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Waterford 3

W3F1-98-0167
A4.05
PR

October 1, 1998

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Subject: Waterford 3 SES
Docket No. 50-382
License No. NPF-38
Technical Specification Change Request NPF-38-211

Gentlemen:

The attached description and safety analysis support a change to the Waterford 3 Technical Specifications (TS). The proposed change modifies TS 3.3.3.7.3 and Surveillance Requirement 4.3.3.7.3 for the broad range gas detection system. A change to Technical Specification Basis 3/4.3.3.7 has been included to support this change. This change to the Technical Specifications is necessary for the installation of a new, more reliable broad range gas detection system.

The changes from our April 11, 1997 Technical Specification Change Request are as follows:

1. Discussion of chlorine monitoring capability of the broad range gas detection system has been deleted. The separate, existing chlorine monitors are utilized to meet the Technical Specification requirement for the chlorine monitoring system (T.S. 3.3.3.7.1).
2. The periodic background/reference spectrum check has been changed from one minute to two minutes. Experience with the new system has shown a higher accuracy with a two minute check. Qualitative analysis has shown no significant increase in risk with a two minute check.

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3. The gases required to be included in the 12 hour CHANNEL CHECK are no longer specified in the Bases. Since the standard gas and CO₂ used in the FUNCTIONAL TEST are expected to normally read zero, this would not provide a meaningful comparison of the channels' reading. Experience with the detectors will determine what gases will be utilized and will be controlled by procedure.

Additionally, this request includes a discussion of the unreviewed safety question which required resolution prior to installation of the new monitoring system. A quantitative analysis has shown that the hazard probability associated with this scenario is negligible.

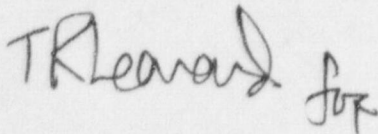
This proposed change has been evaluated in accordance with 10CFR50.91(a)(1), using the criteria in 10CFR50.92(c), and it has been determined that this request involves no significant hazards consideration.

The circumstances surrounding this change do not meet the NRC's criteria for exigent or emergency review. However, due to reliability concerns with our currently installed broad range gas detection system, we respectfully request an expeditious review. Entergy Operations requests the change (i.e., full implementation) be upon completion of the installation of the design change for the new broad range gas detection system. The new broad range gas detectors will be installed one at a time. Waterford 3 plans to implement the revised TS in sequence with the modification. The first detector will be tested and declared operable under the revised TS while the existing TS is still applicable to the second detector. When the second detector is installed and satisfactorily tested, the revised TS will be applied to it. By having both detectors operable under the appropriate TS for the equipment, an unnecessary entry into Action "b" and isolation of the control room can be avoided.

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Should you have any questions or comments concerning this request, please contact
Early Ewing at (504) 739-6242.

Very truly yours,



C.M. Dugger
Vice President, Operations
Waterford 3

CMD/CWT/rtk
Attachment: Affidavit
NPF-38-211

cc: E.W. Mierschoff, NRC Region IV
C.P. Patel, NRC NRR
J. Smith
N.S. Reynolds
NRC Resident Inspectors Office
Administrator Radiation Protection Division (State of Louisiana)
American Nuclear Insurers

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of)
)
Entergy Operations, Incorporated) Docket No. 50-382
Waterford 3 Steam Electric Station)

AFFIDAVIT

Theodore Ray Leonard, being duly sworn, hereby deposes and says that he is General Manager Plant Operations - Waterford 3 of Entergy Operations, Incorporated; that he is duly authorized to sign and file with the Nuclear Regulatory Commission the attached Technical Specification Change Request NPF-38-211; that he is familiar with the content thereof; and that the matters set forth therein are true and correct to the best of his knowledge, information and belief.

Theodore R Leonard

Theodore R. Leonard
General Manager Plant Operations - Waterford 3

STATE OF LOUISIANA)
) ss
PARISH OF ST. CHARLES)

Subscribed and sworn to before me, a Notary Public in and for the Parish and State above named this 1st day of October, 1998.

[Signature]

Notary Public

My Commission expires at death.

DESCRIPTION AND NO SIGNIFICANT HAZARDS EVALUATION OF PROPOSED CHANGE NPF-38-211

The proposed change requests a change to Technical Specification 3.3.3.7.3, its ACTION and Surveillance Requirement 4.3.3.7.3 for the broad range gas detection system. A change to Technical Specification Basis 3/4.3.3.7 has been included to support this change.

Existing Specification

See Attachment A

Proposed Specification

See Attachment B

Background

Waterford 3 is situated in a highly industrialized area. Since the transportation and use of materials present the potential for release of toxic gases, Waterford 3 was evaluated to ensure appropriate design considerations. The main control room design and administrative procedures prevent the incapacitation of control room operators during postulated toxic gas events.

In addition to specific detectors to monitor for chlorine, the design of Waterford 3 included broad range toxic gas monitors. A broad range gas detection system which continuously monitors incoming control room air for the presence of a large variety of toxic gases is installed in the control room air intake duct. If toxic gas relative concentration equals or exceeds the high setting, the detector system sounds an alarm and automatically isolates the control room before toxic levels can be reached.

The current installation of each broad range gas detection system consists of an analyzer panel that includes a photoionization detector, a local readout and alarm adjustments for the detection of toxic gases and isolation of the control room. Also included in the original design is a single gas chromatograph (which is no longer used) to aid the operator in determining the gas or gases that actuated the broad range monitor and that has no automatic actuation features.

Due to the unreliability of the current monitoring system, Waterford 3 has purchased a new detection system. Although recent improvements such as increasing the calibration frequency have increased the reliability of the current system, excessive

maintenance and calibration are required. The system selected to replace the current system is more sensitive, has greater resolution, and is more stable. Replacing the existing broad range gas monitor system will enhance the monitoring of toxic gases and reduce the cost of maintenance and calibration.

The new monitors, known as Air Composition Monitors by the vendor, Telosense, Inc., utilize a Fourier Transform Infrared (FTIR) analysis technique. The FTIR broad range gas detector system utilizes microprocessor gas analysis based on infrared spectrum analysis, and is more accurate than the currently installed unit. Existing alarms and isolation signals will function as presently installed. The gas concentration setpoints presently used is a single quantity which is based on the worst case gas, which has the lowest Immediately Dangerous to Life or Health (IDLH) value. With the replacement units, setpoints may be made for each analyzed gas. The replacement system has the capability of measuring the concentration of all gases of concern to control room habitability except chlorine. The existing chlorine monitors are utilized to meet the Technical Specification for the chlorine monitoring system (T.S. 3.3.3.7.1). In order for the new instrument to properly account for CO₂ and moisture in the air, it is necessary to periodically establish a baseline reference, or self-calibration, for the infrared spectrum. This is done by taking a background or reference spectrum, and is called the background/reference spectrum check. This check must not contain any of the measured gases and should be free of infrared absorbing gases to the extent that is practical. Instrument air is used for this purpose. This function is an integral part of and is performed automatically by the instrument. The time period for this background/reference spectrum check is typically every two hours, however the frequency can be adjusted from one to four hours. This normal mode of operation of the instrument takes two minutes or less. During this small period of time, the instrument is not capable of responding to a toxic gas condition. However, the other channel will be available to respond to a toxic gas and has full capabilities to isolate the control room in the event a toxic gas condition occurs during the background/reference spectrum check. The time at which the background/reference spectrum check occurs will be staggered such that both systems are not out of service simultaneously. In the event the redundant system is out of service, the control room will be without protection for a maximum of two minutes per hour, which is less than the allowed outage time in the current ACTIONS as required by Technical Specifications. However, this automatic background/reference spectrum check feature, designed to enhance system performance, creates a problem with verbatim compliance with the Technical Specifications as currently written and necessitates a change to the Technical Specifications.

License amendment request NPF-38-195 for this new broad range toxic gas monitoring system was submitted to the NRC Staff by Letter W3F1-97-0073, dated April 11, 1997. Based on this request, License Amendment 133 was approved by the NRC and issued on August 19, 1997. The Amendment modified the Technical Specifications to accommodate this new broad range gas detection system and included a requirement to implement within 90 days of issuance of the Amendment.

During the review of the design change to install the new broad range gas detection system, the potential for an unreviewed safety question was identified by Waterford's Plant Operating Review Committee on September 29, 1997. Specifically, the background/reference spectrum check utilizes the plant instrument air system, which employs the atmosphere in the turbine building as its air source. This feature improves the system's performance, but does create a scenario, involving a slow increase in toxic gas levels that could cause detection of the toxic gas to be masked. In this scenario, a slowly increasing quantity of a toxic gas would cause the detector to be recalibrated to a new higher level of that gas such that the increase in level of that gas could remain undetected. With each recalibration to a higher gas concentration, a higher concentration of that toxic gas could remain undetected. This scenario is an unreviewed safety question involving a low probability event that could introduce the possibility of a malfunction that was not previously reviewed and approved by the NRC Staff.

Therefore, until this unreviewed safety question could be evaluated, Waterford 3 requested that the Technical Specifications be changed such that the current detection system could remain in service until this issue could be resolved. As the currently installed system does not use instrument air or any other outside air source for calibration which would be affected by this scenario, it is not susceptible to this potential vulnerability.

Waterford 3 has completed a quantitative analysis of the scenario in which a slowly increasing toxic gas concentration could mask the detection of that toxic gas. The analysis addressed accidents involving chemicals that need to be detected by the new BRGM. For each of the chemicals needing detection, the monitor response to a toxic chemical accident occurring in any hour over an approximately one year time period (when hourly meteorological data were available from the plant computer) was simulated. For each hour in the one year simulation, a toxic chemical accident was assumed to occur. Then the response of the monitors over the next 8 hours was simulated. At 1 hour intervals, the meteorological data was used to calculate the degree of dispersion and, based on the release rate for the accident, the concentration at the control room. Biasing of the monitors by calibration using contaminated instrument air was simulated by setting the monitor biases to the calculated outside concentration whenever a monitor was scheduled to perform a calibration. If monitor actuation was simulated to be necessary because of hazardous outside concentrations, the indicated monitor concentrations were determined (using the calculated biases). If neither monitor would have actuated when needed and the wind had not shifted, it was assumed that the control room operators were at risk and the probability of the accident occurring in that hour was added to a hazard probability sum. The sum over the year is the annual hazard probability.

Based on our analysis, Waterford 3 has determined that the annual probability of this scenario occurring is 3.6×10^{-8} , which is insignificant. Since this probability is very low,

Waterford 3 believes that the hazard associated with this potential new malfunction is negligible.

Description and Safety Considerations

The proposed change to Technical Specification 3.3.3.7.3 annotates the Specification and ACTIONS such that the out of service condition for automatic background/reference spectrum check is not considered to constitute a condition of inoperability of either detector while the automatic background/reference spectrum check is being performed. This change is being made to ensure that verbatim compliance with the Technical Specification can be achieved without entering the ACTION every time the automatic background/reference spectrum check takes place. This is necessary to reduce operator burden by removing the requirement of entering an equipment out of service with associated paperwork each time a broad range gas detection system performs its automatic background/reference spectrum check, which can occur as often as once per hour per detector. The automatic background/reference spectrum check is set for a frequency of once per hour to once per four hours. The exact frequency of occurrence of the automatic background/reference spectrum check will be based on operating experience with the instrument. Additionally, the Surveillance Requirements are being revised consistent with the new detection system.

During the time the automatic background/reference spectrum check is taking place (which will be two minutes or less), the channel will not perform the function of isolation of the control room. This change from our April 11, 1997 submittal is based on our shop tests with the new detectors and will provide increased system accuracy. Qualitative analysis based on a quantitative risk assessment has shown that the impact on operator incapacitation and subsequent core damage risk of this background/reference spectrum check is negligible. With both channels operable, the other system will be available to perform the control room isolation function in the event of a toxic gas incident. With one channel taken out of service (e.g., for maintenance), when the second channel performs the automatic background/reference spectrum check, both channels will be unable to perform the function of isolating the control room for the short time of the background/reference spectrum check. Qualitative analysis based on a quantitative risk assessment has shown that the impact on operator incapacitation and subsequent core damage risk of the background/reference spectrum check while one monitor is out of service for its 7 day allowed outage time is negligible.

Additionally, the new detection system performs the calibration check in a different manner from the present detection system. While the old system required a manual adjustment of instrument sensitivity based on the relationship of the standard gas to the calibration gas, the new system automatically shifts the air sample source from the control room inlet plenum to air inside the system cabinet. The cabinet is continuously supplied with instrument air, which in effect performs a purge of the cabinet. Should

instrument air be lost, the control room ventilation system goes into the recirculation mode and isolates from the outside atmosphere. This is due to the fail position of the control room dampers on loss of instrument air. The system uses this air to perform this self-check and reestablishes the gas baseline for monitoring. As this channel background/reference spectrum check occurs automatically on a preset schedule at a maximum of once per four hour period, the currently required manual calibration at a frequency of once per seven days is being deleted. This change is more conservative than the current requirement of once per seven days. Introduction of a standard gas, which was part of the calibration, will become part of the CHANNEL FUNCTIONAL TEST, consistent with the requirements of the new system.

A CHANNEL CHECK will be performed on a 12 hour frequency to compare channel indications of the same parameter. This is consistent with the vendor recommendations for this system. The CHANNEL FUNCTIONAL TEST will be expanded to require introduction of a standard gas and ensuring that the time of occurrence of the background/reference spectrum check is set such that both channels are not out of service simultaneously.

The Bases for the Chemical Detection Systems is being changed to reflect the new system. Verbiage is being added for the annotated LCO as to operability and entry into the ACTIONS. The broad range gas detection system description is being modified to reflect the new principle of operation. Additionally, the term IDLH is being spelled out in the LCO. An explanation of the Surveillance Testing is being included consistent with the Bases for similar systems in NUREG 1432, "Standard Technical Specifications, Combustion Engineering Plants".

No Significant Hazards Evaluation

The proposed change described above shall be deemed to involve a significant hazards consideration if there is a positive finding in any of the following areas:

1. Will operation of the facility in accordance with this proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

The broad range gas detection system has no effect on the accidents analyzed in Chapter 15 of the Final Safety Analysis Report. It's only effect is on habitability of the control room, which will be enhanced by installation of the new monitoring system and this change to the Technical Specifications. Qualitative analysis based on a quantitative risk assessment has shown that the impact on operator incapacitation and subsequent core damage risk of the periodic automatic

background/reference spectrum check is negligible and that the probability of malfunction of the BRGMs due to a slowly increasing toxic chemical concentration is negligible.

Therefore, the proposed change will not involve a significant increase in the probability or consequences of any accident previously evaluated.

2. Will operation of the facility in accordance with this proposed change create the possibility of a new or different type of accident from any accident previously evaluated?

Response: No.

The proposed Technical Specification change in itself does not change the design or configuration of the plant. The new broad range toxic gas monitoring system performs the same function as the old system, but it accomplishes this function with increased reliability.

Therefore, the proposed change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Will operation of the facility in accordance with this proposed change involve a significant reduction in a margin of safety?

Response: No

The broad range gas detection system has no effect on a margin of safety as defined by Section 2 of the Technical Specifications. Its only effect is on habitability of the control room, which will be enhanced by installation of the new monitoring system and this change to the Technical Specifications.

Therefore, the proposed change will not involve a significant reduction in a margin of safety.

Safety and Significant Hazards Determination

Based on the above No Significant Hazards Evaluation, it is concluded that: (1) the proposed change does not constitute a significant hazards consideration as defined by 10CFR50.92; and (2) there is a reasonable assurance that the health and safety of the public will not be endangered by the proposed change; and (3) this action will not result in a condition which significantly alters the impact of the station on the environment as described in the NRC final environmental statement.

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ATTACHMENT A