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SUBJECT: Responds NRC Bulletin 90-001, "Loss of Fill Oil in Transmitters Mfg by Rosemount." D

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 Standardized plant. 05000529 A
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WILLIAM F. CONWAY
EXECUTIVE VICE PRESIDENT
NUCLEAR

161-03348-WFC/RAB

July 20, 1990

Docket Nos. STN 50-528/529/530

Document Control Desk
U. S. Nuclear Regulatory Commission
Mail Station PL-137
Washington, D.C. 20555

Reference: NRC Bulletin No. 90-01, Loss of Fill-Oil In
Transmitters Manufactured by Rosemount

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2, and 3
Response to Actions Requested of NRC Bulletin 90-01
File: 90-055-026

The attached text contains APS' response as required by NRC Bulletin 90-01, concerning suspect transmitters manufactured by Rosemount. Corrective actions that have been taken and that are currently underway at PVNGS are also noted within this response.

If you have additional questions, please contact Mr. A. C. Rogers of my staff at (602) 340-4104.

Sincerely,

Wm Levine
for WFC

WFC/RAB/jle

Attachment

cc: J. B. Martin
S. R. Peterson
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A. C. Gehr
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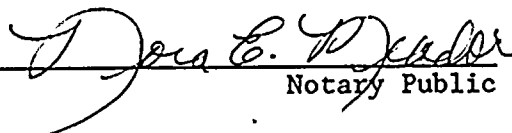
STATE OF ARIZONA)
)ss.
COUNTY OF MARICOPA)

I, J. M. Levine, represent that I am Vice President, Nuclear Production, that the foregoing document has been signed by me on behalf of Arizona Public Service Company with full authority to do so, that I have read such document and know its contents, and that to the best of my knowledge and belief, the statements made therein are true and correct.



J. M. Levine

Sworn To Before Me This 20 Day Of July, 1990.



Notary Public

My Commission Expires

My Commission Expires April 6, 1991

Document Control Desk
U. S. Nuclear Regulatory Commission
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July 20, 1990

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ATTACHMENT

FINAL RESPONSE TO NRC BULLETIN 90-01

OPERATING REACTORS REPORTING REQUIREMENTS

- (1) Provide, within 120 days after receipt of this bulletin, a response that:

(1a) ACTION

Confirms that Items 1, 2, 3, 4, and 5 of Requested Actions for Operating Reactors have been completed.

RESPONSE

OPERATING REACTOR REQUESTED ACTIONS

(1) ACTION

Identify Model 1153 Series B, 1153 Series D, and Model 1154 pressure or differential pressure transmitters, excluding Model 1153 Series B, 1153 Series D, and Model 1154 transmitters manufactured by Rosemount subsequent to July 11, 1989, that are currently utilized in either safety-related systems or systems installed in accordance with 10 CFR 50.62 (the ATWS rule).

RESPONSE

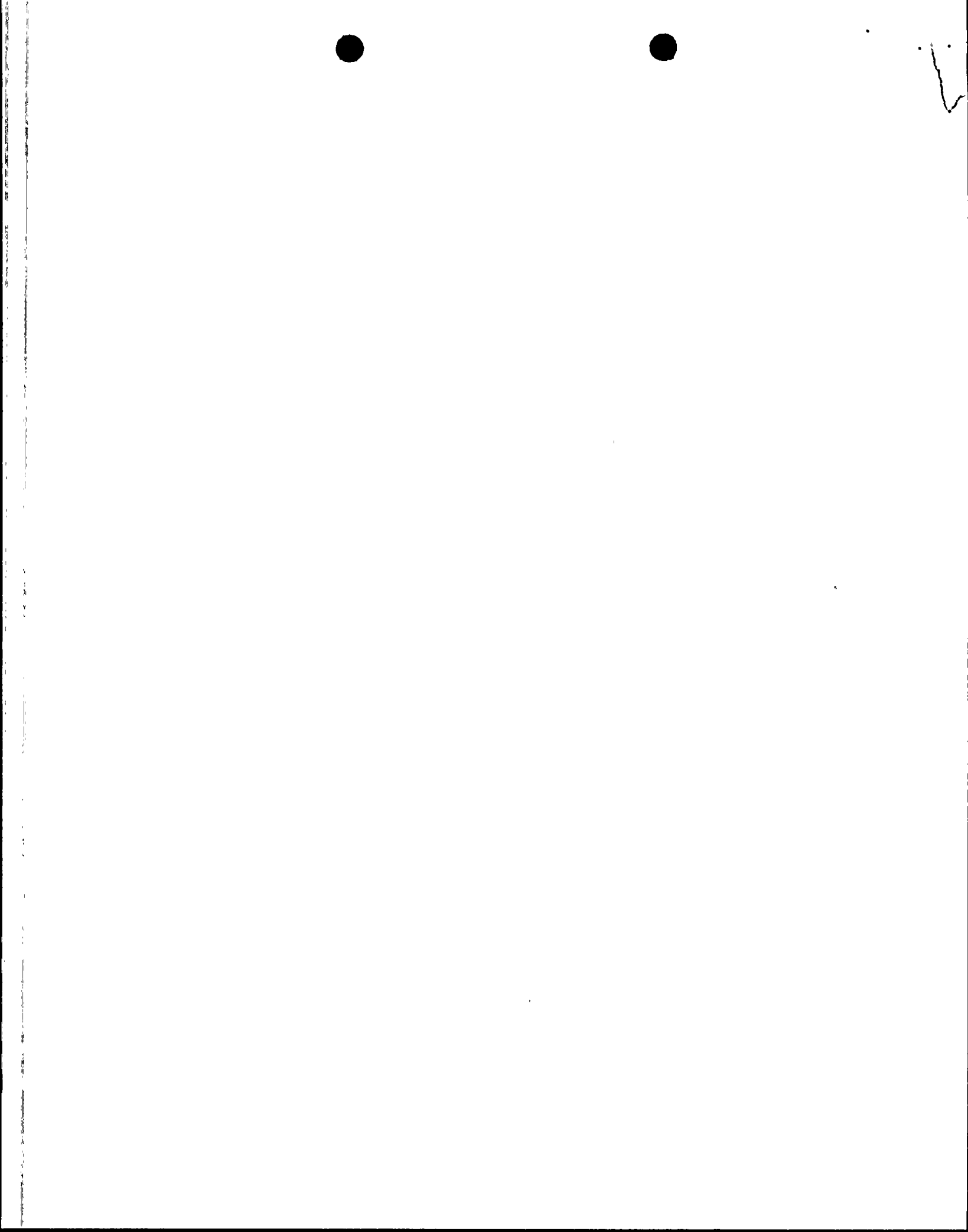
All Model 1153 Series B, 1153 Series D, and Model 1154 pressure and differential pressure transmitters that are currently installed at Palo Verde Nuclear Generating Station have been identified. Tables A1, A2, and A3 contain a list of transmitters sorted by unit and listed by instrument number with a description of the instruments' function.

A review of the reactor protection (RPS), the engineered safety features actuation (ESFAS), and the supplementary protection systems (SPS) has identified that only four functions use Rosemount Model 1153 or 1154 transmitters. These are:

- (a) Containment Pressure - High
- (b) Containment Pressure - High-High
- (c) Refueling Water Tank Level - Low
- (d) Pressurizer Pressure - High (SPS)

(2) ACTION

Determine whether any transmitters identified in Item 1 are from the manufacturing lots that have been identified by Rosemount as having a high failure fraction due to loss of fill-oil. Addressees are requested not to utilize transmitters from these suspect lots in the reactor protection or engineered safety features actuation systems; therefore, addressees are requested to develop and implement a program to replace, at the earliest appropriate opportunity,



transmitters from these suspect lots in use in the reactor protection or engineered safety features actuation systems.

RESPONSE

Thus far we have identified five (5) transmitters that were listed on the "Rosemount Model 1153 and 1154 Pressure Transmitter Suspect List", dated December 22, 1989, that are/were installed at Palo Verde. None of these suspect transmitters are in the reactor protection or engineered safety features actuation systems of any of the three units; however, we have decided to replace all transmitters listed on Rosemount's suspect transmitter list that are installed in any of the units.

No suspect transmitters have been identified as being installed in Unit 1. One (1) suspect transmitter was found to be installed in Unit 2; however, it has been replaced with a transmitter that is not listed on the suspect list. Four (4) suspect transmitters were found to be installed in Unit 3. Three (3) of the four (4) have been replaced with non-suspect transmitters. The fourth transmitter, 3JSIBFT0311 (High Pressure Safety Injection Flow to Reactor Coolant Loop 2A), will be replaced at the earliest opportunity but no later than the end of the next refueling outage.

The spare Rosemount Model 1153 Series B, 1153 Series D, and Model 1154 transmitters in Palo Verde's warehouse have been inspected and eleven (11) transmitters listed on Rosemount's suspect list were identified. Warehouse Deficiency Notices (WDN's) were issued against the transmitters and they have been placed in the warehouse's QA quarantine area until Rosemount authorizes returning them for replacement. Another Model 1153 transmitter listed on Rosemount's suspect list was located in the I&C rework stock. It has been segregated to prevent its inadvertent installation in any of the units.

Including the five (5) transmitters identified above in the units, thus far seventeen (17) transmitters listed on Rosemount's suspect list have been located and have been or will be segregated.

(3) ACTION

Review plant records (for example, the three most recent calibration records) associated with the transmitters identified in Item 1 above to determine whether any of these transmitters may have already exhibited symptoms indicative of loss of fill-oil. Appropriate operability acceptance criteria should be developed and applied to transmitters identified as having exhibited symptoms indicative of loss of fill-oil that do not conform to the operability acceptance criteria and are not addressed in the technical specifications should be replaced at the earliest appropriate opportunity.

RESPONSE

We have reviewed the Palo Verde Failure Data Trending records for every Rosemount Model 1153 and 1154 transmitter. There is no record in this data base of a Model 1153 and/or 1154 failing with symptoms indicative of a possible loss of fill fluid failure, i.e. sluggish response to pressure changes, excessive calibration shift. However, any confirmed transmitter fill-oil failure, which is an NPRDS reportable component, will be reported on NPRDS.

We are currently reviewing the calibration records for the Model 1153 and 1154 transmitters installed in all three units. The review has not yet been completed due to the number of documents involved with the maintenance and calibration of over 260 model 1153 and 1154 transmitters.

(4) ACTION

Develop and implement an enhanced surveillance program to monitor transmitters identified in Item 1 for symptoms of loss of fill-oil. This enhanced surveillance program should consider the following or equally effective actions:

(a) ACTION.

Ensuring appropriate licensee personnel are aware of the symptoms that a transmitter, both during operation and during calibration activities, may exhibit if it is experiencing a loss of fill-oil and the need for prompt identification of transmitters that may exhibit these symptoms.

RESPONSE

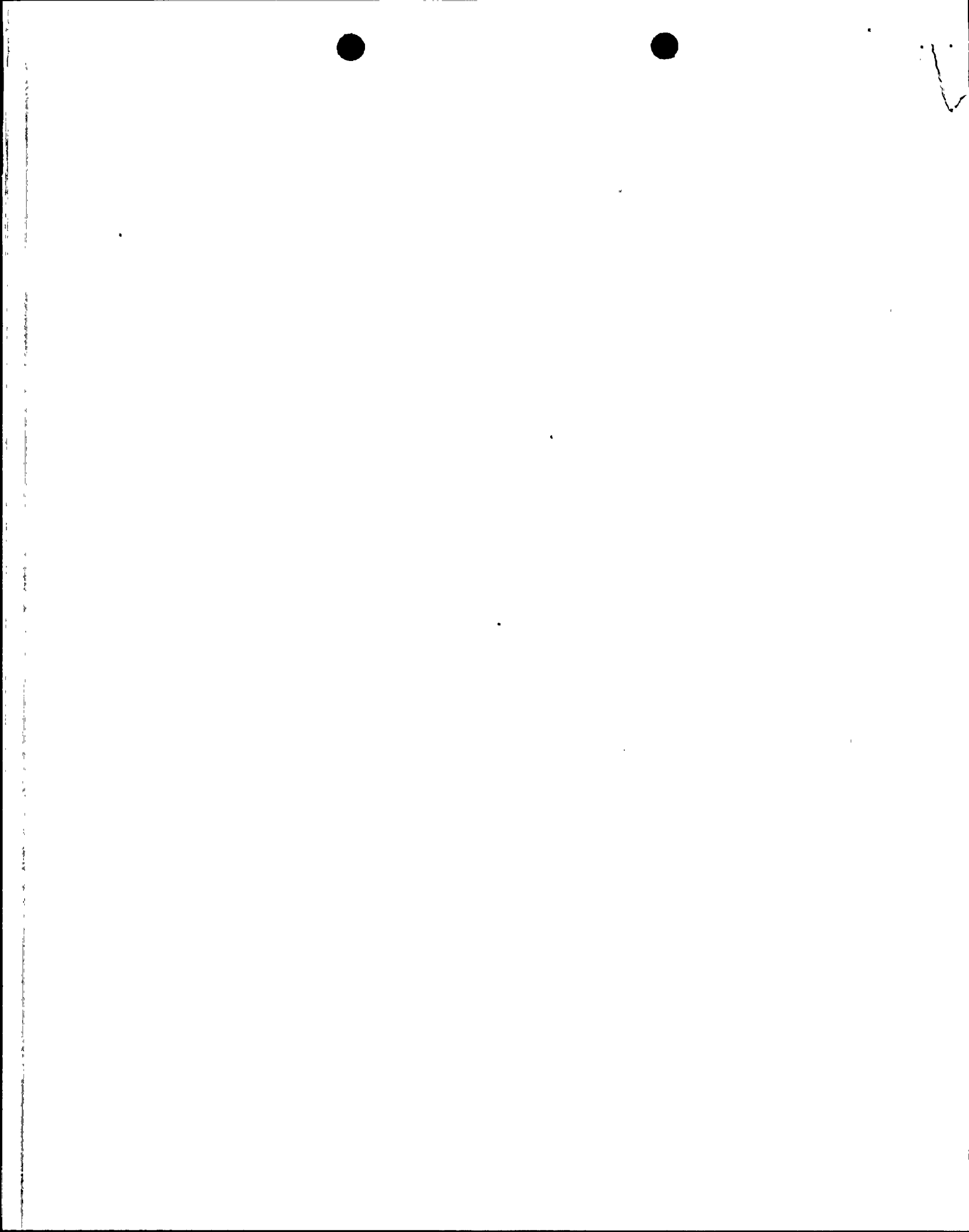
The operations and I&C maintenance staff have been notified of the typical responses that the Model 1153 and 1154 transmitters exhibit when they experience a loss of fill fluid and the need for prompt corrective action. This notification required the acknowledgement of the above staff.

(b) ACTION

Enhanced transmitter monitoring to identify sustained transmitter drift.

RESPONSE

The transmitters are periodically calibrated using approved procedures to demonstrate compliance with established tolerances as part of the APS maintenance program. If there is suspicion that a transmitter is not operating correctly,



its operation is typically verified by performing a calibration using the calibration procedure as part of the work document. We have revised the applicable I&C calibration procedures for Model 1153 and 1154 transmitters to incorporate a requirement that the I&C technicians are to notify I&C Engineering if they find that a transmitter:

- (1) is found with the 4mA. and/or 20mA. calibration points to be outside the accepted calibration tolerances,
- (2) is found to respond sluggishly to the calibration pressure changes,
- (3) does not appear to be responding correctly, based on the opinion of the technician.

This should identify any transmitter that experiences symptoms that could be indicative of a possible loss of sensor fill fluid.

I&C Engineering will then perform a detailed investigation as defined by the "Engineering Evaluation Request" procedure, 73AC-OEE01, for any transmitter that is identified as suspect to determine if it is experiencing a loss of fluid failure.

(c) ACTION

Review of transmitter performance following planned or unplanned plant transients or tests to identify sluggish transmitter response.

RESPONSE

As part of the reactor trip events required data from the "Incident Investigation Category 1 and 2 Events," procedure 79AC-OIP01, App. B, the RPS/ESFAS response is verified to assure that the actuation signals were initiated when required. For Rosemount transmitters installed in these systems, data is sent to a sequence of events recorder. Anomalies in response performance would be analyzed by a post trip review committee.

(d) ACTION

Enhanced awareness of sluggish transmitter response to either increasing or decreasing test pressures during calibration activities.

RESPONSE

Reference response to 4b. The I&C calibration procedures that are applicable to Model 1153 and 1154 transmitters have been revised to incorporate guidelines regarding identification of sluggish transmitter response during calibration with instructions to notify I&C Engineering should this be identified. I&C Engineering will then evaluate the transmitter's operation and response in more detail.

(e) ACTION

Development and implementation of a program to detect changes in process noise.

RESPONSE

Although the NRC Staff has concluded that process noise analysis provides a sufficient basis for detecting fill-oil leakage, APS has not been able to confirm this. The primary reason being lack of any definitive acceptance or rejection criteria. This is based on the information contained in Rosemount's Technical Bulletin No. 4, dated December 22, 1989. This stated that noise data is difficult to analyze and interpret. For this reason Rosemount has not provided any guidelines for analyzing process noise.

(f) ACTION

Development and application to transmitters identified as having exhibited symptoms indicative of loss of fill-oil of an appropriate operability acceptance criteria. Transmitters identified as having exhibited symptoms indicative of loss of fill-oil that do not conform to the operability acceptance criteria should be addressed in accordance with the applicable technical specification. Transmitters identified as having exhibited symptoms indicative of loss of fill-oil that do not conform to the operability acceptance criteria and are not addressed in the technical specifications should be replaced at the earliest appropriate opportunity.

RESPONSE

The operability of any transmitter that exhibits the symptoms that could be indicative of a loss of fill-oil (ie. significant and/or continuing zero and/or span shifts, sluggish response) must be questioned as to whether it is actually experiencing a loss of fill-oil or some other failure. Therefore, we conclude it would be undesirable to establish operability acceptance criteria for any transmitter that is identified as

having exhibited symptoms indicative of loss of fill-oil. We have established criteria for identifying possible loss of fill-oil and that criteria has been incorporated into the calibration procedures for the Model 1153 and 1154 transmitters. Any transmitter that exceeds these criteria will be evaluated thoroughly by the I&C Engineering group to determine the reason for its suspect operation and appropriate corrective action will be performed.

(5) ACTION

Document and maintain in accordance with existing plant procedures a basis for continued plant operation covering the time period from the present until such time that the Model 1153 Series B, 1153 Series D, and Model 1154 transmitters from the manufacturing lots that have been identified by Rosemount as having a high failure fraction due to loss of fill-oil in use in the reactor protection or engineered safety features actuation systems can be replaced. In addition, while performing the actions requested above, addressees may identify transmitters exhibiting symptoms indicative of loss of fill-oil that do not conform to the established operability acceptance criteria and are not addressed in the technical specifications. As these transmitters are identified, this basis for continued plant operation should be updated to address these transmitters covering the time period from the time these transmitters are identified until such time that these transmitters can be replaced. When developing and updating this basis for continued plant operation, addressees may wish to consider transmitter diversity and redundancy, diverse trip functions (a separate trip function that may also provide a corresponding trip signal), special system and/or component tests, or (if necessary) immediate replacement of certain suspect transmitters.

RESPONSE

No justification for continued plant operation is required for any of the three (3) units at Palo Verde because there are no transmitters listed in the Rosemount suspect transmitter list, dated December 22, 1989, installed in the reactor protection or engineered safety features actuation systems.

(1b) ACTION

Identifies the indicated manufacturer; the model number; the system the transmitter was utilized in; the approximate amount of time at pressure; the corrective actions taken; and the disposition (e.g., returned to vendor for analysis) of Rosemount Model 1153 Series B, Model 1153 Series D, and Model 1154 transmitters that are believed to have exhibited symptoms indicative of loss of fill-oil or have been confirmed to have

experienced a loss of fill-oil. This should include Model 1153 Series B, Model 1153 Series D, and Model 1154 transmitters manufactured after July 11, 1989.

RESPONSE

No Model 1153 or Model 1154 transmitters at Palo Verde have exhibited symptoms indicative of loss of fill-oil thus far. We will provide the requested information for any transmitters that exhibit symptoms indicative of loss of fill-oil in the future.

(1c) ACTION

Identifies the system in which the Model 1153 Series B, 1153 Series D, and Model 1154 transmitters from the manufacturing lots that have been identified by Rosemount as having a high failure fraction due to loss of fill-oil are utilized and provides a schedule for replacement of these transmitters which are in use in the reactor protection or engineered safety features actuation systems.

RESPONSE

Unit 3 currently has one (1) Rosemount Model 1153 transmitter installed that is listed on Rosemount's suspect list; however, this transmitter is not part of the reactor protection or engineered safety features actuation systems. This transmitter, 3JSIBFT0311 (High Pressure Safety Injection Flow to Reactor Coolant Loop 2A), will be replaced at the earliest opportunity but no later than the end of the next refueling outage.

No transmitters listed on Rosemount's suspect list have been identified as being currently installed in either Unit 1 or 2.

(2) ACTION

Model 1153 Series B, Model 1153 Series D, and Model 1154 transmitters that, subsequent to providing the response required by Item 1 above, exhibit symptoms of loss of fill-oil or are confirmed to have experienced a loss of fill-oil should be reviewed for reportability under existing NRC regulations. If determined not to be reportable, addressees are requested to document and maintain, in accordance with existing plant procedures, information consistent with that requested in Item 1b above for each transmitter identified.

RESPONSE

This will be done in accordance with PVNGS procedures.

TABLE A1

ROSEMOUNT TRANSMITTER INFORMATION
SORTED BY UNIT AND INSTRUMENT NUMBER

UNIT 1

<u>INSTRUMENT NUMBER</u>	<u>DESCRIPTION</u>	<u>MODEL</u>
1JAFAFT0040A	AFW FLOW TO SG 1	11SSDB5
1JAFAFT0040B	AFW FLOW TO SG 2	1153DB5
1JAFAPT0018	AF PP A DISCH PRESS	1153GB9
1JAFBFT0041A	AFW FLOW TO SG 1	1153DB5
1JAFBFT0041B	AFW FLOW TO SG 2	1153DB5
1JAFBPT0017	AF PP B DISCH	1153GB9
1JCHALT0200	REFUELING WATER TANK LEVEL	1153DB5
1JCHALT0203A	REFUELING WATER TANK LEVEL	1153DB5
1JCHAPT0212	CHARGING PUMPS TO REGEN HX	1153GB9
1JCHBFT0212	CHARGING PUMPS TO REGEN HX	1153HB5
1JCHBLT0201	REFUELING WATER TANK LEVEL	1153DB5
1JCHBLT0203B	REFUELING WATER TANK LEVEL	1153DB5
1JCHCLT0203C	REFUELING WATER TANK LEVEL	1153DB5
1JCHDLT0203D	REFUELING WATER TANK LEVEL	1153DB5
1JCTALT0035	CNDS TK LEVEL	1153DB5
1JCTBLT0036	CNDS TK LEVEL	1153DB5
1JECAFT0533	ESS CHW A FLOW	1153DB4
1JECALT0015	ESS CHLD WTR SURGE TK A LEVEL	1153DB3
1JECBFT0534	ESS CHW B FLOW	1153DB4
1JECBLT0016	ESS CHLD WTR SURGE TK B LEVEL	1153DB3

TABLE A1

ROSEMOUNT TRANSMITTER INFORMATION
SORTED BY UNIT AND INSTRUMENT NUMBER

UNIT 1

<u>INSTRUMENT NUMBER</u>	<u>DESCRIPTION</u>	<u>MODEL</u>
1JEWAF0013	ECW PP A DISCH FLOW	1153GB5
1JEWAF0151	ECWS FLOW TO ESS CHILLER A	1153DB5
1JEWALT0091	ESS LG WTR SURGE TK A LEVEL	1153DB4
1JEWBFT0014	ECW PP B DISCH FLOW	1153DB5
1JEWBFT0152	ECWS FLOW TO ESS CHILLER B	1153DB5
1JEWBLT0092	ESS LG WTR SURGE TK B LEVEL	1153DB4
1JHCAPT0351A	CONTMT PRESS A HI	1153GB6
1JHCAPT0352A	CONTMT PRESS A	1153GB6
1JHCAPT0353A	CONTMT PRESS WIDE RANGE A	1153GB7
1JHCAFT0492	CONTMNT PRESSURE	1153GB3
1JHCBPT0351B	CONTMT PRESS B HI	1153GB6
1JHCBPT0352B	CONTMT PRESS B	1153GB6
1JHCBPT0353B	CONTMT PRESS WIDE RANGE B	1153GB7
1JHCBPT0493	CONTMNT PRESSURE	1153GB3
1JHCCPT0351C	CONTMT PRESS C HI	1153GB6
1JHCCPT0352C	CONTMT PRESS C	1153GB6
1JHCDPT0351D	CONTMT PRESS D HI	1153GB6
1JHCDPT0352D	CONTMT PRESS D	1153GB6
1JNCAFT0474	RCP 1B CLR OUT	1153DB4
1JNCAFT0475	RCP 1A CLR OUT	1153DB4

TABLE A1

ROSEMOUNT TRANSMITTER INFORMATION
SORTED BY UNIT AND INSTRUMENT NUMBER

UNIT 1

<u>INSTRUMENT NUMBER</u>	<u>DESCRIPTION</u>	<u>MODEL</u>
1JNCAFT0476	RCP 2B CLR OUT	1153DB4
1JNCAFT0477	RCP 2A CLR OUT	1153DB4
1JNCBFT0494	RCP 1B CLR OUTLET	1153DB4
1JNCBFT0495	RCP 1A CLR OUTLET	1153DB4
1JNCBFT0496	RCP 2B CLR OUTLET	1153DB4
1JNCBFT0497	RCP 2A CLR OUTLET	1153DB4
1JNCNFT0487	CEDM NORMAL ACU HXS OUT	1153DA5
1JNCNFT0507	CEDM NORM ACU A OUTLET FLOW	1153DA5
1JPCAPT0009	FL PO CLG PF 1 DSCH	1153GB6
1JPCBPT0010	FL PO CLG PP 1 DSCH	1153GB6
1JRCAPT0190A	RCS PRESSURE WIDE RANGE	1153GDO
1JRCAPT0199A	PZR OVER-PRESS TRIP TO SPS	1153GD9
1JRCBPT0190B	RCS PRESSURE WIDE RANGE	1153GDO
1JRCBPT0199B	PZR OVER-PRESS TRIP TO SPS	1153GD9
1JRCCPT0105	PRZR PRESS	1153GD9
1JRCCPT0199C	PZR OVER-PRESS TRIP TO SPS	1153GD9
1JRCDPT0106	PRZR PRESS	1153GD9
1JRCDPT0199D	PZR OVER-PRESS TRIP TO SPS	1153GD9
1JRCEPT0138	PRESSURIZER/RV HEAD VENT LEAK	1153GB9
1JRCNLT0752A	N.R. REFUELING WATER LEVEL	1154HP5

TABLE A1

ROSEMOUNT TRANSMITTER INFORMATION
SORTED BY UNIT AND INSTRUMENT NUMBER

UNIT 1

<u>INSTRUMENT NUMBER</u>	<u>DESCRIPTION</u>	<u>MODEL</u>
1JRCNLTO752B	W.R. REFUELING WATER LEVEL	1154HP5
1JRCNLTO753A	N.R. REFUELING WATER LEVEL	1154HP5
1JRCNLTO753B	W.R. REFUELING WATER LEVEL	1154HP5
1JSGAPT0308	SG2 LN2 ATM DUMP N2 TANK PRESS	1153GB8
1JSGAPT0313	SG2 LN SG1 LN1 DUMP AIR SPPLY	1153GB6
1JSGAPT0315	SG1 LN1 ATM DUMP N2 TANK PRESS	1153GB8
1JSGBPT0301	SG1 LN2 ATM DMP N2 TANK PRESS	1153GB8
1JSGBPT0306	SG1 LN2 SG2 LN1 DUMP AIR SPPLY	1153GB6
1JSGBPT0321	SG2 LN1 ATM DUMP N2 TANK PRESS	1153GB8
1JSIAFT0306	LPSI PP A HDR DSCH FLOW	1153DB5
1JSIAFT0331	HPSI FLOW TO RC 1A	1153HB5
1JSIAFT0338	CONT SPRAY PP A DSCH FLOW	1153HB5
1JSIAFT0341	HPSI FLOW TO RC 1B	1153HB5
1JSIAFT0390	HPSI PP A LONG TERM CLG	1153HB7
1JSIALTO345	SPRAY CHEM STORAGE TANK LEVEL	1153DB4
1JSIALTO349	SPRAY CHEM STORAGE TANK LEVEL	1153DB4
1JSIALTO704	CONMTT SPRAY SYS A HDR WTR LVL	1153GB5
1JSIBFT0307	LPSI PP B HDR DSCH FLOW	1153DB5
1JSIBFT0311	HPSI FLOW TO RC 2A	1153HB5
1JSIBFT0321	HPSI FLOW TO RC 2B	1153HB5

TABLE A1

ROSEMOUNT TRANSMITTER INFORMATION
SORTED BY UNIT AND INSTRUMENT NUMBER

UNIT 1

<u>INSTRUMENT NUMBER</u>	<u>DESCRIPTION</u>	<u>MODEL</u>
1JSIBFT0348	CONT SPRAY PP B DSCH FLOW	1153DB5
1JSIBFT0391	HPSI PP B LONG TERM CLG	1153HB7
1JSIBLT0344	SPRAY CHEM STORAGE TANK	1153DB4
1JSIBLT0348	SPRAY CHEM STORAGE TANK LEVEL	1153DB4
1JSIBLT0705	CONTMT SPRAY SYS B HDR WTR LVL	1153GB5
1JSPAFT0005	ESP PP A DISCH FLOW	1153DB4
1JSPBFT0006	ESP PP B DISCH FLOW	1153DB4

TABLE A2

ROSEMOUNT TRANSMITTER INFORMATION
SORTED BY UNIT AND INSTRUMENT NUMBER

UNIT 2

<u>INSTRUMENT NUMBER</u>	<u>DESCRIPTION</u>	<u>MODEL</u>
2JAFAPT0040A	AFW FLOW TO SG 1	1153DB5
2JAFAPT0040B	AFW FLOW TO SG 2	1153DB5
2JAFAPT0018	AF PP A DISCH PRESS	1153GB9
2JAFBFT0041A	AFW FLOW TO SG 1	1153DB5
2JAFBFT0041B	AFW FLOW TO SG 2	1153DB5
2JAFBPT0017	AF PP B DISCH PRESS	1153GB9
2JCHALT0200	REFUELING WATER TANK LEVEL	1153DB5
2JCHALT0203A	REFUELING WATER TANK LEVEL	1153DB5
2JCHAPT0212	CHARGING PUMPS TO REGEN HX	1153GP9
2JCHBFT0212	CHARGING PUMPS TO REGEN HX	1153HB5
2JCHBLT0201	REFUELING WATER TANK LEVEL	1153DB5
2JCHBLT0203B	REFUELING WATER TANK LEVEL	1153DB5
2JCHCLT0203C	REFUELING WATER TANK LEVEL	1153DB5
2JCHDLT0203D	REFUELING WATER TANK LEVEL	1153DB5
2JCTALT0035	CNDS TK LEVEL	1153DB5
2JCTBLT0036	CNDS TK LEVEL	1153DB5
2JECAFT0533	ESS CHW A FLOW	1153DB4
2JECALT0015	ESS CHLD WTR SURGE TK A LEVEL	1153DB3
2JECBFT0534	ESS CHW B FLOW	1153DB4
2JECBLT0016	ESS CHLD WTR SURGE TK B LEVEL	1153DB3

TABLE A2

ROSEMOUNT TRANSMITTER INFORMATION
SORTED BY UNIT AND INSTRUMENT NUMBER

UNIT 2

<u>INSTRUMENT NUMBER</u>	<u>DESCRIPTION</u>	<u>MODEL</u>
2JRCNLT0752B	W.R. REFUELING WATER LEVEL	1154HP5
2JRCNLT0753A	N.R. REFUELING WATER LEVEL	1154HP5
2JRCNLT0753B	W.R. REFUELING WATER LEVEL	1154HP5
2JSGAPT0308	SG2 LN2 ATM DUMP N2 TANK	1153GB8
2JSGAPT0313	SG2 LN2 SG1 ON1 DUMP AIR SPPLY	1153GB6
2JSGAPT0315	SG1 LN1 ATM DUMP N2 TANK	1153GB8
2JSGBPT0301	SG1 LN2 ATM DUMP N2 TANK	1153GB8
2JSGBPT0306	SG1 LN2 SG2LN1 DUMP AIR SPPLY	1153GB6
2JSGBPT0321	SG2 LN1 ATM DUMP N2 TANK	1153GB8
2JSIAFT0306	LPSI PP A HDR DISCH FLOW	1153DB5
2JSIAFT0308	SPRAY CHEM PP A DISCH	1153DB3
2JSIAFT0331	HPSI FLOW TO RC 1A	1153HB5
2JSIAFT0338	CONT SPRAY PP A DISCH FLOW	1153DB5
2JSIAFT0341	HPSI FLOW TO RC 1B	1153HB5
2JSIAFT0390	HPSI PP A LONG TERM CLG	1153HB7
2JSIALT0345	SPRAY CHEM STORAGE TANK	1153DB4
2JSIALT0349	SPRAY CHEM STORAGE TANK	1153DB4
2JSIALT0704	CONMTT SPRAY SYS A HDR WTR LVL	1153GB5
2JSIBFT0307	LPSI PP B HDR DISCH FLOW	1153DB5
2JSIBFT0309	SPRAY CHEM PP B DISCH	1153DB3

TABLE A2

ROSEMOUNT TRANSMITTER INFORMATION
SORTED BY UNIT AND INSTRUMENT NUMBER

UNIT 2

<u>INSTRUMENT NUMBER</u>	<u>DESCRIPTION</u>	<u>MODEL</u>
2JEWAF0013	ECW PP A DISCH FLOW	1153DB5
2JEWAF0151	ECWS FLOW TO ESS CHILLER A	1153DB5
2JEWAL0091	ESS LG WTG SURGE TK A LEVEL	1153DB4
2JEWBF0014	ECW PP B DISCH FLOW	1153DB5
2JEWBF0152	ECWS FLOW TO ESS CHILLER B	1153DB5
2JEWBL0092	ESS LG WTR SURGE TK B LEVEL	1153DB4
2JHCAPT0351A	CONTMT PRESS A HI	1153GB6
2JHCAPT0352A	CONTMT PRESS A	1153GB6
2JHCAPT0353A	CONTMT PRESS WIDE RANGE A	1153GB7
2JHCAPT0492	CONTMNT PRESSURE	1153GB3
2JHCBPT0351B	CONTMT PRESS B HI	1153GB6
2JHCBPT0352B	CONTMT PRESS B	1153GB6
2JHCBPT0353B	CONTMT PRESS WIDE RANGE B	1153GB7
2JHCBPT0493	CONTMNT PRESSURE	1153GB3
2JHCCPT0351C	CONTMT PRESS C HI	1153GB6
2JHCCPT0352C	CONTMT PRESS C	1153GB6
2JHCDPT0351D	CONTMT PRESS D HI	1153GB6
2JHCDPT0352D	CONTMT PRESS D	1153GB6
2JNCAFT0474	RCP 1B CLR OUTLET FLOW	1153DB4
2JNCAFT0475	RCP 1A CLR OUTLET FLOW	1153DB4

TABLE A2

ROSEMOUNT TRANSMITTER INFORMATION
SORTED BY UNIT AND INSTRUMENT NUMBER

UNIT 2

<u>INSTRUMENT NUMBER</u>	<u>DESCRIPTION</u>	<u>MODEL</u>
2JNCAFT0476	RCP 2B CLR OUTLET FLOW	1153DB4
2JNCAFT0477	RCP 2A CLR OUTLET FLOW	1153DB4
2JNCBFT0494	RCP 1B CLR OUTLET FLOW	1153DB4
2JNCBFT0495	RCP 1A CLR OUTLET FLOW	1153DB4
2JNCBFT0496	RCP 2B CLR OUTLET FLOW	1153DB4
2JNCBFT0497	RCP 2A CLR OUTLET FLOW	1153DB4
2JNCNFT0487	CEDM NORMAL ACU HXS OUT	1153DA5
2JNCNFT0507	CEDM NORM ACU A OUTLET FLOW	1153DA5
2JPCAPT0009	FL PO CLG PP 1 DISCH	1153GB6
2JPCBPT0010	FL PO CLG PP 1 DISCH	1153GB6
2JRCAPT0190A	RCS PRESSURE WIDE RANGE	1153GDO
2JRCAPT0199A	PZR OVER-PRESS TRIP TO SPS	1153GD9
2JRCBPT0190B	RCS PRESSURE WIDE RANGE	1153GDO
2JRCBPT0199B	PZR OVER-PRESS TRIP TO SPS	1153GD9
2JRCCPT0105	PRESSURIZER PRESSURE	1153GD9
2JRCCPT0199C	PZR OVER-PRESS TRIP TO SPS	1153GD9
2JRCDPT0106	PRESSURIZER PRESSURE	1153GD9
2JRCDPT0199D	PZR OVER-PRESS TRIP TO SPS	1153GD9
2JRCEPT0138	PRESSURIZER/RV HEAD VENT LEAK	1153GB9
2JRCNLT0752A	N.R. REFUELING WATER LEVEL	1154HP5

TABLE A2

ROSEMOUNT TRANSMITTER INFORMATION
SORTED BY UNIT AND INSTRUMENT NUMBER

UNIT 2

<u>INSTRUMENT NUMBER</u>	<u>DESCRIPTION</u>	<u>MODEL</u>
2JSIBFT0311	HPSI FLOW TO RC 2A	1153HB5
2JSIBFT0321	HPSI FLOW TO RC 2B	1153HB5
2JSIBFT0348	CONT SPRAY PP B DISCH FLOW	1153DB5
2JSIBFT0391	HPSI PP B LONG TERM CLG	1153HB7
2JSIBLT0344	SPRAY CHEM STORAGE TANK	1153DB4
2JSIBLT0348	SPRAY CHEM STORAGE TANK	1153DB4
2JSIBLT0705	CONTMT SPRAY SYS B HDR WTR LVL	1153GB5
2JSPAFT0005	ESP PP A DISCH FLOW	1153DB4
2JSPBFT0006	ESP PP B DISCH FLOW	1154DB4
2JSSNFT0056	PASS LIQ SAMPLE FLOW	1153DB3

TABLE A3

ROSEMOUNT TRANSMITTER INFORMATION
SORTED BY UNIT AND INSTRUMENT NUMBER

UNIT 3

<u>INSTRUMENT NUMBER</u>	<u>DESCRIPTION</u>	<u>MODEL</u>
3JAFAFT0040A	AFW FLOW TO SG 1	1153DB5
3JAFAFT0040B	AFW FLOW TO SG 2	1153DB5
3JAFAPT0018	AF PP A DISCH PRESS	1153GB9
3JAFBFT0041A	AFW FLOW TO SG 1	1153DB5
3JAFBFT0041B	AFW FLOW TO SG 2	1153DB5
3JAFBPT0017	AF PP B DISCH PRESS	1153GB9
3JCHALT0200	REFUELING WATER TANK LEVEL	1153DB5
3JCHALT0203A	REFUELING WATER TANK LEVEL	1153DB5
3JCHAPT0212	CHARGING PUMPS TO REGEN HX	1153GB9
3JCHBFT0212	CHARGING PUMPS TO REGEN HX	1153HB5
3JCHBLT0201	REFUELING WATER TANK LEVEL	1153DB5
3JCHBLT0203B	REFUELING WATER TANK LEVEL	1153DB5
3JCHCLT0203C	REFUELING WATER TANK LEVEL	1153DB5
3JCHDLT0203D	REFUELING WATER TANK LEVEL	1153DB5
3JCTALT0035	CNDS TK LEVEL	1153DB5
3JCTBLT0036	CNDS TK LEVEL	1153DB5
3JECAFT0533	ESS CHW A FLOW	1153DB4
3JECALT0015	ESS CHLD WTR SURGE TK A LEVEL	1153DB3
3JECBFT0534	ESS CHW B FLOW	1153DB4
3JECBLT0016	ESS CHLD WTR SURGE TK B LEVEL	1153DB3

TABLE A3

ROSEMOUNT TRANSMITTER INFORMATION
SORTED BY UNIT AND INSTRUMENT NUMBER

UNIT 3

<u>INSTRUMENT NUMBER</u>	<u>DESCRIPTION</u>	<u>MODEL</u>
3JNCAFT0476	RCP 2B CLR OUTLET FLOW	1153DB4
3JNCAFT0477	RCP 2A CLR OUTLET FLOW	1153DB4
3JNCBFT0494	RCP 1B CLR OUTLET FLOW	1153DB4
3JNCBFT0495	RCP 1A CLR OUTLET FLOW	1153DB4
3JNCBFT0496	RCP 2B CLR OUTLET FLOW	1153DB4
3JNCBFT0497	RCP 2A CLR OUTLET FLOW	1153DB4
3JNCNFT0487	CEDM NORMAL ACU HXS OUTLET	1153DA5
3JNCNFT0507	CEDM NORM ACU A OUTLET FLOW	1153DA5
3JPCAPT0009	FL PO CLG PP 1 DISCH PRESS	1153GB6
3JPCBPT0010	FL PO CLG PP 1 DISCH PRESS	1153GB6
3JRCAPT0190A	RCS PRESSURE WIDE RANGE	1153GDO
3JRCAPT0199A	PZR OVER-PRESS TRIP TO SPS	1153GD9
3JRCBPT0190B	RCS PRESSURE WIDE RANGE	1153GDO
3JRCBPT0199B	PZR OVER-PRESS TRIP TO SPS	1153GD9
3JRCCPT0105	PRESSURIZER PRESSURE	1153GD9
3JRCCPT0199C	PZR OVER-PRESS TRIP TO SPS	1153GD9
3JRCDPT0106	PRESSURIZER PRESSURE	1153GD9
3JRCDPT0199D	PZR OVER-PRESS TRIP TO SPS	1153GD9
3JRCEPT0138	PRESSURIZER/RV HEAD VENT LEAK	1153GB9
3JRCNLTO752A	N.R. REFUELING WATER LEVEL	1154HP5

TABLE A3

ROSEMOUNT TRANSMITTER INFORMATION
SORTED BY UNIT AND INSTRUMENT NUMBER

UNIT 3

<u>INSTRUMENT NUMBER</u>	<u>DESCRIPTION</u>	<u>MODEL</u>
3JEWAF0013	ECW PP A DISCH FLOW	1153DB5
3JEWAF0151	ECWS FLOW TO ESS CHILLER A	1153DB5
3JEWALT0091	ESS LG WTR SURGE TK A LEVEL	1153DB4
3JEWBFT0014	ECW PP B DISCH FLOW	1153DB5
3JEWBFT0152	ECWS FLOW TO ESS CHILLER B	1153DB5
3JEWBLT0092	ESS LG WTR SURGE TK B LEVEL	1153DB4
3JHCAPT0351A	CONTMT PRESS A HI	1153GB6
3JHCAPT0352A	CONTMT PRESS A	1153GB6
3JHCAPT0353A	CONTMT PRESS WIDE RANGE A	1153GB7
3JHCAPT0492	CONTMNT PRESSURE	1153GB3
3JHCBPT0351B	CONTMT PRESS B HI	1153GB6
3JHCBPT0352B	CONTMT PRESS B	1153GB6
3JHCBPT0353B	CONTMT PRESS WIDE RANGE B	1153GB7
3JHCBPT0493	CONTMNT PRESSURE	1153GB3
3JHCCPT0351C	CONTMT PRESS C HI	1153GB6
3JHCCPT0352C	CONTMT PRESS C	1153GB6
3JHCDPT0351D	CONTMT PRESS D HI	1153GB6
3JHCDPT0352D	CONTMT PRESS D	1153GB6
3JNCAFT0474	RCP 1B CLR OUTLET FLOW	1153DB4
3JNCAFT0475	RCP 1A CLR OUTLET FLOW	1153DB4

TABLE A3

ROSEMOUNT TRANSMITTER INFORMATION
SORTED BY UNIT AND INSTRUMENT NUMBER

UNIT 3

<u>INSTRUMENT NUMBER</u>	<u>DESCRIPTION</u>	<u>MODEL</u>
3JRCNLTO752B	W.R. REFUELING WATER LEVEL	1154HP5
3JRCNLTO753A	N.R. REFUELING WATER LEVEL	1154HP5
3JRCNLTO753B	W.R. REFUELING WATER LEVEL	1154HP5
3JSGAPT0308	SG2 LN2 ATM DUMP N2 TANK PRESS	1153GB8
3JSGAPT0313	SG2 LN2 SG1 LN1 DUMP AIR SPPLY	1153GB6
3JSGAPT0315	SG1 LN1 ATM DUMP N2 TANK PRESS	1153GB8
3JSGBPT0301	SG1 LN2 ATM DUMP N2 TANK PRESS	1153GB8
3JSGBPT0306	SG1 LN2 SG2 LN1 DUMP AIR SPPLY	1153GB6
3JSGBPT0321	SG2 LN1 ATM DUMP N2 TANK PRESS	1153GB8
3JSIAFT0306	LPSI PP A HDR DISCH FLOW	1153DB5
3JSIAFT0331	HPSI FLOW TO RC 1A	1153HB5
3JSIAFT0338	CONT SPRAY PP A DISCH FLOW	1153DB5
3JSIAFT0341	HPSI FLOW TO RC 1B	1153HB5
3JSIAFT0390	HPSI PP A LONG TERM CLG FLOW	1153HB7
3JSIALTO345	SPRAY CHEM STORAGE TANK LEVEL	1153DB4
3JSIALTO349	SPRAY CHEM STORAGE TANK LEVEL	1153DB4
3JSIALTO704	CONMTT SPRAY SYS A HDR WTR LVL	1153GB5
3JSIBFT0307	LPSI PP B HDR DISCH FLOW	1153DB5
3JSIBFT0311	HPSI FLOW TO RC 2A	1153HB5
3JSIBFT0321	HPSI FLOW TO RC 2B	1153HB5

TABLE A3

ROSEMOUNT TRANSMITTER INFORMATION
SORTED BY UNIT AND INSTRUMENT NUMBER

UNIT 3

<u>INSTRUMENT NUMBER</u>	<u>DESCRIPTION</u>	<u>MODEL</u>
3JSIBFT0348	CONT SPRAY PP B DISCH FLOW	1153DB5
3JSIBFT0391	HPSI PP B LONG TERM CLG FLOW	1153HB7
3JSIBLT0344	SPRAY CHEM STORAGE TANK LEVEL	1153DB4
3JSIBLT0348	SPRAY CHEM STORAGE TANK LEVEL	1153DB4
3JSIBLT0705	CONTMT SPRAY SYS B HDR WTR LVL	1153GB5
3JSPAFT0005	ESP PP A DISCH FLOW	1153DB4
3JSPBFT0006	ESP PP B DISCH FLOW	1153DB4
3JSSNFT0056	PASS LIQ SAMPLE FLOW	1153DB3

