IES
UTILITIES INC.

January 20, 1995
NG-95-0089

Mr. William T. Russell, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-37
Washington, DC 20555-0001

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Request for Technical Specification Change (RTS-232): Increase in Allowable MSIV Leakage Rate and Deletion of the MSIV Leakage Control System
Reference: NG-94-2629, J. Franz (IES) to W. Russell (NRC) dated August 15, 1994
File: A-117, N-11

Dear Mr. Russell:

In the referenced letter, IES Utilities Inc. submitted a request for Technical Specification (TS) change which allows the elimination of the Main Steam Isolation Valve (MSIV) Leakage Control System (LCS) and increases allowable MSIV leakage. Your Staff has requested additional information pertaining to that submittal. The purpose of this letter is to provide the additional information.

Data used as input to the radiological calculations is included as Attachment 1. Attachment 2 provides additional information about the computer codes used in the seismic calculations.

This letter contains no new NRC commitments. Should you have any questions regarding this matter, please contact this office.

Sincerely,

Keith D. Young

Keith D. Young
Manager, Nuclear Licensing

Attachments: 1) Radiological Dose Calculation Data
2) Additional Information on Seismic Computer Codes

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cc: C. Rushworth
J. Franz
L. Liu
L. Root
G. Kelly (NRC-NRR)
J. Martin (Region III)
S. Brown (State of IA)
NRC Resident Office
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Radiological Dose Calculation Data
BWR OWNERS' GROUP
MSIV LEAKAGE CLOSURE COMMITTEE

RADIOLOGICAL DOSE CALCULATION
DATA SHEET #1

PLANT(S) Duane Arnold

100% RATED POWER LEVEL 1658 MW THERMAL

Containment

Maximum Allowable Leakage Rate to Reactor Building 2 % per day

Does this include MSIV Leakage? X Yes ___ No

Reactor to Outboard MSIV Pipe Compartment

Number of Lines	4	
Average Pipe Length	Appendix A	feet *
Pipe Inside Diameter	17.938	inches
Pipe Outside Diameter	20.0	inches
Pipe Mass Per Unit Length	208.87	lbm. per foot
Insulation Material	Nukon	
Insulation Thickness	3	inches

Outboard MSIV to Turbine Stop Valve Pipe Compartment (HP Turbine Pathway)

Average Pipe Length	Appendix B	feet *
Pipe Inside Diameter	17.938	inches
Pipe Outside Diameter	20.0	inches
Pipe Mass Per Unit Length	208.87	lbm. per foot
Insulation Material	Mirror	
Insulation Thickness	4	inches

Outboard MSIV to Condenser Pipe Compartment (Drain Line Pathway)

Number of Lines	Appendix C	*
Average/Equivalent Pipe Length	Appendix C	feet *
Pipe Inside Diameter	Appendix C	inches
Pipe Outside Diameter	Appendix C	inches
Pipe Mass per Unit Length	Appendix C	lbm. per foot
Insulation Material	Appendix C	
Insulation Thickness	Appendix C	inches
Minimum Diameter of Drain line Pathway	Appendix C	inches *

* GE will calculate equivalent values if appropriate drawings are provided (piping segments may not have same diameters or same number of parallel pathways).

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RADIOLOGICAL DOSE CALCULATION
DATA SHEET #2

PLANT(S) Duane Arnold

Main Condenser/LP Turbine

Free Volume Condenser (not including hotwell)	55,000	cubic feet
Free Volume LP Turbines	45,000	cubic feet

Relative Elevations (Needed to Calculate Effective Volume)

- Surface of Water in Hotwell	739	feet
- Drain Line Inlet to Condenser	742.5	feet
- Condenser to LP Turbine Bellows	778	feet
- Turbine Center Line	783	feet

Turbine Building

Estimated Free Volume	1.2 E6	cubic feet

HP Turbine

Estimated Free Volume	568.6	cubic feet *
Estimated Internal Area	4402	square feet *

Control Room

Free Volume	155,000	cubic feet
Habitable Volume	155,000	cubic feet
Vent Filter Intake	16.67	cubic feet per second
Vent Unfiltered Intake	1.125	cubic feet per second
Recirculation Rate	265	cubic feer per second
Intake Filter Efficiency	99% particulates	90% minimum iodine 131
Intake Filter Activated Carbon Bed Depth	2	inches
Recirculation Filter Efficiency	N/A	%
Recirculation Filter Activated Carbon Bed Depth	N/A	inches

Is the intake and recirculation filter the same filter? ___ Yes ___ No N/A

* Typical from GE Turbine Department; if you have specific value for your plant, please revise accordingly.

BWR OWNERS' GROUP

MSIV LEAKAGE CLOSURE COMMITTEE

RADIOLOGICAL DOSE CALCULATION

DATA SHEET #3

PLANT(S) Duane Arnold

Meteorology Factors* $\frac{X}{Q}$ (sec/m^3)

	Control Room	Off-Site LPZ	Exclusion Area Boundary
0-2 HR.	5.0 E-4	5.6 E-5	5.0 E-4
0-8 HR.	5.0 E-4	5.6 E-5	
or 2-8 HR.			
8-24 HR.	2.90 E-4	1.82 E-5	
24-96 HR.	1.07 E-4	6.61 E-6	
96-720 HRS.	2.55 E-5	1.46 E-6	

X/Q data taken from GE Analysis AE-39-0484 SSS 7/28/94.
DAEC Radiological Effects of Power Uprate, April 1984

* Attach appropriate tables from FSAR or other reference.

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Appendix A - Reactor to Outboard MSIV Pipe Compartment

Piping Specification: GE Spec. 21A9210 rev. 2 IE Doc.#: APED-B21-067

Purchase Part Drawing: GE 731E782 rev. 8 IE Doc.#: APED-B21-007

Master Parts List: B21-G001

Piping Code: ANSI B31.1.0 - Code for Pressrue Piping, Power Piping
ANSI B36.10 - Wrought-Steel and Wrought-Iron Pipe

Insulation Spec.: MRS-M425

Piping Dimensions (per ANSI B36.10)

	Nominal Wall Thickness	OD	lbm/ft	Insulation Thickness
20" Schedule 80	1.031"	20.0"	208.87 lbm/ft	3"(Nukon)

Pipe lengths:

	MSL A	MSL B	MSL C	MSL D
Vessel to Inboard MSIV	83.2'	90.5'	90.6'	83.2'
Inboard MSIV	4.1'	4.1'	4.1'	4.1'
Inboard to Outboard MSIV	18.3'	19.8'	19.8'	18.3'
Outboard MSIV	4.1'	4.1'	4.1'	4.1'
Total	109.7'	118.5'	118.6'	109.7'

Drawings Referenced:

P&ID	M114
PPD	B21-007 sheets 1-4
Insulation	BECH-M425-006
	BECH-M425-008 sheets 1-4

Appendix B - Outboard MSIV to Turbine Stop Valve Pipe Compartment
(HP Turbine Pathway)

Piping Specification: BECH-MRS-M116B

Piping Summary: BECH-M190 class EBD

Piping Code: ANSI B31.1.0 - Code for Pressrue Piping, Power Piping
ANSI B36.10 - Wrought-Steel and Wrought-Iron Pipe

Insulation Spec.: MRS-M117

Piping Dimensions (per ANSI B36.10)

	Nominal Wall Thickness	OD	lbm/ft	Insulation Thickness
20" Schedule 80	1.031"	20.0"	208.87 lbm/ft	4" (mirror)

Pipe lengths:

	MSL A	MSL B	MSL C	MSL D
MSIV to Header	132.6'	131.3'	128.6'	129.9'
Header to SV	3.7'	3.7'	3.7'	3.7'
Total	136.3'	135.0'	132.3'	133.6'

Drawings Referenced:

P&ID	M114	
	M103 sheet 1	
Isometric	BECH-M716	
Insulation	BECH-M117-022 sheets 1,2	
	BECH-M117-019 sheets 1-6	

Appendix C - Outboard MSIV to Condenser Pipe Compartment (Drain Line Pathway)

Primary Pathways (pipe diameter >2"):
A - Inboard Main Steam Line Drain to Condenser
B - Main Steam Line to Bypass Valves to Condenser
C - Outboard Main Steam Line Drain to Condenser via MO10 3
D - Outboard Main Steam Line Drain to Condenser via CV1064 and FO1051.
E - Before Stop Valve Drains to Condenser via MO1038 to MO1041.

Secondary Pathways (pipe diameter <2"): As shown on P&IDs M103, M104, and M105 but not included below.

Piping Specification: BECH-MRS-M116B

Piping Summary: BECH-M190 class DBA - pathway A thru 2nd Isolation
class EBD

Piping Code: ANSI B31.1.0 - Code for Pressrue Piping, Power Piping
ANSI B31.7.0 class 1 - for DBA piping
ANSI B36.10 - Wrought-Steel and Wrought-Iron Pipe

Insulation Spec.: MRS-M117
BECH-M190

Piping Dimensions (per ANSI B36.10)

	Nominal Wall Thickness	OD	lbm/ft	Insulation Thickness
10" Schedule 80	0.594"	10.75 "	64.43 lbm/ft	3.75(mirror)
6" Schedule 80	0.432"	6.625"	28.57 lbm/ft	3.75(mirror)
3" Schedule 160	0.438"	3.5 "	14.32 lbm/ft	2.5 (mirror)
2" Schedule 160	0.436"	2.375"	9.03 lbm/ft	2.5
1" Schedule 160	0.250"	1.315"	2.84 lbm/ft	2.0

Pipe lengths: (not determined)

Drawings Referenced:

Pathway A - Inboard Main Steam Line Drain to Condenser

P&ID	M114 M103 sheet 1
Field Sketch	FSK-3939 rev. 5 FSK-3973 rev. 3 (RCIC) FSK 3994 rev. 3 (HPCI)

Isometrics	ISO-DBA-002-01 rev. 3 ISO-EBD-003-03 rev. 2 ISO-EBD-003-02 rev. 4 ISO-EBD-003-01 rev. 5
Insulation	BECH-M117-008 sheets 1,2

Pathway B - Main Steam Line Drain to Bypass Valves to Condenser

P&ID	M103 sheet 1
Isometrics	BECH-M716 ISO-EBD-006-01 rev. 3 ISO-EBD-006-02 rev. 2 ISO-EBD-006-03 rev. 4 ISO-EBD-009-01 rev. 3 ISO-EBD-009-02 rev. 2 ISO-EBD-009-03 rev. 2
Insulation	BECH-M117-022 sheets 1,2

Pathway C - Outboard Main Steam Line Drain to Condenser via MO1043

P&ID	M103 sheet 1
Isometrics	BECH-M716 ISO-EBD-003-03 rev. 2
Field Sketch	FSK-3584
Insulation	Class I, 2-1/2" thick, calcium silicate or fiber glass.

Pathway D - Outboard Main Steam Line Drain to Condenser via CV1064 and FO1051.

P&ID	M103 sheet 1
Isometrics	BECH-M716 ISO-EBD-003-02 rev. 4 ISO-EBD-003-01 rev. 7
Field Sketch	FSK-4951 FSK-3576
Insulation	Class I, 2" thick, calcium silicate or fiber glass.
Orifice Data	BECH-M470-22 rev. 3 BECH-M470-13 rev. 3

Pathway E - Before Stop Valve Drains to Condenser via MO1038 thru MO1041

P&ID	M103 sheet 1
Isometrics	ISO-EBD-015-01 rev. 2
Field Sketch	FSK-4465
Insulation	Class I, 2" thick, calcium silicate or fiber glass.

Additional Information on Seismic Computer Codes

All computer codes used for the Duane Arnold Energy Center (DAEC) Main Steam Isolation Valve (MSIV) Leakage Control System (LCS) soil structure interaction (SSI) calculations have been subject to the verification and validation requirements of the EQE Quality Assurance Program. The computer codes SSIN, GLAY and CLAN used to perform the SSI analyses are modules of a family of CLASSI (Continuum Linear Analysis for Soil-structure Interaction) derivative programs. SSIN, GLAY and CLAN have been benchmarked against published results and independent computer codes such as SUPERALUSH. The EQE Quality Assurance Program and the EQE Computer Software Verification and Validation procedures have been audited by the Nuclear Procurement Issues Committee (NUPIC), as well as many nuclear utilities, and found acceptable for 10 CFR 50 Appendix B applications. EQE Quality Assurance Procedures and Certification of Conformance for the applicable computer codes are on file at the EQE offices.