ATTACHMENT I to JPN-92-044

# CURRENT TECHNICAL SPECIFICATIONS TO BE CHANGED REGARDING

# OFFGAS SYSTEM DILUTION FLOW SETPOINTS (JPTS-92-018)

**New York Power Authority**

JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333

## LIMITING CONDITIONS FOR OPERATION

treatment system under the following conditions:

1. The offgas dilution steam flow instrumentation shall alarm and automatically isolate the offgas recombiner system at low flow less than 6000 pounds per hour or high flow greater than 7200 pounds per hour.

2. The offgas recombiner inlet temperature sensor shall alarm and automatically isolate the offgas recombiner system at a temperature of not less than 125°C.

3. The offgas recombiner outlet temperature shall alarm and automatically isolate the offgas treatment system at a temperature of not less than 150°C.

c. In lieu of continuous hydrogen or oxygen monitoring, the condenser offgas treatment system recombiner effluent shall be analyzed to verify that it contains less than or equal to 4% hydrogen by volume.

d. With the requirements of the above specifications not satisfied, restore the recombiner system to within operating specifications or suspend use of the charcoal treatment system within 48 hours.

## SURVEILLANCE REQUIREMENTS

1. An instrument check shall be performed daily when the offgas treatment system is in operation.

2. An instrument channel functional test shall be performed once per operating cycle.

3. An instrument channel calibration shall be performed once per operating cycle.

c. With condenser offgas treatment system recombiner in service, in lieu of continuous hydrogen or oxygen monitoring, the hydrogen content shall be verified weekly to be less than or equal to 4% by volume.

In the event that the hydrogen content cannot be verified, operation of this system may continue for up to 14 days.

IV.A, to assure that the releases of radioactive materials in gaseous effluents will be kept "as low as is reasonably achievable."

3.5 MAIN CONDENSER STEAM JET AIR EJECTOR (SJAE)

This specification is provided to assure that remedial action is taken to limit the noble gas release rate at the SJAE. The requirement provides reasonable assurance that the amount of noble gas that must be treated and/or released is controlled to a level that prevents exceeding the limits specified in 10 CFR 20, Appendix B, Table II.

Two air ejector offgas monitors are provided and when their trip point is reached, cause an isolation of the air ejector offgas line. Isolation is initiated when both instruments reach their high trip point or one has an upscale trip and the other a downscale trip. There is a 15 minute delay before the air ejector offgas isolation valve is closed. This delay is accounted for by the 30 minute holdup time of the offgas before it is released to the stack. Both instruments are required for trip but the instruments are so designed that any instrument failure gives a downscale trip.

3.6 OFFGAS TREATMENT SYSTEM

This specification is provided to ensure that the system will be available for use when required to reduce projected doses due to gaseous releases. This specification assures that the requirements of 10 CFR 50.36a, 10 CFR 50, Appendix A, General Design Criterion 60, and design objective in 10 CFR 50, Appendix I, Section II.D are met. The specified limits governing the use of appropriate portions of the systems are specified as a suitable fraction of the guide values set forth in 10 CFR 50, Appendix I, Sections II.B and II.C, for gaseous effluents.

The requirement for offgas treatment system operability provides assurance that the release of radioactive materials in gaseous waste will be kept "as low as is reasonably achievable." Operability of the system is based upon start-up of the second turbine driven feedwater pump. This is due to the fact that excess air in-leakages in the main condenser as a result of operating only one turbine driven feedwater pump will exceed offgas treatment system limitations and consequently render the system inoperable. Start-up of the second turbine driven feedwater pump will decrease air in-leakages and assure offgas treatment system availability.

3.7 OFFGAS TREATMENT SYSTEM EXPLOSIVE GAS MIXTURE INSTRUMENTATION

This specification is provided to ensure that the concentration of potentially explosive gas mixtures contained in portions of the offgas treatment system not designed to withstand a hydrogen explosion is maintained below the lower explosive limit of hydrogen. The proper operation of the primary recombiner ensures that the charcoal contained in the condenser

offgas treatment system is not exposed to an explosive mixture of gases. Thus it provides assurance that the releases of radioactive materials will be controlled in conformance with the requirements of 10 CFR 50, Appendix A, General Design Criterion 60.

INSERTED TEXT

3.8 STANDBY GAS TREATMENT SYSTEM (SBGTS)

Four radiation monitors are provided which initiate isolation of the reactor building and operation of the SBGTS. The monitors are located as follows: two in the reactor building ventilation exhaust duct and two in refuel floor ventilation exhaust duct. Each pair is considered a separate system. The trip logic consists of any upscale trip on a single monitor or a downscale trip on both monitors in a pair to cause the desired action.

Trip settings for the monitors in the refueling area ventilation exhaust ducts are based upon initiating normal ventilation isolation and SBGTS operation so that most of the activity released during the refueling accident is processed by the SBGTS.

The radiation monitors in the refueling area ventilation duct which initiate building isolation and standby gas treatment operation are arranged in a one out of two logic system. The bases given in Appendix A Bases 4.2 for the rod blocks apply here also and were used to arrive at the functional testing frequency. The air ejector offgas monitors are connected in a two out of two logic arrangement. Based on experience with instruments of similar design, a testing interval of once every three months has been found adequate.

3.9 MECHANICAL VACUUM PUMP ISOLATION

3.10 MAIN CONTROL ROOM VENTILATION RADIATION MONITOR

ATTACHMENT II to JPN-92-044

# PROPOSED TECHNICAL SPECIFICATION CHANGES REGARDING

# OFFGAS SYSTEM DILUTION FLOW SETPOINTS (JPTS-92-018)

**New York Power Authority**

JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333

| LIMITING CONDITIONS FOR OPERATION | SURVEILLANCE REQUIREMENTS |
|---|---|
| treatment system under the following conditions:<br>1. The offgas dilution steam flow instrumentation shall alarm and automatically isolate the offgas recombiner system at low flow less than or equal to 6300 pounds per hour or high flow greater than or equal to 7900 pounds per hour.<br>2. The offgas recombiner inlet temperature sensor shall alarm and automatically isolate the offgas recombiner system at a temperature of not less than 125°C.<br>3. The offgas recombiner outlet temperature shall alarm and automatically isolate the offgas treatment system at a temperature of not less than 150°C. | 1. An instrument check shall be performed daily when the offgas treatment system is in operation.<br>2. An instrument channel functional test shall be performed once per operating cycle.<br>3. An instrument channel calibration shall be performed once per operating cycle. |
| c. In lieu of continuous hydrogen or oxygen monitoring, the condenser offgas treatment system recombiner effluent shall be analyzed to verify that it contains less than or equal to 4% hydrogen by volume. | c. With condenser offgas treatment system recombiner in service, in lieu of continuous hydrogen or oxygen monitoring, the hydrogen content shall be verified weekly to be less than or equal to 4 % by volume.<br>In the event that the hydrogen content cannot be verified, operation of this system may continue for up to 14 days. |
| d. With the requirements of the above specifications not satisfied, restore the recombiner system to within operating specifications or suspend use of the charcoal treatment system within 48 hours. | |

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3.5 MAIN CONDENSER STEAM JET AIR EJECTOR (SJAE)

This specification is provided to assure that remedial action is taken to limit the noble gas release rate at the SJAE. The requirement provides reasonable assurance that the amount of noble gas that must be treated and/or released is controlled to a level that prevents exceeding the limits specified in 10 CFR 20, Appendix B, Table II.

Two air ejector offgas monitors are provided and when their trip point is reached, cause an isolation of the air ejector offgas line. Isolation is initiated when both instruments reach their high trip point or one has an upscale trip and the other a downscale trip. There is a 15 minute delay before the air ejector offgas isolation valve is closed. This delay is accounted for by the 30 minute holdup time of the offgas before it is released to the stack. Both instruments are required for trip but the instruments are so designed that any instrument failure gives a downscale trip.

3.6 OFFGAS TREATMENT SYSTEM

This specification is provided to ensure that the system will be available for use when required to reduce projected doses due to gaseous releases. This specification assures that the requirements of 10 CFR 50.36a, 10 CFR 50, Appendix A, General Design Criterion 60, and design objective in 10 CFR 50, Appendix I, Section II.D are met. The specified limits governing the use of appropriate portions of the systems are specified as a suitable fraction of the guide values set forth in 10 CFR 50, Appendix I, Sections II.B and II.C, for gaseous effluents.

The requirement for offgas treatment system operability provides assurance that the release of radioactive materials in gaseous waste will be kept "as low as is reasonably achievable." Operability of the system is based upon start-up of the second turbine driven feedwater pump. This is due to the fact that excess air in-leakages in the main condenser as a result of operating only one turbine driven feedwater pump will exceed offgas treatment system limitations and consequently render the system inoperable. Start-up of the second turbine driven feedwater pump will decrease air in-leakages and assure offgas treatment system availability.

3.7 OFFGAS TREATMENT SYSTEM EXPLOSIVE GAS MIXTURE INSTRUMENTATION

This specification is provided to ensure that the concentration of potentially explosive gas mixtures contained in portions of the offgas treatment system not designed to withstand a hydrogen explosion is maintained below the lower explosive limit of hydrogen. Operation of the offgas recombiner system ensures that the concentration of hydrogen in the offgas charcoal filters remains below combustible levels.

Thus it provides assurance that the releases of radioactive materials will be controlled in conformance with the requirements of 10 CFR 50, Appendix A, General Design Criterion 60. The low steam flow trip point is based on 92% of design steam flow and reroutes the offgas to prevent overheating or ignition of the recombiner catalyst. The high steam flow trip point isolates the recombiner on excess steam flow that may be associated with a pipe break downstream of the recombiner.

3.8 STANDBY GAS TREATMENT SYSTEM (SBGTS)

Four radiation monitors are provided which initiate isolation of the reactor building and operating of the SBGTS. The monitors are located as follows: two in the reactor building ventilation exhaust duct and two in refuel floor ventilation exhaust duct. Each pair is considered a separate system. The trip logic consists of any upscale trip on a single monitor or a downscale trip on both monitors in a pair to cause the desired action.

Trip settings for the monitors in the refueling area ventilation exhaust ducts are based upon initiating normal ventilation isolation and SBGTS operation so that most of the activity released during the refueling accident is processed by the SBGTS.

The radiation monitors in the refueling area ventilation duct which initiate building isolation and standby gas treatment operation are arranged in a one out of two logic system. The bases given in Appendix A Bases 4.2 for the rod blocks apply here also and were used to arrive at the functional testing frequency. The air ejector offgas monitors are connected in a two out of two logic arrangement. Based on experience with instruments of similar design, a testing interval of once every three months has been found adequate.

3.9 MECHANICAL VACUUM PUMP ISOLATION

3.10 MAIN CONTROL ROOM VENTILATION RADIATION MONITOR

ATTACHMENT III to JPN-92-044

# SAFETY EVALUATION FOR

# PROPOSED TECHNICAL SPECIFICATION CHANGES REGARDING

# OFFGAS SYSTEM DILUTION FLOW SETPOINTS (JPTS-92-018)

New York Power Authority

JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333

**SAFETY EVALUATION FOR**
**PROPOSED TECHNICAL SPECIFICATION CHANGES**
**OFFGAS SYSTEM STEAM DILUTION FLOW SETPOINTS (JPTS-92-018)**



## I. DESCRIPTION OF THE PROPOSED CHANGES

The proposed changes to the James A. FitzPatrick Radiological Effluent Technical Specifications (RETS) revise Section 3.7 and the corresponding bases. Specifically, pages 33, 41 and 42 of the RETS contained in Volume 1B of the Technical Specifications are revised as follows:

Page 33, Specification 3.7.b.1

Replace the phrase "low flow less than 6000 pounds per hour or high flow greater than 7200 pounds per hour." with the phrase "low flow less than or equal to 6300 pounds per hour or high flow greater than or equal to 7900 pounds per hour."

Page 41, Bases 3.7

Replace the second sentence which currently reads, "The proper operation of the primary recombiner ensures that the charcoal contained in the condenser offgas treatment system is not exposed to an explosive mixture of gases." with the following:

"Operation of the offgas recombiner system ensures that the concentration of hydrogen in the offgas charcoal filters remains below combustible levels."

Page 42, Bases 3.7

Add the following sentence at the end of the section:

"The low steam flow trip point is based on 92% of design steam flow and reroutes the offgas to prevent overheating or ignition of the recombiner catalyst. The high steam flow trip point isolates the recombiner on excess steam flow that may be associated with a pipe break downstream of the recombiner."

## II. PURPOSE OF THE PROPOSED CHANGES

The proposed change to Section 3.7.b.1 of the James A. FitzPatrick Radiological Effluent Technical Specifications increases the offgas dilution steam low flow and high flow setpoints to greater than or equal to 6300 and less than or equal to 7900 pounds per hour respectively. Section 3.7 of the bases is also revised to describe more accurately the explosion protection function of the offgas system.

As described in Section 11.4.[illegible] of the FSAR, the recombiner system receives off gas (mainly noncondensables) from the main condenser and recombines the hydrogen and oxygen continuously to form steam. Before recombination, the gas mixture is diluted with steam to reduce the hydrogen concentration to less than 4% by volume. The dilution "...will ensure that the gas mixture is maintained below the flammable concentration for

hydrogen." The recombiner system also reduces the volume of offgas to ensure adequate holdup time for the decay of short lived radioactive isotopes of noble gases and iodine.

The primary method to ensure that the hydrogen concentration is within acceptable limits in the recombiner is direct monitoring of this parameter. If the continuous hydrogen monitor is not available, one of the alternate monitoring methods is to use the dilution steam flow instrument. Alarm and auto isolation of the recombiner are currently provided at low steam flow of less than 6000 pounds per hour or high flow greater than 7200 pounds per hour. The low flow setpoint ensures sufficient steam to prevent overheating or ignition of the recombiner catalyst. The high flow setpoint ensures isolation of a postulated pipe break downstream of the recombiner.

Recent setpoint calculations identified that operation of the plant within the existing setpoints can not be assured when instrument loop uncertainty is considered. To ensure operation within the technical specifications limit while considering loop uncertainty, either the instrumentation must be replaced to reduce instrument uncertainty or the technical specifications limit must be revised to provide a wider window for operation using the currently installed instrumentation. Changing the technical specifications setpoints is the more cost and time effective method of resolving this concern.

In addition, the planned reactor power uprate will increase the radiolytic production of hydrogen by about 4%. This will increase the minimum required dilution steam flow and the corresponding low flow setpoint by about 4%. This amendment application proposes to change the low flow setpoint from the present 6000 pounds per hour to 6300 pounds per hour. This represents a 5% increase. The low flow setpoint of 6300 lbs/hr follows the guidance provided in General Electric Service Information Letter 150 (GE SIL 150), Rev. 2, which recommends that the low flow setpoint be set at a value no lower than 92% of the design steam flow required to keep the gas mixture below the hydrogen flammability limit. The basis for the minimum value of 92% of the design steam flow, as recommended in GE SIL 150, is to prevent overheating or ignition of the catalyst. 92% of the current FitzPatrick design steam flow of 6508 lbs/hr results in a minimum setpoint of 5987 lbs/hr. With the power uprate design steam flow of 6770 lbs/hr, the minimum setpoint becomes 6228 lbs/hr. Therefore, the proposed setpoint of 6300 lbs/hr is conservative for both the current licensed power level and for the planned power uprate.

This amendment application also proposes to raise the upper setpoint from 7200 to 7900 lbs/hr to provide an adequate window for normal plant operations considering loop uncertainty while remaining within the range of the current instrumentation. The increase in the amount of steam released in the event that a pipe break occurs with the new higher setpoint in effect is insignificant. An engineering evaluation was performed to verify that the recombiner will continue to isolate automatically within 5 seconds of a pipe break downstream of the recombiner, as described in Section 11.4.4.2 of the FSAR. The evaluation concluded that the pipe break detection and isolation function will still be accomplished within 5 seconds with the new setpoint.

## III. SAFETY IMPLICATION OF THE PROPOSED CHANGES

The proposed changes do not affect the ability of the offgas system to meet its safety design bases contained in Section 11.4.3 of the FSAR. The proposed amendment does not change the assumptions or conclusions contained in the plant safety analyses.

The revised steam dilution low flow setpoint will prevent overheating or ignition of the catalyst. The proposed value is consistent with the guidance provided in GE SIL 150, Rev. 2. This proposed change will also accommodate the increased quantity of hydrogen flow expected due to the planned power uprate. The proposed steam dilution high flow setpoint is sufficiently low to provide break detection downstream of the recombiner as described in the FSAR. Although the low and high flow isolation setpoints will be raised, actual dilution steam flow is expected to remain unchanged for the current power level. However, should steady state dilution steam flow approach the revised high flow setpoint, the additional steam can be removed in the offgas condenser and dryers. Therefore, at the current power level, the amount of noncondensible gases entering the holdup piping and hence, holdup times remain unchanged.

The proposed changes to the bases will clarify the safety function of the recombiner and the steam dilution flow setpoints.

## IV. EVALUATION OF SIGNIFICANT HAZARDS CONSIDERATION

Operation of the FitzPatrick plant in accordance with the proposed Amendment would not involve a significant hazards consideration as defined in 10 CFR 50.92, since it would not:

1. involve a significant increase in the probability or consequences of an accident previously evaluated.

   The offgas system is not used to mitigate any of the transients or the accidents described in the FSAR. The proposed change increases the offgas dilution steam low flow and high flow setpoints to greater than or equal to 6300 and less than or equal to 7900 pounds per hour respectively. The proposed setpoints do not change the normal operation of the system. The proposed steam dilution low setpoint will continue to ensure adequate steam flow through the recombiner during normal plant operation to prevent overheating or ignition of the catalyst. The proposed low setpoint follows the guidance provided in GE SIL 150, Rev. 2. which recommends that the low flow setpoint be set at a value no lower than 92% of the design steam flow required to keep the process below the flammability limit. In addition, this value is conservative for both the current licensed power level and for the planned power uprate. The proposed steam dilution high setpoint will continue to provide recombiner isolation in the event of a break as described in the FSAR. If a postulated break occurs, the difference of the release between the old and new setpoint will be negligible. The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed changes involve changing the instrument setpoints but do not change the operation of the offgas system or the ability of the recombiner to perform its intended function. The proposed changes will ensure sufficient steam to prevent overheating the recombiner catalyst as well as isolation and pipe break detection. The changes do not introduce new equipment or any new failure modes to the plant. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. involve a significant reduction in a margin of safety.

   Increasing the existing low and high dilution flow setpoints will provide an adequate window for normal plant operation. The proposed changes will ensure that existing margin of safety will be maintained. The offgas system will continue to meet all of its safety design bases as described in the FSAR. Changing the setpoints values will ensure safe plant operation since the probability of hydrogen combustion within the offgas system remains unchanged and within acceptable levels. In addition, the isolation function will continue to be provided by the revised setpoints. The proposed setpoints will ensure an adequate operational band when instrument uncertainty is considered. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

## V. IMPLEMENTATION OF THE PROPOSED CHANGE

Implementation of the proposed changes will not adversely affect the ALARA or Fire Protection Programs at the FitzPatrick plant, nor will the changes affect the environment.

## VI. CONCLUSION

The changes, as proposed, do not constitute an unreviewed safety question as defined in 10 CFR 50.59. That is, they:

1. will not increase the probability nor the consequences of an accident or malfunction of equipment important to safety as previously evaluated in the Safety Analysis Report;
2. will not create the possibility of an accident or malfunction of a type different from any previously evaluated in the Safety Analysis Report;
3. will not reduce the margin of safety as defined in the basis for any technical specification; and
4. involve no significant hazards consideration, as defined in 10 CFR 50.92.

## VII. REFERENCES

1. James A. FitzPatrick Nuclear Power Plant Updated Final Safety Analysis Report, Section 11.4.
2. James A. FitzPatrick Radiological Effluent Technical Specifications, Section 3.7.
3. New York Power Authority Calculation JAF-CALL-OFG-00505, "Offgas Steam Dilution Flow Calculation", dated May 6, 1992.
4. General Electric Service Information Letter 150, Rev. 2, Sup. 3, "Hydrogen Ignition Design Considerations for BWR Offgas Systems", dated July 1979.