BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter of :

Docket No. 50-387

PENNSYLVANIA POWER & :
LIGHT COMPANY

PROPOSED AMENDMENT No. 184
FACILITY OPERATING LICENSE NO. NPF-14
SUSQUEHANNA STEAM ELECTRIC STATION
UNIT NO. 1

Licensee, Pennsylvania Power & Light Company, hereby files proposed Amendment No. 184 to its Facility Operating License No. NPF-14 dated July 17, 1982.

This amendment contains a revision to the Susquehanna SES Unit 1 Technical Specifications.

PENNSYLVANIA POWER & LIGHT COMPANY
BY:

R. G. Byram
Sr. Vice President - Nuclear

Sworn to and subscribed before me
this 31st of March, 1995.

Notary Public

Notarial Seal
Martha C. Sedora, Notary Public
Allentown, Lehigh County
My Commission Expires Jan. 15, 1998
Member, Pennsylvania Association of Notaries

BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter of :

Docket No. 50-388

PENNSYLVANIA POWER & LIGHT COMPANY :

PROPOSED AMENDMENT No. 140
FACILITY OPERATING LICENSE NO. NPF-22
SUSQUEHANNA STEAM ELECTRIC STATION
UNIT NO. 2

Licensee, Pennsylvania Power & Light Company, hereby files proposed Amendment No. 140 to its Facility Operating License No. NPF-22 dated March 23, 1984.

This amendment contains a revision to the Susquehanna SES Unit 2 Technical Specifications.

PENNSYLVANIA POWER & LIGHT COMPANY
BY:

R. G. Byram
Sr. Vice President - Nuclear

Sworn to and subscribed before me
this 31st of March, 1995.

Notary Public

Notarial Seal
Martha C. Sedora, Notary Public
Allentown, Lehigh County
My Commission Expires Jan. 15, 1998
Member, Pennsylvania Association of Notaries

SAFETY ASSESSMENT

MODIFY THE REACTOR COOLANT pH ANALYSIS REQUIREMENT

Background

The water chemistry limits of the reactor coolant system are established to prevent damage to the reactor materials in contact with the coolant. Chloride limits are specified to prevent stress corrosion cracking of the stainless steel. Conductivity measurements are required on a continuous basis since changes in this parameter are an indication of abnormal conditions. When the conductivity is within limits, the pH, chlorides and other impurities affecting conductivity must also be within their acceptable limits. The current Technical Specifications require reactor coolant pH measurements be taken every 72 hours, irrespective of the coolant conductivity. As highlighted above and contained within the current Tech Spec Bases when conductivity is within limits, the other impurities must also be within their acceptable limits. This means that when conductivity is within limits for OPERATIONAL CONDITION 1 (i.e., when the conductivity is $\leq$1.0 µmho/cm), the pH must be within the Technical Specification limits of 5.6 to 8.6 as specified in Table 3.4.4-1. Therefore, since Technical Specification 4.4.4.c requires continuous measurement of conductivity, there is no need to measure pH if the conductivity is $\leq$1.0 µmho/cm as the pH must be within its limits.

Description of Changes

The proposed change affects the Surveillance Requirement for reactor coolant system pH in Section 4.4.4 of the Technical Specifications. The change would modify the pH analysis requirement from "at least every 72 hours" to "at least every 72 hours whenever reactor coolant conductivity exceeds 1.0 µmho/cm".

Safety Analysis

Analysis

The safety function of the reactor coolant specifications is to protect the structural integrity of the core components and the reactor coolant boundary. In both FSAR Section 5.2.3.2.2 and the Tech Spec Bases for Section 3/4.4.4 (Chemistry), the primary emphasis is on the chloride limits, which are specified to prevent stress corrosion cracking of stainless steel. Continuous monitoring of conductivity is required as it provides a reliable indicator of abnormal chemistry conditions. The FSAR references Regulatory Guide 1.56 which contains the following statement: "Chloride ions and high or low pH conditions, which may promote stress-corrosion cracking of austenitic stainless steel components and structures, are of particular concern".

The theoretical relationship between pH and conductivity is shown in Attachment A. This figure is from Regulatory Guide 1.56 Revision 1, July 1978, "Maintenance of Water Purity in Boiling Water Reactors". The solid curve indicates the dividing line between regions where the theoretical relationship between pH and conductivity is possible and were it is impossible. (The dashed lines are related to chloride concentrations and can be ignored in this discussion.) For example, if the conductivity is 0.2 μmho/cm, the pH may be anywhere in the range from 6.3 to 7.9 but it can never be less than 6.3 nor greater than 7.9. Likewise, if the conductivity is 1.0 the pH must be in the range from 5.6 to 8.6. Obtaining reliable pH measurements for high purity water is very difficult if not impossible using current standard methods. The normal calibration procedure for pH electrodes using pH buffers will not yield correct pH measurements in water with a conductivity below 1.0 μmho/cm. This is an inherent limitation of the standard electrodes used in pH measuring equipment. In addition to this problem , laboratory pH measurements on grab samples of high purity water are subject to large errors due to the absorption of carbon dioxide from the atmosphere while sampling, transporting and waiting for the pH meter readings to stabilize. The combination of these two problems has resulted in the reporting of pH values for reactor coolant that are in the impossible region; generally, the measured pH values reported are lower than theoretically possible for the measured in-line conductivity.

Conclusion

Since continuous monitoring of conductivity remains a Technical Specification requirement, there is no apparent need to measure pH if the conductivity is ≤1.0 μmho/cm, as the pH must be within its limits.

NO SIGNIFICANT HAZARDS CONSIDERATIONS

The proposed changes do not:

I. Involve a significant increase in the probability or consequences of an accident previously evaluated.

The pH limits on reactor coolant are not affected by this change. The pH will be measured whenever it is theoretically possible for it to be outside the Tech Spec limits of <5.6 or >8.6 (i.e., whenever the conductivity is greater than 1.0 μmho/cm). Because of the theoretical relationship between pH and conductivity as shown in Attachment A, it is possible to establish pH limits on the reactor coolant by limiting the conductivity. As shown in this figure, the pH must be >5.6 and <8.6 if the conductivity is ≤1.0 μmho/cm. Attachment A was taken from Regulatory Guide 1.56 Revision 1, July 1978 "Maintenance of Water Purity in Boiling Water Reactors". As noted in both FSAR and Technical Specification Bases, the pH and conductivity limits for OPERATIONAL CONDITION 1 are consistent with this theoretical relationship. The Bases for Section 3/4.4.4 of the Tech Specs

contains the following statement: "When the conductivity is within limits, the pH, chlorides and other impurities affecting conductivity must also be within their acceptable limits.'

Since the conductivity is measured by grab sampling at least every 72 hours to verify that it is within limits, this will also verify that pH is within limits every 72 hours. If the conductivity should exceed 1.0 μmho/cm, pH measurements will be made to determine if the Tech Spec pH limits have been exceeded. It should also be noted that in-line conductivity instrumentation is very stable and reliable and is used to continuously monitor the reactor coolant per Tech Spec requirements, with instrumentation connected to redundant sources (reactor water cleanup influent and reactor recirculation loop). Therefore, the proposed change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

II. Create the possibility of a new or different kind of accident from any accident previously evaluated.

As stated above, the pH limits on reactor coolant are not affected by this change. Since the conductivity is monitored continuously, to verify that it is within limits, this will also verify that pH is within limits. If the conductivity should exceed 1.0 μmho/cm, pH measurements will be made to determine if the Tech Spec pH limits have been exceeded. Therefore, the incorporation of this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

III. Involve a significant reduction in a margin of safety.

The in-line conductivity instrumentation has been determined to be very stable and reliable in its use to continuously monitor the reactor coolant per Tech Spec requirements. To maintain this reliability, this instrumentation is connected to redundant sources (reactor water cleanup influent and reactor recirculation loop). Based on this continuous monitoring of reactor coolant conductivity, as provided by this instrumentation, the incorporation of this change will have no impact on current safety margins, nor will it involve a significant reduction in the margin to safety.

ENVIRONMENTAL CONSEQUENCES

This request is consistent with the Susquehanna design basis, in that the pH will be measured whenever it is theoretically possible for it to be outside the Tech Spec limits of <5.6 or >8.6 (i.e., whenever the conductivity is greater than 1.0 μmho/cm). Therefore, no environmental consequences that have not been previously considered are anticipated.

IMPLEMENTATION

PP&L would like to incorporate this enhancement into the SSES Technical Specifications upon its approval, and asks that the NRC complete its review no later than December 31, 1995.

TSCR No: 277

Attachment A

From Regulatory Guide 1.56 Revision 1 July 1978

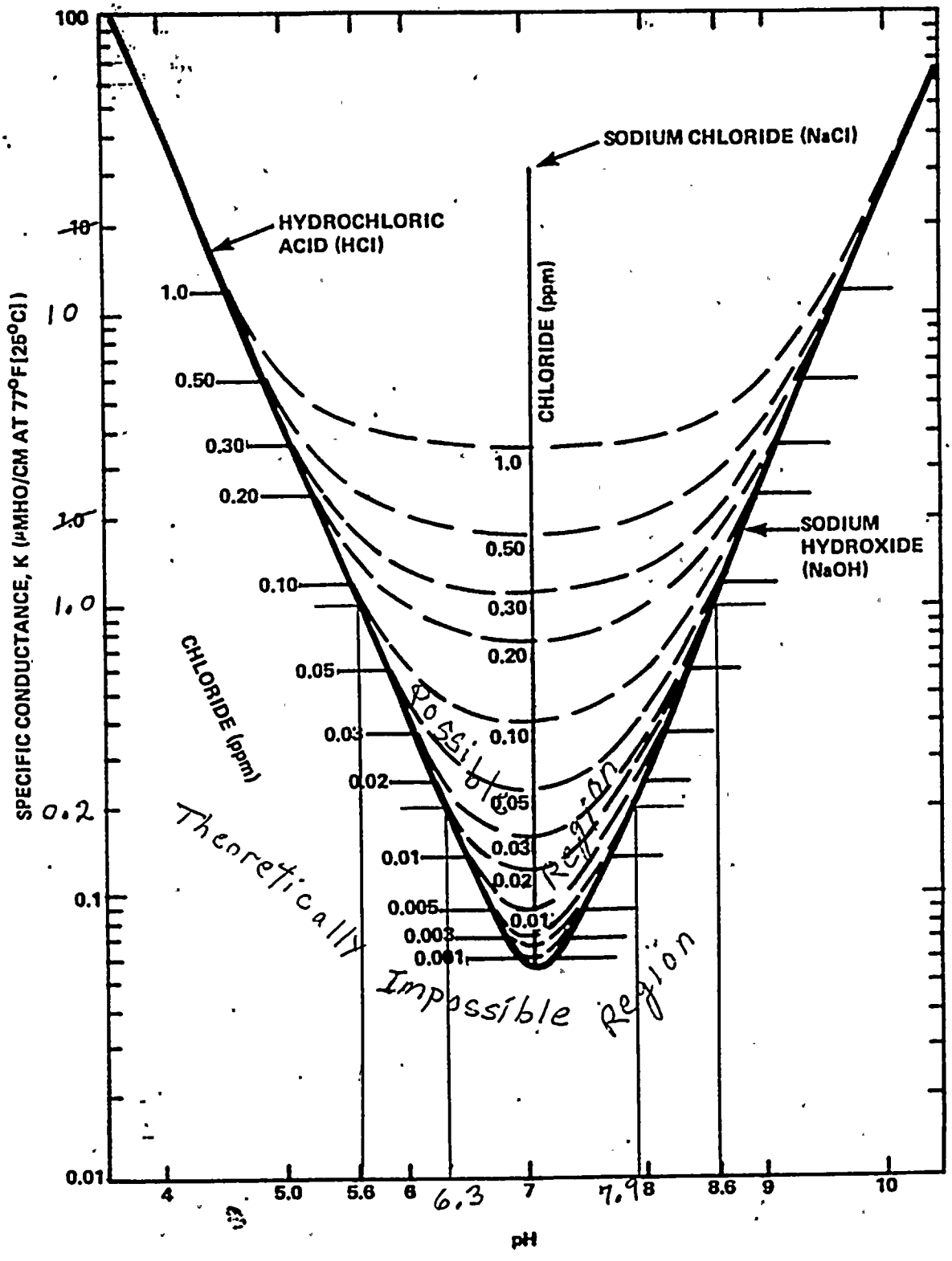

Figure 2
CONDUCTIVITY, pH, AND CHLORIDE CONCENTRATION OF AQUEOUS SOLUTIONS AT 77°F (25°C)