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DUANE ARNOLD ENERGY CENTER
DOCKET 50-331
LICENSE No. DPR-49
GENERIC LETTER 2003-01: CONTROL ROOM HABITABILITY 60-DAY RESPONSE

The Nuclear Regulatory Commission (NRC) issued the subject generic letter (GL) on June 12, 2003. The GL contains a 180-day requested response for specific information. Addressees that cannot provide the information or cannot meet the requested completion date are requested to submit a written response within 60-days to address any proposed alternative course of action, including the basis for acceptability and the schedule for completion of the alternative course of action. Nuclear Management Company, LLC (NMC) is unable to meet the completion date for all the requested information for the Duane Arnold Energy Center (DAEC). Accordingly, NMC is providing the requested proposed alternative course of action in Attachment 1.

NMC makes the following commitment:

NMC will provide the schedule to perform the ASTM E741 test and the schedule for the requested responses to items 1(a), (b), and (c) for DAEC by December 5, 2003.



Mark A. Peifer
Site Vice President, Duane Arnold Energy Center

CC Regional Administrator, USNRC, Region III
 Project Manager, Duane Arnold Energy Center, USNRC, NRR
 NRC Resident Inspector – Duane Arnold Energy Center

Attachment

ATTACHMENT 1

**NUCLEAR MANAGEMENT COMPANY
DUANE ARNOLD ENERGY CENTER
DOCKET 50-331**

**GENERIC LETTER 2003-01: CONTROL ROOM HABITABILITY 60-DAY
RESPONSE**

6 Pages Follow

GENERIC LETTER 2003-01: CONTROL ROOM HABITABILITY

DAEC 60-DAY RESPONSE

Requested Information

Addressees are requested to provide the following information within 180-days of the date of this letter.

If an addressee cannot provide the information or cannot meet the requested completion date, the addressee should submit a written response indicating this within 60-days of the date of this generic letter. The response should address any proposed alternative course of action the addressee proposes to take, including the basis for acceptability of the proposed alternative course of action and the schedule for completion of the alternative course of action.

1. *Provide confirmation that your facility's control room meets the applicable habitability regulatory requirements (e.g., GDC 1, 3, 4, 5, and 19) and that the CRHSs (control room habitability systems) are designed, constructed, configured, operated, and maintained in accordance with the facility's design and licensing bases. Emphasis should be placed on confirming:
 - (a) *That the most limiting unfiltered inleakage into your CRE (and the filtered inleakage if applicable) is no more than the value assumed in your design basis radiological analyses for control room habitability. Describe how and when you performed the analyses, test, and measurements for this confirmation.**

Response

System Design

The DAEC control room envelope (CRE) is located in the control building, which is adjacent to, but physically separate from, the reactor and turbine buildings. The CRE includes the control room and associated auxiliaries, essential switchgear rooms, battery rooms, cable spreading room, computer room, and HVAC equipment room.

The control room ventilation system (CRVS) that provides control room airflow also supplies the remainder of the control building, including the essential switchgear and battery rooms, the cable spreading areas above and below the control room, and the HVAC equipment room. Because the source of control room air is presently common with the air distributed to the remainder of the control building, no special means of isolating just the control room is provided.

The present design includes a HEPA and charcoal filtration train in the emergency makeup air duct through which emergency makeup air is automatically diverted when a predetermined level of airborne radioactivity is detected. This detection also isolates the normal control building makeup air supply and exhaust ducts. These actions of isolating the control building and filtration of the emergency makeup supply protect the control building inhabitants from high levels of airborne radioactivity.

The CRVS operates in one of three modes, Fresh Air, Recirc or Isolation. In the Fresh Air mode, a continuous flow of fresh makeup air is supplied to the building with emphasis on personnel comfort and equipment operation. In the Recirc mode the building air is recirculated and a reduced volume of fresh makeup air drawn in through the normal control building inlet dampers. In the Isolation mode, building air is recirculated and a reduced volume of fresh makeup air is filtered through a HEPA filter and carbon bed adsorption process before distribution. Cable Spreading Room and Battery rooms exhaust lineups change allowing only one battery room exhaust fan to remain running and the Corridor Exhaust Fan is secured. The change in CRVS lineup is to accommodate the reduced fresh air makeup flow during an isolation, and maintain the CRE pressure positive with respect to the outside, to minimize unfiltered in-leakage. This mode of operation continues until manually reset by the Control Room operator.

The DAEC CRE is a positive pressure type. The control room positive pressure, with respect to potentially contaminated adjacent areas, is periodically tested to verify proper function of the standby filter unit (SFU) system. During the emergency mode of operation, the SFU system is designed to slightly pressurize the control room ≥ 0.1 inches of water gauge above atmospheric pressure, under calm wind conditions to prevent unfiltered inleakage. The SFU system is designed to maintain this positive pressure at a flow rate of 1000 cfm $\pm 10\%$ to the control room in the isolation mode.

The DAEC CRHS is currently designed, constructed, configured, operated and maintained in accordance with plant design and licensing bases as described in the UFSAR. Further, DAEC believes this has been consistent with previous regulation and interpretation of GDC 1, 3, 4, 5, and 19. In the DAEC follow-on response to this generic letter, several changes to plant design and licensing bases will be required. (For example, the design basis for the control room envelope currently based on positive pressurization will be changed to a basis of measured inleakage.) The hazardous chemical protection scenerios will be expanded to include transportation sources within five miles. The previous DAEC compliance with Appendix R and Fire Protection regulations will be expanded to address vulnerability to smoke intrusion into the control room from internal and external sources.

Additional information confirming the DAEC control room meets the applicable habitability regulatory requirements (e.g., GDC 1, 3, 4, 5, and 19) and that the CRHSs are designed, constructed, configured, operated and maintained in accordance with the facility's design and licensing bases will be provided when the committed responses to items 1(a), (b), and (c) described below are completed.

Testing Considerations

Testing to quantify the most limiting unfiltered inleakage has not yet been performed at the Duane Arnold Energy Center (DAEC). Nuclear Management Company, LLC (NMC) cannot confirm that radiological consequences analysis has assumed the most limiting unfiltered inleakage into the CRE until an acceptable test, in accordance with the standard methodology of ASTM E741 and this generic letter (GL), can be performed for the Duane Arnold Energy Center.

DAEC submitted an application for full scope implementation of an Alternative Source Term under 10 CFR 50.67 in letter NG-00-1589 from G. Van Middlesworth to the Office of Nuclear Reactor Regulation, "Duane Arnold Energy Center Docket 50-331 Op. License No: DPR-49 Technical Specification Change Request (TSCR-037) Alternative Source Term," dated October 19, 2000. NRC approved the DAEC application and provided Safety Evaluation Reports in amendments 237 and 240 dated April 16, 2001, and July 31, 2001 respectively.

In Attachment 4 to the application "Safety Evaluation," DAEC reported that control room unfiltered inleakage had been evaluated for values of 0, 67.5, 500, and 1000 cfm. 1000 cfm was chosen as an upper bound for inleakage because that is the volumetric flow rate for the emergency ventilation mode of the control room HVAC system. It was considered likely that inleakage values greater than this value would prevent successful completion of existing control room pressurization surveillance testing.

The limiting radiological event for control room operator dose for the DAEC was identified as a Loss of Coolant Accident (LOCA) with 0 cfm inleakage. The predominant source path for operator dose is containment leakage. During the positive pressure period, this path is a ground release close to the control room ventilation intake. Once secondary pressure is drawn down by the standby gas treatment system, this release becomes a filtered, elevated release from the offgas stack. Other assumptions to maximize dose consequences included a long positive pressure period (5 minutes) and automatic isolation of the control room at 4 minutes that traps a large source term in the CRE. Since the DAEC control room ventilation system does not incorporate recirculation filters, the only removal mechanisms for this source term are decay and dilution by ventilation intake. Once the positive pressure period ends, the dispersion of the elevated release actually results in unfiltered inleakage having lower radioactivity than the

control room atmosphere. Thus, non-zero, unfiltered inleakage helps to more quickly dilute the source term in the control room atmosphere and reduces the analyzed dose to operators.

The conservatism of other assumptions such as drawdown time and control room isolation makes the quantification of unfiltered inleakage unnecessary for the LOCA event. The control room dose consequences for other events (i.e., Fuel Handling Accident (FHA), Main Steamline Break Accident (MSLBA), and Control Rod Drop Accident (CRDA)) have been analyzed and found non-limiting over a similar range of assumed values for unfiltered inleakage. Assumptions of instantaneous release and conservatively short isolation of the control room in the MSLB analysis also had results similar to the LOCA in that unfiltered inleakage would reduce the dose to operators. FHA analysis assumed 1000 cfm unfiltered inleakage. The control room dose consequences of a CRDA were not evaluated at the time of the submittal, but have been analyzed since that time, confirming the judgment that although the dose consequences do increase with unfiltered inleakage, the source term released is very small compared to the other events and the CRDA is a non-limiting event.

The inleakage assumed in these analyses are considered adequate to provide reasonable assurance that CRE integrity is being maintained. However, until additional testing can be performed, the most limiting inleakage cannot be confirmed for all potential scenarios.

NMC is evaluating vendors to perform ASTM E741 testing for all plants within the NMC fleet. The evaluation, along with the supporting activities to prepare for the testing (such as CRE walkdowns and safety analysis reassessment to establish testing acceptance criteria), is planned for the fourth quarter of 2003. Upon completion of the evaluation and activities described, CRE inleakage testing will be scheduled as soon as practical.

The schedule to perform the ASTM E741 test and provide the requested response to item 1(a) for DAEC will be provided by December 5, 2003.

Requested Information

(b) That the most limiting inleakage into your CRE is incorporated into your hazardous chemical assessments. This inleakage may differ from the value assumed in your design basis radiological analyses. Also, confirm that the reactor control capability is maintained from either the control room or the alternate shutdown panel in the event of smoke.

Response

Hazardous Chemical Assessments

NMC has determined that the information cannot be completed until the testing described in item 1(a) is completed. The current DAEC assessments of toxic chemical releases considered local releases of agricultural chemicals and gasses used on-site at the plant. The rural location of the DAEC does not provide other significant sources of fixed storage of industrial or hazardous chemicals. An interstate highway is located at a distance of just under 5 miles to the northeast and a rail line is located to the south-southwest about 3 miles from the plant. Neither of these sources for transportation accidents is in the direction of prevailing winds.

Smoke Assessments

Evaluation of potential impacts and vulnerability to smoke propagation from onsite and offsite fires has not been completed.

Current hazardous chemical assessments and fire protection program guidelines provided in the DAEC UFSAR provide reasonable assurance that CRE integrity and reactor control capability will be maintained. As indicated in the response to request 1(a), NMC is evaluating vendors and developing a schedule for performance of ASTM E741 testing to establish the measured inleakage for the CRE. The schedule for the response to item 1(b) will be provided by December 5, 2003.

Requested Information

- (c) That your technical specifications verify the integrity of the CRE, and the assumed inleakage rates of potentially contaminated air. If you currently have a ΔP surveillance requirement to demonstrate CRE integrity, provide the basis for your conclusion that it remains adequate to demonstrate CRE integrity in light of the ASTM E741 testing results. If you conclude that your ΔP surveillance requirement is no longer adequate, provide a schedule for: 1) revising the surveillance requirement in your technical specification to reference an acceptable surveillance methodology (e.g., ASTM E741), and 2) making any necessary modifications to your CRE so that compliance with your new surveillance requirement can be demonstrated.*

If your facility does not currently have a technical specification surveillance requirement for your CRE integrity, explain how and at what frequency you confirm your CRE integrity and why this is adequate to demonstrate CRE integrity.

Response

DAEC Improved Technical Specifications (ITS) currently contain the ΔP surveillance requirement. NMC has concluded that the ΔP surveillance requirement is no longer adequate to demonstrate CRE integrity in light of the results of industry ASTM E741 testing.

The schedule for the development of technical specification changes (and any associated plant modifications) to support requested information item 1(c) will be provided by December 5, 2003.

Requested Information

2. *If you currently use compensatory measures to demonstrate control room habitability, describe the compensatory measures at your facility and the corrective actions needed to retire these compensatory measures.*

Response

No compensatory measures are currently being used at DAEC.

Requested Information

3. *If you believe that your facility is not required to meet either the GDC, the draft GDC, or the "Principle Design Criteria" regarding control room habitability, in addition to responding to 1 and 2 above, provide documentation (e.g., Preliminary Safety Analysis Report, Final Safety Analysis Report sections, or correspondence) of the basis for this conclusion and identify your actual requirements.*

Response

This request does not apply to DAEC.