before August 24.

This letter first restates what level of operation Pepco believes is necessary at Potomac River to ensure a reasonable level of electric reliability for the Nation's Capital. Second, it provides details on the steps necessary to restart units of the plant. Third, it provides examples of extraordinary measures that might reduce startup times.

As Pepco stated in its filing with the FERC on September 9, we believe there is an operating solution for Potomac River that ameliorates the risk to electric reliability caused by the plant's shutdown and that either eliminates potential exceedances of air quality limits or dramatically reduces environmental impacts.

- When the load served by the substation located next to the Potomac River plant exceeds 475 MW, at least one generator at Potomac River must be kept running.
- If maintenance must be scheduled on one of the 230kV transmission circuits, the generation at the plant, as required by PJM, must match and "follow" the load in real time. Depending on the load level, up to five generators must be running at least at partial output.
- If one of the 230kV transmission circuits into the substation trips unexpectedly, all five generators must be able to run on an emergency basis, and must be available to start within 11 hours.

- If both 230kV transmission circuits trip unexpectedly, which would result in a blackout, all five generators must be available to start within 11 hours to ensure rapid restoration of power.

Eleven hours is the period Mirant has identified in filings with PJM within which it can return the units to full power from a cold startup (i.e., where the plant has not been operating for some time and the units do not retain heat beyond ambient temperatures). In its Response to the Commission dated August 26, 2005, Mirant stated that the normal startup time for cold startups for Potomac River is as follows:

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
Notification period (in hours)	7	7	72	72	72
Startup time (in hours)	9	9	11	11	11

The notification times are, to our understanding, not operational limitations. In the case of an emergency, substantially less notification time would be required, as Mirant has acknowledged.[1]

Not all five units can be brought up simultaneously from a cold start, because combustion must be started using oil; to our knowledge, the plant's facilities to initiate this process are not sufficient to start more than two units at a time. Also, specific conditions with each of the units could shorten or lengthen these times. Before describing them in detail, let me briefly describe what must happen to bring a coal boiler from a cold start to a state of availability.

First, the boiler needs to be warmed up, which requires turning on fans and precipitator (which are powered using electricity from reserve transformers), running water through the boiler, lighting the igniters (pilot burners) for initial warm-up, then starting the coal pulverizers, and finally running coal through the coal pulverizers and into the boiler where it is combusted.

A critical element affecting the amount of time this process can take is ensuring that the water being used is sufficiently clean, otherwise known as ensuring proper "water chemistry." Insufficiently clean water can result in constituencies in the steam that can cause serious damage to the turbine. Ordinary drinking water is not clean enough for use inside a boiler. Contamination may be in the source water itself, or it may come from corrosion on the insides of the boiler if the boiler has not been maintained to prevent it. Typically a coal plant will have its own water purification system to clean the water to be used in the boiler. Corrosion on the

[1] In its August 26 filing with the FERC, Mirant stated: "The notification and start up times set forth above are currently on record with PJM for normal dispatch\operations. In an emergency return to service scenario, the start up times may be capable of being shortened."

inside of a boiler can be prevented by maintaining the unit under a "nitrogen blanket," i.e., by filling the boiler with nitrogen. It is likely that Mirant has taken this step while the Potomac River plant has suspended operation. Under worst-case conditions, establishing proper water chemistry could take up to a day if corrosion has occurred or if there are other problems providing purified water.

To summarize, because of the need to avoid over-stressing metals in the boiler, warming the boiler is a process requiring perhaps three to four hours.

After the boiler is warmed, some steam may begin to be admitted to the turbine. As with the boiler, this process must take place at a measured pace over a period of hours, as metals within the turbine must be heated at a relatively even rate. Concurrently, the pressures and temperatures within the boiler are raised to design parameters. As the turbine warms, it must be brought up to a speed of roughly 1800 rpms for Units 1 and 2 and 3600 rpms for Units 3–5 to synchronize it with the electrical grid at 60 Hz.

Once the turbine rotates in synchronization with the grid, about three megawatts per minute can be added to the grid. For a 90 MW unit, it would take roughly 30 minutes from the time the unit is synchronized to the time its full load output can be fully placed on the grid.

As the chart above demonstrates, the length of time required for this process varies by unit. This is a factor of the size of the unit, as larger boilers have more surface area to be heated. Units 1 and 2 at Potomac River are natural circulation units, meaning that water circulates naturally through the boiler. Units 3-5 are forced circulation units, in which three pumps are used to circulate water through the system. They are also larger units.

Hot start times are substantially shorter than for cold start times because less time is required to heat the metals. The typical situation for a hot start is shutdown of a unit at night when its generating capacity is not needed, and return of the unit to service the next morning before metal temperatures drop appreciably. Because of return to service times, among other things, Units 3-5 are units that the plant operator would seek to run on a cycle longer than an "on during the daytime, off at night" schedule.

As far as expediting the return of a unit from a cold start in the case of an immediate need for power, there are few options and none that would reduce the times to those for a hot start. The pumps on Units 3-5 for forced water circulation can be used to initiate water cleanup in advance of an anticipated return of the units to power. However, an emergency would not provide this opportunity to anticipate. Again, water chemistry is less likely to pose a delay if the units have been under a nitrogen blanket.

A boiler that is only expected to be off-line for a few days can be "hot banked" to keep it warm. This involves closing all of the inlet and outlet air and gas path dampers to minimize draft and thus retain as much heat in the boiler as possible. In a few days the metals cool, after which the cold start sequence is required. Some very small units use steam coils to keep the temperature up but this can't be employed at Potomac River since they don't have package/auxiliary boilers to provide the necessary steam.[2]

Rotating operation of the units on a fairly frequent basis, for example every five days, is a possible solution to keep the units warm enough for a relatively quick start. Rotating them on a longer basis does not seem like a viable option that will expedite the start-up of any given unit once it returns to service. If each unit is operated only once every two to five weeks, not enough heat can be retained in the units to allow them to return to service without going through the cold start sequence.

Since steam now should be available due to Unit 1 running, additional options may be available to speed up the start-up time on the units.

- Steam could be run through coils in the air/gas stream or through the boiler tubes to keep metal temperatures up. This would not maintain full operating metal temperatures but could reduce the time required to heat the boiler up during start-up.

- Steam could be run through the steam seals and potentially into the turbine at reduced pressures and flows to again maintain turbine metal temperatures higher than ambient temperatures.

- Theoretically, steam could be dumped into the boiler cavity. This may achieve limited pre-warming, but it would be very inefficient. With cold weather approaching this would result in a steam plume coming out of the stacks, which likely would raise more questions from the surrounding community.

These options would require a distribution header, with associated valves, to be run between all five units since it may not be known which units would run and which units would be maintained in a stand-by mode. We believe that part or all of a distribution header already exists between the units. Thus, all that may be necessary is to run sections of piping from the header to various inlet points.

Let me emphasize, as we discussed during our meeting, that Pepco is pursuing a variety of measures to bolster electric reliability for the Nation's Capital on the assumption that some or all units of the Potomac River plant may not be readily available to provide generation support in the future. Nevertheless, it is a basic fact that having generation available close to the load is an important factor in maintaining electric reliability. There are no options for serving the affected areas as reliably as having the Potomac River plant available.

[2] An auxiliary boiler is a smaller boiler that typically has its own control system, fans, and related equipment. Such boilers are expensive, though they can be rented. One constraint is that they are emission sources, and even if rented may require permitting.

We urge the Department of Energy to order the plant immediately to return to service in accordance with our comments to the FERC above. This proposal, made in consideration of the environmental concerns that have been raised, is the minimum operation of the plant that acceptably protects electric reliability in the near term.

If we can be of further assistance, please let me know.

Sincerely,

W M Gausman

William M. Gausman

CC: Larry Mansueti
Bruce Diamond