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INDIANA & MICHIGAN POWER COMPANY

P. O. BOX 18 BOWLING GREEN STATION NEW YORK, N. Y. 10004

March 3, 1977

Donald C. Cook Nuclear Plant Unit No. 1 Docket No. 50-315 DPR No. 58

Mr. Benard C. Rusche, Director Office of Nuclear Reactor Regulation U.S. Nuclear Regulatory Commission Washington, D.C. 20555 U.S. NUCLEAR MICOLASSIC

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Dear Mr. Rusche:

This letter is in response to Mr. Dennis L. Ziemann's letter dated January 10, 1977 which requested that we identify the implementation option we have selected for the installation of acceptable long-term improvements to mitigate overpressurization transients. There were also staff positions and requests for additional information listed in enclosure 1 to Mr. Ziemann's letter. Our responses to the staff positions and requests for information are provided in Attachment 1.

Attachment 2 presents two sketches which represent the control function - logic diagram for the circuits to be installed at the Cook Nuclear Plant to mitigate the effects of an overpressurization transient. This control scheme will be duplicated on both existing RCS wide range pressure transmitters with each train actuating one Pressurizer Power Operated Relief Valve.

This control scheme will be the long-term solution for RCS overpressure protection. The selection and ordering of hardware (e.g. -Block-Unblock switch) is currently underway. The estimated delivery for the hardware is late September 1977. The remaining equipment that is needed is already available or can be fabricated on site.

The mitigating system we have designed incorporates controls for two (2) of our existing Pressurizer Power Operated Relief Valves and the control scheme of Attachment 2. The mitigating system will represent good engineering practice and will not adversely affect plant safety or introduce potential common mode failures that could both cause a pressure transient and disable the protection system.





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Mr. Benard C. Rusche

March 3, 1977

We will have all the necessary equipment available and be prepared to do the installation work by December 31, 1977. We will install the equipment at the first system depressurization subsequent to having all of the equipment available on site. We believe this to be the most logical approach since there is no need for the mitigating system until the reactor coolant system is depressurized from operating conditions.

Your August 13, 1976 letter required us to provide "an analysis of the RCS response to pressure transients." We expect that the analysis, when completed by Westinghouse, will show that our existing relief capacity is adequate to mitigate all the anticipated pressure transients. We will advise you as to the results of the analysis when they become available.

Very truly yours,

P. Maloney Vice President

GPM:mam Attachment

Sworn and subscribed to before me on this 3th day of March 1977 in New York County, New York

Notary Public

KATHLEEN BARRY NOTARY FUBLIC, State of New York No. 41-4606/92 Qualified in Queens County Certificate filed in New York County Commission Expires March 30, 1277

cc: G. Charnoff

- R. J. Vollen
- R. C. Callen
- P. W. Steketee
- R. Walsh
- R. S. Hunter
- R. W. Jurgensen Bridgman

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Attachment 1

Response to Item 1:

Discussion of PWR overpressurization transients will be conducted as a part of the Licensed Operator Requalification Program. The program is conducted on a one shift per week basis. The required personnel attendance is normally all RO and SRO licensed operators on shift. For the purpose of overpressurization discussions, attendance will also be required of shift auxiliary equipment operators and C&I Technicians. The requalification program, year three, will start in March, 1977.

- a) It is estimated that all plant operators will have participated in formal discussions of overpressure transients by May 15, 1977.
- b) A formal discussion of overpressure transients at PWR's will be conducted as a part of the licensed operator requalification program. The discussions will cover in detail the following subjects:
 - 1. The causes of past pressure transients that have occurred at other PWR facilities.
 - 2. Plant conditions at the time of the pressure transients.
 - 3. The mitigating action that could have been or was taken.
 - 4. The preventive measures that could have been taken to avoid the event.
 - 5. The steps that have been taken to prevent similar occurrences.
 - 6. Cook Nuclear Plant similarities and differences with other PWR facilities and how these relate to overpressure events which occurred at these other facilities.
- c) We have been able to collect details of eleven overpressure events at PWR facilities. These have been analyzed as to their possibility of occurrence at the Cook Nuclear Plant and the results are summarized in the following table.

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Table of Overpressure Events (Item 1(c) & (d))

Donald C. Cook Nuclear Plant

<u>Plant Name</u>	Cause of Event	Event <u>Nature</u>	Water-Solid Operation*	Steam-Bubble Operation**	
Indian Point 3	Component Failure	RHR-Letdown Credible Isolation		Not-Credible	
Indian Point 2 (2 events)	Component Failure	Loss of Instrument Air			
St. Lucie l	Defective Procedure	RCP Start	RCP Start Credible		
D. C. Cook l	Defective Procedure	Letdown Isolation	Credible	Not-Credible	
Beaver Valley 1 76-13/3L	Personnel Error	SIS plus Letdown Isolation	Insufficient Information to draw a conclusion.***		
Point Beach 2	Defective Procedure	Letdown Isolation Deliberate Operator Action	Credible	Not-Credible	
Beaver Valley l 76-11/3L	Personnel Error	Letdown Isolation Electronic Instr. Spike	Insufficient Inform to draw a conclusio		

*This column reflects the Cook Nuclear Plant prior to the revision of the three major operating procedures described in Item 2 response.

**This column reflects the Cook Nuclear Plant with its current operating procedures which provide for a steam cushion in the pressurizer.

***The description of the event in the available reports did not contain enough information to be able to determine the event credibility at the Cook Nuclear Plant. •

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Table cont'd....

Donald C. Cook Nuclear Plant

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<u>Plant Name</u>	Cause of Event	Event Natures	Water-Solid Operation*	Steam-Bubble Operation**
St. Lucie l	Component Failure	Hot Functional	Insufficient Inform to draw a conclusio	ation
Zion l	Operator Error	Letdown Isolation	Credible	Not-Credible
TurkeyyPoint 3	Insufficient Information	RHR-Letdown Isolation	Credible	Not-Credible
Indian Point 2	Defective Procedure	RCP Start	Credible	Not-Credible

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- d) To reduce the likelihood of occurrence of the events which are listed as credible in the preceeding table, we have revised three major operating procedures to include non-water-solid operation of the reactor coolant system (RCS) and have installed an "operator alert" alarm. The description of the details of the procedural changes and the alarm function are provided in the response to Items 2 and 5 below.

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Response to Item 2:

Three major operating procedures in which the plant would experience a water solid condition have been re-written. These procedures cover plant heatup, cooldown, and reactor coolant system fill and vent. As a result of the revisions to these operating procedures described below, it is not anticipated that the Cook Nuclear Plant will be operated or maintained in a water solid condition. Therefore the possibility of an overpressurization during these plant conditions has been greatly reduced.

a) Revised Plant Operating Procedures:

1. Filling and Venting Reactor Coolant System-OHP 4021.002.001

Prior to revising this procedure the pressurizer (PZR) and coolant loops were filled to a condition in which four air pockets remained in the steam generator tubes. The RCS pressure was then increased to about 400 psig using the charging pumps. While maintaining this pressure with the charging pumps and letdown through RHR, each reactor coolant pump (RCP) was bumped and the RCS was vented. After this venting the RCS was in a water solid condition using charging and letdown to control pressure and RHR system to control temper-After the first vent the reactor coolant pumps ature. were run again for 1 minute and the system vented. This cycle was repeated two (2) more times for 5 and 10 minute runs on the reactor coolant pumps. After completing the ten minute run/vent cycle the fill and vent procedure was considered complete and the plant remained in this condition until plant heatup, at which time a pressurizer bubble was drawn during heatup.

The revised procedure fills the RCS using the charging system to the condition where four air pockets remain in the steam generator tubes. At this point instead of pressurizing the system, bumping reactor coolant pumps and venting to a water solid condition, the pressurizer heaters are energized and a steam bubble is formed in the pressurizer. Pressurizer temperature is then increased to bring system pressure up to about 325 psig for reactor coolant pump operation. The

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pressurizer steam space is put on sample recirculation to the volume control tank to remove air and N_2 from pressurizer. The reactor coolant pump run/vent cycle is now performed using steam bubble for pressure control. After the last RCP is run, the reactor coolant system pressure is reduced to 50-100 psig for final vent, to remove more N_2 from solution at lower pressure. After venting at 100 psig the fill and vent procedure is complete and the system will remain in this condition until heatup. Using this revised fill and vent method, which makes use of the air pockets in the four steam generator tubes, the RCS will never be in a water solid condition. Previous experience has shown that this procedure provides a "soft" system while drawing the steam bubble.

2. Plant Heatup from Cold Shutdown to Hot Standby-OHP 4021.001001

This procedure was revised so that initial conditions for the heatup are that the RCS pressure is being maintained by a pressurizer steam bubble. The steam bubble has already been established during the fill and vent, therefore, the heatup procedure is not involved with water solid operation under any conditions.

3. <u>Plant Cooldown from Hot Standby to Cold Shutdown-</u> OHP 4021.001.004

Prior to revising the cooldown procedure the RCS was placed in a water solid condition during the last phase of plant cooldown. The first phase of plant cooldown remains the same, since water solid condition is not a concern during this part of the cooldown. The RCS temperature is reduced to about 150°F in the reactor vessel and loops, and 425°F in the pressurizer (which maintains system pressure at about 325 psig), by dumping steam to the condenser and placing RHR system in service at 425 psig/350°F. During the first phase of cooldown the following pertinent steps are taken at the indicated system conditions.

i) System Pressure < 1000 psig:

Accumulator isolation valves IMO-110, 120, 130, 140 are closed and breakers are racked out and tagged.

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ii) System temperature <350°F:

SI pump breakers are racked out and tagged.

Note: A revision is now being made to add the following valves to condition (ii), (system temp. <350°F).

Close the following valves, rack out and tag supply breakers for each:

SI Pump discharge Valves - ICM-260 ICM-265

Cold Leg SI Valves - IMO-51 IMO-52 IMO-53 IMO-54

The steps listed above will completely disable the SIS system.

A major revision was made to the last phase of the cooldown procedure to cool the pressurizer down and depressurize the system using Auxiliary spray with a maximum level in pressurizer of 85%, instead of filling the pressurizer to water solid condition for cooldown. The revised procedure completes the plant cooldown as follows:

Plant Conditions:

Loop and vessel temperature - 150°F

Pressurizer temperature - 420°F

Pressurizer pressure - 325 psig

l reactor coolant pump running, RHR in service.

First the running RCP is secured and the PZR heaters are de-energized. Using Auxiliary spray the PZR level is slowly increased, cooling the PZR and depressurizing

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tt ust om som in the **normann set theology** sourcest the sourcest of sourcest to the common theology sourcest in the sourcest the sourcest of the th**e** sourcest of the sourcest of the the system. The PZR level is allowed to increase to 85% maximum level and recirculated using Auxiliary and letdown through RHR until a steam space temperature of 250°F to 275°F is reached. When this condition is established, the PZR level is reduced by increasing letdown through RHR system and the charging system is secured. Draining of the RCS to necessary level for maintenance/and/or refueling can be started at this point and the cooldown is considered complete.

For all other conditions which do not require opening of the RCS a low pressure steam bubble will be maintained during the cold shutdown condition.

- b) With the revision of the above three procedures, it is not anticipated that the RCS will be operated or maintained in a water solid condition at any time during further operations.
- c) It is not anticipated that the need will exist to operate the RCS in a water solid condition.

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Response to Item 3:

The safety injection system (SIS) pumps will be deenergized during cold shutdown operation as required. However, our current Technical Specifications (3.5.2 & 3.5.3) require that surveillance testing of the SIS be performed during cold shutdown and hence the SIS pumps must be operated during this mode. We will not be able to de-energize the SIS pumps during this testing period but they will be de-energized at all other times during cold shutdown.

- a) Figures 1 and 2 (attached) show the SIS flow paths into the RCS.
- b) Figures 3 and 4 show the head-flow characteristics of both (North & South) SIS Pumps.
- c) The values and pumps to be closed and de-energized are shown on Figure 1 by being circled with a dotted line. Items are identified as North and South ("N" and "S") pumps, values V-9 (ICM-265) & V-10 (ICM-260) and values IMO-51, IMO-52, IMO-53, IMO-54.
- d) The present revision of the plant cooldown procedure requires the accumulator valves to be closed and the breakers for each to be racked out and tagged. The SIS pumps are also de-energized and the supply breakers racked out and tagged.

A temporary sheet has added the following values to the cooldown procedure:

Cold leg injection valves IMO-51, 52, 53, and 54

SI pump discharge valves ICM-265 and 260 (V-9 & V-10 respectively)

The change requires these values to be closed and the breakers for each racked out and tagged.

e) All equipment identified in 3(c) will remain closed and/or de-energized during cold shutdown operation, except when technical specification surveillance testing is being performed. It is felt that by closing and de-energizing

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ార్లో ఉనినినించిన చిల్లి సినియాన్ వర్షింగ్ సినిమార్ ఇంటి ఉంటించింది. వార్ష్ సాంతారా సార్లి జార్, జాతిరిలో ఇంటా స్రాథాలు రాహాజర్లు, లూరాలో రాహుంజు రోహాల్, ప్రాథాలు, పార్రికు రాహులు సార్లి ప్రాథాలు స్రాథాలు రాహాల్, రాహాలాలు, పార్లి స్రాథాలు, రాహాలాలు the cold leg injection valves IMO-51, 52, 53, 54 that SIS injection would be prevented in the event of an inadvertent operation of the SIS during cold shutdown condition.

f) Safety Injection Pump "S" is supplied from circuit breaker T11A1 located in the Bus A and Bus B 4kV switchgear room. Safety injection pump "N" is supplied from circuit breaker T11D5 located in the Bus C and Bus D 4kV switchgear room. Both switchgear rooms are on elevation 609'. These circuit breakers are normally operated from the control room. Disconnecting these circuit breakers, which makes them inoperable, is done at the 4 kV switchgear rooms.

The north safety injection pump shutoff valve, ICM-260, is supplied from MCC=1-ABV-D and the south safety injection pump shutoff valve, ICM-265, is supplied from MCC-1-ABV-A. Both motor control centers (MCC) are located on elevation 587'. The valve motor operators are normally controlled from the control room. Opening the circuit breakers to the valve controller, which will disable the valve operator, is done at the motor control center.

g) Disconnecting the circuit breakers for the safety injection pump motors will turn off both the red and green breaker position indicating lights and the white breaker closing status light. The status monitor lights are still operable and will indicate a failure of the safety injection pump motors to start if a safety injection is initiated.

The red and green value position indicating lights will both go out on both values. The status monitoring lights will indicate the values closed if a safety injection is initiated.

h) The plant cooldown procedure will provide the administrative control necessary to insure that each designated valve and pump is de-energized and/or closed at the correct time during cooldown. When the equipment is placed in the indicated position the step in the procedure will be signed off. The equipment will also be tagged out in A description of the second state of the second state

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ికు ఉంటులు కారించిన కార్లి కొంటులు కోటింది. కారించిందిన కార్లి కారి ఉంటులు కారించింది. ఇంటులు అంటులు లో సార్లికి ఇంట్ కొంటులు వివరం కార్లు కారించింది. ఇంటులు కార్లు క్రించికి ఇంట్ క్రించింది. ఇంట్ కోటింది కారించికి కార్లికి కార్లి కారించింది. కార్లు ఇంటులు కేంట్ ప్రతిపోటింది. ఇంట్ కిమారాలు కేంట్లు కొంటులు కేంటింది. కార్లికి ఇంటులు కార్లు ప్రతిపోటింది. ఇంట్ కిమారాలు కేంట్లు కేంటి కేంటి ప్రతిపోటింది.

ಾಂಧ ಜ್ಯಾಗಿ ಗಾಗಿ ನಾಯನು ಗಾಸಿಗಳು ನಾಗತೆ ಹೊಗಾ ಕೇಗ್ರಿಕಾಗಿದ್ದಾರೆ. ಮಾರ್ಗ್ನನ್ನು ನಾಗಿ ನಾಗನ್ ಮಾಗಿ ಮಾಗಿದೆ ಮಾಗಿ ನಾಗಿ ಬೆಡಗಿದ್ದಾರೆ. ಮಾಗ್ರೆ ಗೈಗಿ ಸ್ಥಾರ್ ಕೃತ್ಯ ಸಾಗ್ರಿಕಾರ್ ಮೇಗಿ ಮಾಗಾಗು ಮಾಗಿ ಹೊಗಾಗಿದೆ. ಗೇಗಿ ಬೇಗು ಬೇಗಿ ಮಾಗಾಗು

ు, నిర్మేషికాలలు ప్రాణాలు సాయాక్షిక్ ావెహింది కాలా సిల్పెడానా జానార స్పెఫాకు లెడాలు రోహా కాండ్కరాభాగ లెలాపి రోజుల్లా హిండలు రాజ్శాలు గ్రాణాలు రోజుల్ కూలు గ్రాజాలు కాడి కులు కాడి కిండం డాహాజంతా ోజ్ అ

ka a more a konstruction of a construction of a state Definition of a state that the tension of a set of the state of a state of the s accordance with the plant tagging procedure, which provides another administrative control. When the equipment is tagged, it can not be energized or its position changed without first obtaining authorization from the shift operating engineer.

When the plant is returned to power, proper equipment alignment and operability is administratively controlled by the technical specification surveillance signoff sheets. These data sheets are attached to the plant heatup and startup procedures and require that all equipment associated with a mode change are OPERABLE prior to that mode change. All equipment listed above will be checked and verified OPERABLE in this manner.

Each shift operating engineer is responsible for plant operation and control of plant equipment on his shift. It is the shift operating engineer's responsibility to insure that designated equipment is closed, de-energized and tagged out in accordance with plant procedures.

i) The accumulator isolation valves will be closed when the RCS pressure is at 1000 psig or less.

The supply breakers for the motor operated accumulator isolation valves are located on Motor Control Centers 1-EZC-A,B,C, and D. These MCC's are located in the electrical bay mezzanine. The switches for the isolation valves are located on the control room panel SIS. The supply breakers are opened and closed locally at the MCC's.

Disabling the valve motor operators will cause the red and green valve position lights to go out. The annunciator "accumulator valve not fully open" will be operable when operating above Pll interlock and the status monitor lamps will be operable.

j) The overall impact on plant operation, to lower accumulator nitrogen pressure for each cooldown, would be the possible increase in time to either the cooldown or heatup cycle due to depressurization or pressurization of accumulators. (a) a set of the set of the set of providence of this of the set of the set

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ు రాజు ఉంటే సారాగినిగా ఉన్న సారాజు సంధానిగా గ్రాజు సంగ్రివా నారంగాలో ఉన్న కారించిగా ఉన్న ప్రధానికి సంధానికి సంఘటనాలు కార్లో ఉన్న శ్రాలు లో క్రాలంగి సినిమా శార్తి సార్థించిన సింద కార్ క్రాల్ కారాజు కార్లు కార్లు సార్థించిన సారాజు కార్ క్రాల్ రాలంగా నిరాణం క్రాలంగా కి. కారాలు ఎర్జి కి. వి. నిరిమా కార్లు

Also the increased usage and availability of N_2 could effect plant operation.

There is also a remote chance that the N_2 would have to be vented to the gas system due to high gaseous activity which would overload the waste gas system.

We believe that closing the isolation valves, de-energizing and tagging the breakers supply power to the motor operated valves is sufficient protection.

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Response to Item 4:

- a) The charging system and the safety injection system are routinely tested while in cold shutdown.
- b) For extra measures taken see the response to Item 3.

Response to Item 5:

A high pressure alarm ("operator alert") used during low RCS temperature operation is presently installed at the Cook Nuclear Plant.

- a) The "operatorn alert" alarm was installed prior to the December 23, 1976 refueling outage.
- b) The system modifications are shown in Figure 5 (attached).
- c) The alarm setpoint, mode of annunciation and sensor are shown in Figure 5.
- d) It is not anticipated that the Cook Nuclear Plant will be operated in a water-solid condition.

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Response to Item 6:

- a) RHR Design pressure is 600 psig.
- b) Figure 2 identifies the RHR isolation values relevant to overpressure incidents by means of two hexagons. The values are Copes-Volcan, double disk, motor operated gate values.
- c) RHR Interlocks, setpoints, alarms: RHR pump suction valves: IMO-128 and ICM-129.
 - 1. IMO-128 is interlocked with RCS wide range pressure channel NPS-122. When pressure drops below 425 psi, a permissive signal allows the operator tormanually open this valve. If the pressure increases above 600 psi, this valve is closed automatically.

An RCS high pressure alarm in the control room is energized whenever pressure is above 600 psi, as sensed on either wide range pressure channel, NPS-121 or NPS-122. An RCS low pressure alarm is energized whenever both pressure channels are below 425 psi.

- 2. ICM-129 is interlocked with RCS wide range pressure channel NPS-121. Operation and setpoints are as above.
- d) The nominal stroke time for these valves is 35 seconds.
- e) The setpoint and capacity of the relevant RHR safety valve is 450 psig and 900 gpm, respectively. This safety valve is designated on Figure 2 by an asterisk(*).
- f) The other alarms and setpoints associated with RHR not discussed in (c) above are as follows:

Pressure alarms(); IPA-310, IPA-320

RHR pump discharge pressure high alarms annunciate in the control room above 590 psi.

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Response to Item 7:

We feel that adequate provisions have been provided by means of the revised procedures described in the response to Item 2.

a) Using our revised procedures for RCS fill and vent, plant cooldown and heatup, the RCS will no longer be in a water solid condition during any of these operations. During RCS fill and vent, air bubbles are maintained in the steam generators while a pressurizer steam bubble is established. The reactor coolant pumps (RCP's) are not operated prior to PZR steam bubble formation. System pressure is increased for RCP operation by increasing PZR temperature to about 440°F. Pump run and vent cycles are conducted at these conditions. With this procedure the RCP's are not operated in a water solid condition.

The RCS is not placed in a water solid condition at anytime during cooldown. The PZR is cooled down and RCS depressurized using Auxiliary spray and slowly filling the PZR to a maximum level of 85% and recirculating until conditions are met for draining the PZR/RCS.

Either air or N₂ blanket is placed on system at start of drain down. If the RCS is not to be opened during a unit shutdown, a low pressure (i.e. 50-75 psig) bubble will be maintained in the PZR during shutdown precluding a water solid condition.

Using these revised procedures, RCP operation during water solid conditions is no longer a question.

- b) A PZR steam bubble is established for all conditions listed in Item 7(a) prior to the start of the first reactor coolant pump.
- c) Listed below are the limits associated with system temperature before the first RCP can be started. This question is not applicable to the Cook Plant due to the response of (b) above.

ಸರ್ಕಾರ್ ಕರ್ಣಾ ಕರ್ಣಾ ಕರ್ಷಗಳಿಂದ ಸಂಕರ್ಣ ಸಂಧಾರ ಸಂದರ್ಧ ನಿರ್ದಾರಿಗಳು ಸಂಕರ್ಣ ನಾಡಿಸಿದ್ದರು.
ಸ್ಥಾರ್ ಕರ್ಣಾರ್ ರಾಗ್ರೆಸ್ ಸಂಕರ್ಣ ಸಂಕರ್ಣ ಸಂಕರ್ಣ ಸಂಕರ್ಣ ಸಂಕರ್ಣ ನಾಡಿಸಿದ್ದರು.
ಸ್ಥಾರ್ ಕರ್ಣಾರ್ ರಾಗ್ರೆಸ್ ಸಂಕರ್ಣ ಸಂಕರ ಸಂಕರ್ಣ ಸಂಕರ ಸ್ಥಾರ್ ಸಂಕರ್ಣ ಸ ಸಂಕರ್ಣ ಸ ಸಂಕರ್ಣ

ಾನ್ಸಿಂ ಸಂಕರ್ಷನಿಯಾಂಗಿ ಮಾಡು ಸಾಭಾಯ ನಾಟಿಕಿ ಸಾಂಕರ್ಣಿನ ಜಾಗಿ ರಾಗ್ಸ್ ಎ ಚಾರ್ಟ್ ಡಾನ್ ತಿಂದು ನಾಡಿಯನ್ ಎ ಕೆಂಡ್ ತಾಗಿಯು ಗ್ರಾ ನ ಹಿತ್ತಿತ್ತಿದ್ದಾರೆ ಹೊಡಿದುವರೆ ಎ ಸಾಭಿ ಟಿಯ್ನಾನ ಎರಡು ಎ ಎಂಡ ಹಿತ್ತಿತ್ತಿಕ್ಕಾರ ಗೊಡಿ ಎಂದು ನಿಂದ್ ನಿಂದು ಹಿಂದಾಗಿ ಹೊಡಿದು ವಾಗಿಗೆ ಸ್ಥಾ ಎಗಿಗೆ ಸ್ಥಾ

ಷ್ಟರಾಯನ್ ಸೇರಿಯನ್ ಬೇರೆ ನಿರ್ದೇಶನ ಕೇಳಿ ಕೇಳಿದ್ದಾರೆ ಕ್ಷಣ್ಣ ನಡೆಯಿಂದ ನೇಕೆ ಬೇರೆ ಬೇರೆ ಕಾರ್ಮಿಕ್ಷೆ ಮತ್ತು ಬೇರನ್ ನಿನ್ನಿಯಿಂದ ಬೇನಿದ ಕಾರ್ಯನಾಗಿದ್ದ ನಾಡು ದೇಕೆ ಗೇರೆ ಕಾರ್ಮಿಕ್ಸ್ ಮಾಜಿಪ್ರವಿಗಾಗುವುದು ಬೇರೆ ಕ್ಷಣ್ಣ ಕೇಳಿದ ಕಾರ್ಯನ್ ಕೇಳಿಗಳು ಕೇಳಿದ್ದ ಬೇರ್ಟ್ ಬೇರೆ ಬಾಟಿ ನಾಗುಕೇಳಿಗಳು ಬೇರೆ ಕಾರ್ಯನ್ ಕಾರ್ಯನ್ ಬೇರೆ ಕಾರ್ಯನ್ ಗೇಳಿ ಕಾರ್ಯನ್ ಬೇರೆ ಮತ್ತು ಬೇರೆ ಕಾರ್ಯನ್ ಬೇರೆ ಕಾರ್ಯ

> ್ಯಾಯ್ಯಾನ ಪ್ರಾಜ್ಞಾನನ್ನು ಇರನ್ನು ಇಡನ್ ಗ್ರಾಂಗ್ರಾಂಶ್ ಮನ್ನಡ ಪ್ರತಿ ನಿರ್ದಾರ್ಶ ಪ್ರೋಪಿ ಸ್ಥಾನ್. ನ್ರಾಯ್ಯಾನ್ ಗ್ರಾಂಗ್ರಿ ನಿರ್ವಾಸ್ತ್ರಿಗಳ ಪ್ರಾಯಾ ಸ್ಥಾನ ಡಿ. ಸ್ಥಾನ್ ಡಿ. ಸ್ಥಾನ್ ಪ್ರಾಯಾ ಸ್ಥಾನ

ు సంగణాలు ఉండాయా సంతారానికి ఉండా సంగ్రామం వారి వారి విరుద్ధ సంసం మూడాలు సంగోహపు కోటు ఉళ్ళు కారికుండం కారుశారాని కుండా కార్ కారుగాలు జానిపిరాజు కారు.

- 1. RCS below 150°F without seal water or with RCP seal leakage rate at 5 gpm or less and about 35 gpm of component cooling water at inlet temperature of about 80°F is flowing through thermal barrier.
- A pressure differential of at least 275 psi is available across the #1 controlled leakage seal. This is met if reactor coolant pressure is above 375 psig., and temperature of 350°F or less.
- d) RCS temperature profile instruments:
 - 1. Individual hot and cold leg reactor coolant temperature are recorded over the range of 0-700°F.
 - 2. RHR pump discharge temperature is recorded over a range of 0-400°F.
- e) With steam bubble operation it is not necessary to establish isothermal conditions in the RCS for RCP operation.
- f) Pressure spikes are not a problem on RCP starts when a PZR steam bubble has been established. Several uses of the revised procedures as described in the response to Item 2 have shown this to be the case.

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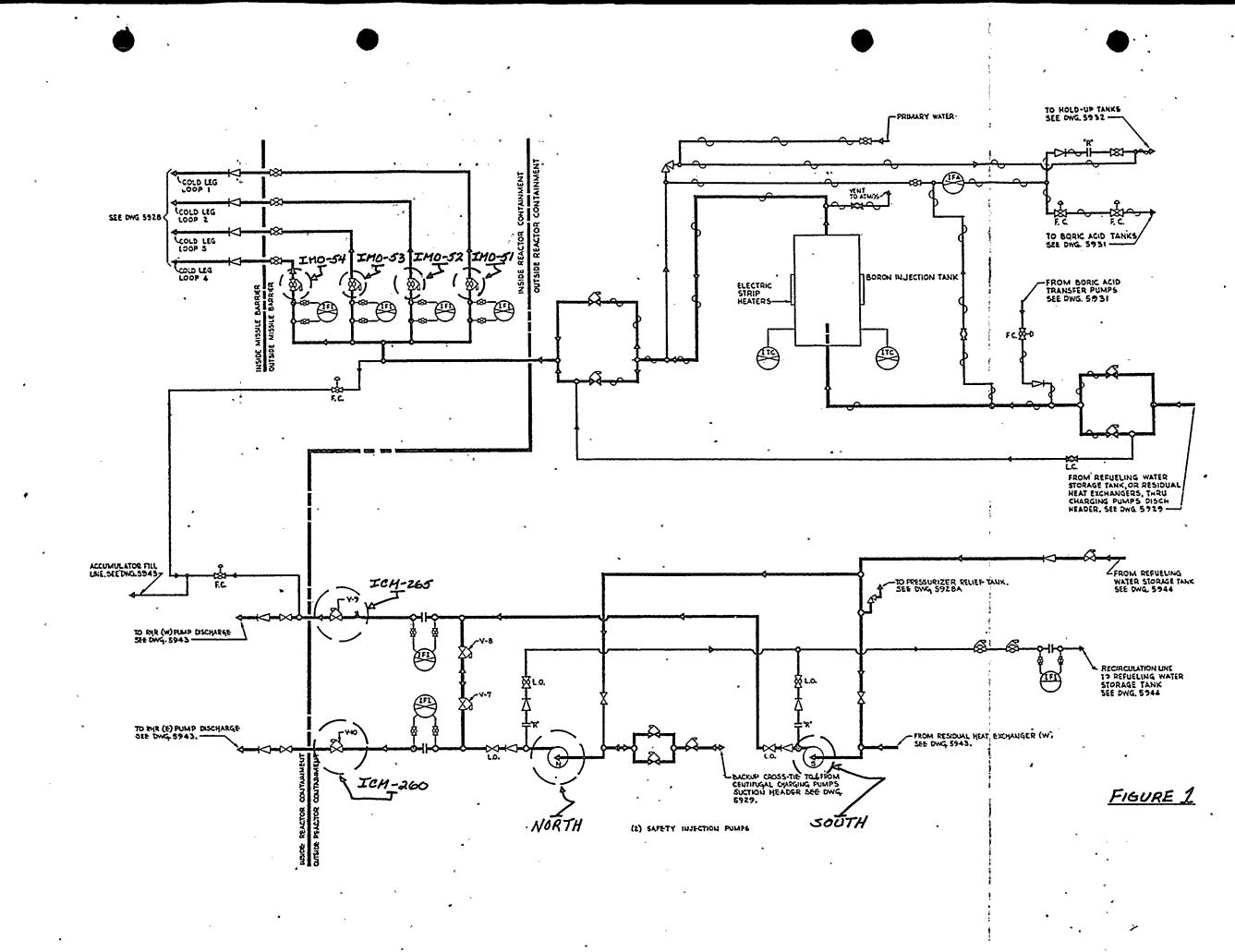
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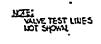
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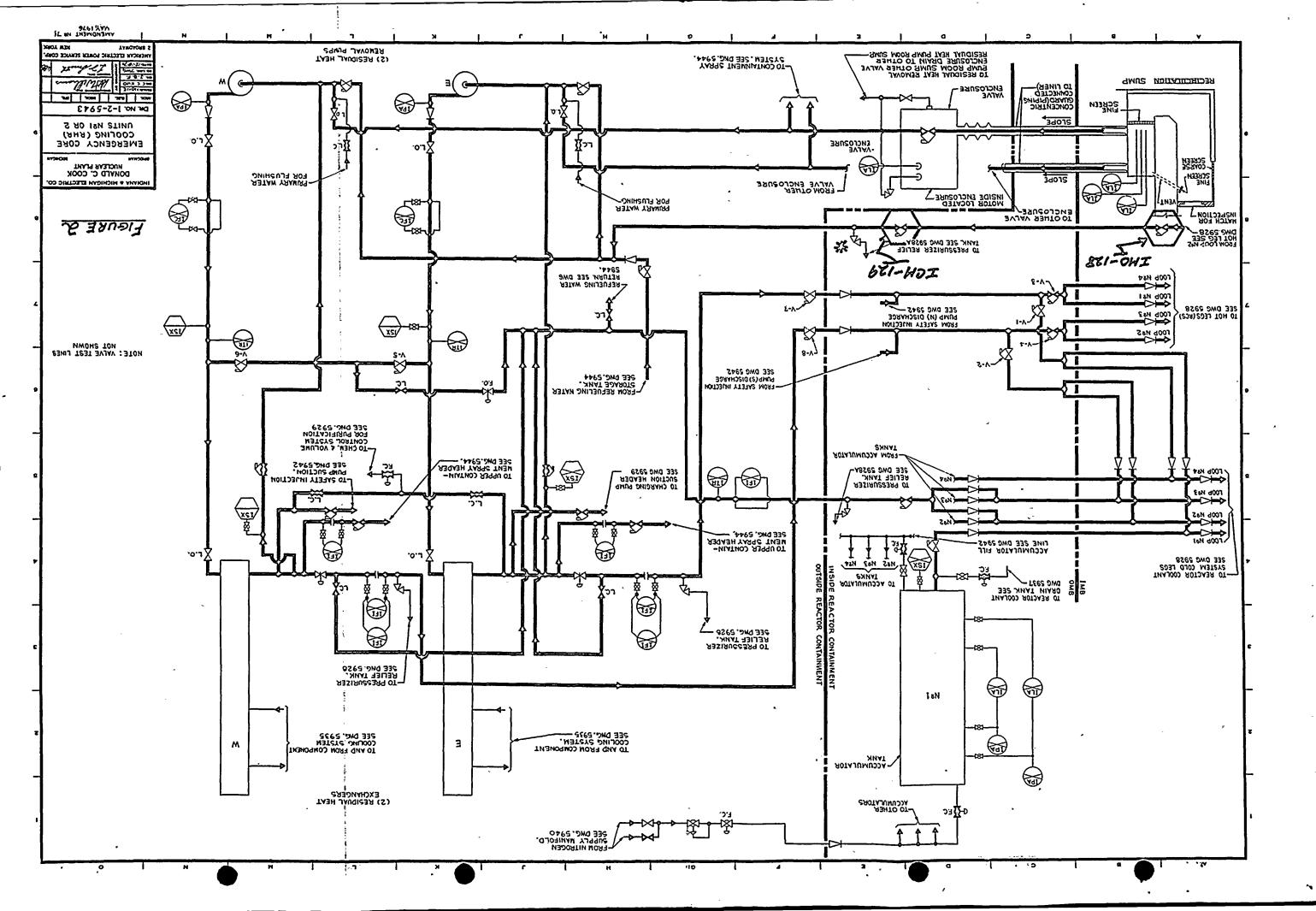
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DATE 11/5/76 BY D.E. GOLINO CK-- AMERICAN ELECTRIC POWER SERVICE CORP. INM POWER 2 BROADW COMPA D.C. COOK PLANT. NEW YOR SUBJECT_RCS OVERPRESSURE ALARM - RFC-DC-12-1332 Loop 2 RCS WIDE RANGE · PRESSURE · CHANNEL NPS -121 0-3000 751 PS n PC 1PP 'II 70 CONTROL LOOF SETPENNT = 425FSI = 15.67AKA NOTESS ADJUST LOCKUP FIR 435FT = 15.801 A Pa. 13 י ק' 1) PRESENT , RHK INTERLOCK SU WILL NOT BE AFFECTED. EXISTING RHR 2) ALARM SHOULD BE MOUNTED IN INTERLOCK PS CIRCUIT THE "U" SECTION OF THE CONTROL ROOM. 3) THE LOCKUP ADJUSTIAENT , ON AUX THE RHR FERMISSIVE INTRIK RELAY WILL BE NARROWED FROM 1% TO 0.325% . THIS IS ALLOW RHR VALVES TO BE THE POINT AT WHICH OPENED BELOW THE BISTABLE RESETS ON _425PSI 14 B INLREASING PRESSURE ANNUNCIATOR TO ALERT OPERATOR TO FOSSISLE ALARM WILL BE ENERGIZED RCS OVERFRESSURE ATONE 435 ps1 DURING NORMAL OFERATION Paniel drop PZR-39 (5) LOOP ALLURACY 1/2% = 1:5PS1 FIGURE 5

FORM, GELS OF Z ENGINEERING D SHEET 77 BY D.F. GLINCK AMERICAN ELECTRIC POWER SERVICE CORP. COMPANY TI AT POWER 2 BROADWAY D.C COOK NEW YORK PLANT. Attachment 2 RC.S. OVERPRESSURIZATION SUBJECT. SKETCH PROPOSAL -. | . RCS WIDE RANGE PRESSURE TRANSHITTER REF 1-2-5/28 PT : -98204 0-3000 PSI 1 -98205 10-50 made ... - 98271 PS ir NOTE: TYPICAL FOR TRAIN ONE PC OTHER TRAIN SIMILAR 97 ł 70 CONTROL LOOP SETPOINT= 425ps1=15,67 Ma. RESET = 435,51 = 15, 80 ma ED r A 'A" '3' · EXISTING RHR INTERLECK CIRCUIT CLOSE VALVE ABOVE GOOPSI Korey EXISTING RHR PERMISSIVE - ALLON RHR VALVES TO OPEN BELOW 425PSI 10, RU RCS OVERPRESSURE PROTECTION SEE BLOCCED CIRCUIT_ (OFERIDZ WARNING) SKETCH OPEN POWER OFERATED RELICF VALVE CIRCUN AUX RELAY "A

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