T 11.0 LOSS OF FUNCTION DIAGRAMS

A. Purpose

Loss of Function Diagrams (LFDs) provide a means for evaluating the affects of the loss of one or more instrument channels on the capability of the associated instrument logic to perform its intended safety function. In fulfilling this purpose, the LFDs provide the following:

- The number of channels associated with a given instrument function.
- The configuration of the instrument channels in the trip systems.
- The number and combinations of channels required to be operable in order for instrument function capability to be maintained.

B. General Rules for Use:

- LFDs are "channel-based," that is, they are designed to be used to determine instrument function capability given a loss of one or more channels. For the purposes of determining loss of function, the LFDs show what constitutes a channel. However, in identifying the beginning and end of a channel for the purpose of determining channel functional test scope, the LFD should not be used for this purpose; instead, the TRM definition "Channel Functional Test Scope" should be used.
- As in typical elementary logic, the energy trace is from the sensor to the actuated device. Consequently, inoperability of a component in the energy trace can directly or indirectly affect the ability of a downstream component in the trace to function. However, the opposite is not always true; that is, the downstream component since it does not provide input to the upstream component does not affect the ability of the upstream component to function. As such, loss of a component anywhere other than in the channel cannot in all cases be traced back to evaluate the affect of the loss on a channel(s). Consequently, since the LFDs are "channel-based," in such cases, the LFD cannot be used to determine instrument function capability. Instead, the elementary logic must be consulted to determine the affect of the loss on the supported system.
- LFDs are designed to be used with the instrumentation specifications found in the Technical Specifications, the TRM, and the ODCM. Typically, an LFD is provided for each instrumentation specification line item. However, some instruments provide more than one instrument function and an LFD may not provide sufficient information to ascertain all of the functions provided by the instrument. In order to identify all instrument functions performed by a particular instrument, Table 10.1-1, Master Equipment Cross Reference, Sorted by MPL, must be consulted. For a given MPL, this sort will identify all LFDs for the instrument functions that are served by the instrument.
- The complete logic from sensor to the actuation logic/actuated device is not reflected in the LFDs. A dashed line is used to denote cases where the logic

was not included. Elementary diagrams used to develop the LFD are referenced on the LFD in the event information on the omitted logic is needed.

- The drawings show the channels and the trip logics associated with a particular instrument function and how the channels and the trip logics are related in the trip systems.

- The LFDs are ordered alphabetically by the system abbreviation and then sequentially by the sketch number.

- The LFD sketches are condensed elementaries and, therefore, the same rules of use that apply to elementaries also apply to the LFDs.

- The loss of function statement typically found at the bottom of the LFD identifies the channel combinations required to be operable in order for instrument function capability as defined in the instrumentation specification to be maintained. In some cases, the associated instrument specification contains an action statement that requires tripping the inoperable channel within a prescribed period of time. The LFD takes credit for this requirement in that it specifies for these cases that in order for instrument function to be maintained, the prescribed combinations of channels must be either operable or maintained in the tripped condition.

- The following is a list of abbreviations and their meanings used in the drawings that may be unfamiliar to the user:

  AU - Alarm Unit
  EPM - RPS Electric Power Monitoring
  ITU - Indicating Trip Unit
  LRM - Log Radiation Monitor
  MTU - Master Trip Unit
  PRM - Process Radiation Monitoring
  PS - Pressure Switch
  RWLH - Reactor Water Level High
  RIS - Radiation Indicating Switch
  SAU - Single Alarm Unit
  STU - Slave Trip Unit

T 11.0 LOSS OF FUNCTION DIAGRAMS

LIST OF DIAGRAMS

Diagram No.	Title	Revision No.
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LFD-1-CRB-03 (1 sheet)	TS 3.3.2.1-1, Item 1.c, Control Rod Block, Rod Block Monitor, High Power Range - Upscale	12
LFD-1-CRB-04 (1 sheet)	TS 3.3.2.1-1, Item 1.d, Control Rod Block, Rod Block Monitor - Inop	12
LFD-1-CRB-05 (1 sheet)	TS 3.3.2.1-1, Item 1.e, Control Rod Block, Rod Block Monitor - Downscale	12
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LFD-1-CRB-07 (1 sheet)	TS 3.3.2.1-1, Item 2, Control Rod Block, Rod Worth Minimizer	
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LFD-1-CRB-09 (1 sheet)	TRM T3.3.2-1, Item 1.a, Control Rod Block Instrumentation, SRM - Detector Not Full In	60
LFD-1-CRB-10 (1 sheet)	TRM T3.3.2-1, Item 1.b, Control Rod Block Instrumentation, SRM - Upscale	60
LFD-1-CRB-11 (1 sheet)	TRM T3.3.2-1, Item 1.c, Control Rod Block Instrumentation, SRM - Inoperative	60
LFD-1-CRB-12 (1 sheet)	TRM T3.3.2-1, Item 1.d, Control Rod Block Instrumentation, SRM - Downscale	60
LFD-1-CRB-13 (1 sheet)	TRM T3.3.2-1, Item 2.a, Control Rod Block Instrumentation, IRM - Detector Not Full In	60
LFD-1-CRB-14 (1 sheet)	TRM T3.3.2-1, Item 2.b, Control Rod Block Instrumentation, IRM - Upscale	60
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LFD-1-CRB-18 (1 sheet)	TRM T3.3.2-1, Item 3.b, Control Rod Block Instrumentation, APRM - Simulated Thermal Power - Upscale (Setdown)	60
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LFD-1-CRB-20 (1 sheet)	TRM T3.3.2-1, Item 3.d, Control Rod Block Instrumentation, APRM - Neutron Flux - Downscale	60
LFD-1-CRB-21 (1 sheet)	TRM T3.3.2-1, Item 3.e, Control Rod Block Instrumentation, APRM - Low LPRM Count	60
LFD-1-CRB-22 (1 sheet)	TRM T3.3.2-1, Item 3.f, Control Rod Block Instrumentation, APRM - Reactor Recirculation Flow - Upscale	60
LFD-1-CRB-23 (1 sheet)	TRM T3.3.2-1, Item 4, Control Rod Block Instrumentation, SDV Level - High	60
LFD-1-ECCS-01 (1 sheet)	TS 3.3.5.1-1, Item 1.a, Core Spray System RWL - Low Low Low, Level 1	6
LFD-1-ECCS-02 (1 sheet)	TS 3.3.5.1-1, Item 1.b, Core Spray System Drywell Pressure - High	93
LFD-1-ECCS-03 (1 sheet)	TS 3.3.5.1-1, Item 1.c & TS 3.3.5.2-1, Item 1.a, Core Spray System Reactor Steam Dome Pressure - Low	113
LFD-1-ECCS-04 (1 sheet)	TS 3.3.5.1-1, Item 1.d & TS 3.3.5.2-1, Item 1.b, Core Spray System Core Spray Pump Discharge Flow - Low	113
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LFD-1-ECCS-09 (1 sheet)	TS 3.3.5.1-1, Item 2.e, LPCI System Reactor Vessel Shroud, Level 0	
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LFD-1-ECCS-15 (1 sheet)	TS 3.3.5.1-1, Item 3.d, HPCI System Condensate Storage Tank Level - Low	
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LFD-1-ECCS-18 (1 sheet)	TS 3.3.5.1-1, Item 4.a/5.a, ADS Trip System RWL - Low, Low, Low - Level 1	6
LFD-1-ECCS-19 (1 sheet)	TS 3.3.5.1-1, Item 4.b/5.b, ADS Trip System Drywell Pressure - High	93
LFD-1-ECCS-20 (1 sheet)	TS 3.3.5.1-1, Item 4.c/5.c, ADS Trip System ADS Initiation Timer	
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LFD-1-ECCS-27 (1 sheet)	TRM T3.3.5-1, Item 5, RCIC Turbine Trip RCIC Turbine Exhaust Pressure - High	104
LFD-1-ECCS-28 (1 sheet)	TRM T3.3.5-1, Item 6, RCIC Turbine Trip RCIC Pump Suction Pressure - Low	60
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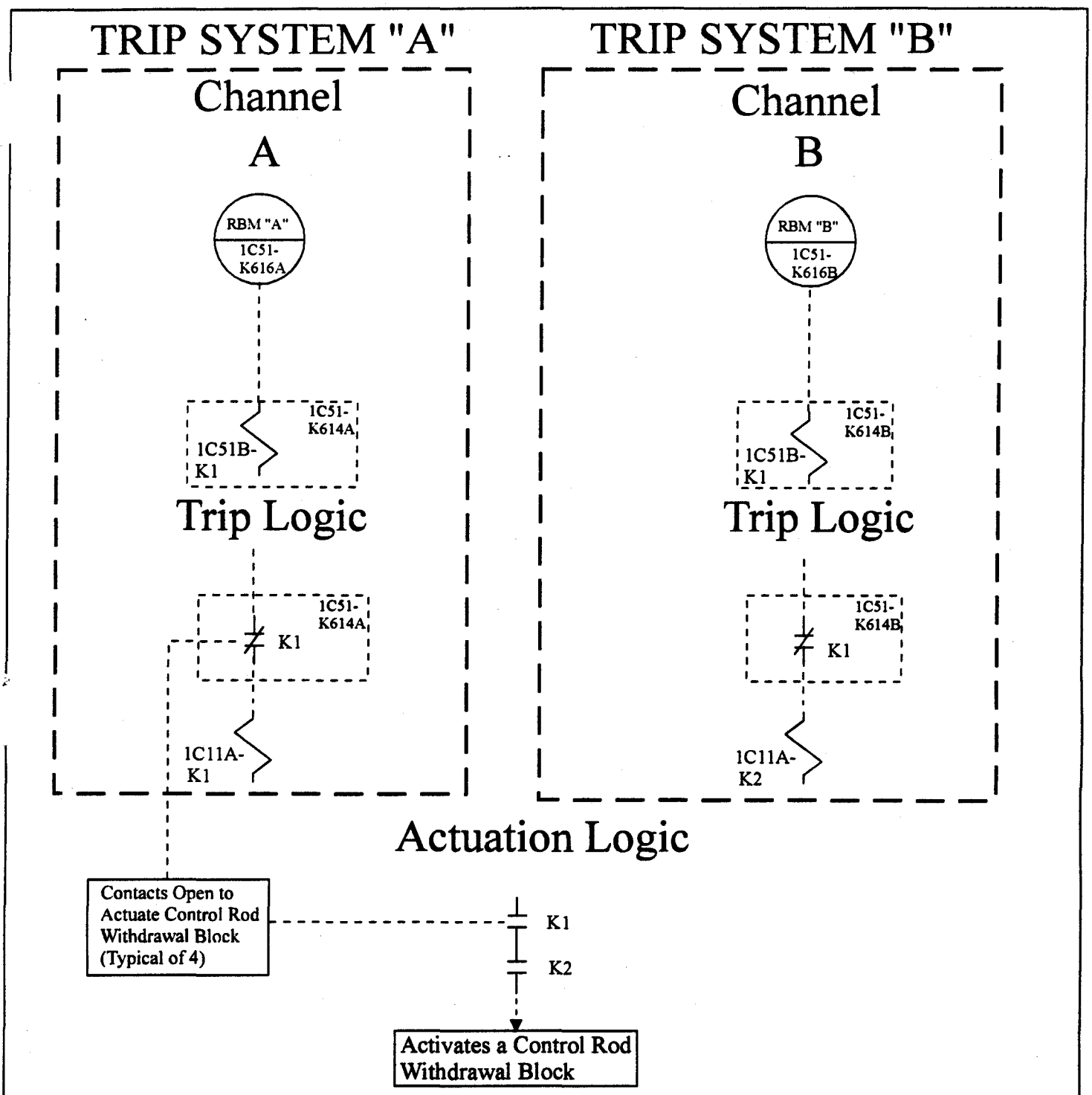


Minimum Channel Requirements for System Initiation Capability:

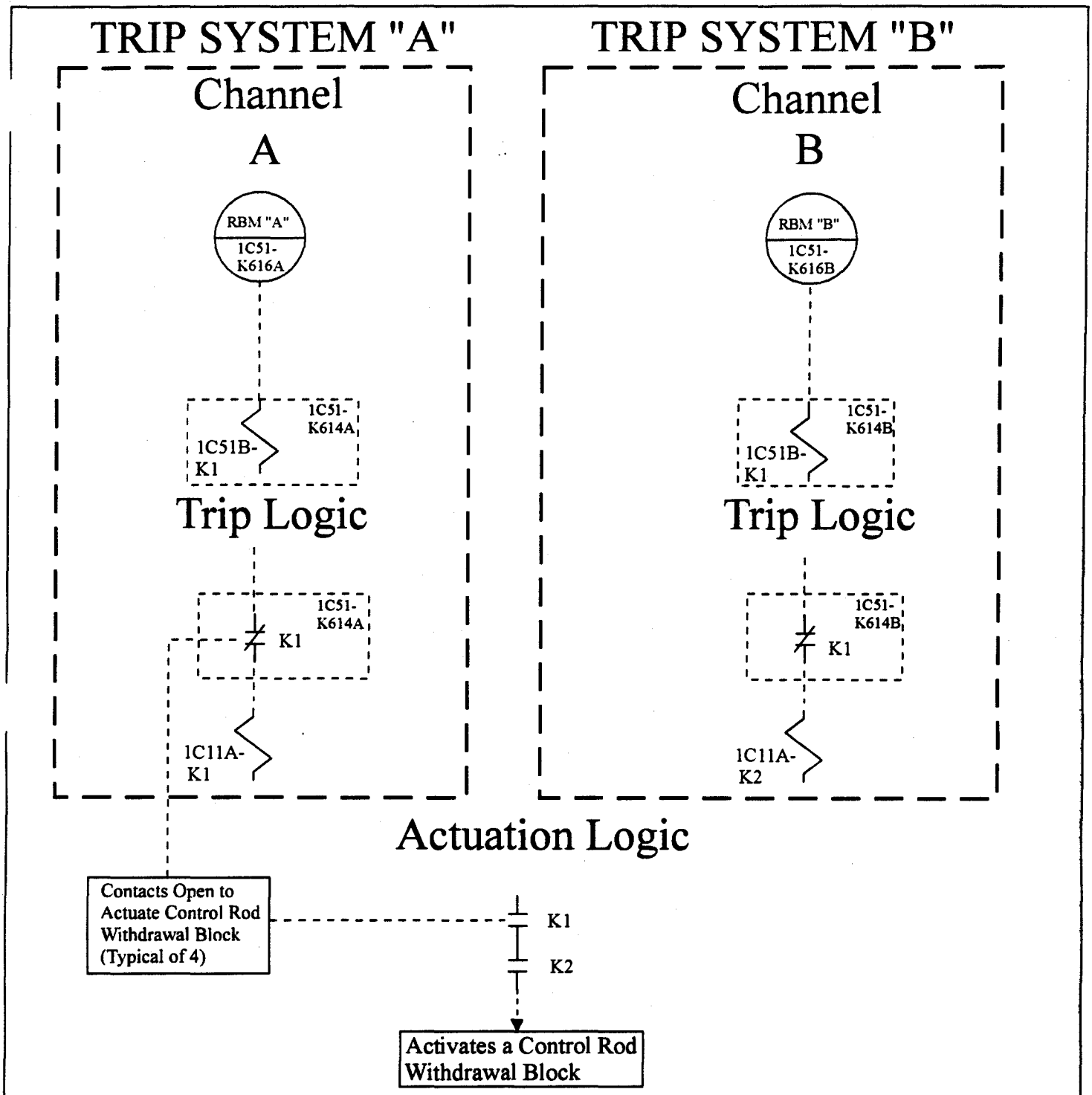
In order to maintain Control Rod Withdrawal Block capability on an RBM Low Power Range - Upscale condition, one channel must be operable or maintained in the tripped condition.

Elem. Ref.
H-17828
H-17831
H-44709
H-44710
H-44713

Prepared By:

Reviewed By:

LFD-1-CRB-01
TS 3.3.2.1-1, Item 1.a Control Rod Block, Rod Block Monitor Low Power Range - Upscale
TRM Rev. 12



Minimum Channel Requirements for System Initiation Capability:

In order to maintain Control Rod Withdrawal Block capability on an RBM Intermediate Power Range - Upscale condition, one channel must be operable or maintained in the tripped condition.

Elem. Ref.
H-17828
H-17831
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H-44710
H-44713

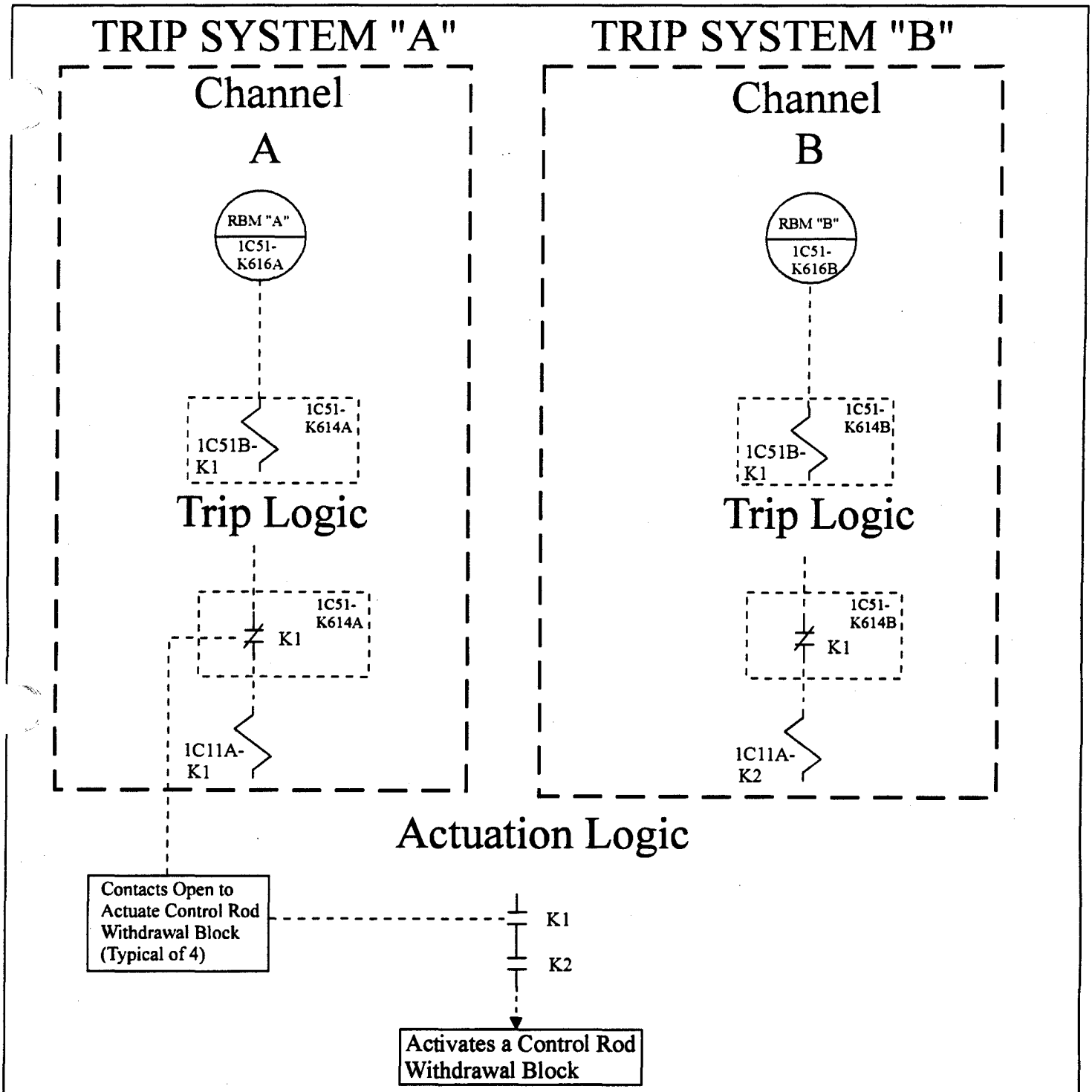
Prepared By:

Reviewed By:

LFD-1-CRB-02

TS 3.3.2.1-1, Item 1.b
Control Rod Block,
Rod Block Monitor
Intermediate Power
Range - Upscale

TRM Rev. 12



Minimum Channel Requirements for System Initiation Capability:

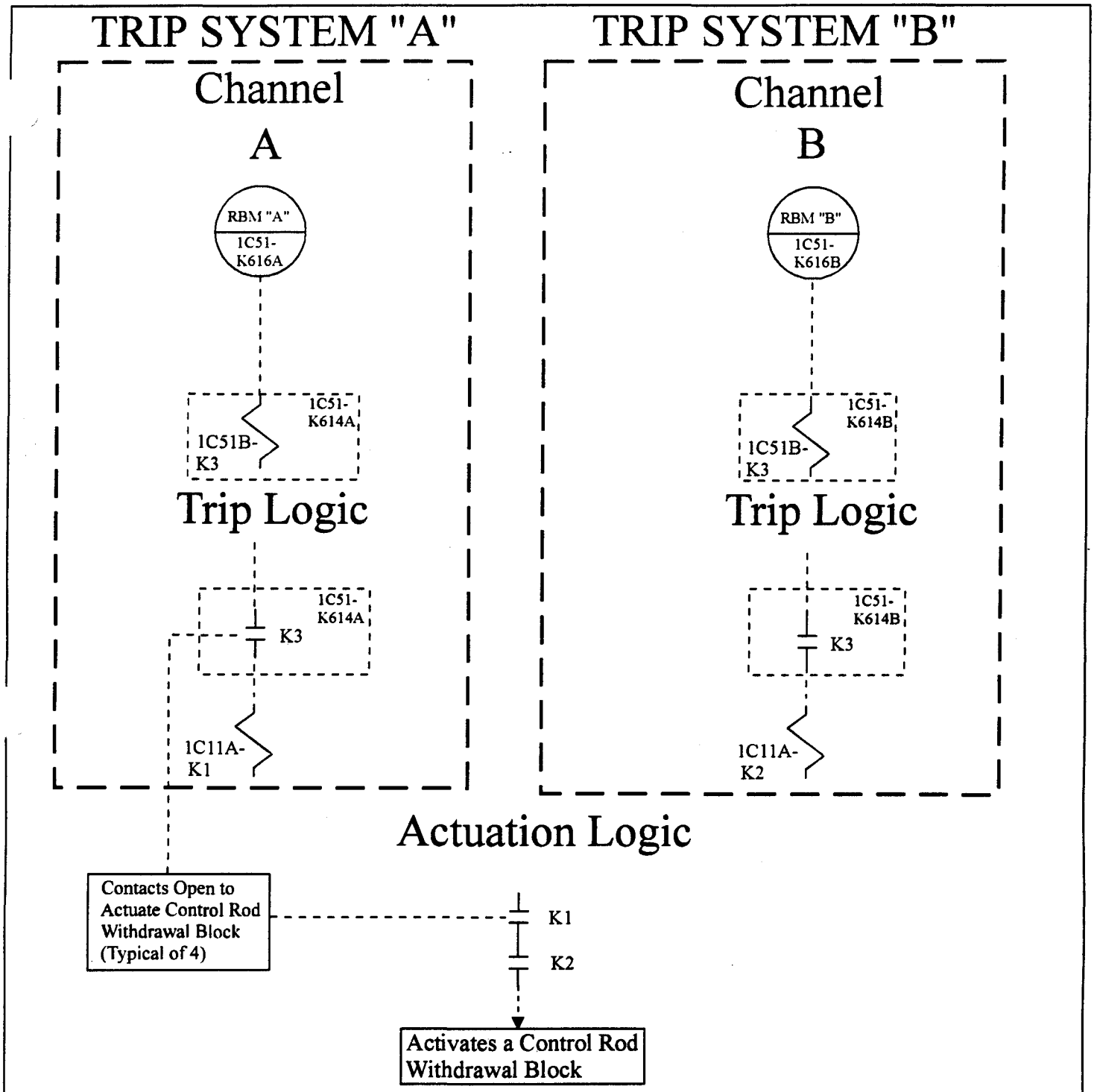
In order to maintain Control Rod Withdrawal Block capability on an RBM High Power Range - Upscale condition, one channel must be operable or maintained in the tripped condition.

Elem. Ref.
17828
17831
H-44709
H-44710
H-44713

Prepared By:

Reviewed By:

LFD-1-CRB-03
TS 3.3.2.1-1, Item 1.c Control Rod Block, Rod Block Monitor High Power Range - Upscale
TRM Rev. 12



Minimum Channel Requirements for System Initiation Capability:

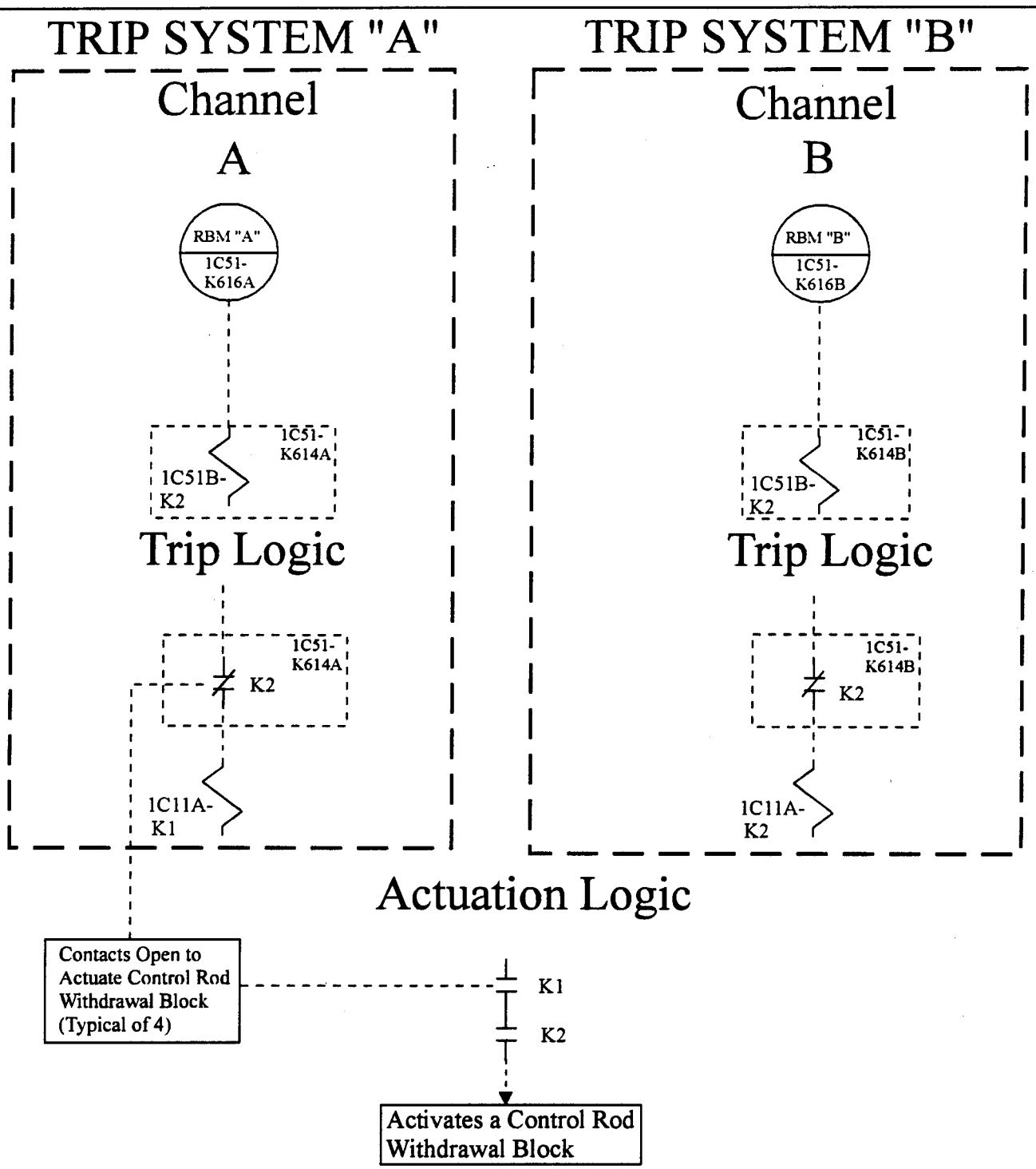
In order to maintain Control Rod Withdrawal Block capability on an RBM Inoperable condition, one channel must be operable or maintained in the tripped condition.

Elem. Ref.
H-17828
H-17831
H-44709
H-44710
H-44713

Prepared By: [signature]

Reviewed By: [signature]

LFD-1-CRB-04
TS 3.3.2.1-1, Item 1.d Control Rod Block, Rod Block Monitor Inop
TRM Rev. 12



Minimum Channel Requirements for System Initiation Capability:

In order to maintain Control Rod Withdrawal Block capability on an RBM Downscale condition, one channel must be operable or maintained in the tripped condition.

Elem. Ref.
H-17828
H-17831
H-44709
H-44710
H-44713

Prepared By: D Rayne

Reviewed By: C Brenner

LFD-1-CRB-05
TS 3.3.2.1-1, Item 1.e Control Rod Block, Rod Block Monitor - Downscale
TRM Rev. 12

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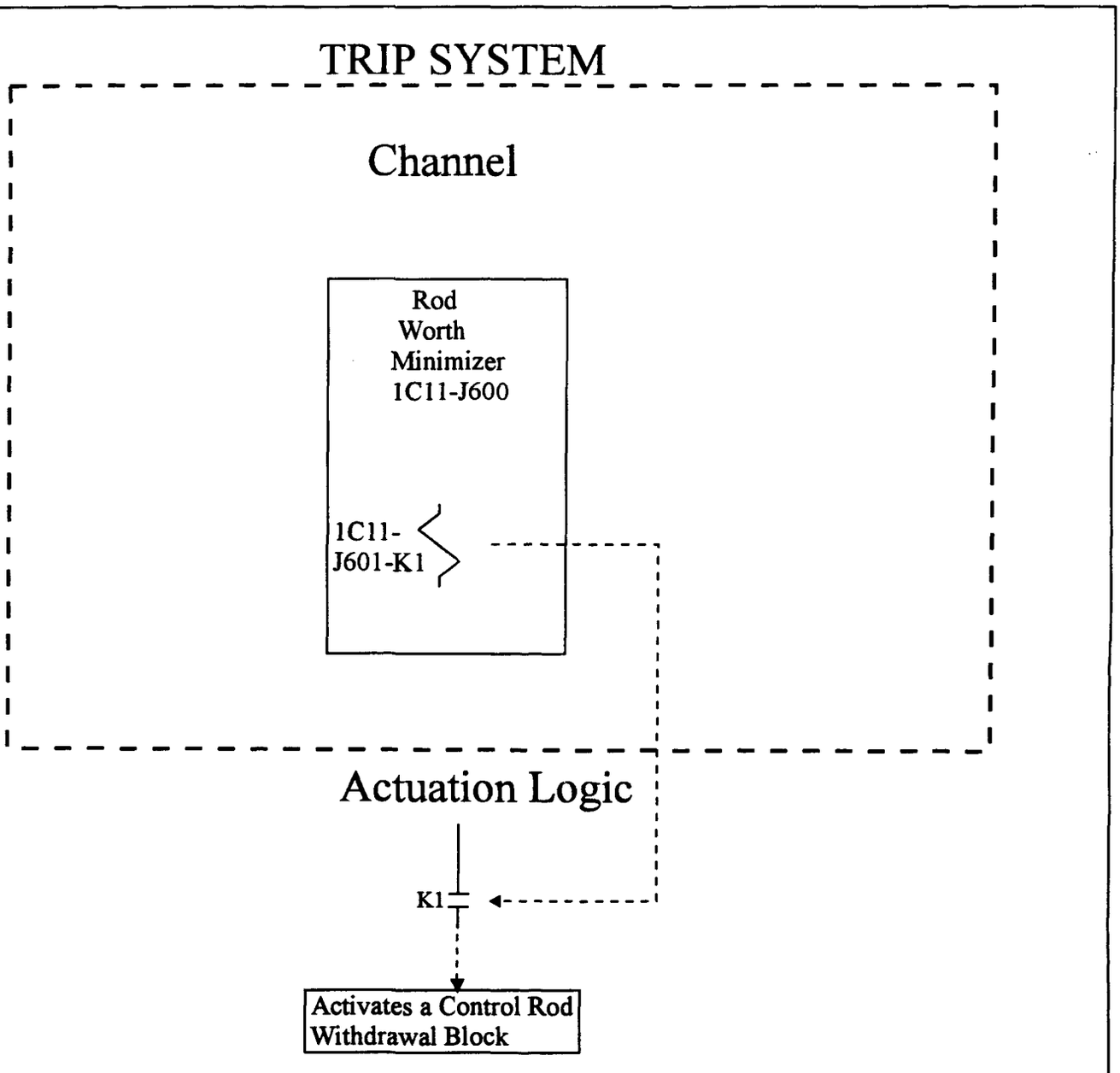


Minimum Channel Requirements for System Initiation Capability:

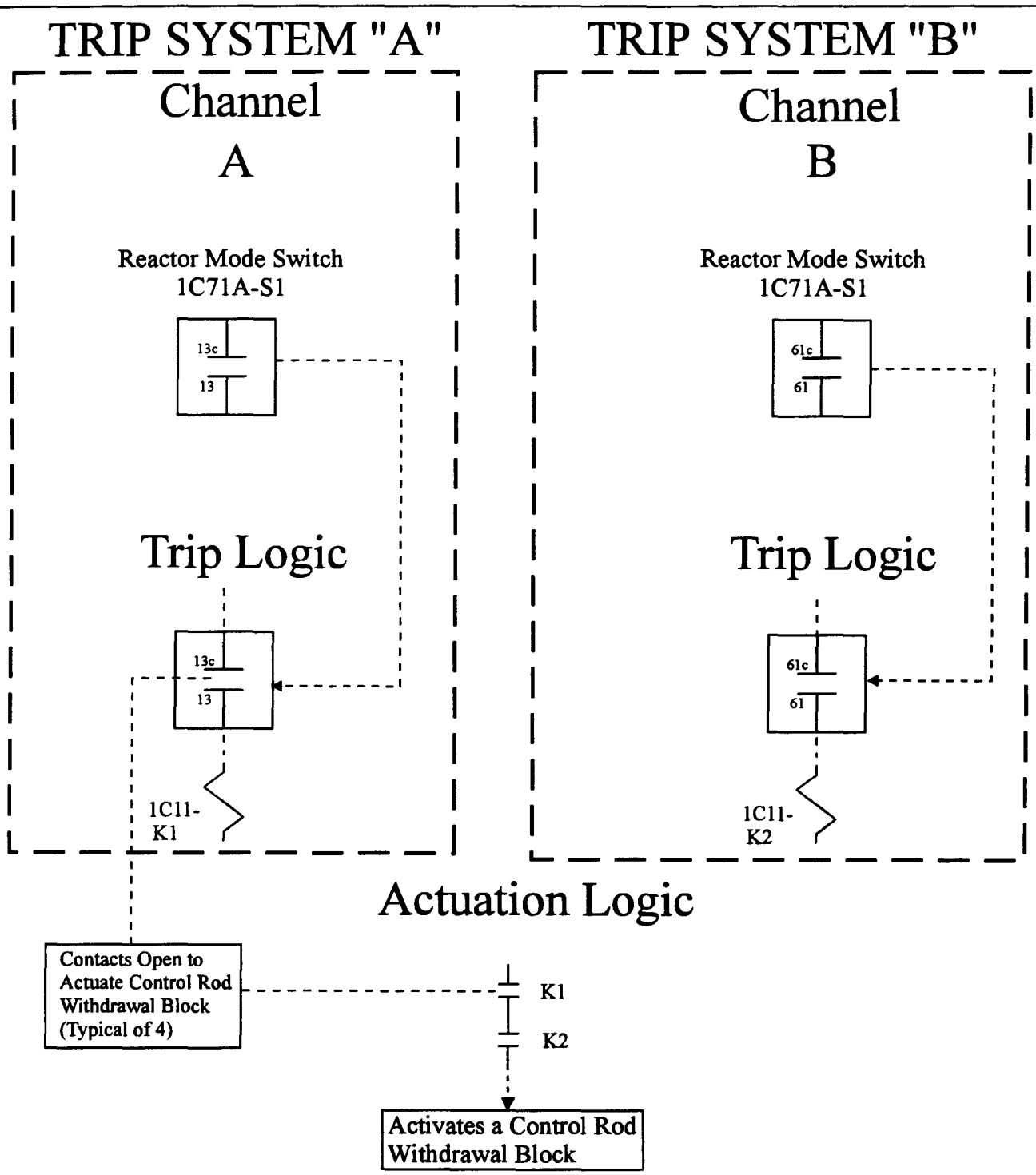
In order to maintain Control Rod Withdrawal Block capability associated with the Rod Worth Minimizer, one channel must be operable or maintained in the tripped condition.

Elem. Ref.
H-17831
H-17117

Prepared By: Roger Clark

Reviewed By: S. E. Brunn

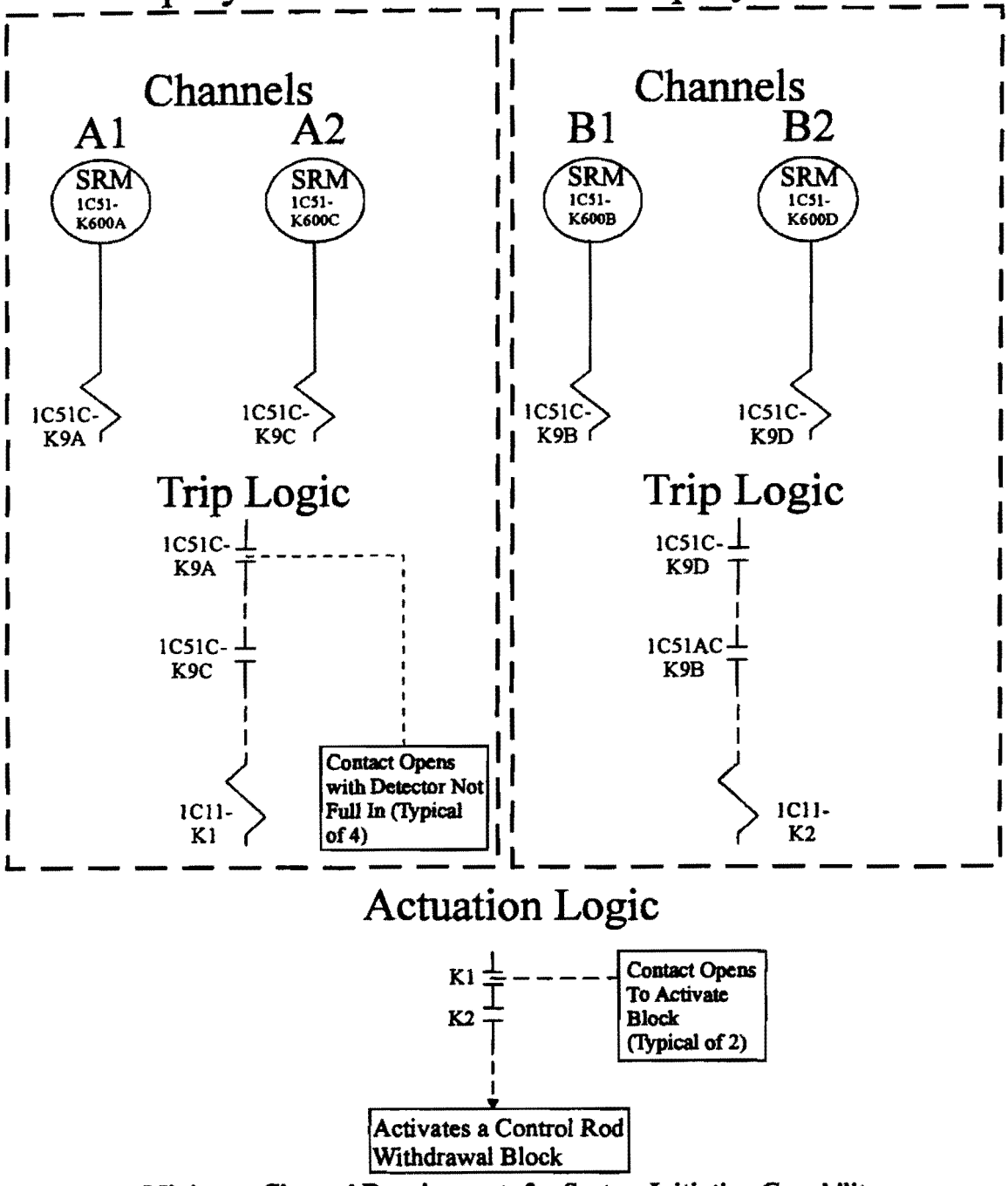
LFD-1-CRB-07	
TS 3.3.2.1-1, Item 2 Control Rod Block, Rod Worth Minimizer	
Rev. 0	12/8/94



Minimum Channel Requirements for System Initiation Capability:

In order to maintain Control Rod Withdrawal Block capability on Reactor Mode Switch in Shutdown, one channel must be operable or maintained in the tripped condition.

	LFD-1-CRB-08
	TS 3.3.2.1-1, Item 3 Control Rod Block, Reactor Mode Switch - Shutdown Position
Elem. Ref. H-17828 H-17831	Prepared By: Reyes Clark Reviewed By: S.G. Brown
	Rev. 0 12/8/94



Minimum Channel Requirements for System Initiation Capability

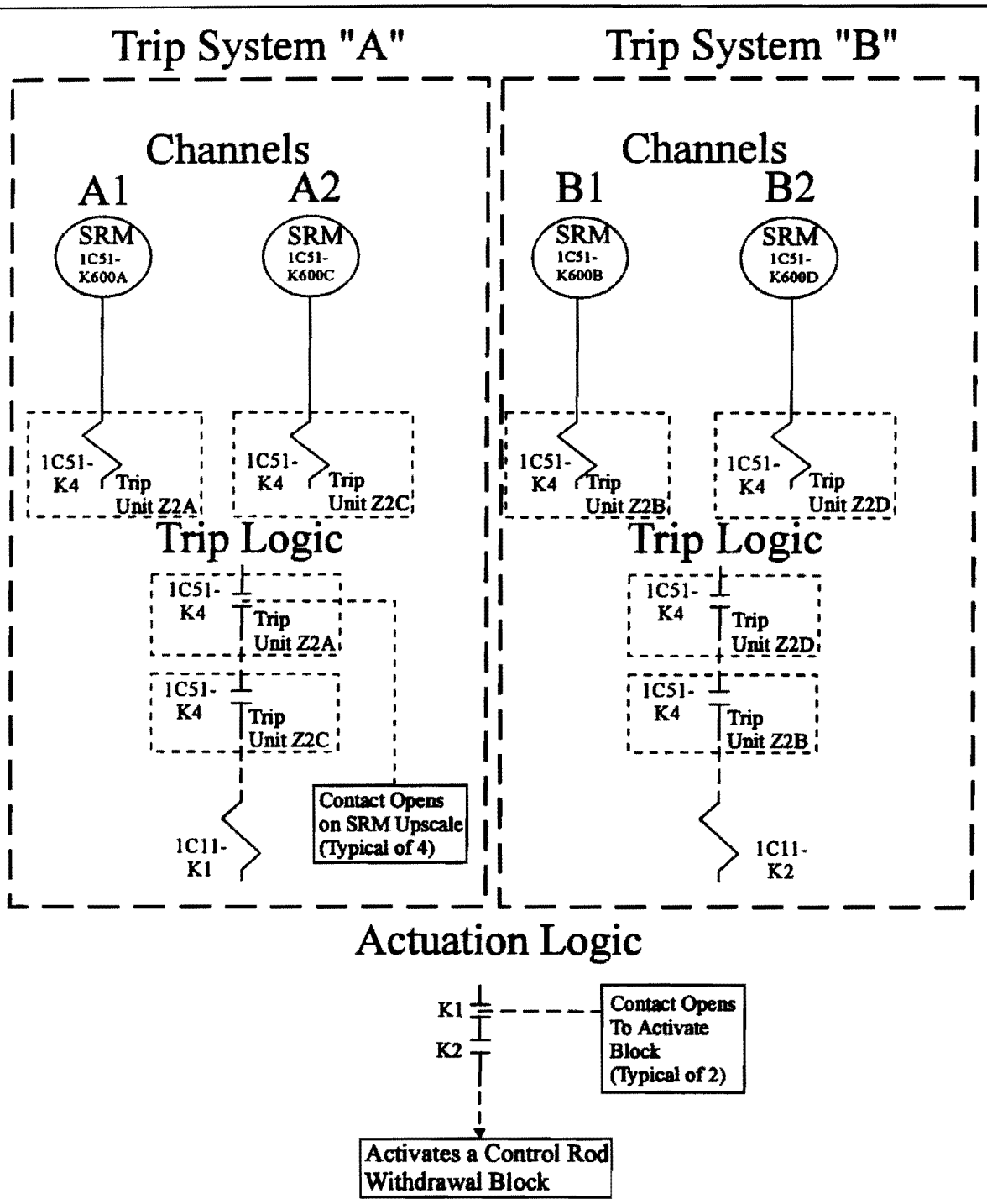
In order to maintain Control Rod Withdrawal Block capability on an SRM detector-not-full-in condition, one channel must be functional or maintained in the tripped condition.

Elem. Ref.
H-17122
H-17123
H-17175
H-17828
H-17831

Prepared By: RCC

Reviewed By:

LFD-1-CRB-09
TRM T3.3.2-1, Item 1.a Control Rod Block Instrumentation, SRM - Detector Not Full In
TRM REV. 60



Minimum Channel Requirements for System Initiation Capability

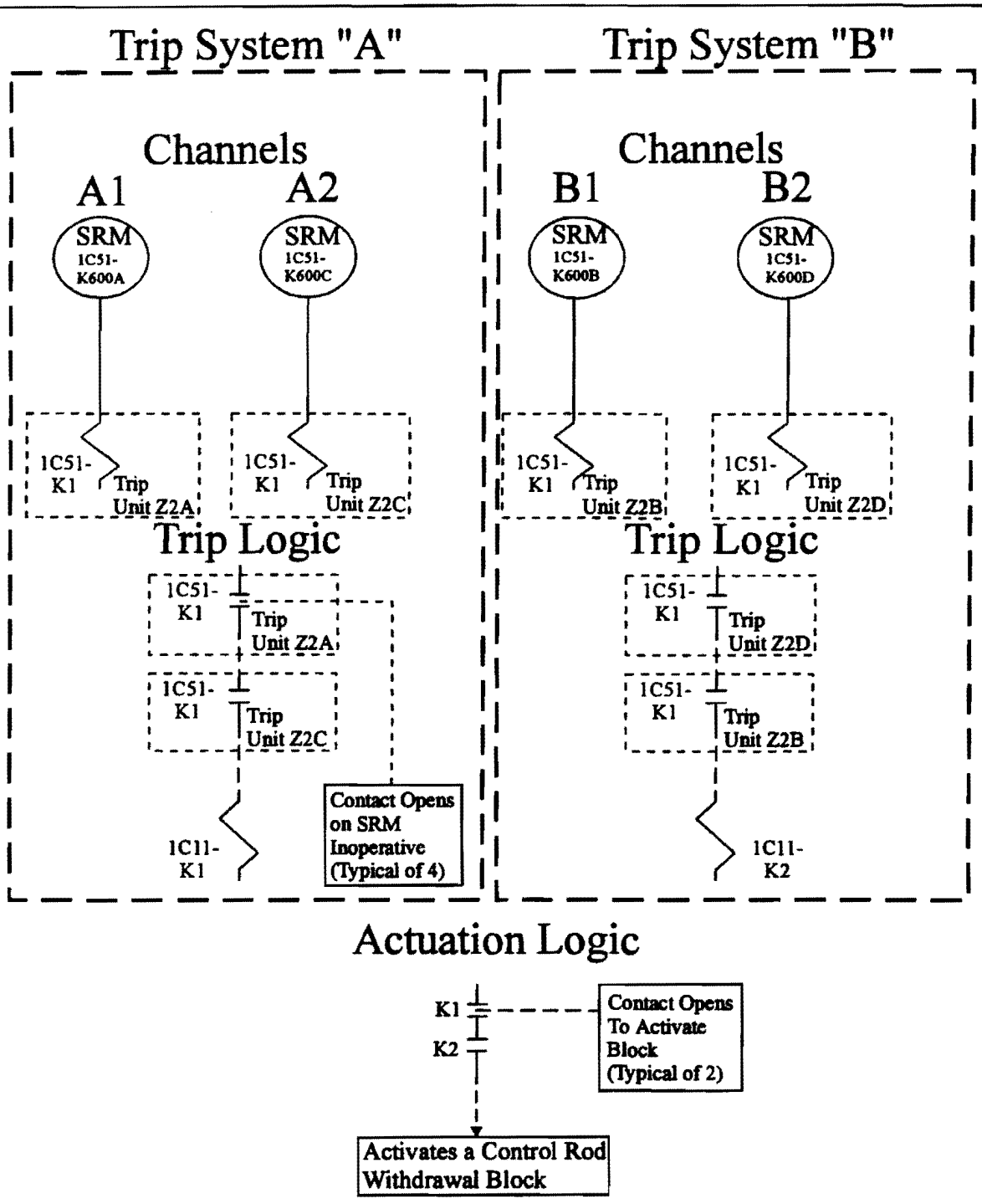
In order to maintain Control Rod Withdrawal Block capability on an SRM upscale condition, one channel must be functional or maintained in the tripped condition.

Elem. Ref.
H-17167
H-17175
H-17828
H-17831

Prepared By: RLC

Reviewed By:

LFD-1-CRB-10
TRM T3.3.2-1, Item 1.b Control Rod Block Instrumentation, SRM - Upscale
TRM REV. 60



Minimum Channel Requirements for System Initiation Capability

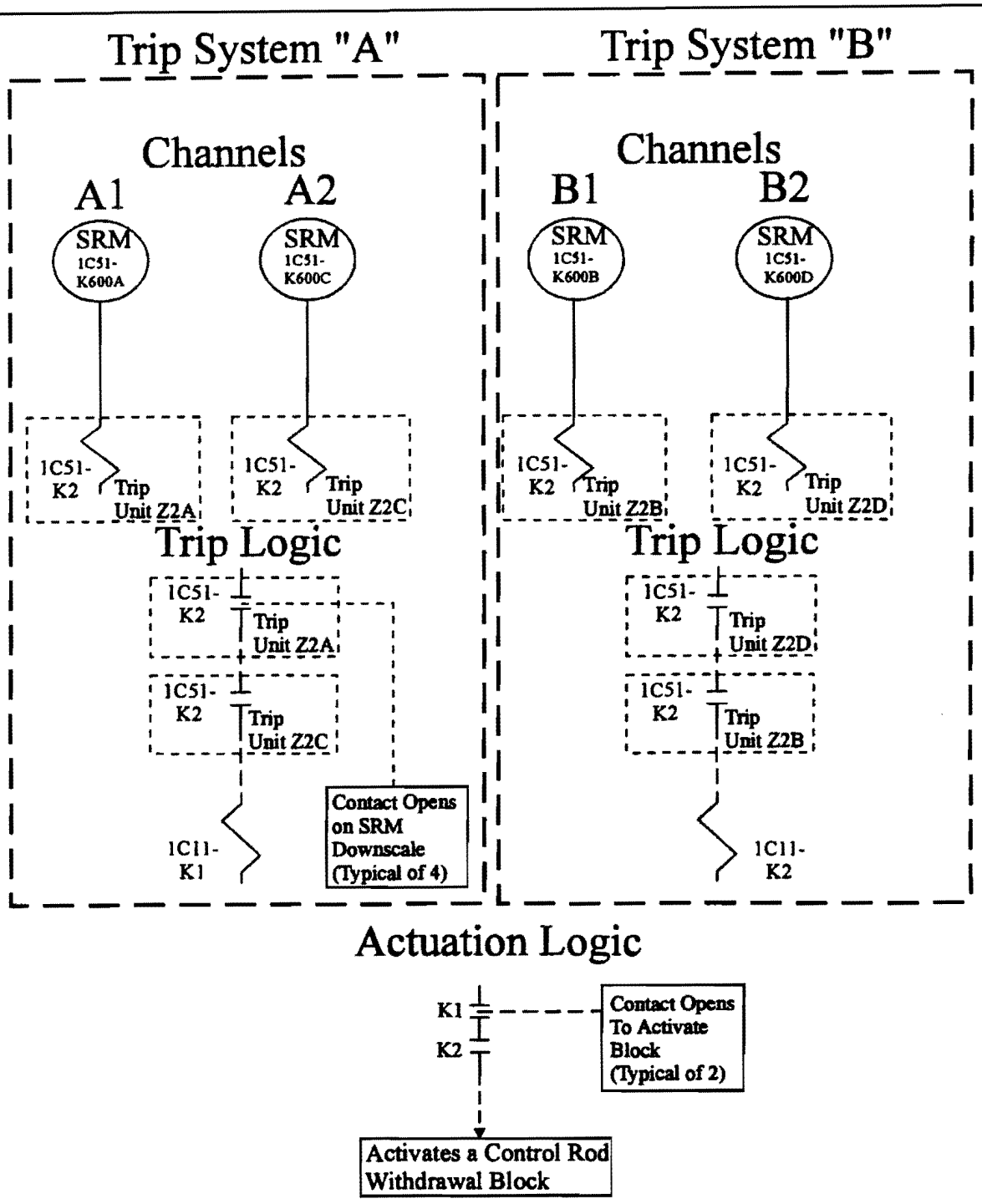
In order to maintain Control Rod Withdrawal Block capability on an SRM inoperative condition, one channel must be functional or maintained in the tripped condition.

Elem. Ref.
H-17167
H-17175
H-17828
H-17831

Prepared By: RLC

Reviewed By:

LFD-1-CRB-11
TRM T3.3.2-1, Item 1.c Control Rod Block Instrumentation, SRM - Inoperative
TRM REV. 60



Actuation Logic

Minimum Channel Requirements for System Initiation Capability

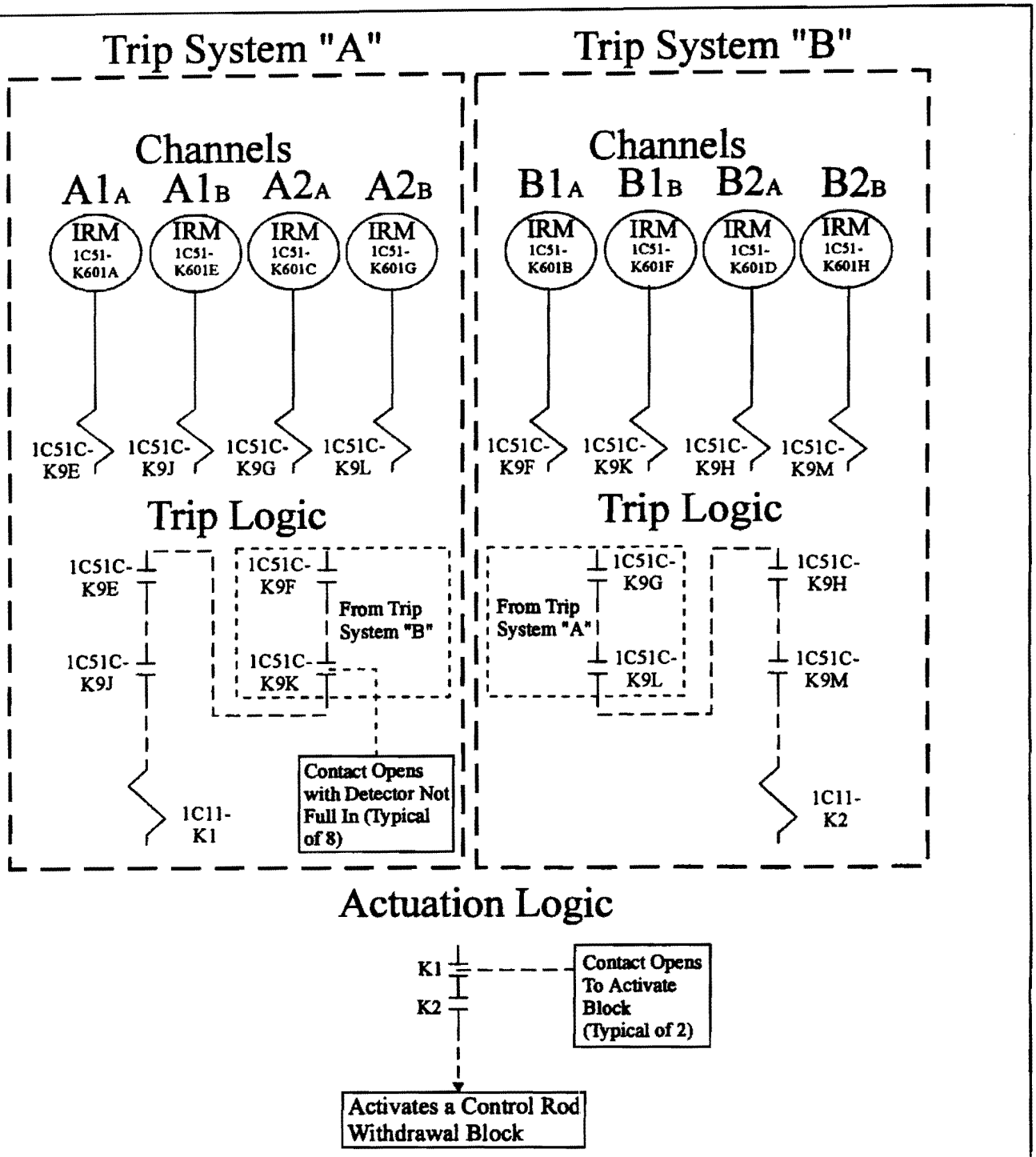
In order to maintain Control Rod Withdrawal Block capability on an SRM downscale condition, one channel must be functional or maintained in the tripped condition.

Elem. Ref.
H-17167
H-17175
H-17828
H-17831

Prepared By: RLC

Reviewed By: RDH

LFD-1-CRB-12
TRM T3.3.2-1, Item 1.d Control Rod Block Instrumentation, SRM - Downscale
TRM REV. 60



Minimum Channel Requirements for System Initiation Capability

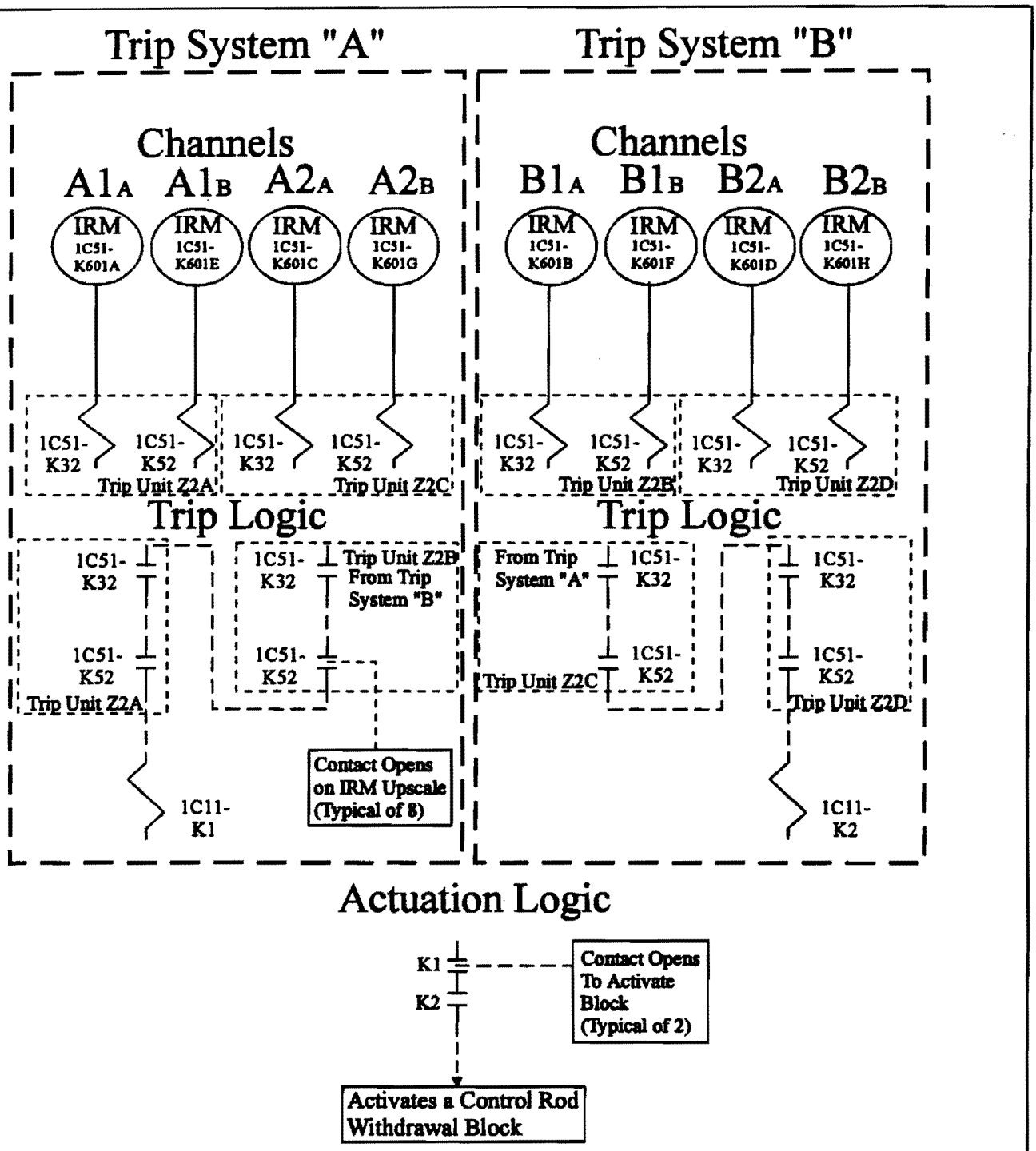
In order to maintain Control Rod Withdrawal Block capability on an IRM not full in condition, one channel must be functional or maintained in the tripped condition.

Elem. Ref.
H-17124
H-17125
H-17175
H-17828
H-17831

Prepared By: RLC

Reviewed By:

LFD-1-CRB-13
TRM T3.3.2-1, Item 2.a Control Rod Block Instrumentation, IRM - Detector Not Full In
TRM REV. 60



Minimum Channel Requirements for System Initiation Capability

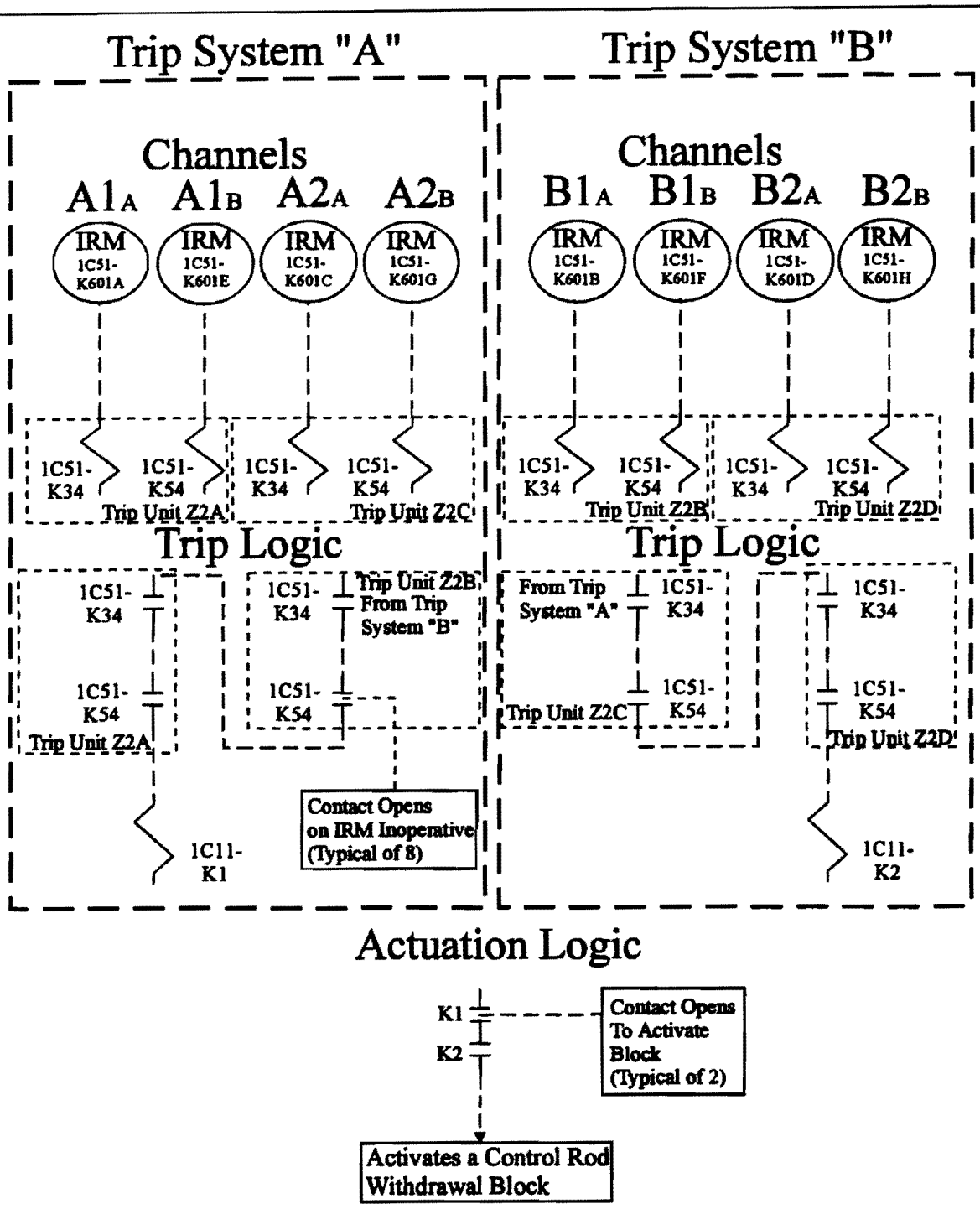
In order to maintain Control Rod Withdrawal Block capability on an IRM upscale condition, one channel must be functional or maintained in the tripped condition.

Elem. Ref.
H-17169
H-17170
H-17175
H-17828
H-17831

Prepared By: RLC

Reviewed By:

LFD-1-CRB-14
TRM T3.3.2-1, Item 2.b Control Rod Block Instrumentation, IRM - Upscale
TRM REV. 60



Minimum Channel Requirements for System Initiation Capability

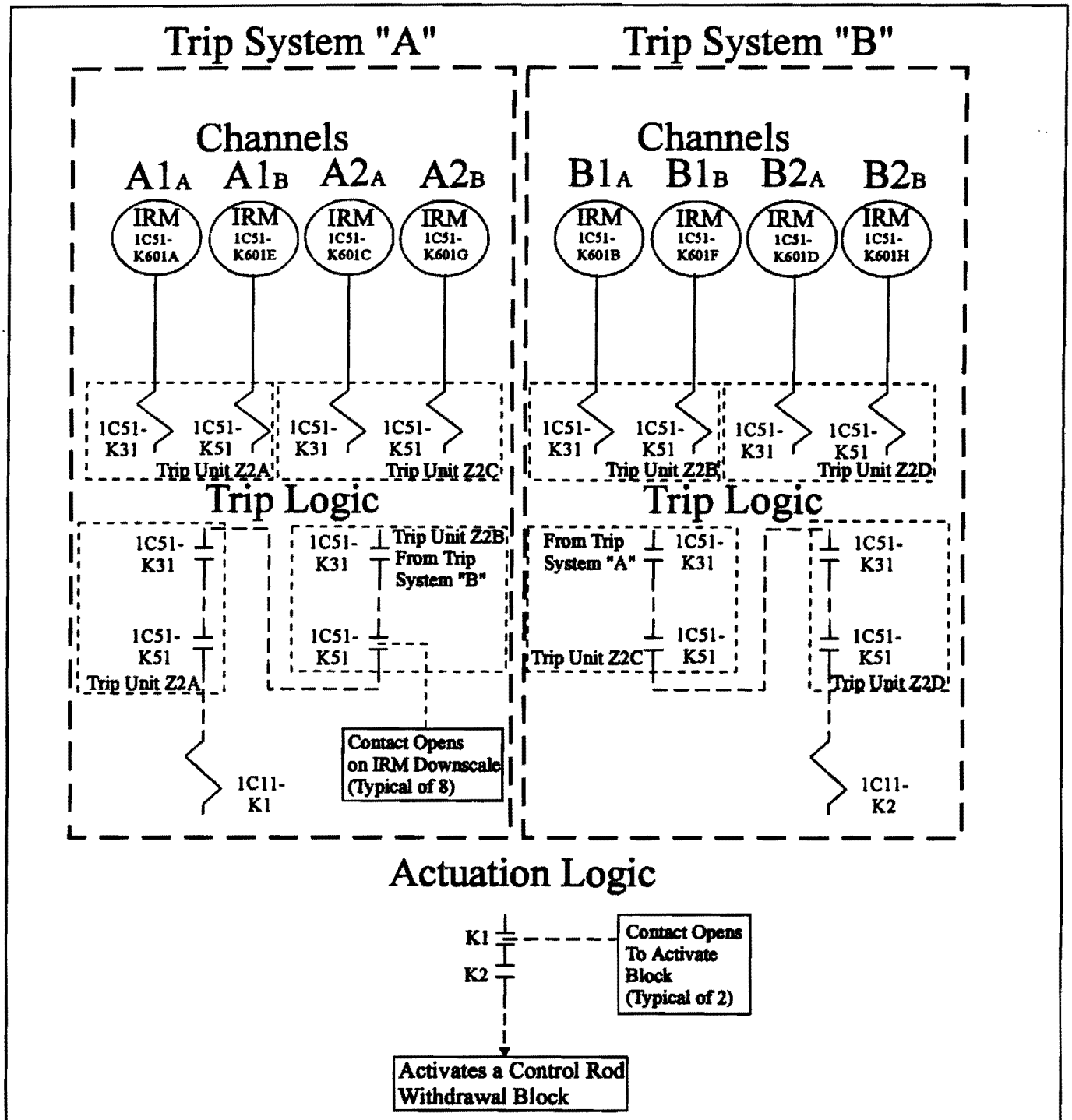
In order to maintain Control Rod Withdrawal Block capability on an IRM inoperative condition, one channel must be functional or maintained in the tripped condition.

Elem. Ref.	
H-17169	H-17175
H-17170	H-17828
H-17171	H-17831
H-17172	

Prepared By: RLC

Reviewed By:

LFD-1-CRB-15
TRM T3.3.2-1, Item 2.c Control Rod Block Instrumentation, IRM - Inoperative
TRM REV. 60



Minimum Channel Requirements for System Initiation Capability

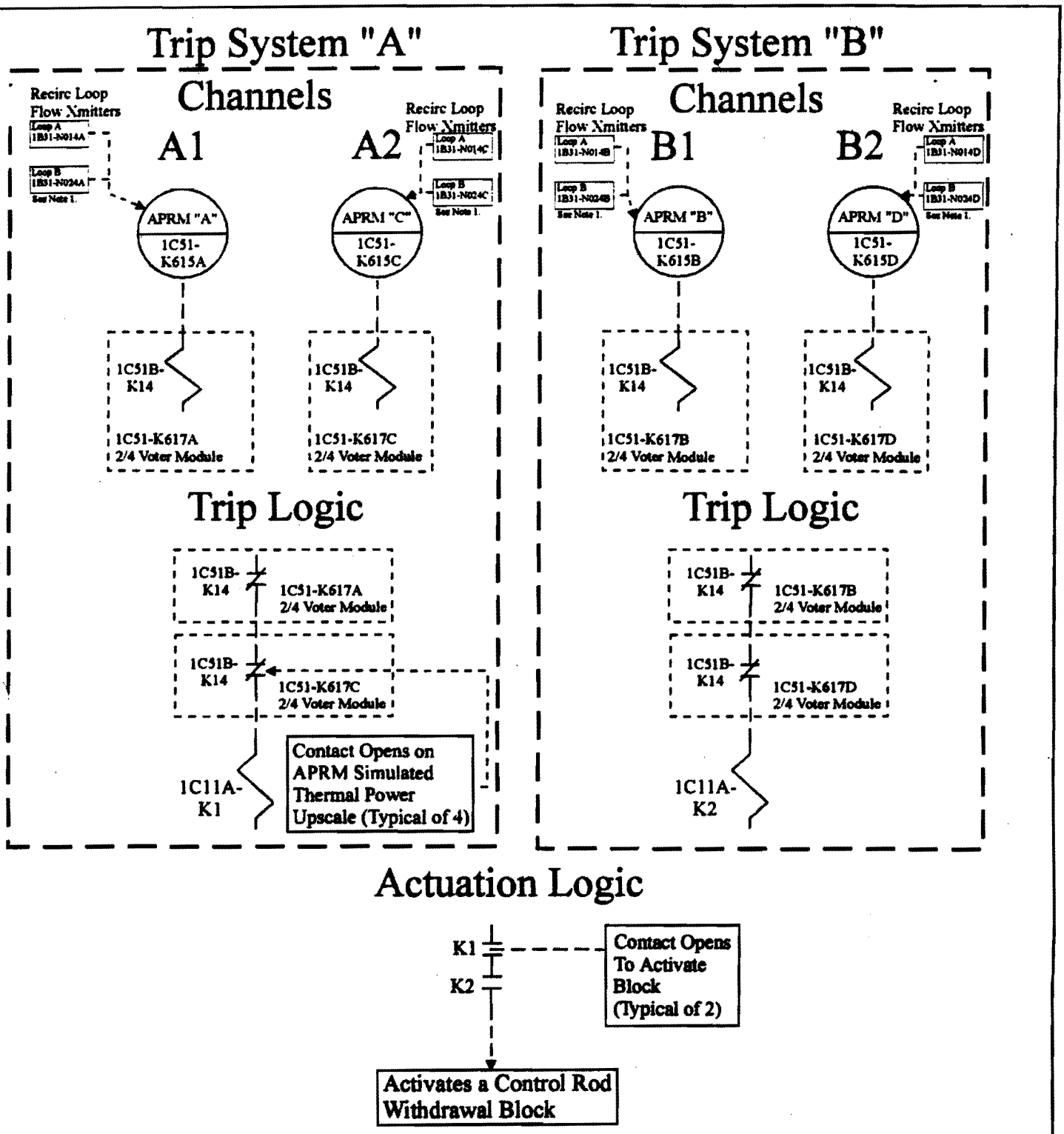
In order to maintain Control Rod Withdrawal Block capability on an IRM downscale condition, one channel must be functional or maintained in the tripped condition.

Elem. Ref.
H-17169
H-17170
H-17175
H-17828
H-17831

Prepared By: RLC

Reviewed By: [illegible]

LFD-1-CRB-16
TRM T3.3.2-1, Item 2.d Control Rod Block Instrumentation, IRM - Downscale
TRM REV. 60



Minimum Channel Requirements for System Initiation Capability:

In order to maintain Control Rod Withdrawal Block capability on an APRM Simulated Thermal Power Upscale condition, one channel must be functional or maintained in the tripped condition.

Elem. Ref.	
H-17828	H-44707
H-17831	H-44708
H-44705	H-44713
H-44706	

Note 1: For the STP Upscale function of an APRM to be considered operable, both of the associated Recirc Flow transmitters must be operable.

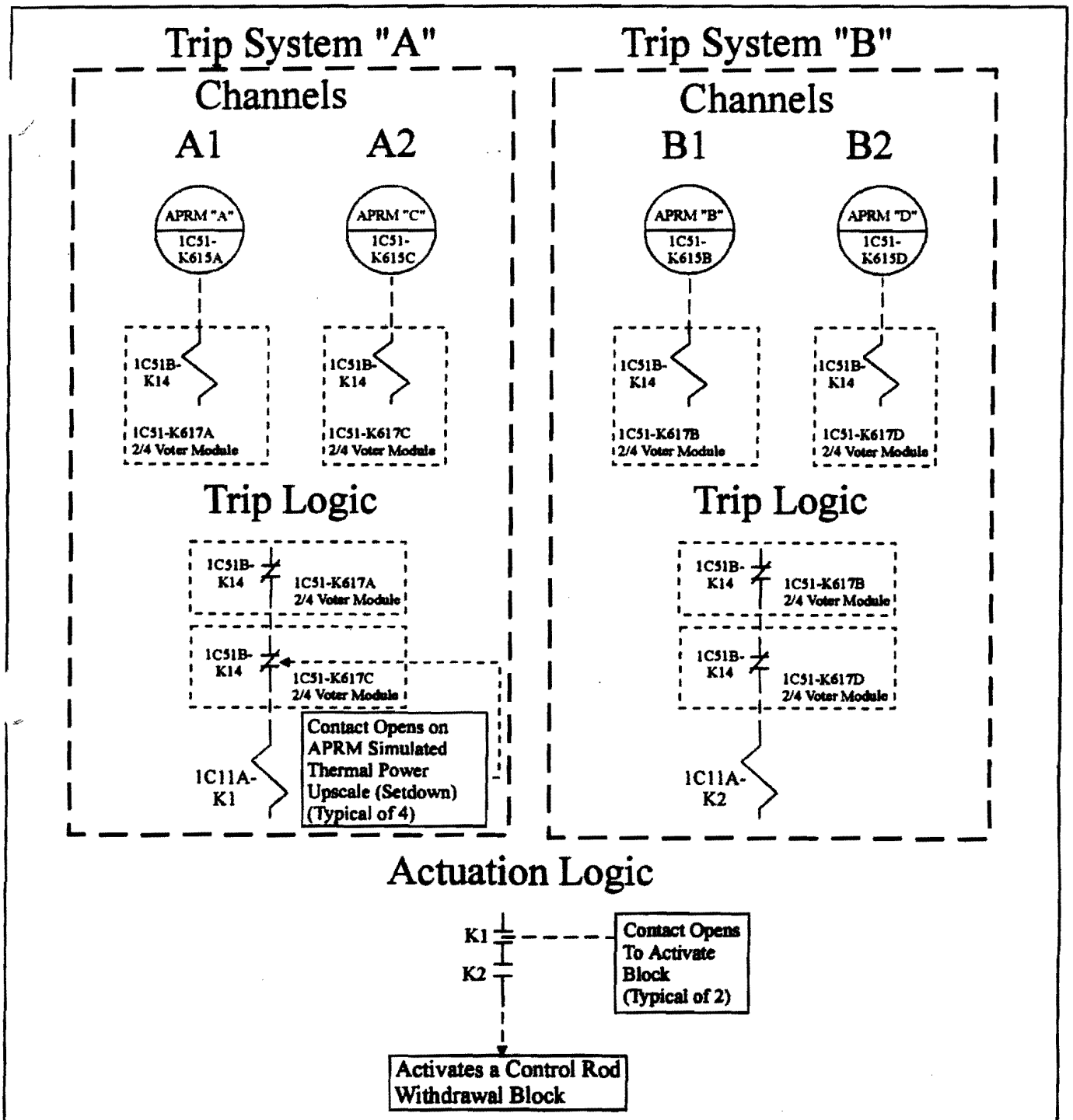
Prepared By: TRC

Reviewed By: [signature]

LFD-1-CRB-17

TRM T3.3.2-1, Item 3.a Control Rod Block Instrumentation, APRM - Simulated Thermal Power Upscale

TRM REV. 60



Minimum Channel Requirements for System Initiation Capability:

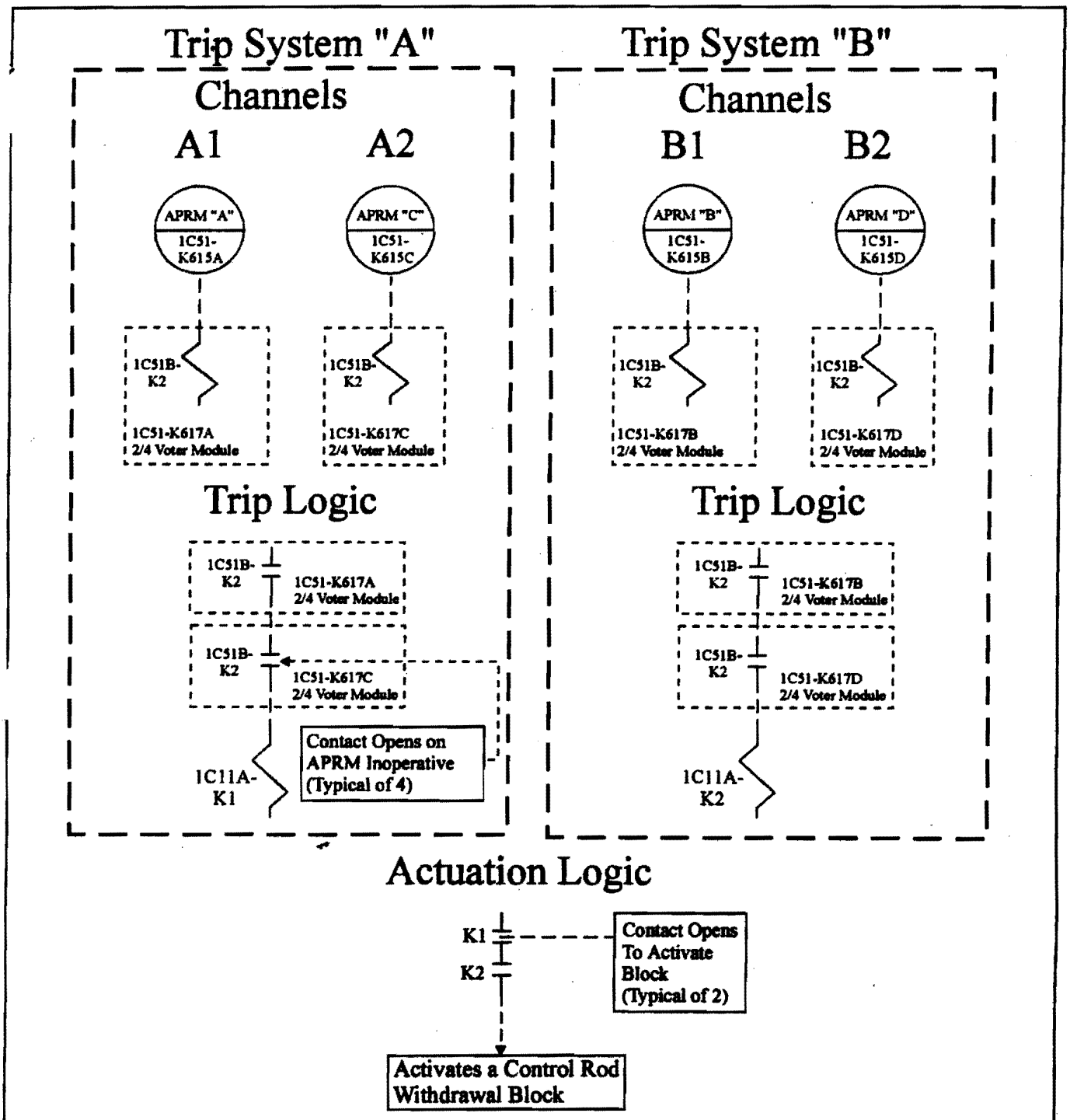
In order to maintain Control Rod Withdrawal Block capability on an APRM Simulated Thermal Power Upscale (Setdown) condition, one channel must be functional or maintained in the tripped condition.

Elem. Ref.	
H-17828	H-44707
H-17831	H-44708
H-44705	H-44713
H-44706	

Prepared By: RLC

Reviewed By:

LFD-1-CRB-18
TRM T3.3.2-1, Item 3.b Control Rod Block Instrumentation, APRM - Simulated Thermal Power Upscale (Setdown)
TRM REV. 60



Minimum Channel Requirements for System Initiation Capability:

In order to maintain Control Rod Withdrawal Block capability on an APRM Inoperative condition, one channel must be functional or maintained in the tripped condition.

Elem. Ref.	
H-17828	H-44707
H-17831	H-44708
H-44705	H-44713
H-44706	

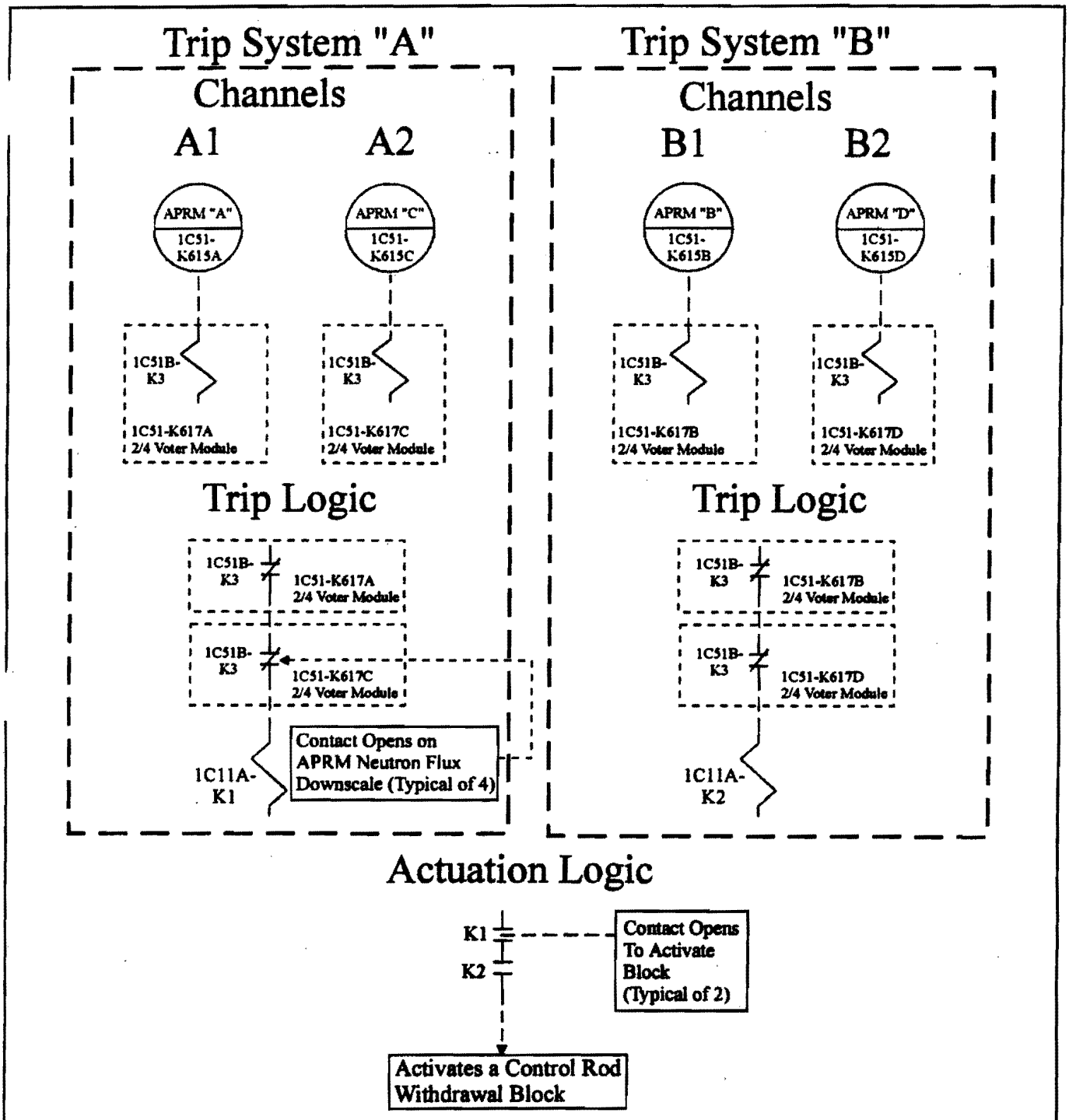
Prepared By: RLC

Reviewed By:

LFD-1-CRB-19

TRM T3.3.2-1, Item 3.c Control Rod Block Instrumentation, APRM - Inoperative

TRM REV. 60



Minimum Channel Requirements for System Initiation Capability:

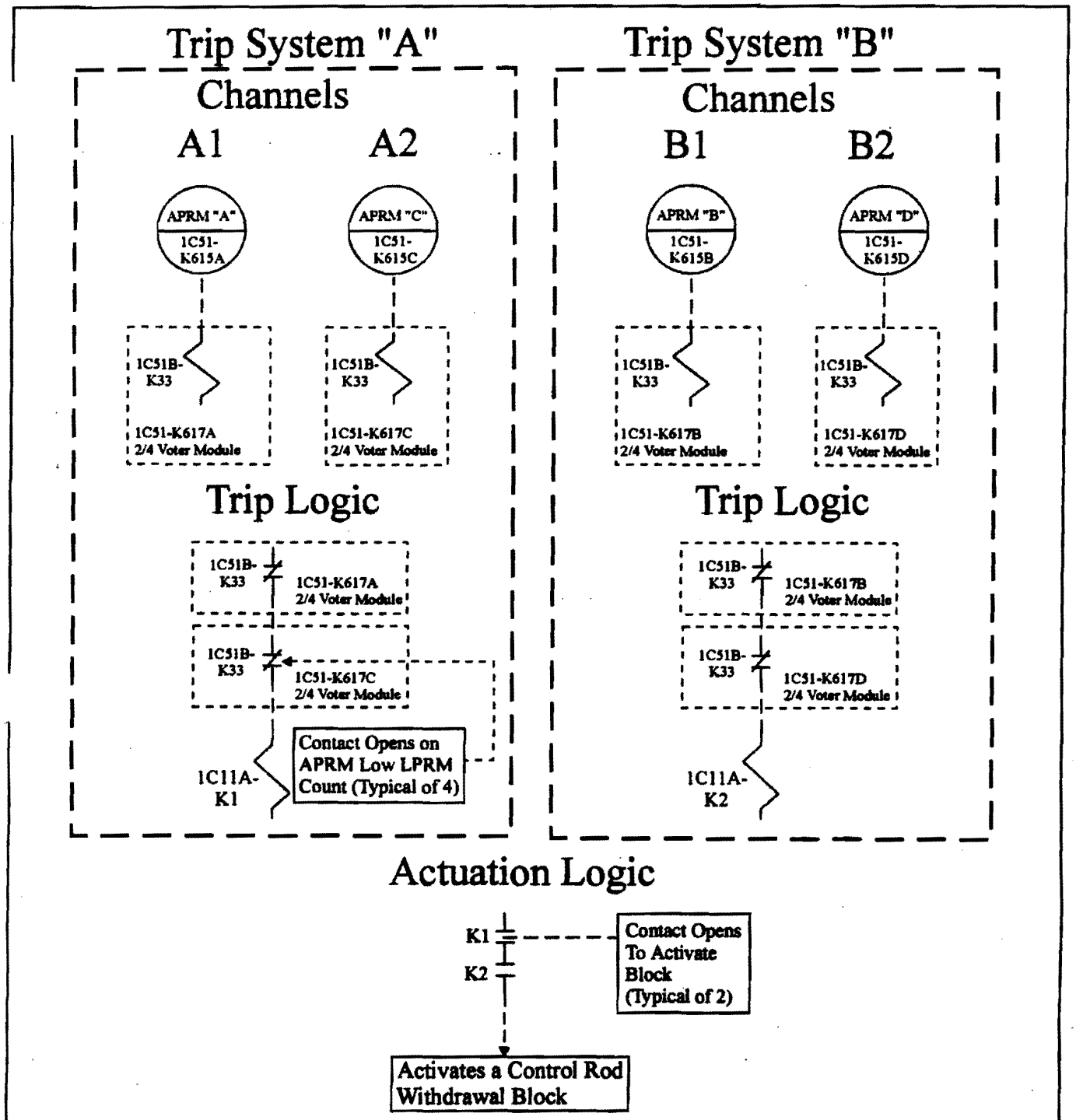
In order to maintain Control Rod Withdrawal Block capability on an APRM Neutron Flux Downscale condition, one channel must be functional or maintained in the tripped condition.

Elem. Ref.	
H-17828	H-44707
H-17831	H-44708
H-44705	H-44713
H-44706	

Prepared By: RLC

Reviewed By: [illegible]

LFD-1-CRB-20
TRM T3.3.2-1, Item 3.d Control Rod Block Instrumentation, APRM - Neutron Flux Downscale
TRM REV. 60



Minimum Channel Requirements for System Initiation Capability:

In order to maintain Control Rod Withdrawal Block capability on an APRM Low LPRM Count condition, one channel must be functional or maintained in the tripped condition.

Elem. Ref.	
H-17828	H-44707
H-17831	H-44708
H-44705	H-44713
H-44706	

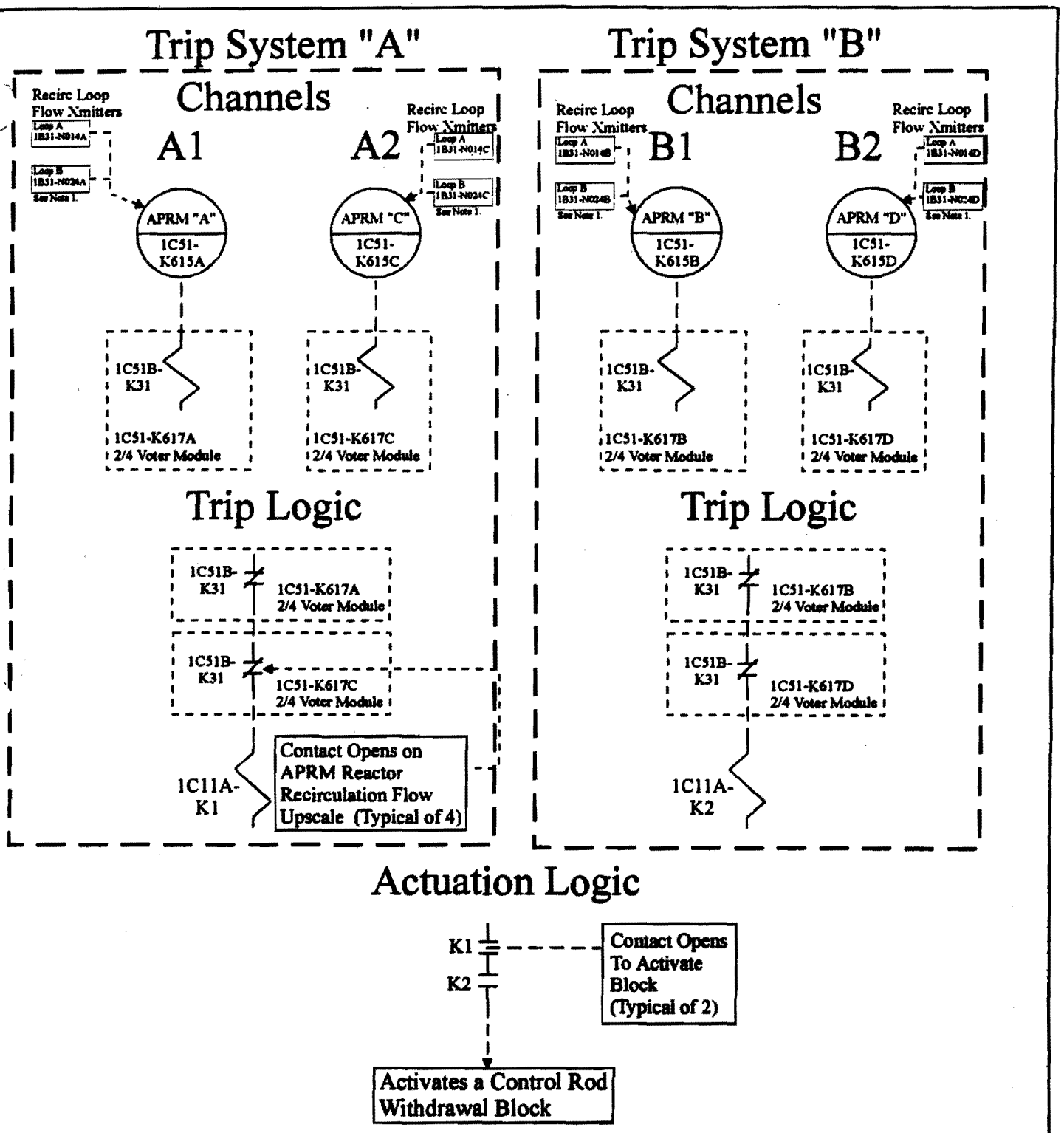
Prepared By: DLC

Reviewed By:

LFD-1-CRB-21

TRM T3.3.2-1, Item 3.e Control Rod Block Instrumentation, APRM - Low LPRM Count

TRM REV. 60



Minimum Channel Requirements for System Initiation Capability:

In order to maintain Control Rod Withdrawal Block capability on an APRM Reactor Recirculation Flow Upscale condition, one channel must be functional or maintained in the tripped condition.

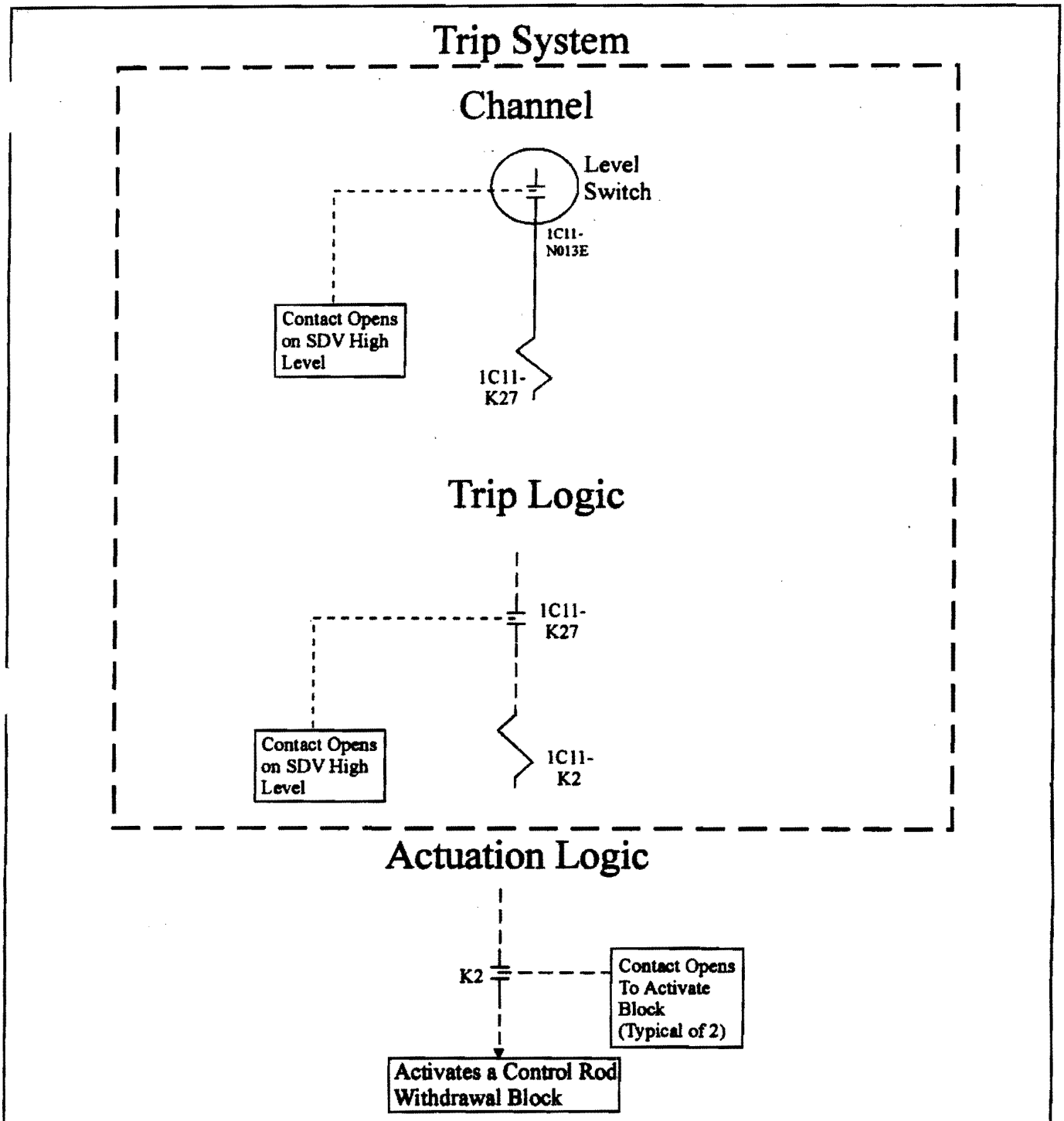
Elem. Ref.	
H-17828	H-44707
H-17831	H-44708
H-44705	H-44713
H-44706	

Note 1: For the Reactor Recirculation Flow Upscale function of an APRM to be considered operable, both of the associated Recirc Flow transmitters must be operable.

Prepared By: RLC

Reviewed By:

LFD-1-CRB-22
TRM T3.3.2-1, Item 3.f Control Rod Block Instrumentation, APRM - Reactor Recirculation Flow Upscale
TRM REV. 60



Minimum Channel Requirements for System Initiation Capability:

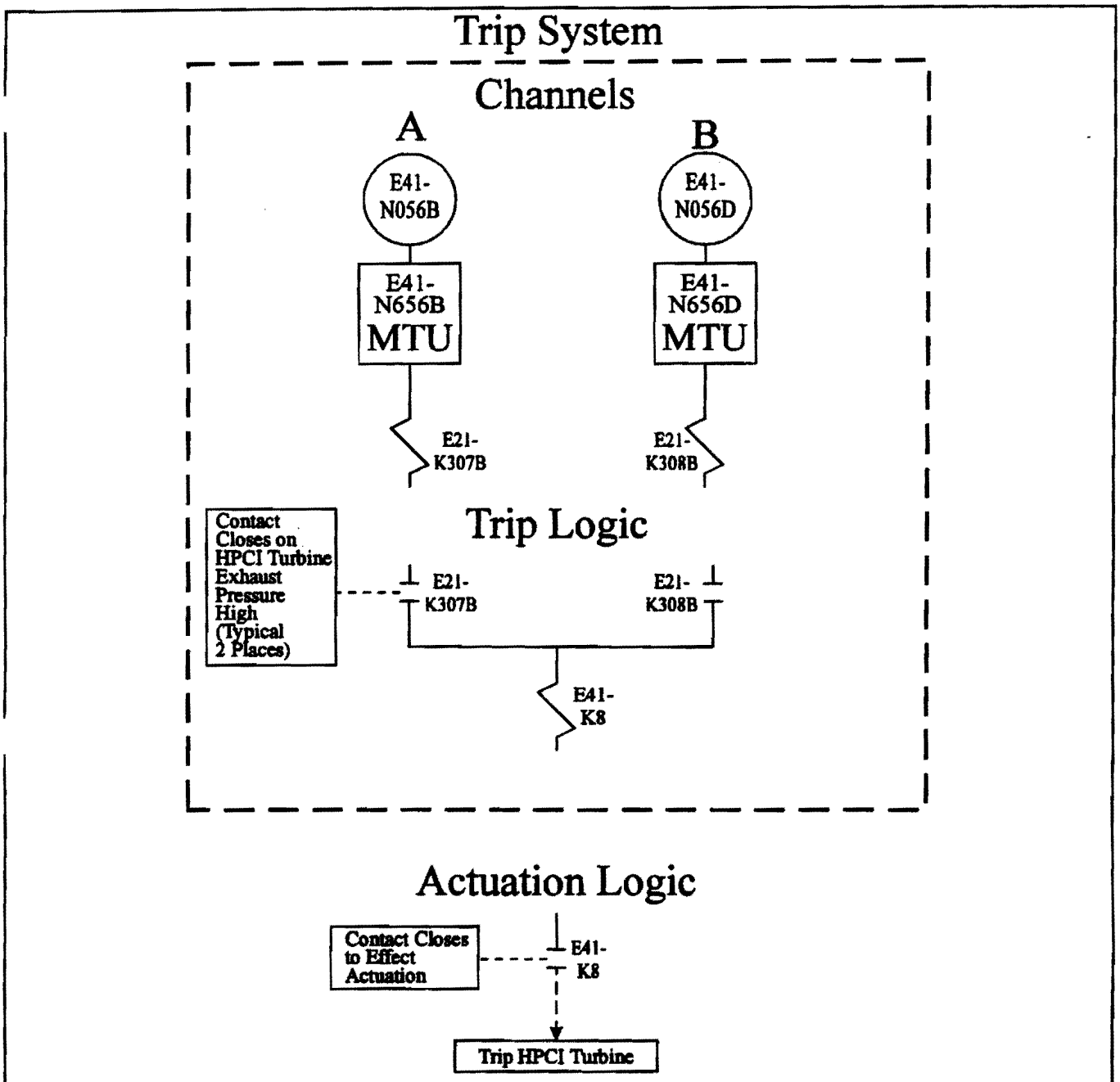
In order to maintain Control Rod Withdrawal Block capability on a Scram Discharge Volume high level condition, the one channel must be functional or maintained in the tripped condition.

Elem. Ref.
H-17828
H-17831
H-17832

Prepared By: DLC

Reviewed By:

LFD-1-CRB-23
TRM T3.3.2-1, Item 4 Control Rod Block Instrumentation, SDV Level - High
TRM REV. 60



Minimum Channel Requirements for System Trip Capability:

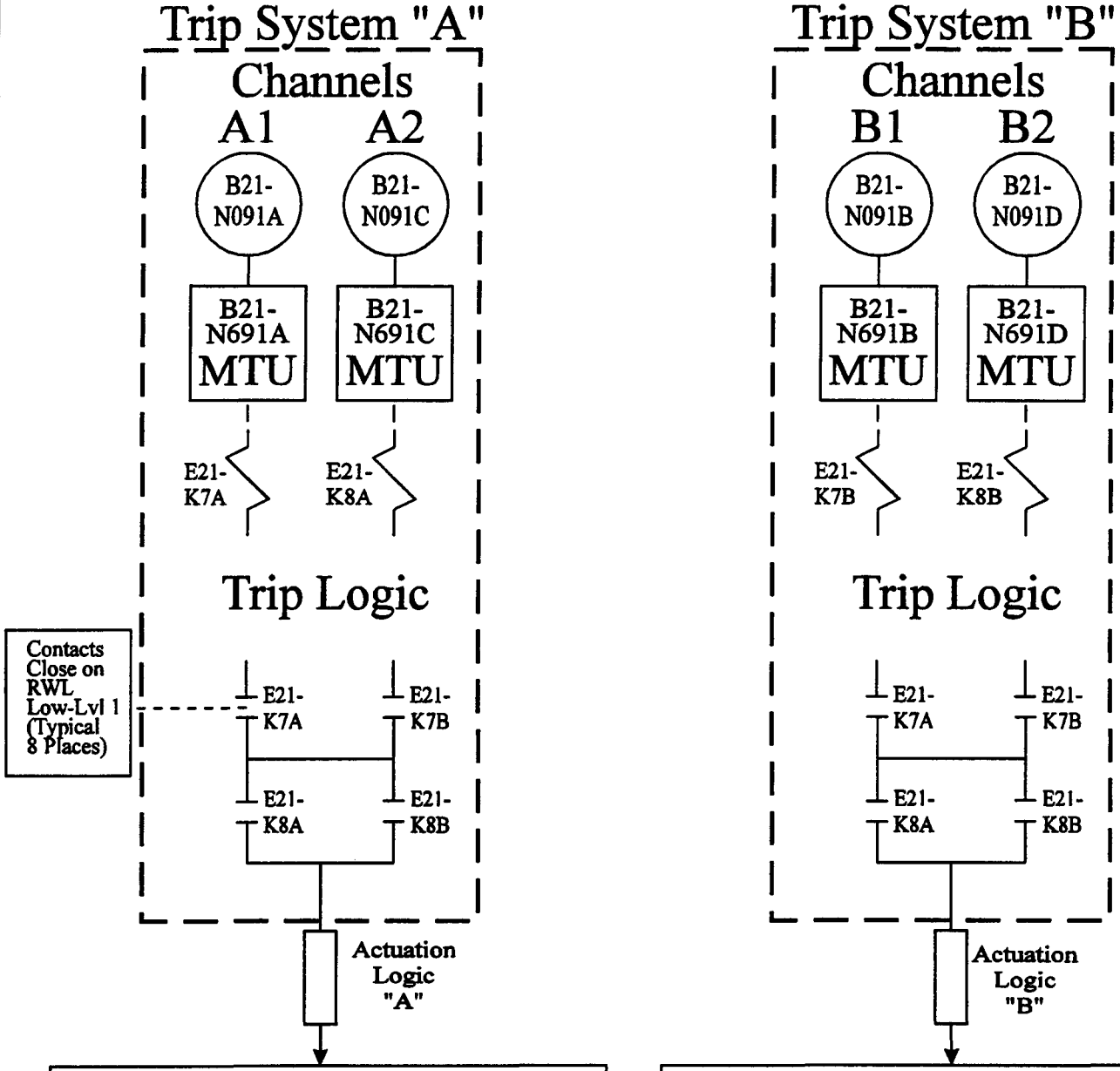
In order to maintain HPCI turbine trip capability with regard to a HPCI turbine exhaust pressure-high signal, at least one channel must be functional.

Elem. Ref.
H-17159
H-17160
H-19824

Prepared By: DLC

Reviewed By:

LFD-1-ECCS-25
TRM T3.3.5-1, Item 2 HPCI Turbine Trip HPCI Turbine Exhaust Pressure-High
TRM REV. 60



Initiation of CS Subsystems "A" and "B" (Except Valve 1E21-F004B Does Not Receive an Open Signal and Valve 1E21-F015B Does Not Receive a Closed Signal); EDG's 1A, 1C, 1B; PSW P41-F310A,B,C,D Valves; Lock-out Auto-start of Cond. and Cond. Booster Pumps for 50 secs.; Trip of CRD Pump "A"; Trip of D/W Cooling System; Trip of T/B Chiller "A"; Trip of Cooling Tower ACB 135313.

Initiation of CS Subsystems "A" and "B" (Except Valve 1E21-F004A Does Not Receive an Open Signal and Valve 1E21-F015A Does Not Receive a Closed Signal); EDG's 1A, 1C, 1B; PSW P41-F310A,B,C,D Valves; Lock-out Auto-start of Cond. and Cond. Booster Pumps for 50 secs.; Trip of CRD Pump "B"; Trip of D/W Cooling System; Trip of T/B Chiller "B"; Trip of Cooling Tower ACB 135312.

Minimum Channel Requirements for System Initiation Capability:

In order to maintain initiation capability for Core Spray, the EDG's, the PSW turbine building isolation valves, and the above noted load shed and sequence logic on a RWL-Level 1 signal, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 & A2
A1 & B2
B1 & A2
B1 & B2

Elem. Ref.		
H-13380	H-17102	H-19826
H-13385	H-17109	H-19829
H-17047	H-17114	H-19830
H-17101	H-19823	

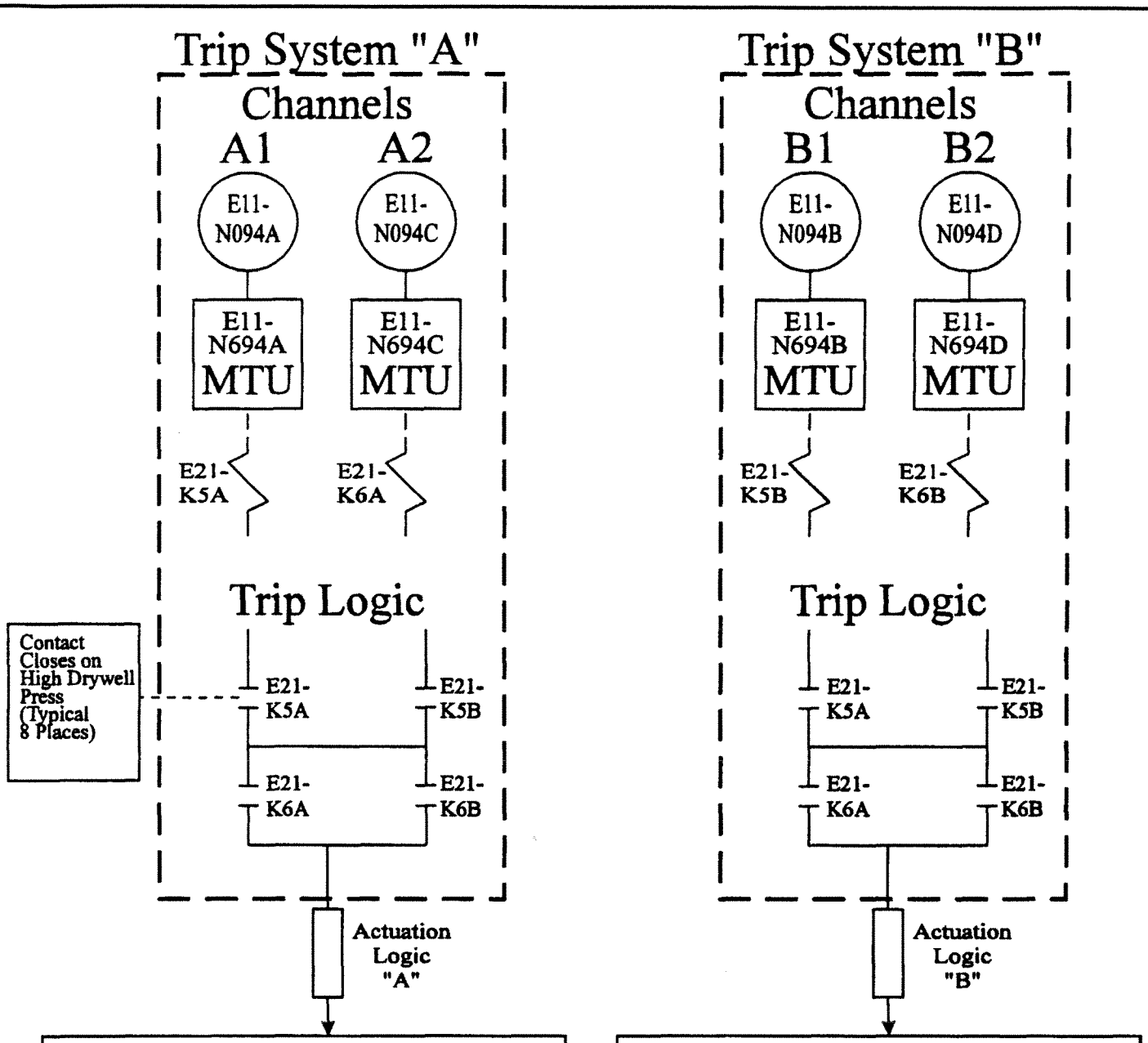
Prepared By: S. G. Gibson

Reviewed By: Kathryn Wilkins

LFD-1-ECCS-01

TS 3.3.5.1-1, Item 1.a
Core Spray System
RWL-Low Low Low, Level 1

TRM Rev. 6



Initiation of CS Subsystems "A" and "B" (Except Valve 1E21-F004B Does Not Receive an Open Signal and Valve 1E21-F015B Does Not Receive a Closed Signal); EDG's 1A, 1C, 1B; PSW P41-F310A,B,C,D Valves; Lock-out Auto-start of Cond. and Cond. Booster Pumps for 50 secs.; Trip of CRD Pump "A"; Trip of D/W Cooling System; Trip of T/B Chiller "A"; Trip of Cooling Tower ACB 135313.

Initiation of CS Subsystems "A" and "B" (Except Valve 1E21-F004A Does Not Receive an Open Signal and Valve 1E21-F015A Does Not Receive a Closed Signal); EDG's 1A, 1C, 1B; PSW P41-F310A,B,C,D Valves; Lock-out Auto-start of Cond. and Cond. Booster Pumps for 50 secs.; Trip of CRD Pump "B"; Trip of D/W Cooling System; Trip of T/B Chiller "B"; Trip of Cooling Tower ACB 135312.

Minimum Channel Requirements for System Initiation Capability:

In order to maintain initiation capability for Core Spray, the EDG'S, the PSW turbine building isolation valves,and the above noted load shed and sequence logic on a Drywell Pressure-High signal, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 & A2
A1 & B2
B1 & A2
B1 & B2

Elem. Ref.

H-13380 **H-17102** H-19826
H-13385 **H-17109** **H-19827**
H-17047 **H-17114** **H-19830**
H-17101 H-19823

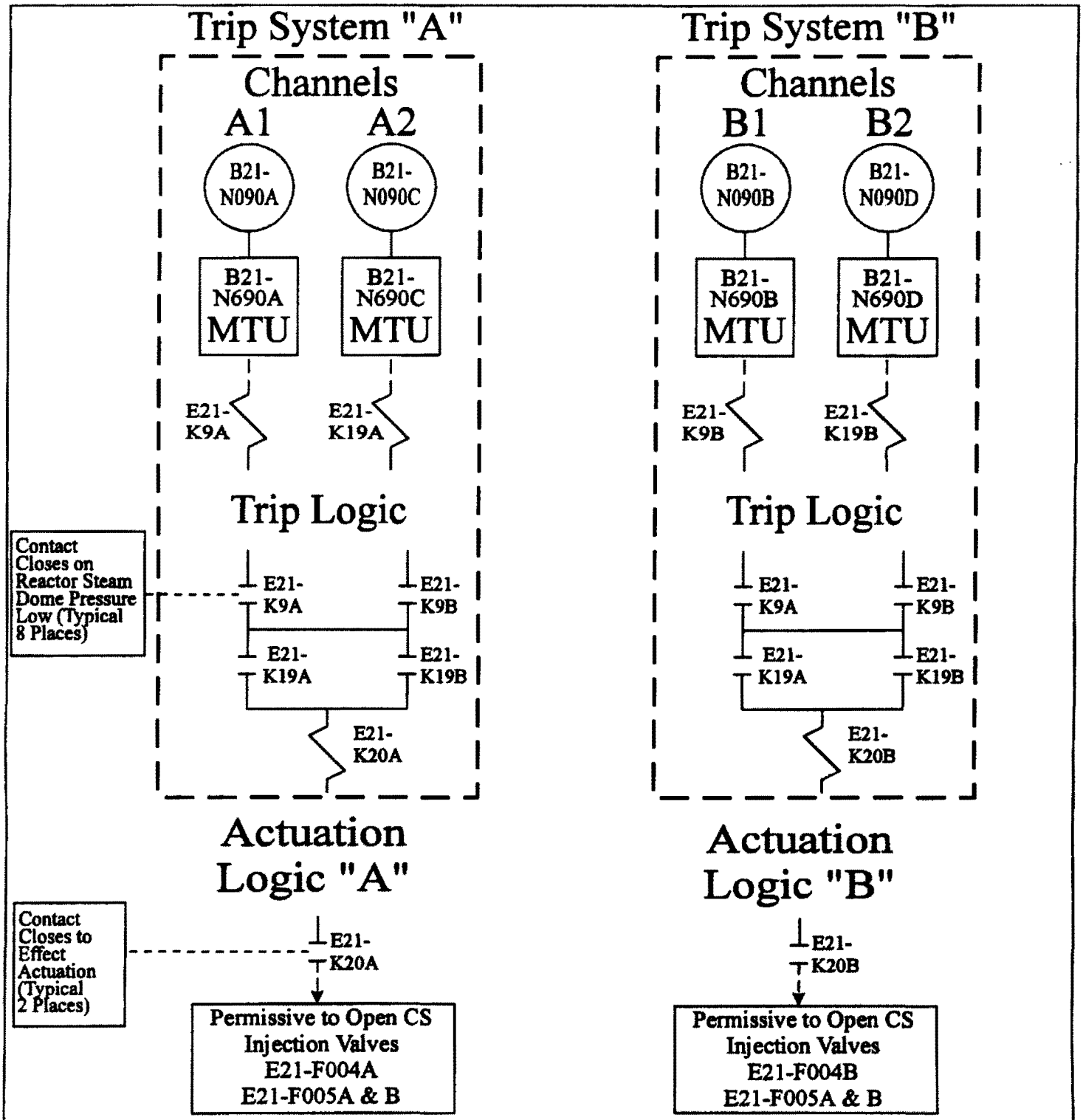
Prepared By: B.G. Thigpin

Reviewed By: S.B. Tipps (printed)

LFD-1-ECCS-02

TS 3.3.5.1-1, Item 1.b
Core Spray System
Drywell Pressure-High

TRM Rev. 93



Minimum Channel Requirements for System Initiation Capability:

In order to maintain Core Spray system initiation capability on a Reactor Steam Dome Pressure-Low signal, channels in one of the following combinations must be either operable or maintained in the tripped condition for modes 4 and 5 only. Credit cannot be taken for tripped channels in modes 1, 2, and 3.

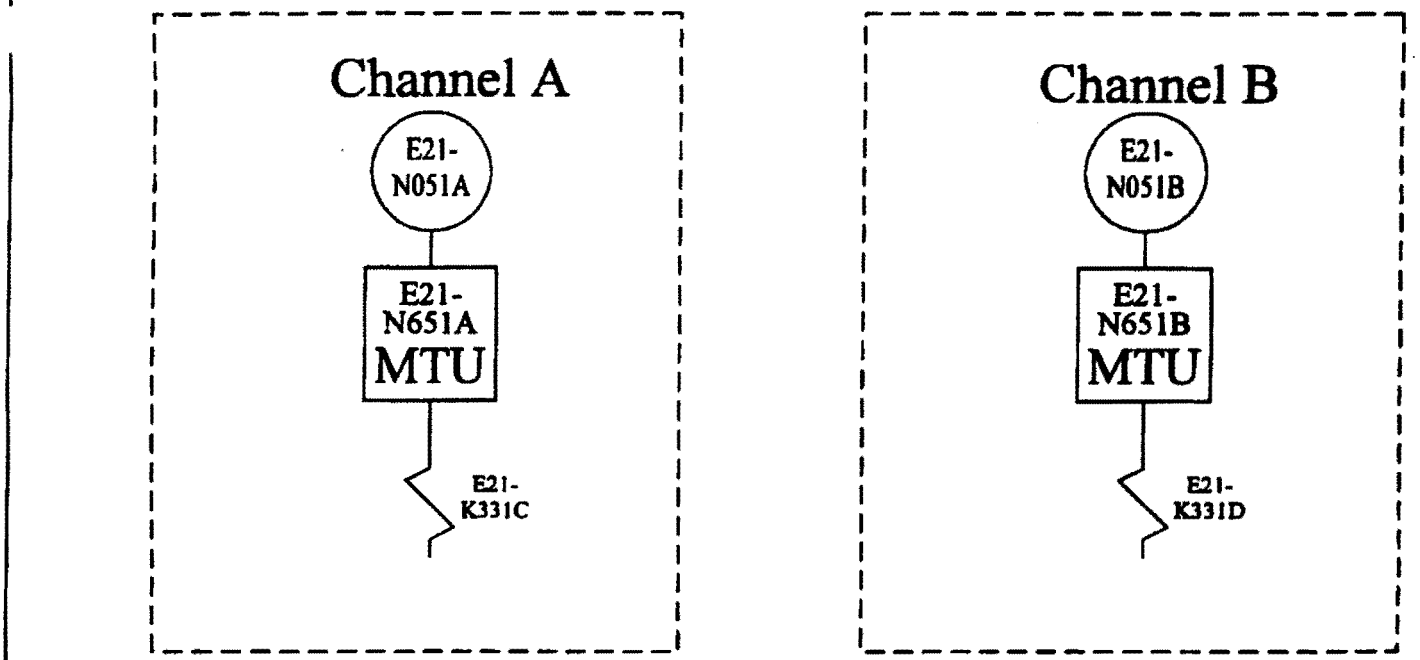
A1 & A2
A1 & B2
B1 & A2
B1 & B2

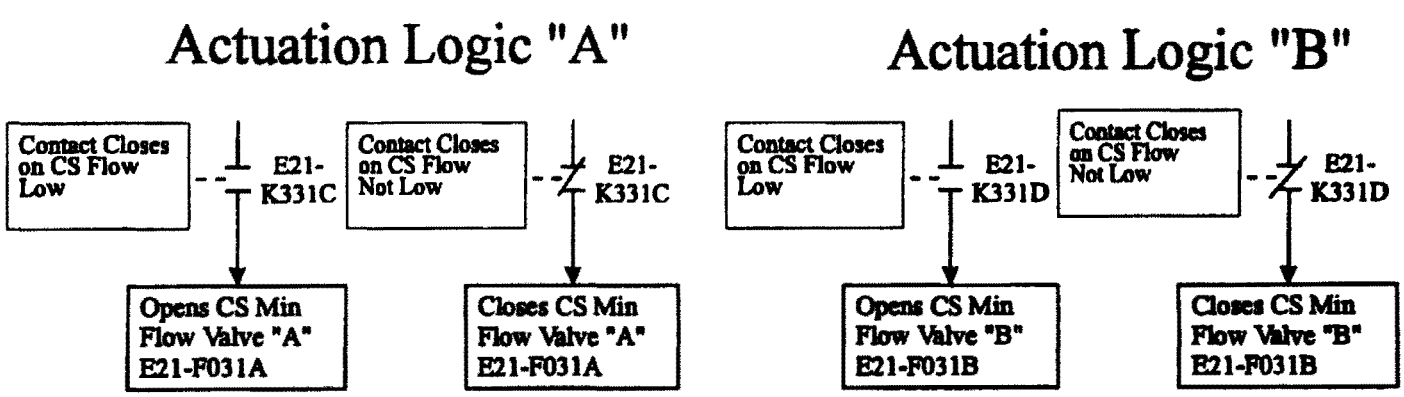
Elem. Ref.
H-17109
H-19827
H-19830

Prepared By: JSO

Reviewed By: TCK

LFD-1-ECCS-03
TS 3.3.5.1-1, Item 1.c
TS 3.3.5.2-1, Item 1.a
Core Spray System
Reactor Steam Dome Pressure-Low
Rev. 1 12/06/18





Minimum Channel Requirements for System Initiation Capabilities:

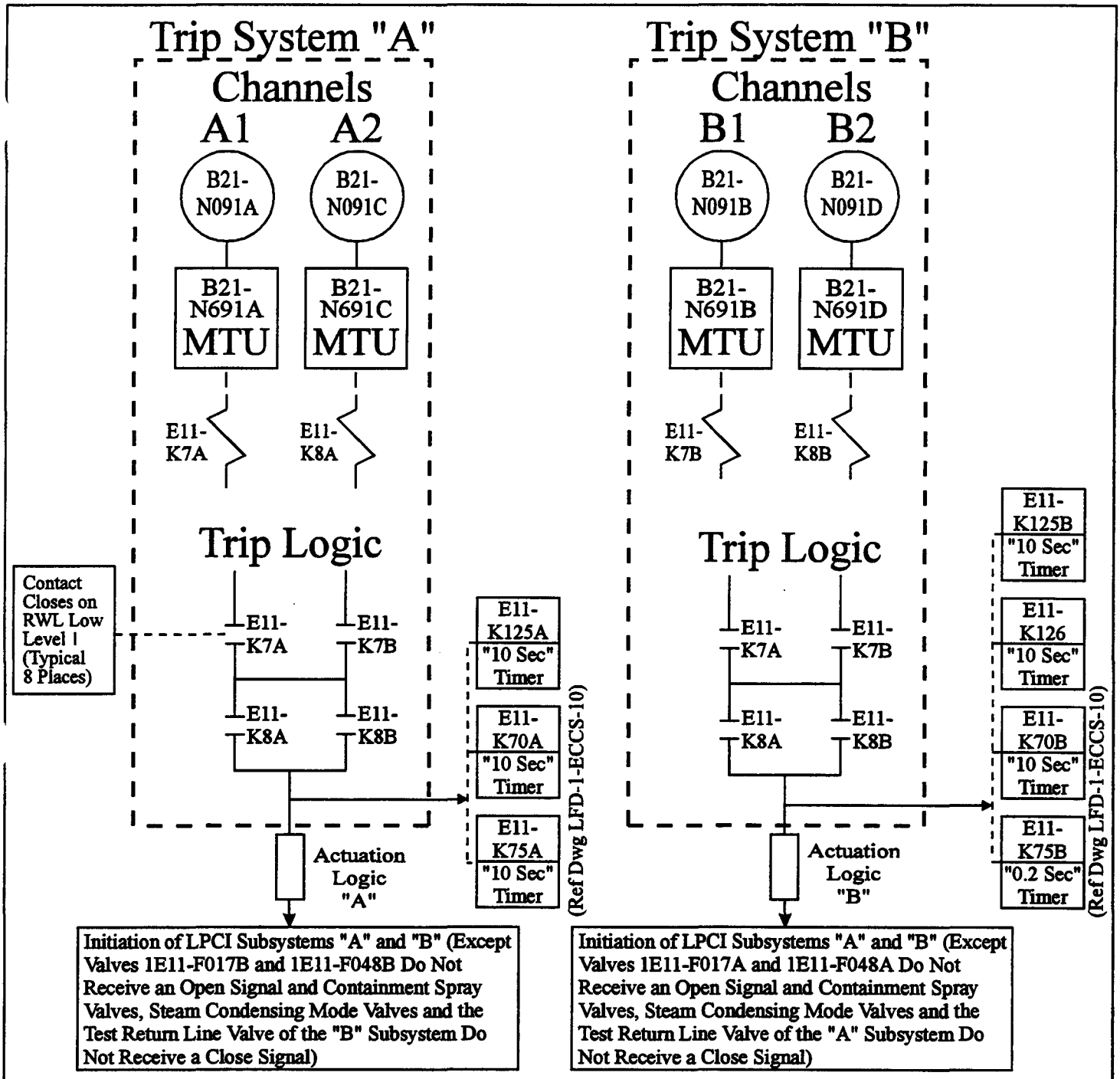
In order to maintain Core Spray system initiation capability with regard to minimum flow valve operability, channel A or B must be operable.

Elem. Ref.
H-19828
H-19831
H-17111

Prepared By: DPC

Reviewed By: TLL

LFD-1-ECCS-04
TS 3.3.5.1-1, Item 1.d
TS 3.3.5.2-1, Item 1.b
Core Spray System
Core Spray Pump Discharge Flow-Low
Rev. 1 12/06/18



Minimum Channel Requirements for System Initiation Capability:

In order to maintain initiation capability for the LPCI system on a RWL-Level 1 signal, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 & A2
A1 & B2
B1 & A2
B1 & B2

Elem. Ref.	
H-17763	H-19826
H-17766	H-19829
H-19823	H-19830

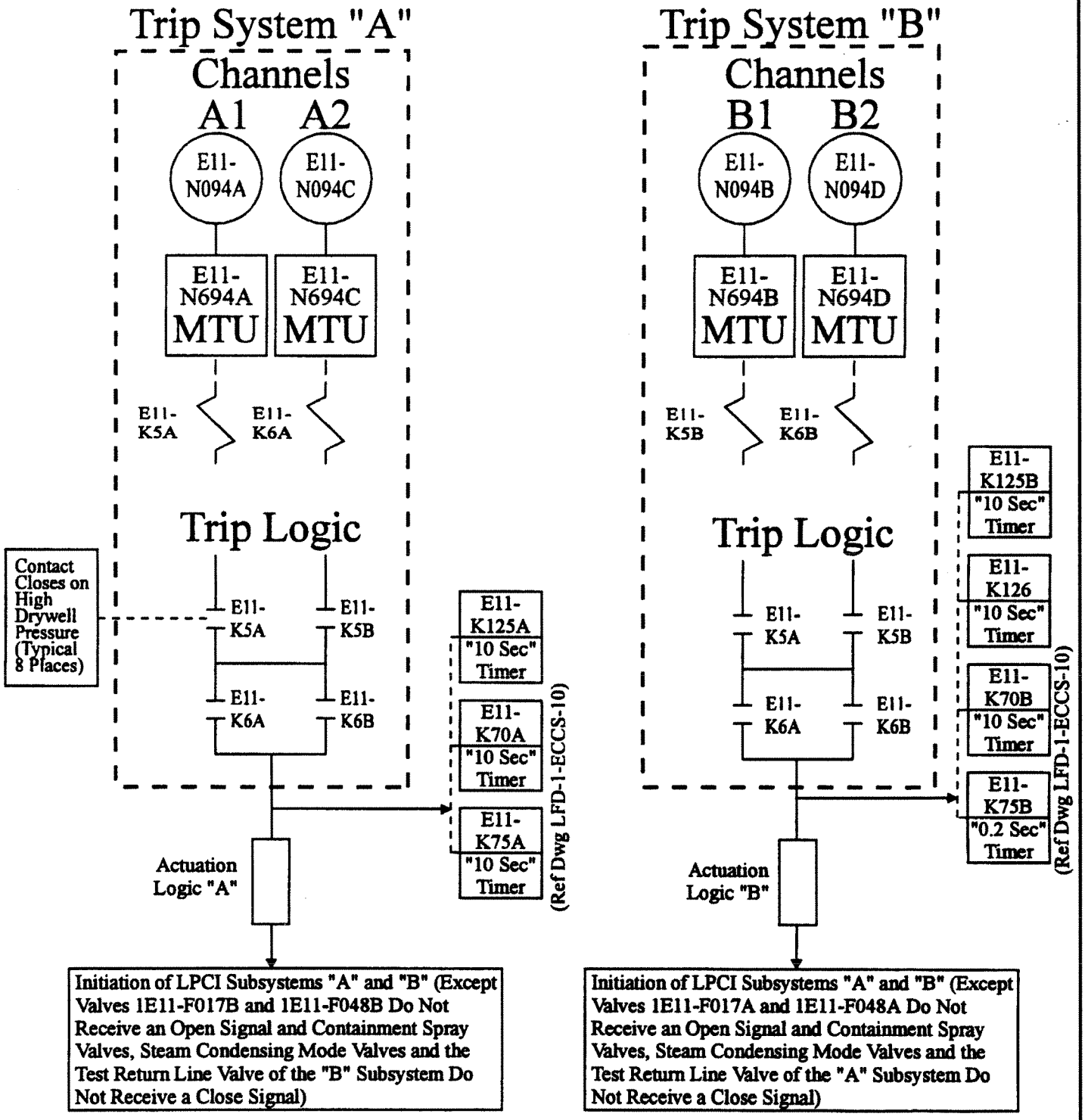
Prepared By: [signature]

Reviewed By: [signature]

LFD-1-ECCS-05

TS 3.3.5.1-1, Item 2.a
LPCI System
RWL- Low Low Low, Level 1

TRM Rev. 6



Minimum Channel Requirements for System Initiation Capability:

In order to maintain initiation capability for the LPCI system on a Drywell Pressure-High signal, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 & A2
A1 & B2
B1 & A2
B1 & B2

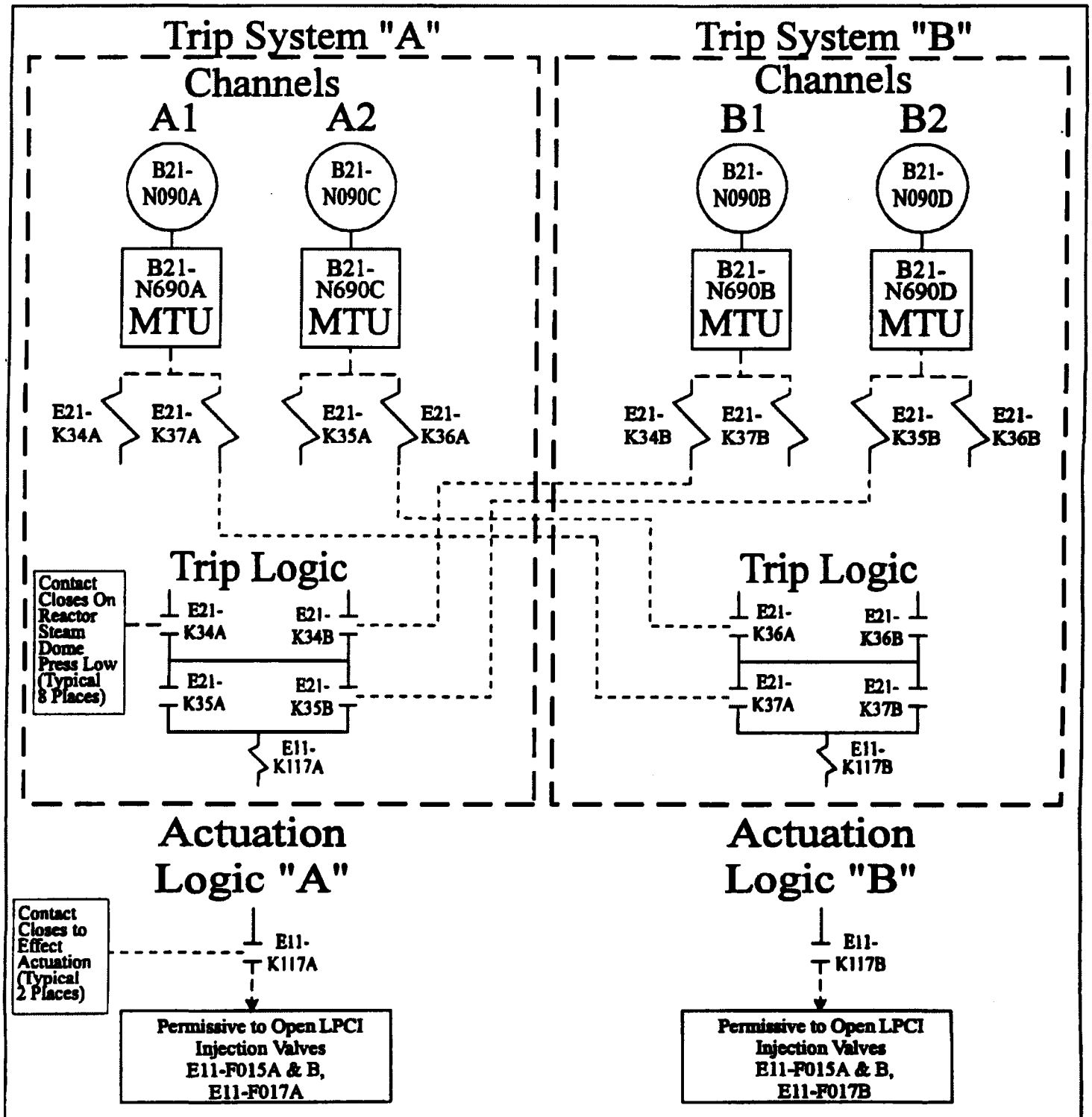
Elem. Ref.
H-17763 H-19827
H-17766 H-19830
H-19823
H-19826

Prepared By: B.G. Thigpin
Reviewed By: S.B. Tipps (printed) (signature)

LFD-1-ECCS-06

TS 3.3.5.1-1, Item 2.b
LPCI System
Drywell Pressure-High

TRM Rev. 93



Minimum Channel Requirements for System Initiation Capability:

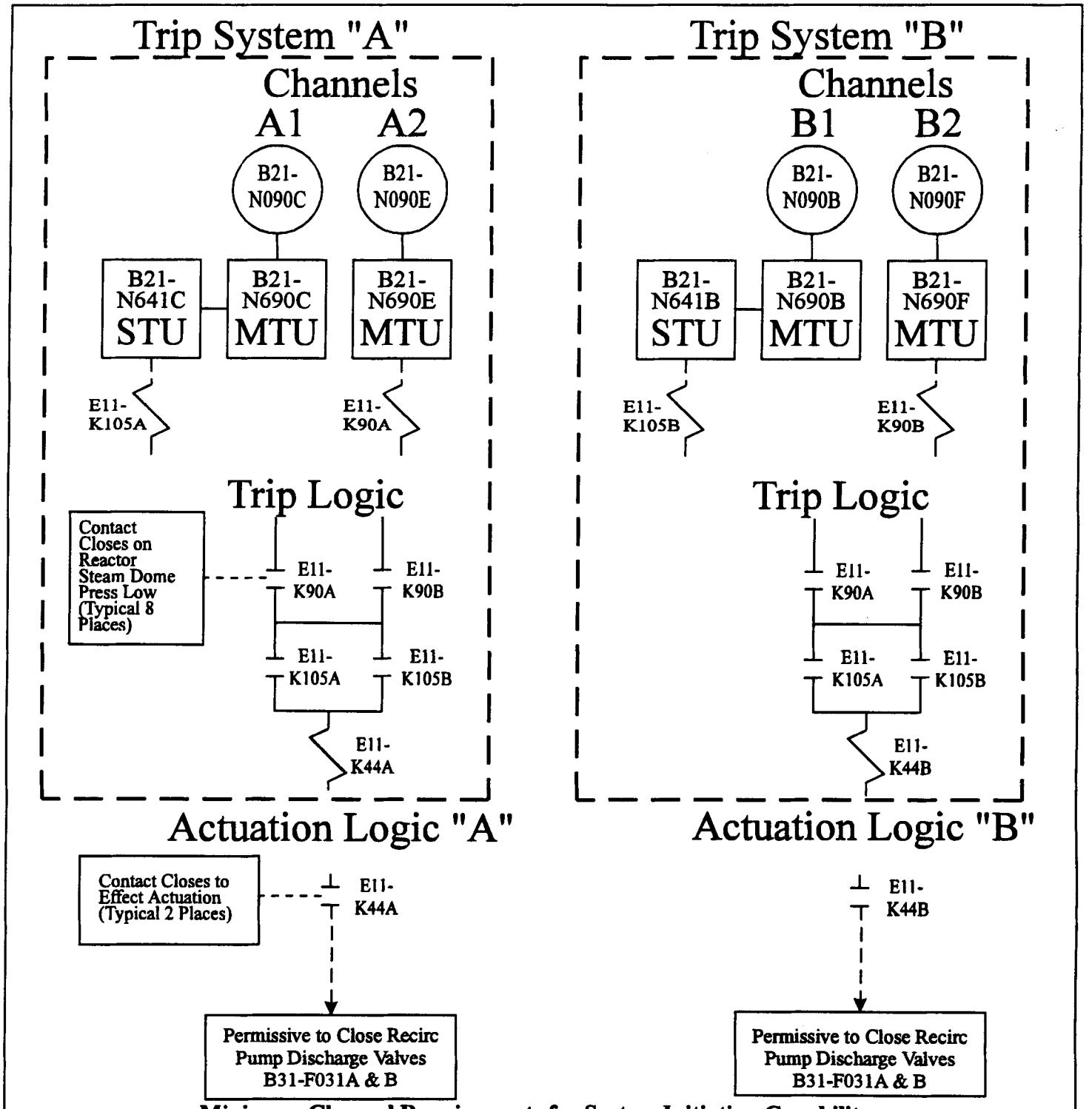
In order to maintain LPCI system initiation capability on a Reactor Steam Dome Pressure-Low signal, channels in one of the following combinations must be either operable or maintained in the tripped condition for modes 4 and 5. Credit cannot be taken for tripped channels in modes 1, 2, and 3.

A1 & A2
A1 & B2
B1 & A2
B1 & B2

Elem. Ref.
H-19827
H-19830
H-17109
H-17763
H-17766

Prepared By: JDB
Reviewed By: JLF

LFD-1-ECCS-07
TS 3.3.5.1-1, Item 2.c
TS 3.3.5.2-1, Item 2.a
LPCI System
Reactor Steam Dome Pressure-Low
Rev. 1 12/06/18



Minimum Channel Requirements for System Initiation Capability:

In order for a Recirc Pump Disch Valve close permissive to be capable of initiating on a Reactor Steam Dome Pressure Low signal, channels in one of the following combinations must be operable.

A1 & A2
A1 & B1
B2 & A2
B1 & B2

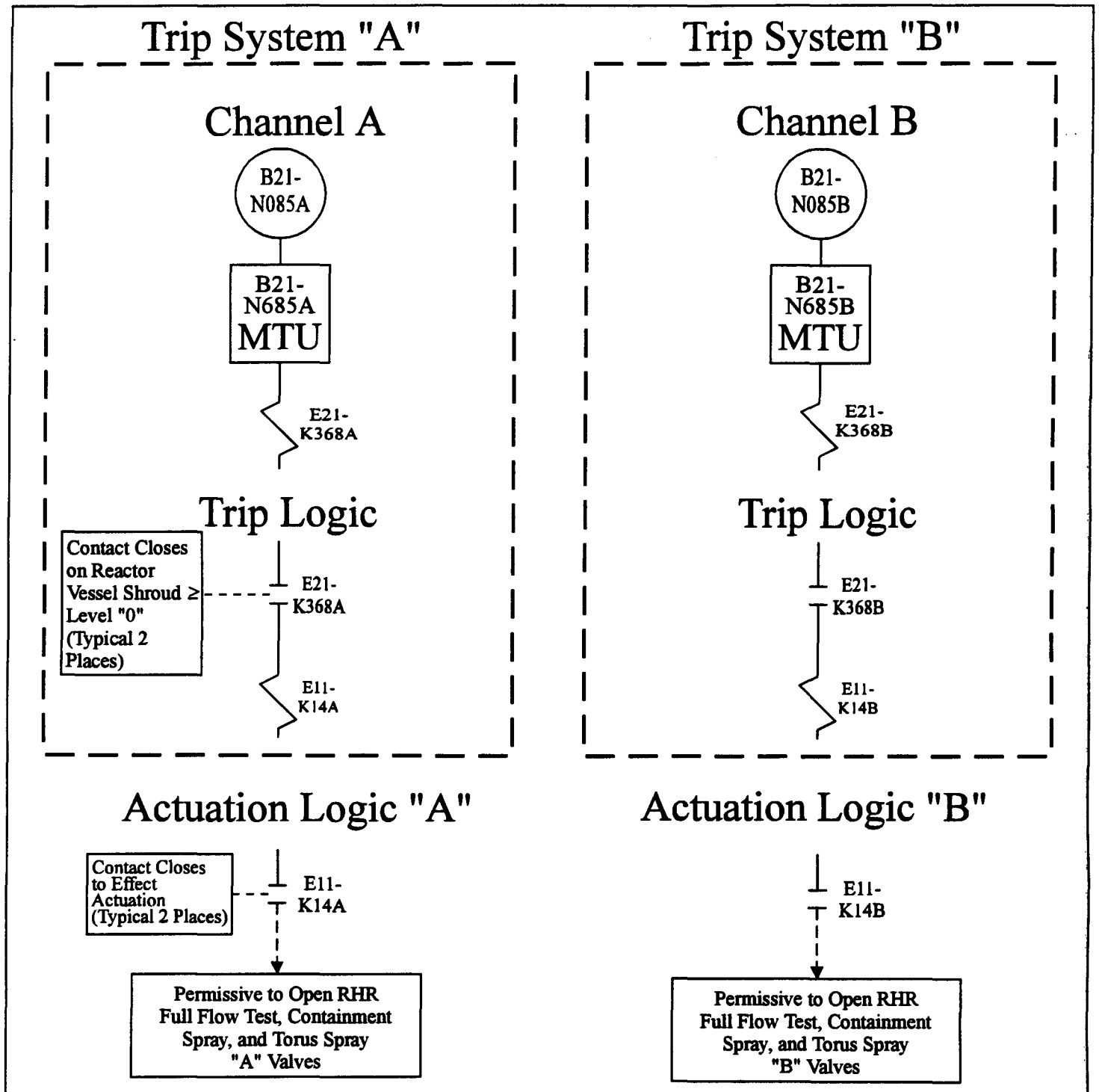
Elem. Ref.
H-19827
H-19830
H-17765
H-17768

Prepared By: DSB
Reviewed By: DLR

LFD-1-ECCS-08

TS 3.3.5.1-1, Item 2.d
LPCI System
Reactor Steam Dome Pressure-Low
Recirc Disch Valve Permissive

Rev. 0 11/16/94



Minimum Channel Requirements for System Initiation Capability:

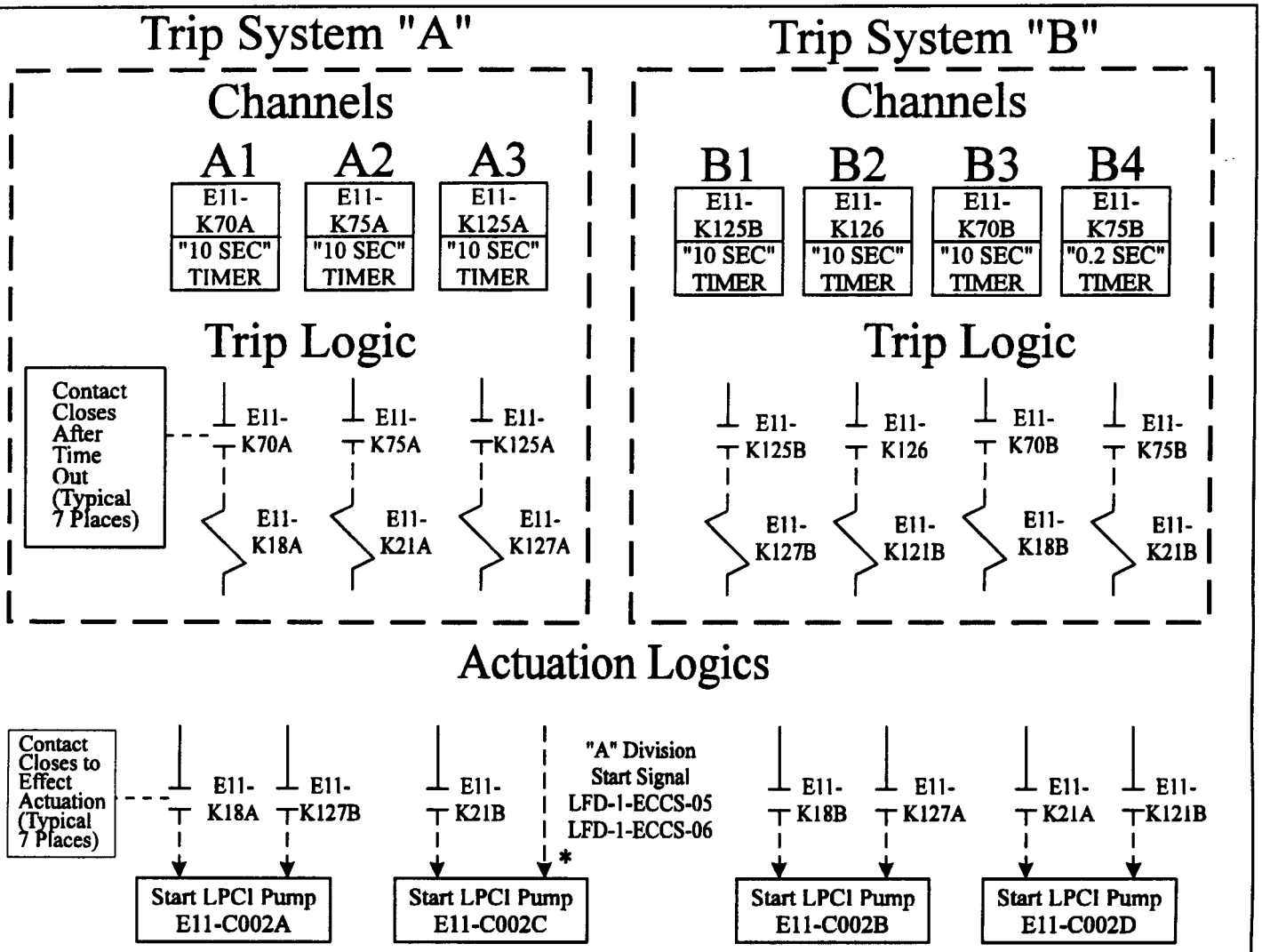
In order to maintain LPCI mode initiation capability (i.e., automatically securing other modes of RHR) with Reactor Water Level at or below Level-0, at least one channel must be operable or maintained in the tripped condition.

Elem. Ref.
H-19823
H-19826
H-17763
H-17766
H-17772
H-17774

Prepared By: JSB

Reviewed By: SDR

LFD-1-ECCS-09	
TS 3.3.5.1-1, Item 2.e LPCI System Reactor Vessel Shroud Level-0	
Rev. 0	11/16/94



* No timer is associated with the "A" division start signal for pump E11-C002C, consequently, even if channel "B4" is inoperable, pump E11-C002C is still capable of being started provided the "A" division initiation logic is operable.

Minimum Channel Requirements for System Initiation Capability:

In order to maintain LPCI initiation capability with regard to the LPCI Pump Start Timers, one of the following combinations of channels is required to be operable:

(A1 or B1) and (* or B4)

or

(A2 or B2) and (A3 or B3)

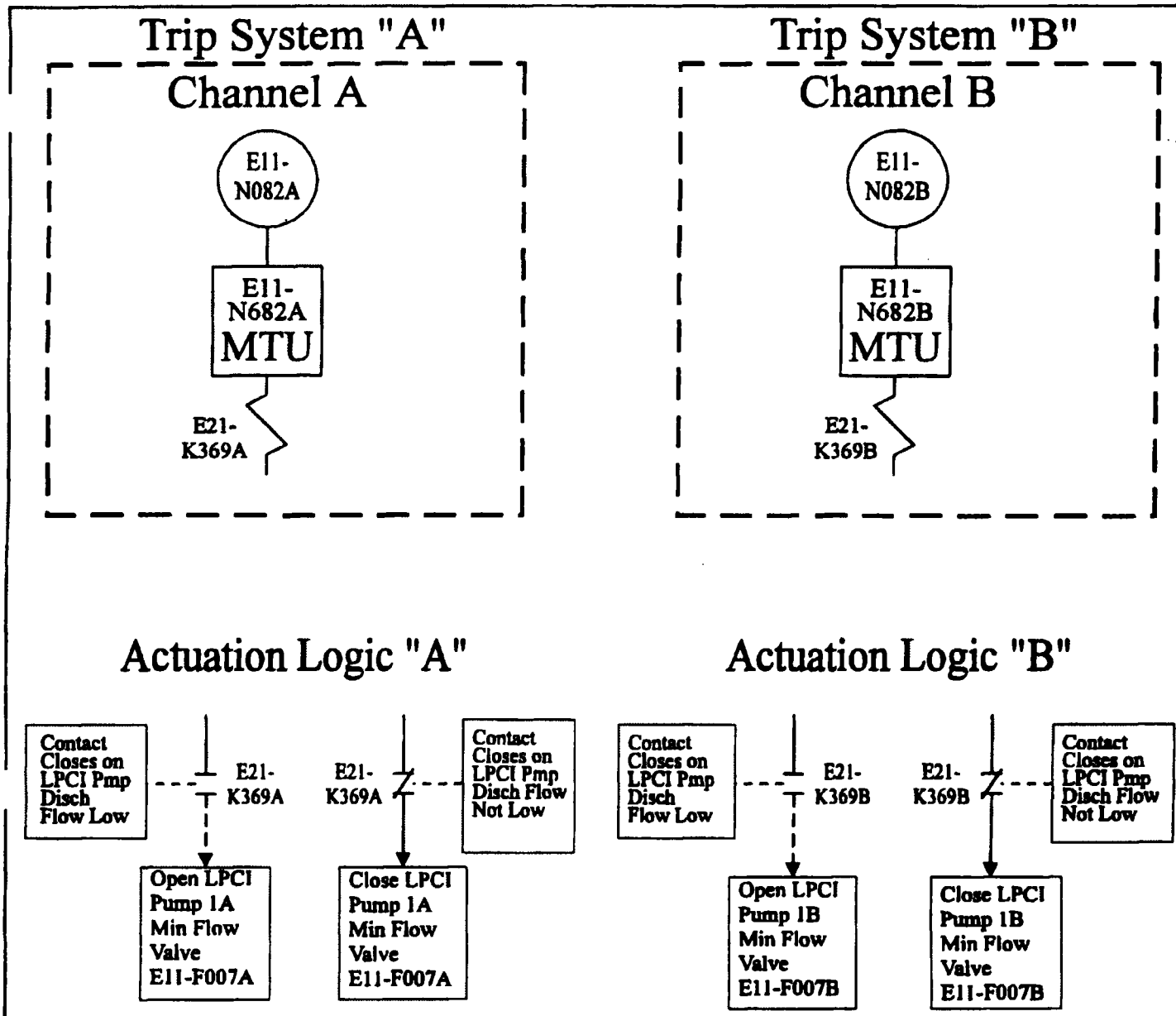
It is noted that when a timer fails such that it would actuate faster than required, the possibility exists of the pump associated with the failed timer overloading the associated Emergency Diesel Generator thereby affecting two low pressure ECCS pumps unless the pump is prevented from starting.

Elem. Ref.
H-17764
H-17765
H-17767
H-17768
H-17782

Prepared By: J. G. Brunner

Reviewed By: M. Wagner

LFD-1-ECCS-10	
TS 3.3.5.1-1, Item 2.f LPCI System LPCI Pump Start-Time Delay Relay	
Rev. 0	3/30/95



Minimum Channel Requirements for System Initiation Capability:

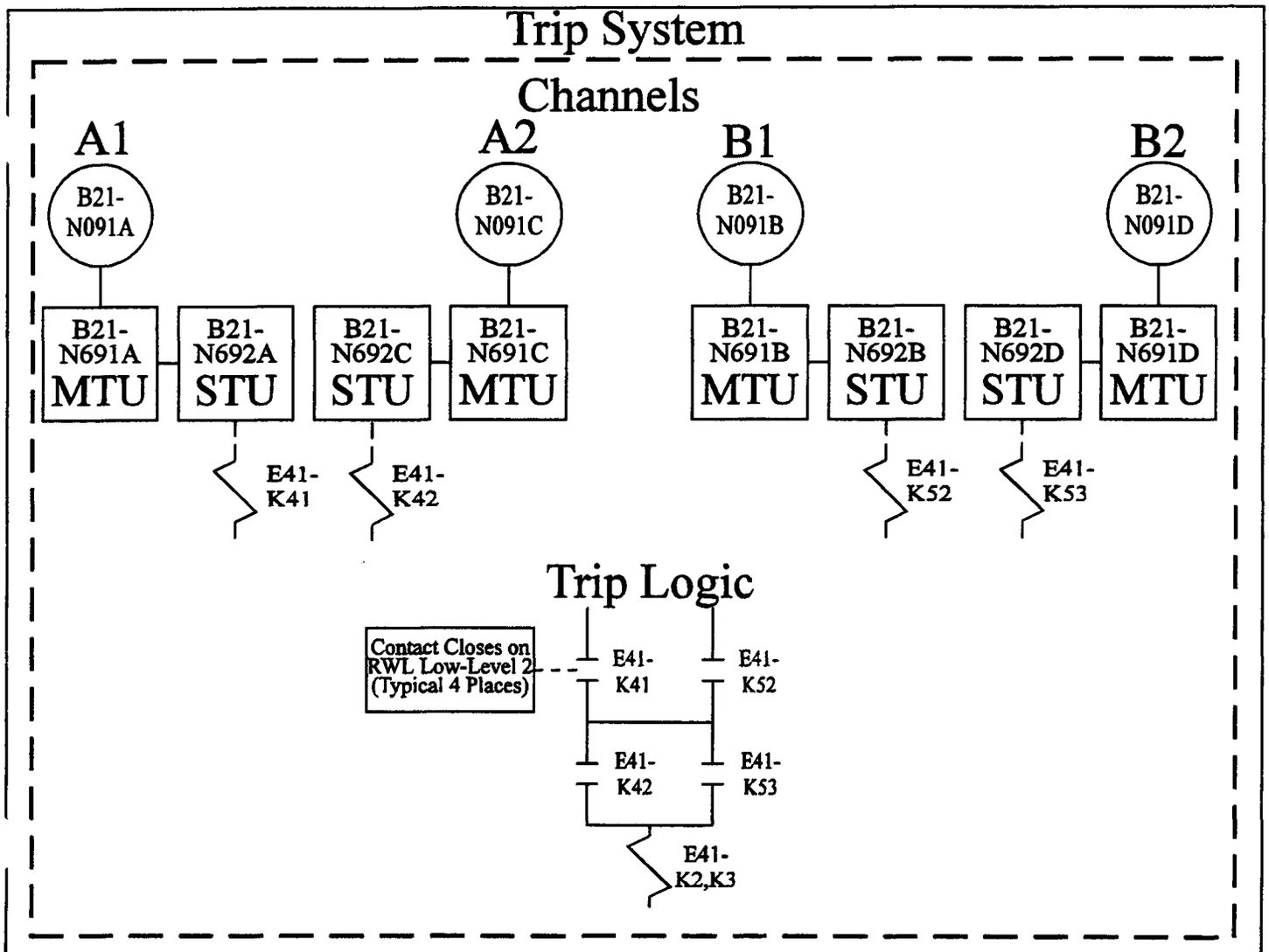
In order to maintain LPCI initiation capability regarding minimum flow protection, at least one of the two channels must be operable.

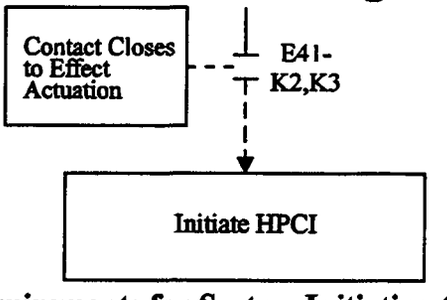
Elem. Ref.
H-19823
H-19826
H-17763
H-17766
H-17773
H-17775

Prepared By: DPC

Reviewed By: TKR

LFD-1-ECCS-11
TS 3.3.5.1-1, Item 2.g
TS 3.3.5.2-1, Item 2.b
LPCI System
LPCI Pump Discharge Flow-Low (Bypass)
Rev. 1 12/06/18





Minimum Channel Requirements for System Initiation Capability:

In order to maintain HPCI Initiation capability on Reactor Water Low Level-2, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 & A2
A1 & B2
B1 & A2
B1 & B2

Elem. Ref.	
H-17159	H-19826
H-17160	H-19829
H-19823	H-19830

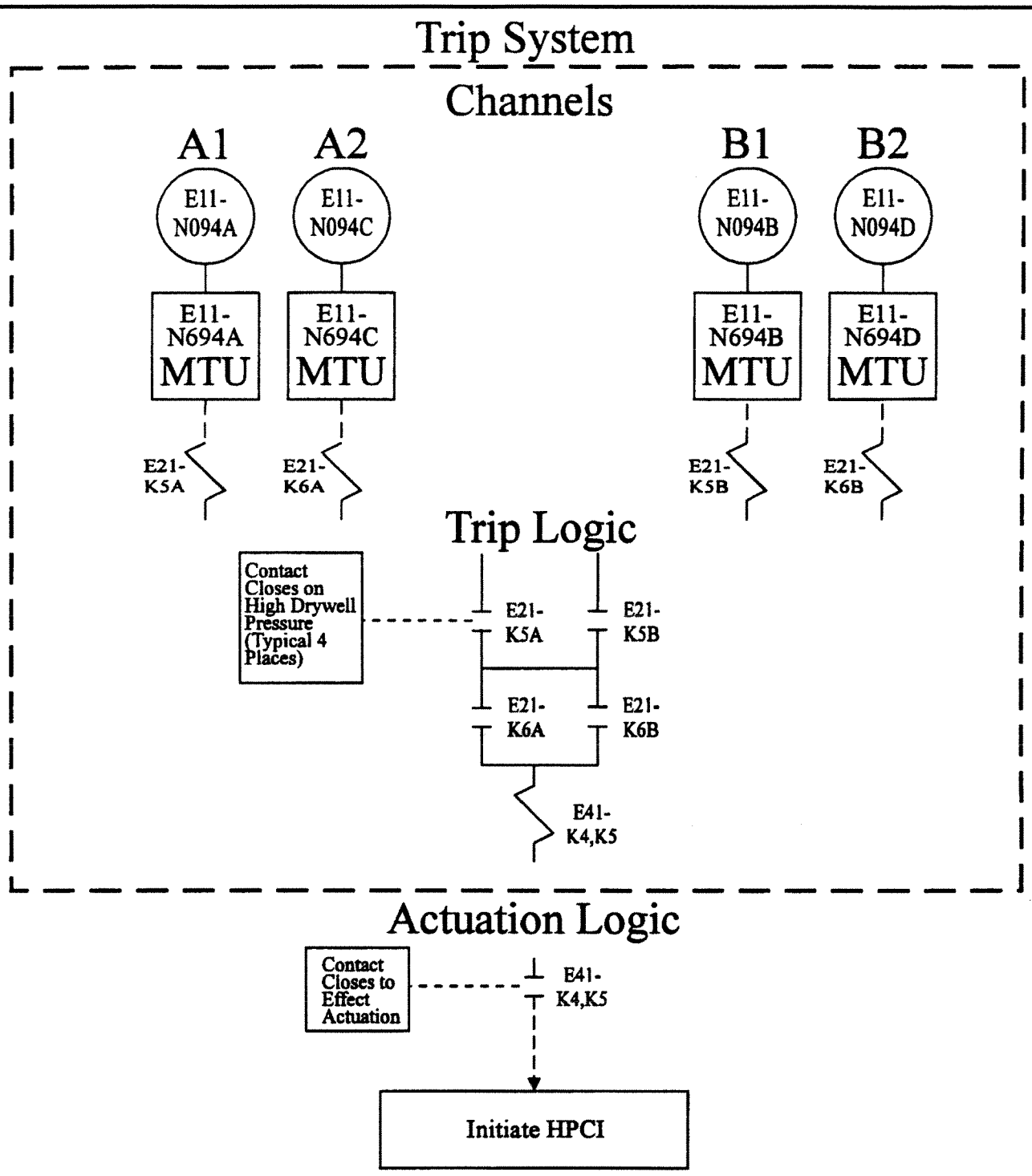
Prepared By: T. G. Brennan

Reviewed By: Kathryn Williams

LFD-1-ECCS-12

TS 3.3.5.1-1, Item 3.a
HPCI System
RWL-Low Low, Level 2

TRM Rev. 6



Minimum Channel Requirement for System Initiaton Capability:

In order to maintain HPCI initiation capability on High Drywell Pressure, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 & A2
A1 & B2
B1 & A2
B1 & B2

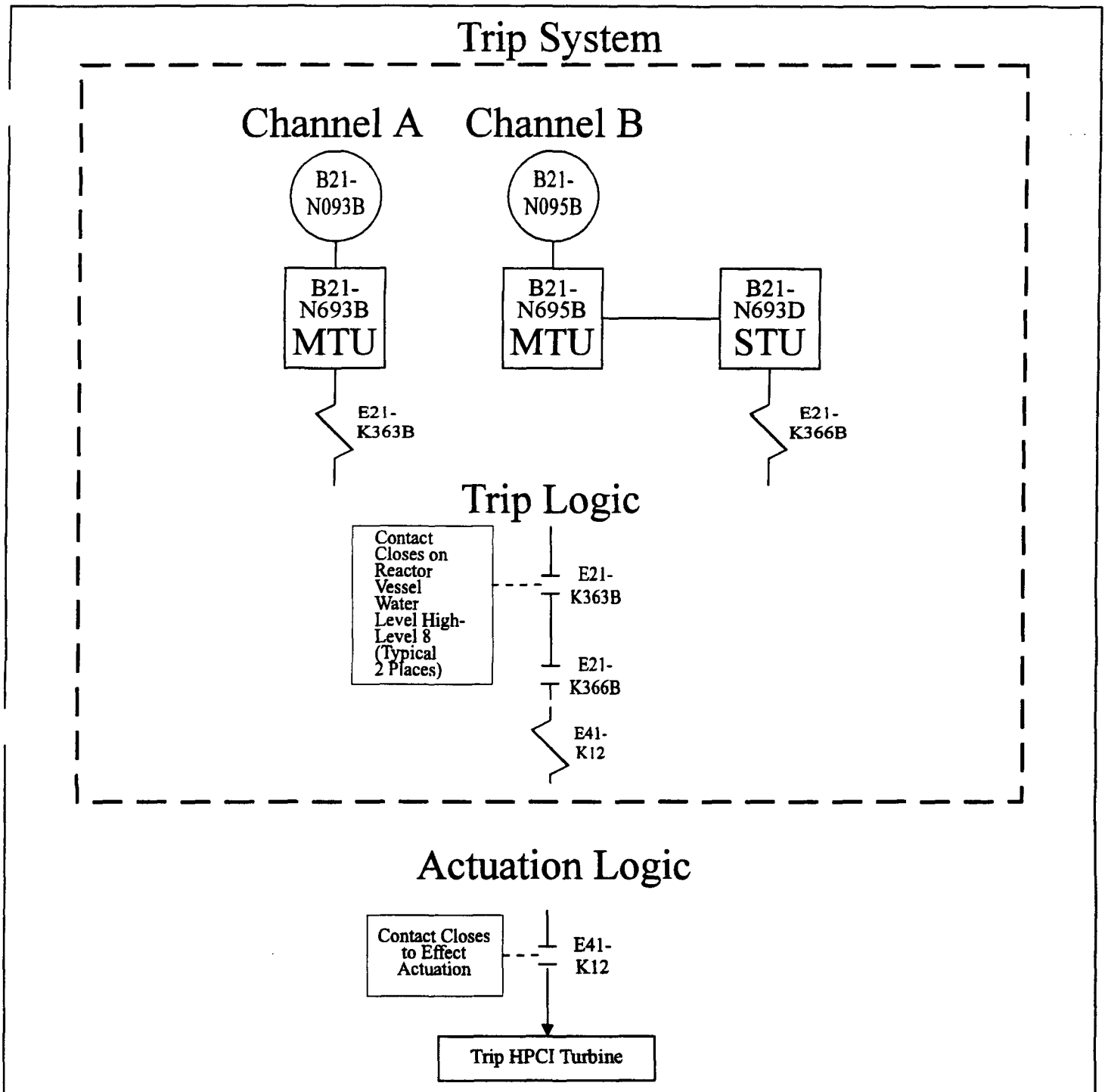
Elem. Ref.
H-17109 H-19827
H-17159 H-19830
H-19823
H-19826

Prepared By: B.G. Thigpin
Reviewed By: S.B. Tipps (printed) (signature)

LFD-1-ECCS-13

TS 3.3.5.1-1, Item 3.b
HPCI Initiation
Drywell Pressure-High

TRM Rev. 93



Minimum Channel Requirements for System Initiation Capability:

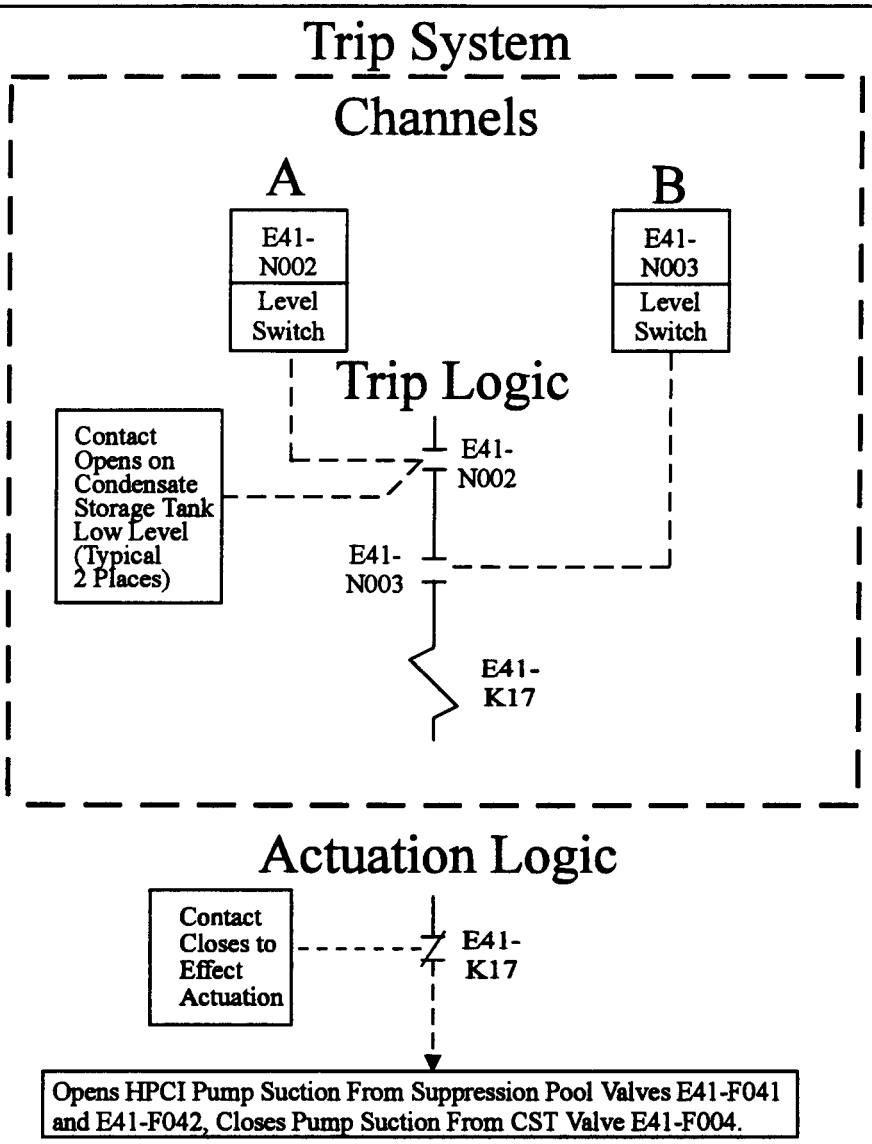
In order to ensure a HPCI turbine trip on a RPV Water Level High-Level 8 signal, both channels must be operable.

Elem. Ref.
H-17159
H-17160
H-19826

Prepared By: DPC

Reviewed By:

LFD-1-ECCS-14	
TS 3.3.5.1-1, Item 3.c HPCI System Reactor Vessel Water Level-High, Level 8	
Rev. 0	11/16/94



Minimum Channel Requirements for System Initiation Capability:

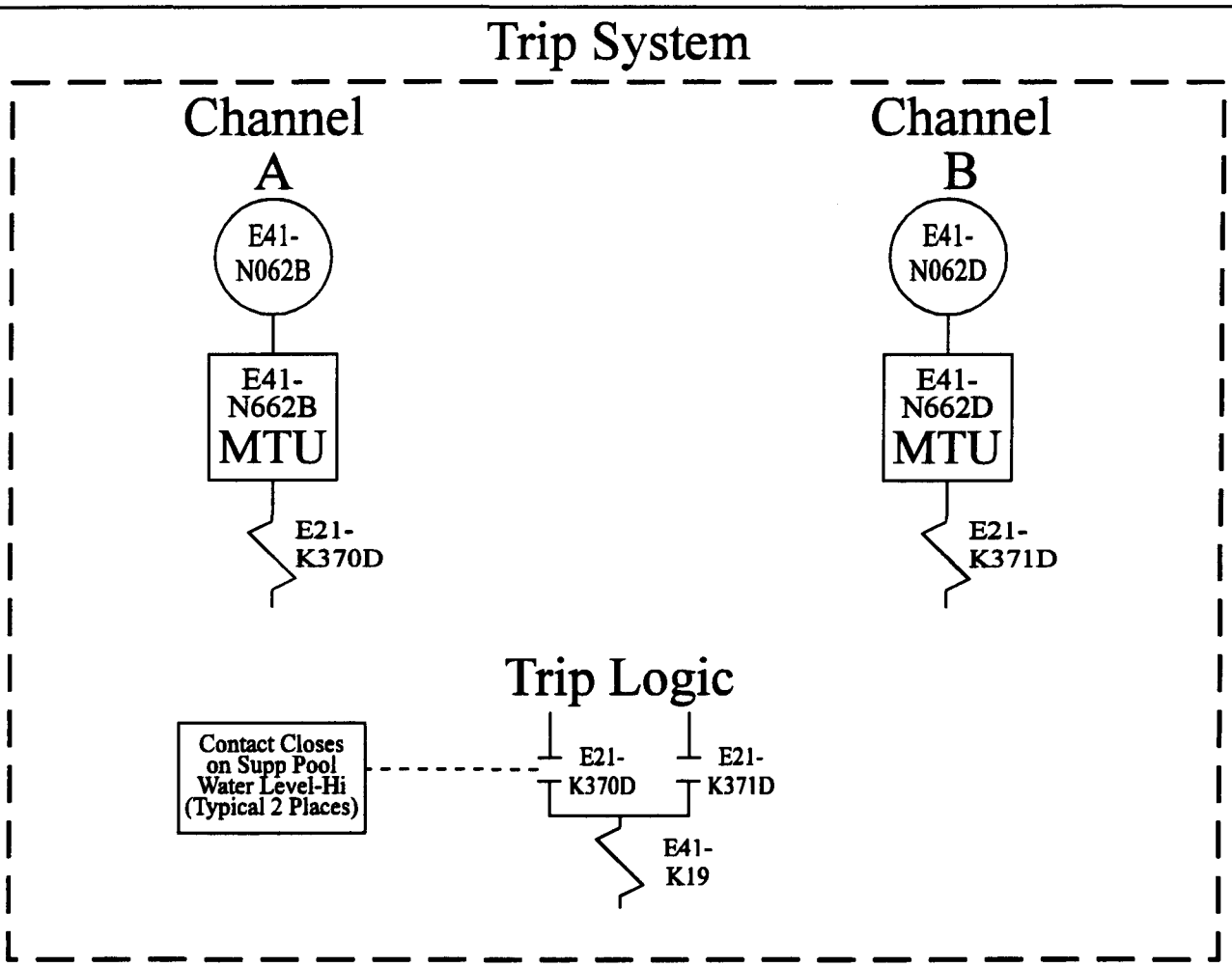
In order to maintain the ability to automatically transfer the HPCI pump suction from the CST to the Suppression Pool on a Low Condensate Storage Tank Water Level signal, one of the channels must be either operable or maintained in the tripped condition.

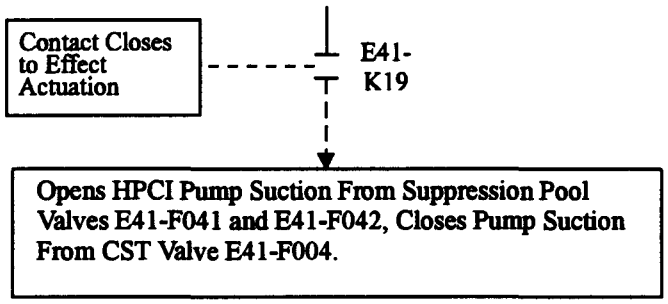
Elem. Ref.
H-17159
H-17163
H-17164

Prepared By: JDB

Reviewed By: [illegible]

LFD-1-ECCS-15	
TS 3.3.5.1-1, Item 3.d HPCI System Condensate Storage Tank Level-Low	
Rev. 0	11/16/94





Minimum Channel Requirements for System Initiation Capability:

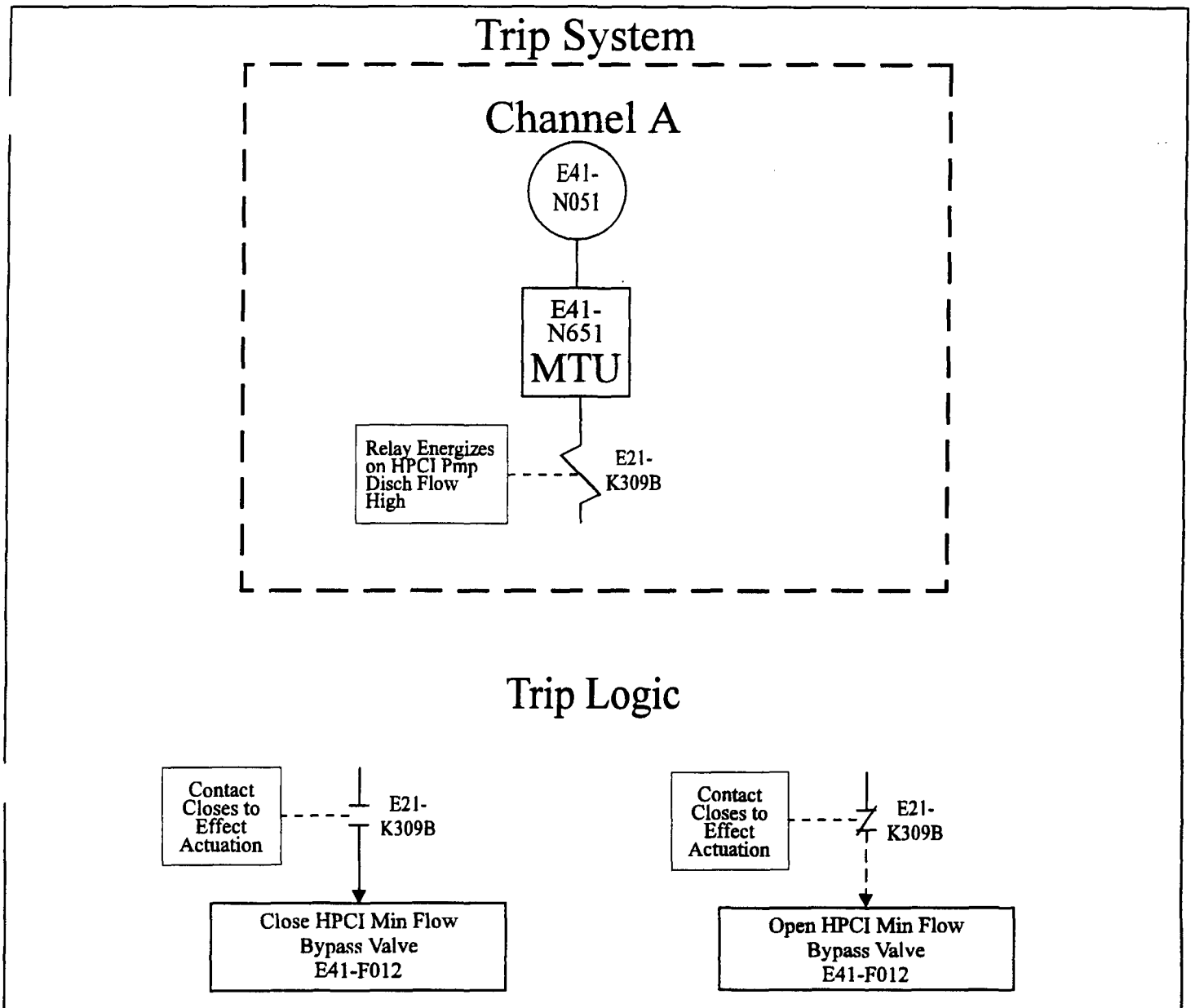
In order to maintain the ability to automatically transfer the HPCI pump suction from the CST to the Suppression Pool on a Suppression Pool Water Level-High signal, at least one channel must be operable or maintained in the tripped condition.

Elem. Ref.
H-19832
H-17159
H-17163
H-17164

Prepared By: JSB

Reviewed By: CSR

LFD-1-ECCS-16	
TS 3.3.5.1-1, Item 3.e HPCI System Suppression Pool Water Level-High	
Rev. 0	11/16/94



Minimum Channel Requirements for System Initiation Capability:

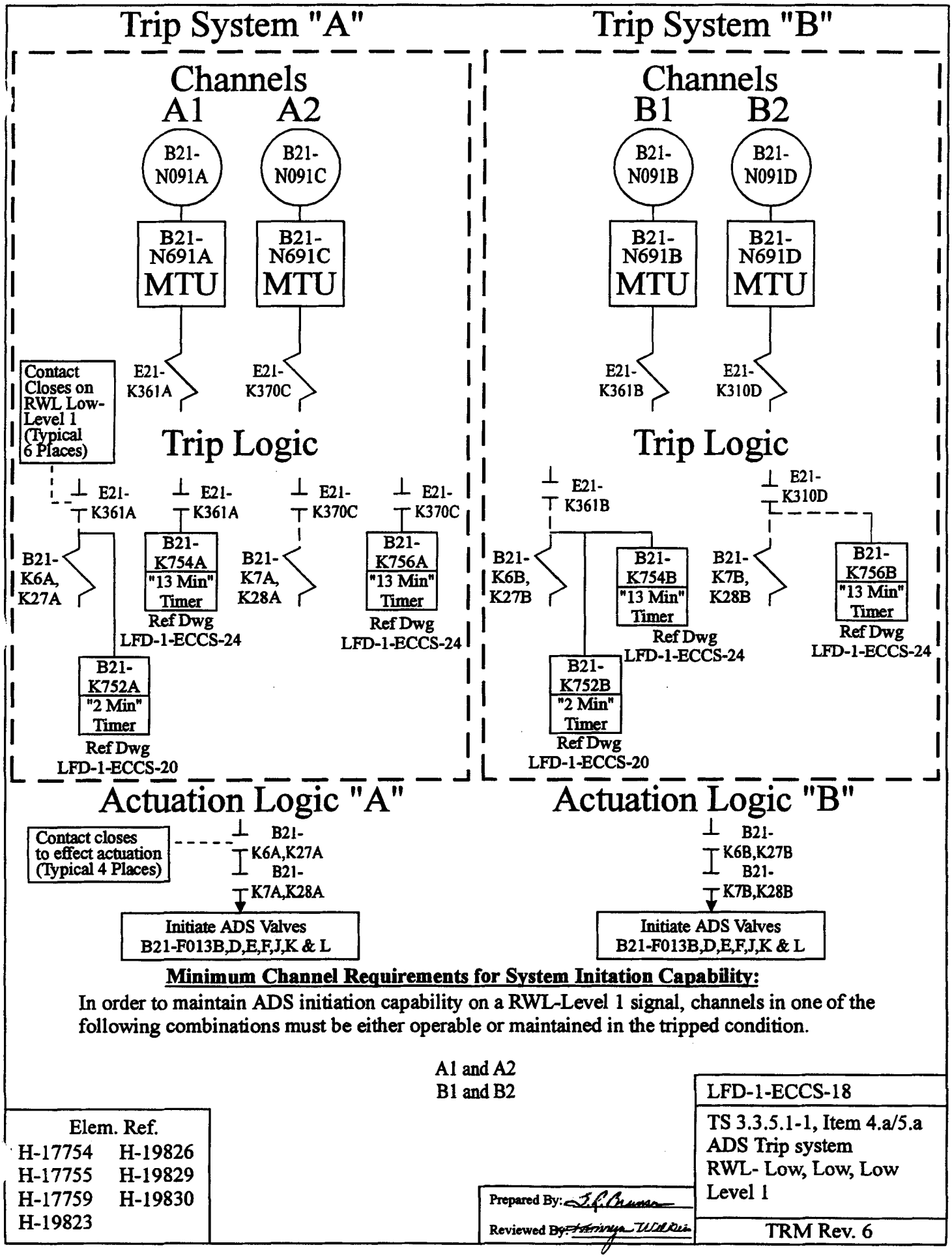
In order to maintain HPCI Initiation capability regarding minimum flow protection, this channel must be operable.

Elem. Ref.
H-19824
H-17159
H-17163

Prepared By: DFC

Reviewed By: JOK

LFD-1-ECCS-17	
TS 3.3.5.1-1, Item 3.f HPCI System HPCI Pump Disch Flow-Low (Bypass)	
Rev. 0	11/16/94



Minimum Channel Requirements for System Initation Capability:

In order to maintain ADS initiation capability on a RWL-Level 1 signal, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 and A2
B1 and B2

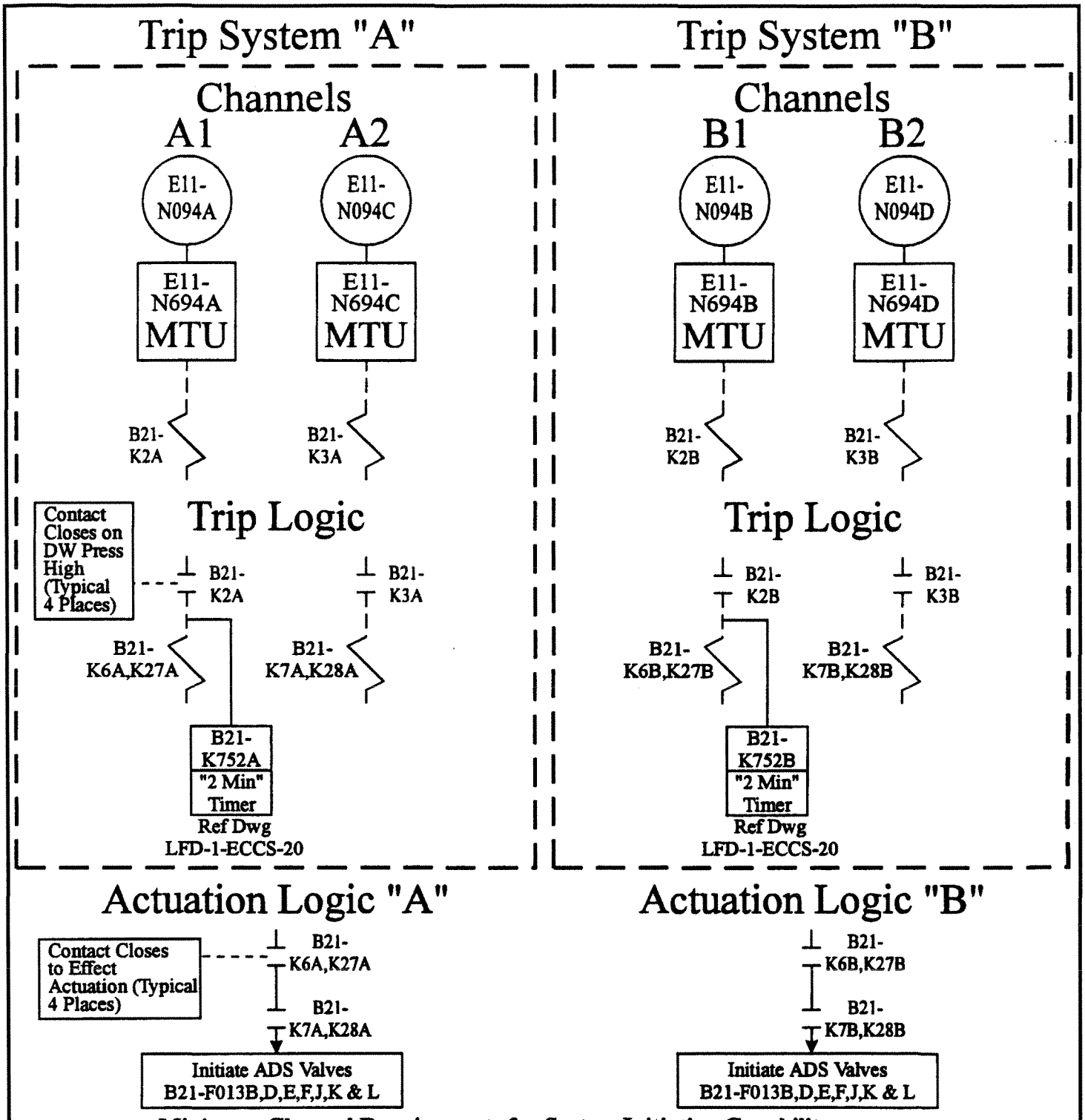
Elem. Ref.	
H-17754	H-19826
H-17755	H-19829
H-17759	H-19830
H-19823	

Prepared By: [signature]
Reviewed By: [signature]

LFD-1-ECCS-18

TS 3.3.5.1-1, Item 4.a/5.a
ADS Trip system
RWL- Low, Low, Low Level 1

TRM Rev. 6



Minimum Channel Requirements for System Initiation Capability:

In order to maintain ADS initiation on a Drywell Pressure - High signal, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 and A2
B1 and B2

Elem. Ref.

H-17754 H-19827
H-17755 H-19830
H-19823
H-19826

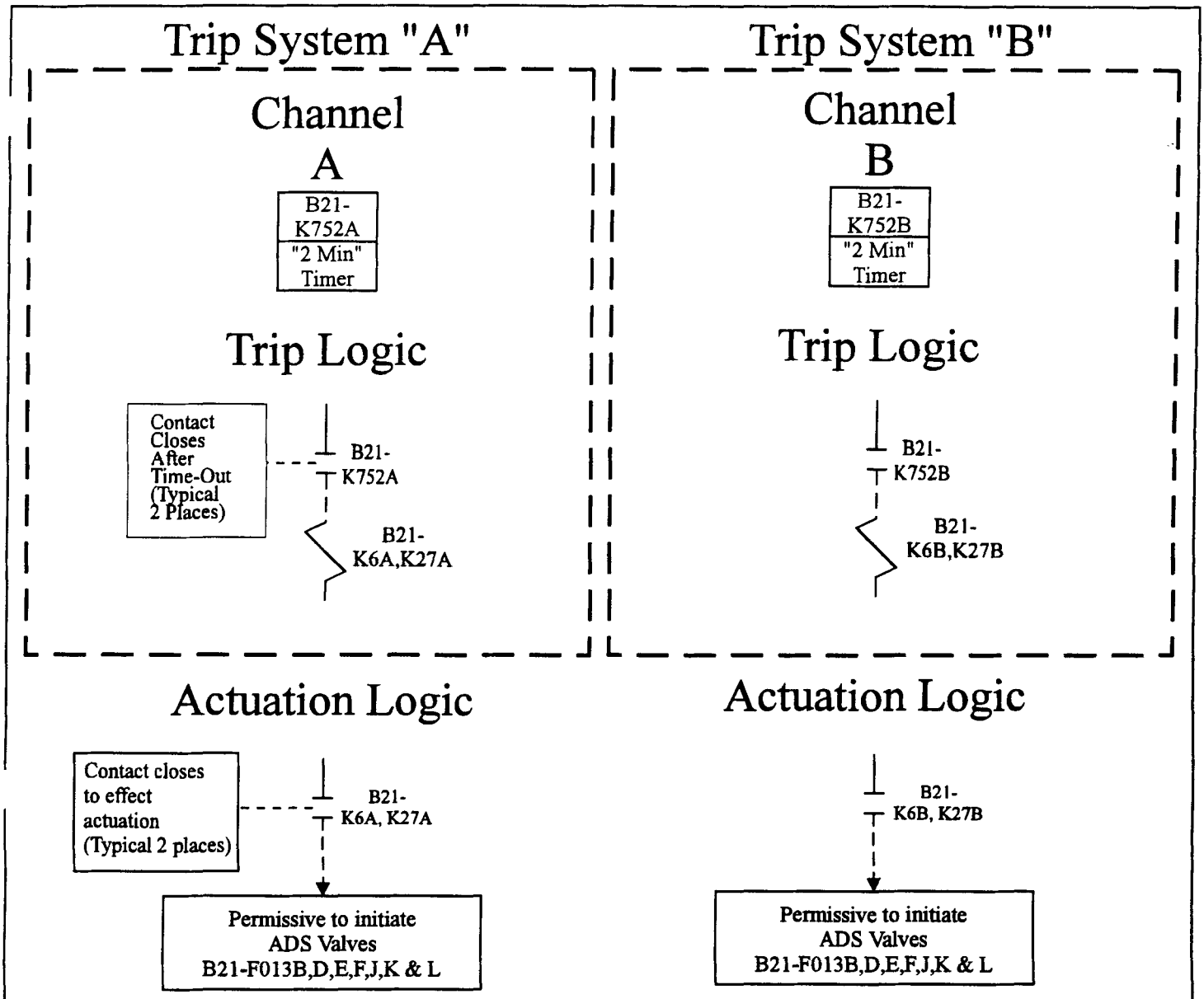
Prepared By: B.G. Thigpin

Reviewed By: S. B. Tipps (printed) S. B. Tipps (signature)

LFD-1-ECCS-19

TS 3.3.5.1-1, Item 4.b/5.b
ADS Trip System
Drywell Pressure-High

TRM Rev. 93



Minimum Channel Requirements for System Initiation Capability:

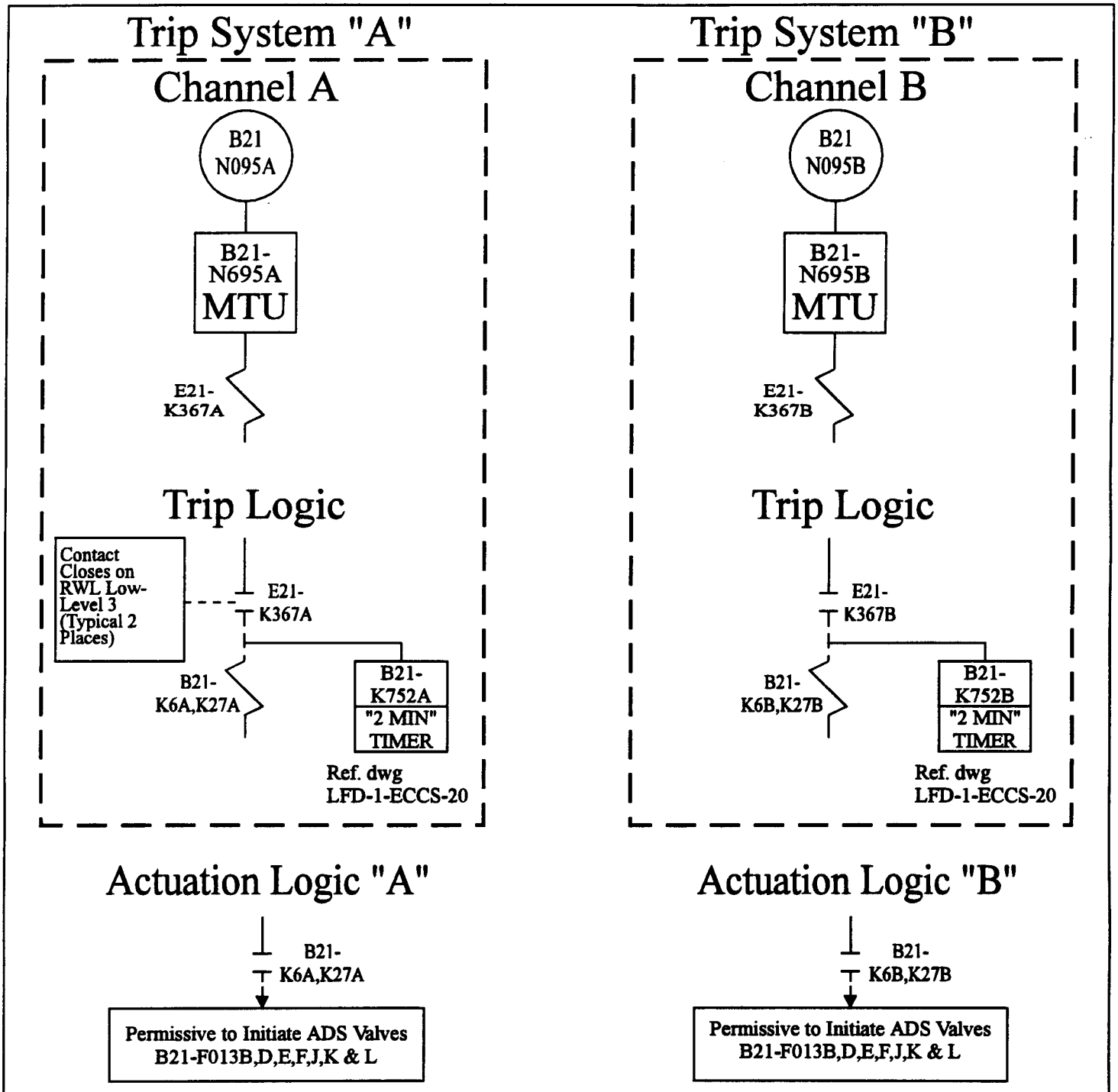
In order to maintain ADS initiation capability on a "2 Minute" Timer Permissive signal, either channel A or B and its associated logic must be operable.

Elem. Ref.
H-17754
H-17755

Prepared By: JDB

Reviewed By:

LFD-1-ECCS-20	
TS 3.3.5.1-1, Item 4.c/5.c ADS Trip System ADS Initiation Timer	
Rev. 0	11/16/94



Minimum Channel Requirements for System Initiation Capability:

In order to maintain ADS initiation capability due to a RWL-Level 3 Confirmation signal, either channel A or B must be operable or maintained in the tripped condition.

Elem. Ref.
H-17754
H-17755
H-19823
H-19826

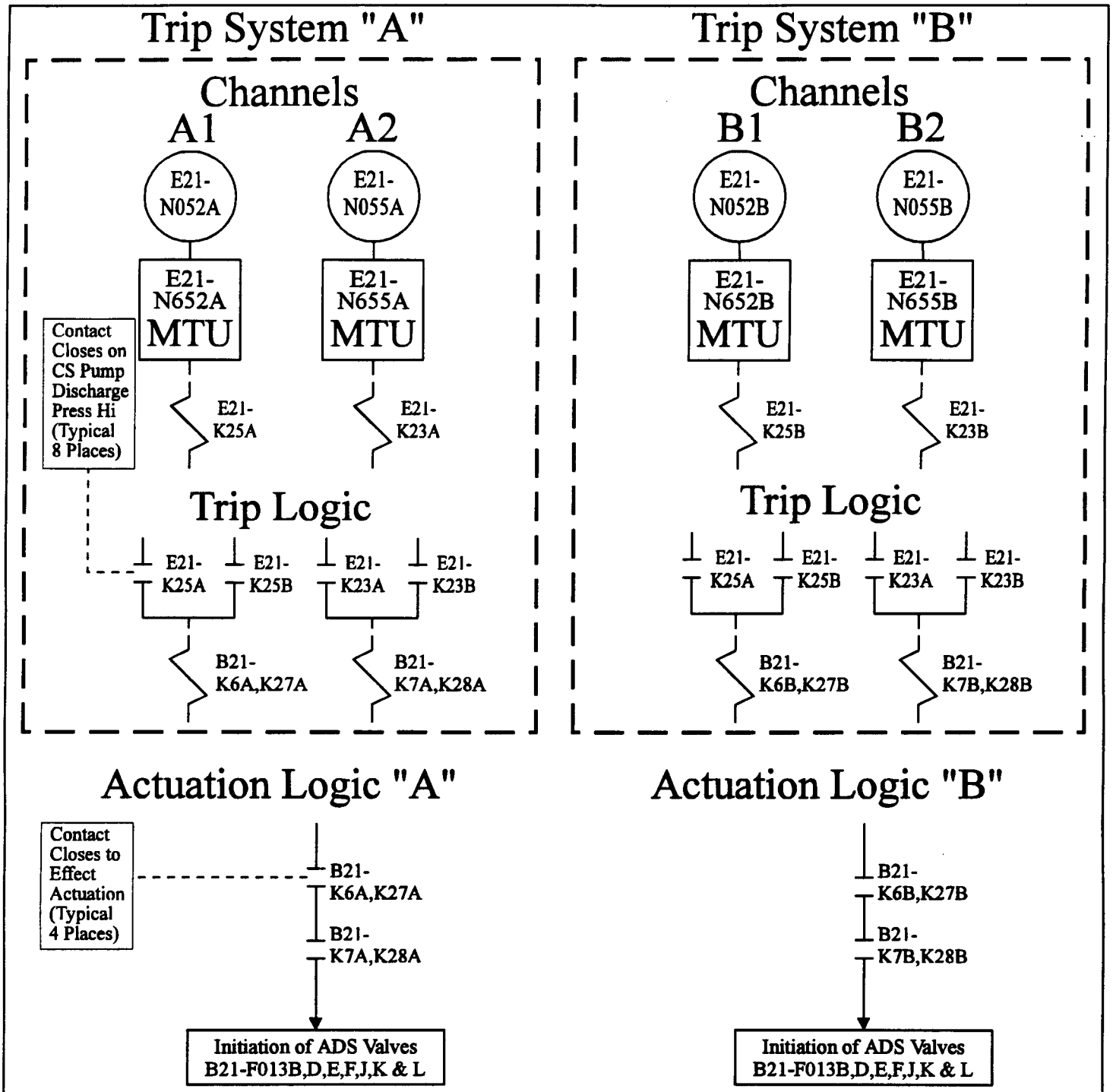
Prepared By: DB

Reviewed By: [illegible]

LFD-1-ECCS-21

TS 3.3.5.1-1, Item 4.d/5.d
ADS Trip System
RWL-Low Level 3
(Confirmatory)

Rev. 0 11/16/94



Minimum Channel Requirements for System Initiation Capability:

In order to maintain ADS initiation capability for a Core Spray Pump Discharge Pressure-High permissive, channels in one of the following combinations must be operable.

A1 and A2
A1 and B2
B1 and A2
B1 and B2

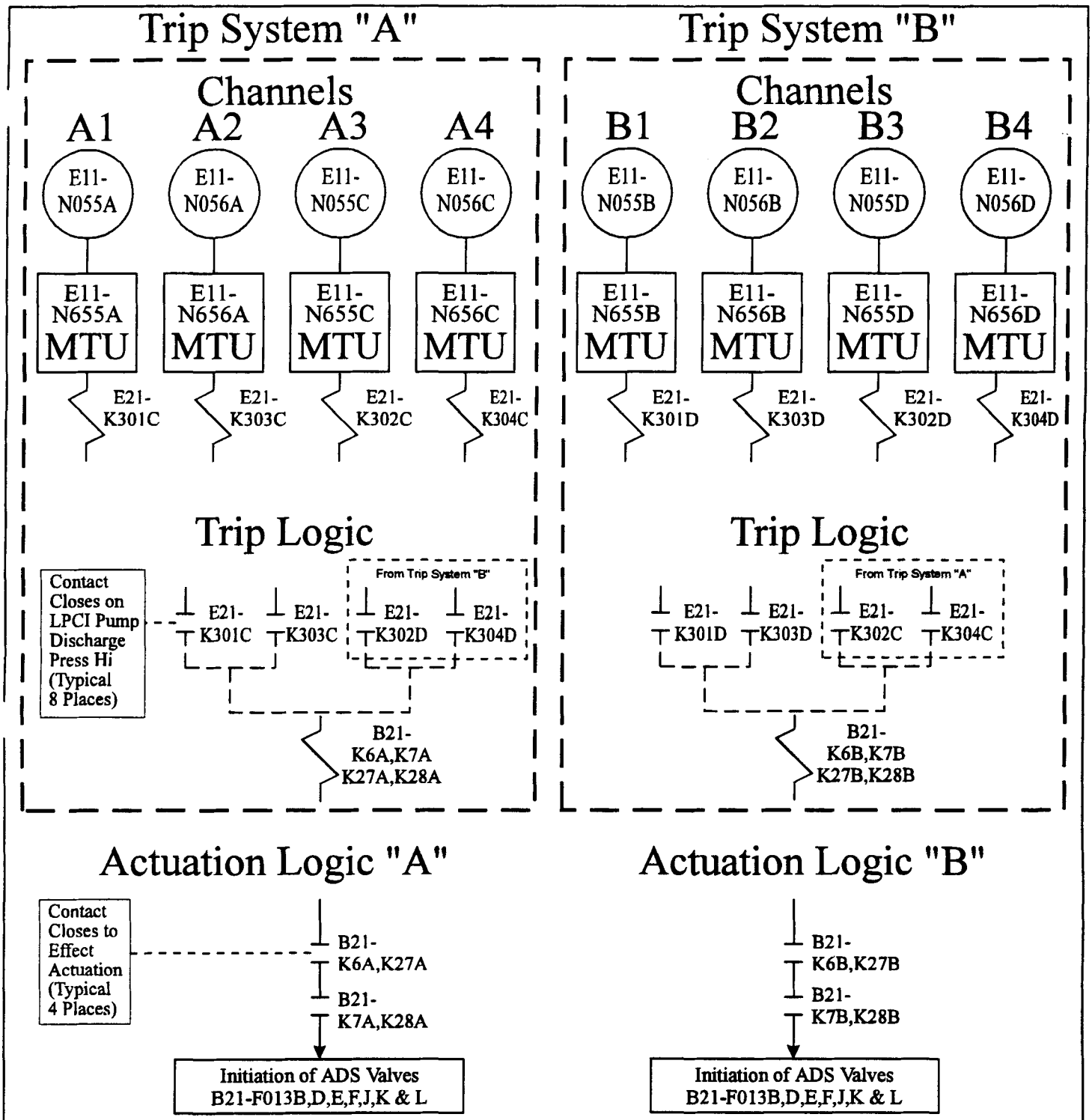
Elem. Ref.
H-19828
H-19831
H-17109
H-17754
H-17755

Prepared By: JDB
Reviewed By: JLR

LFD-1-ECCS-22

TS 3.3.5.1-1, Item 4.e/5.e
ADS Trip System
Core Spray Pump Discharge Press-High

Rev. 0 11/16/94



Minimum Channel Requirements for System Initation Capability:

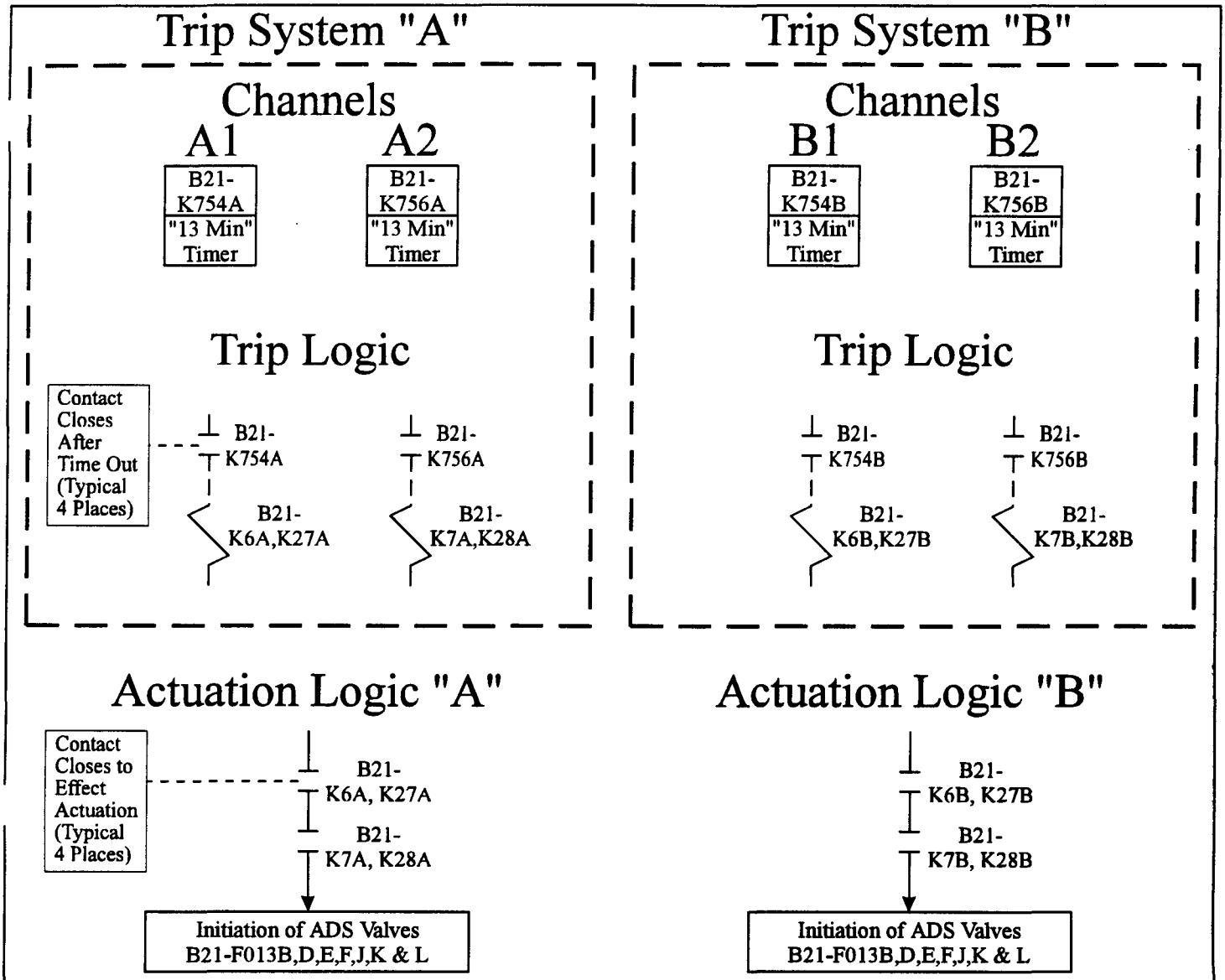
In order to maintain ADS initiation capability for a LPCI Pump Discharge Pressure-High signal, at least one channel must be operable.

Elem. Ref.
H-17754
H-17755
H-17764
H-17767
H-19827
H-19830

Prepared By: JSG

Reviewed By: GLR

LFD-1-ECCS-23	
TS 3.3.5.1-1, Item 4.f/5.f ADS Trip system LPCI Pump Discharge Pressure-High	
Rev. 0	11/16/94



Minimum Channel Requirements for System Initiation Capability:

In order to maintain ADS initiation capability with regard to the ADS low water level timers, one of the following channel combinations must be operable:

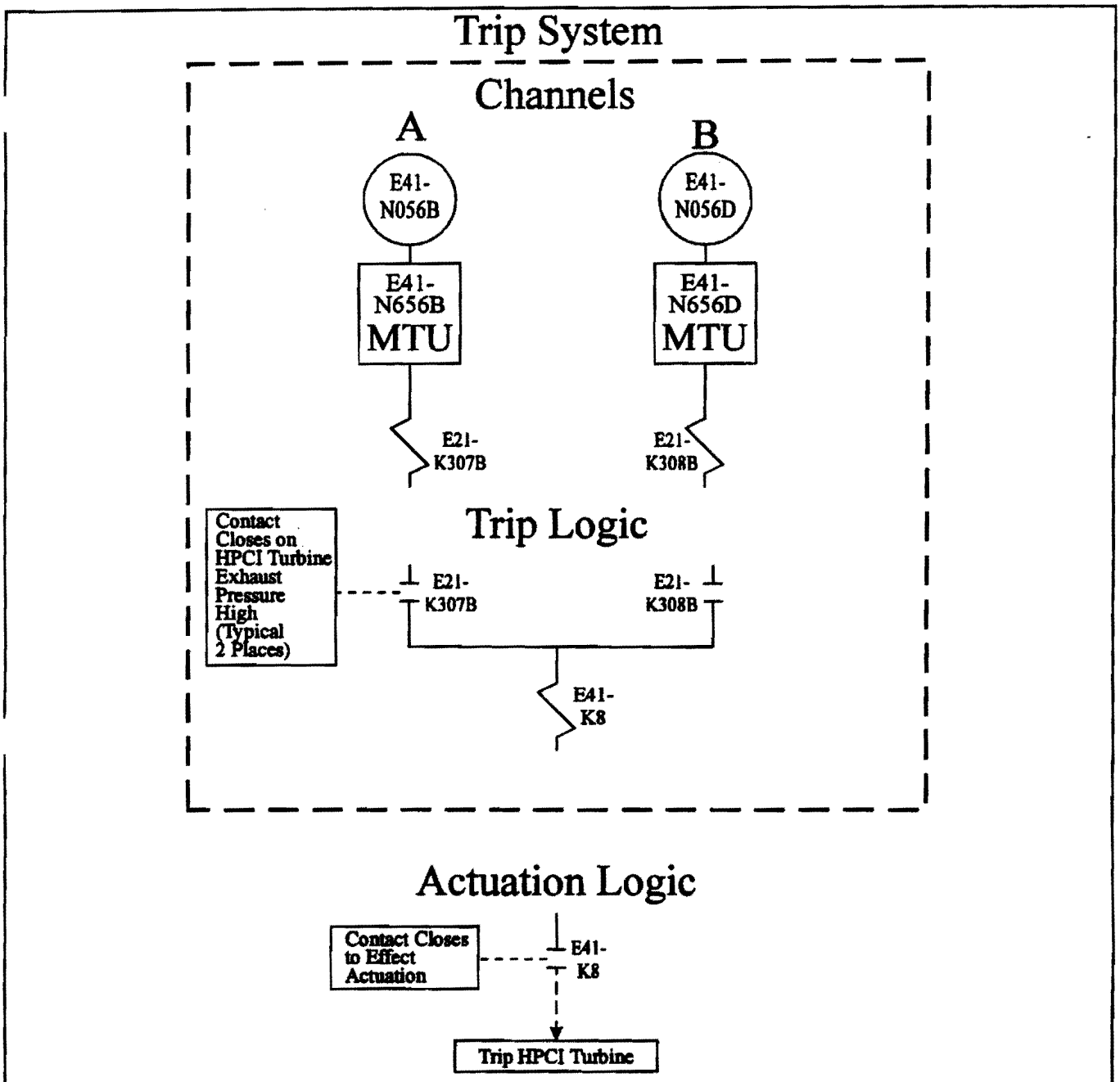
A1 and A2
B1 and B2

Elem. Ref.
H-17754
H-17755
H-17759

Prepared By: JSB

Reviewed By:

LFD-1-ECCS-24	
TS 3.3.5.1-1, Item 4.g/5.g ADS Trip System ADS Low Water LVL Actuation Timer	
Rev. 0	11/16/94



Minimum Channel Requirements for System Trip Capability:

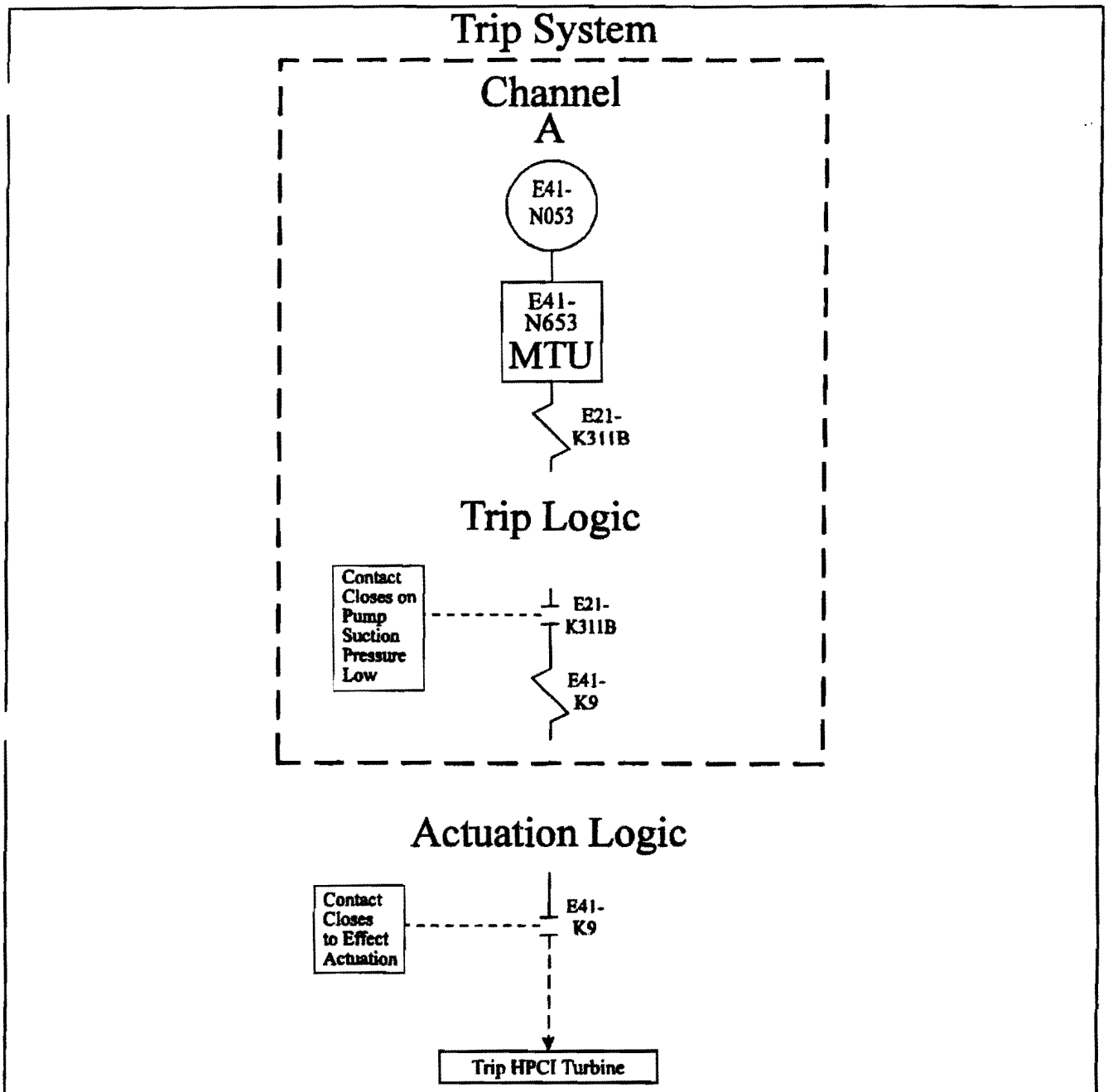
In order to maintain HPCI turbine trip capability with regard to a HPCI turbine exhaust pressure-high signal, at least one channel must be functional.

Elem. Ref.
H-17159
H-17160
H-19824

Prepared By: DLC

Reviewed By:

LFD-1-ECCS-25
TRM T3.3.5-1, Item 2 HPCI Turbine Trip HPCI Turbine Exhaust Pressure-High
TRM REV. 60



Minimum Channel Requirements for System Trip Capability:

In order to maintain HPCI turbine trip capability with regard to a HPCI pump suction pressure-low signal, this channel must functional.

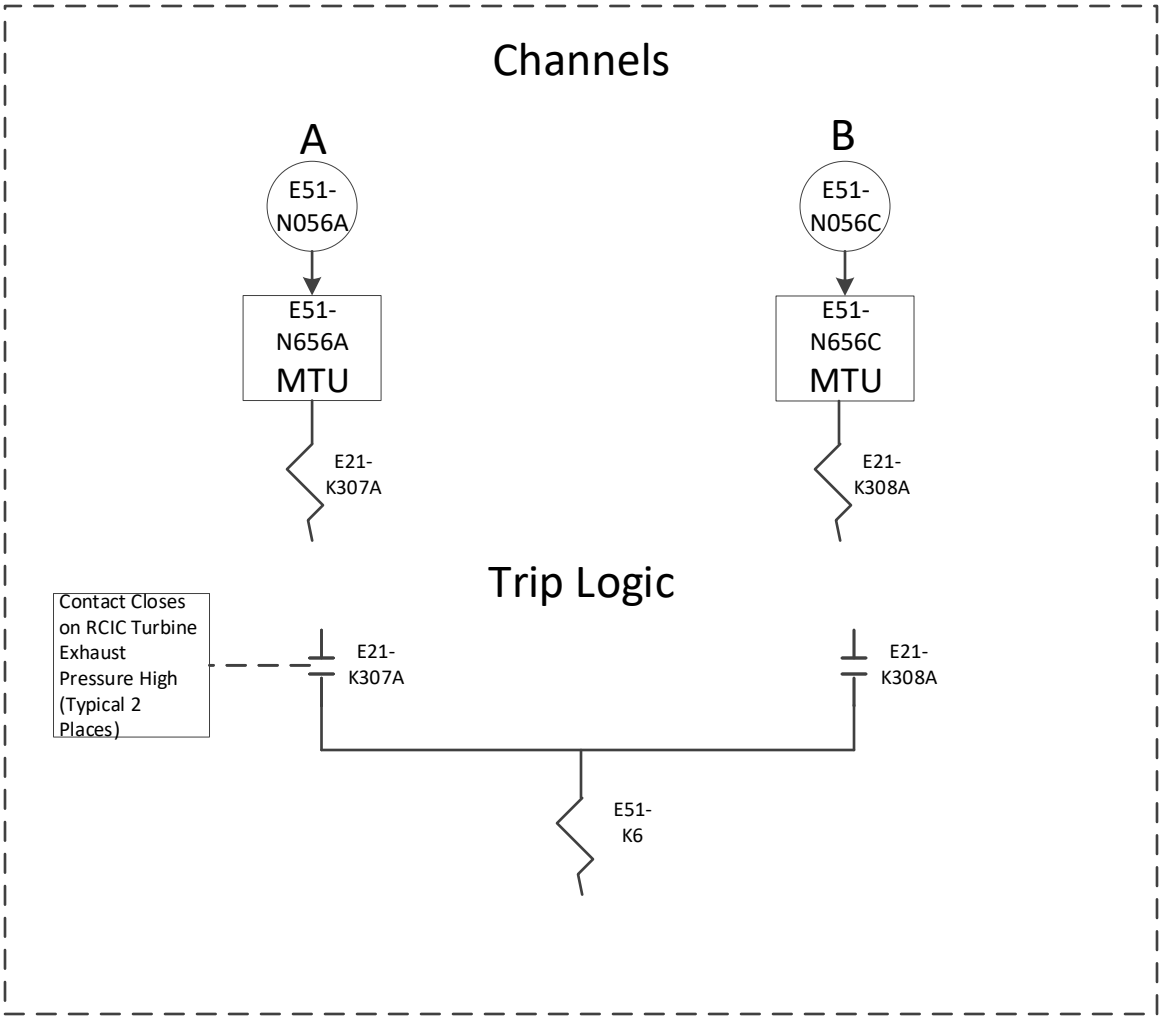
Elem. Ref.
H-17159
H-17160
H-19824

Prepared By: TLC

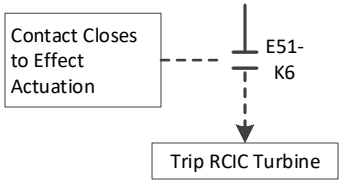
Reviewed By:

LFD-1-ECCS-26
TRM T3.3.5-1, Item 3 HPCI Turbine Trip HPCI Pump Suction Pressure-Low
TRM REV. 60

Trip System



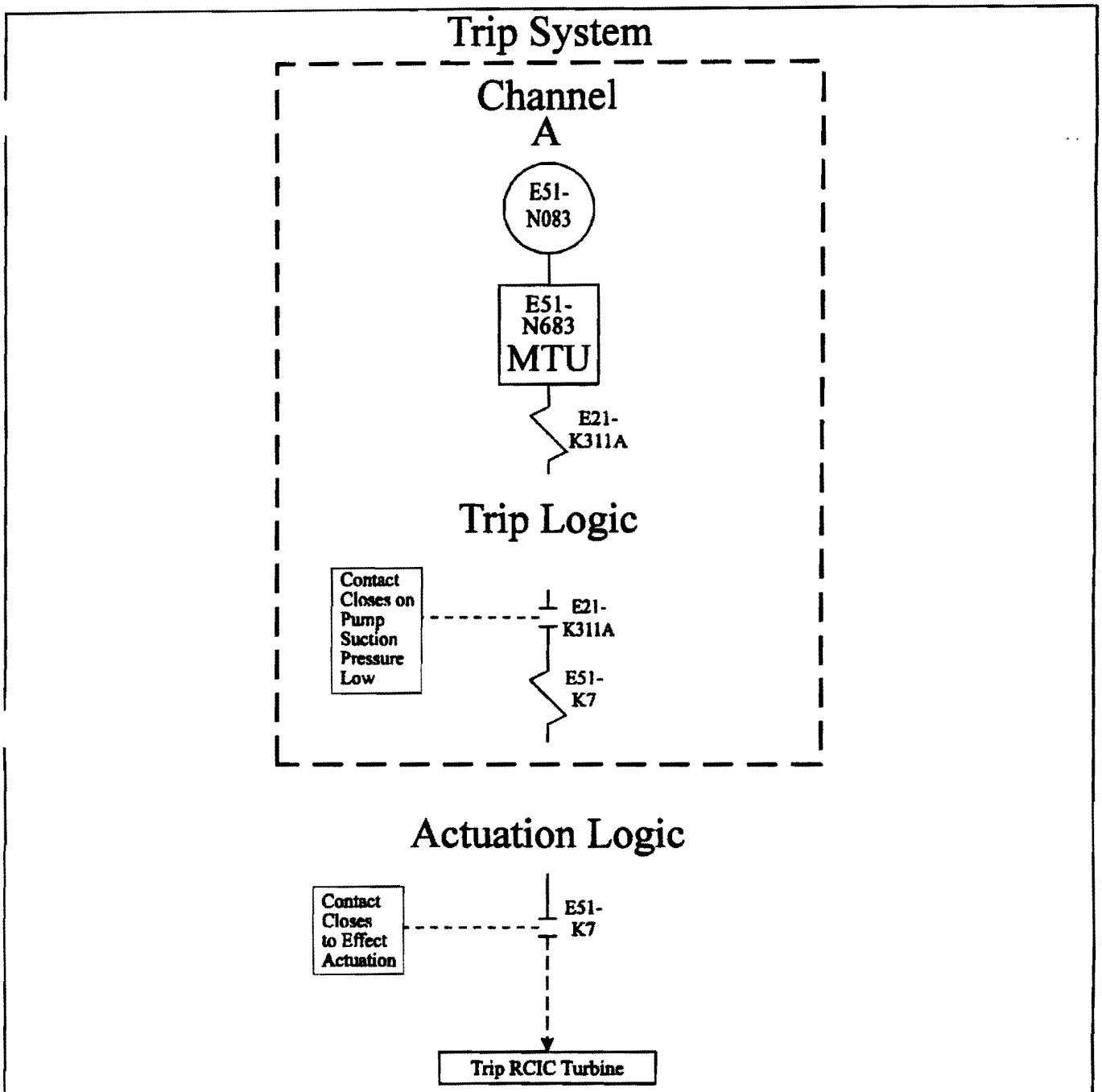
Actuation Logic



Minimum Channel Requirements for System Trip Capability:
In order to maintain RCIC turbine trip capability with regard to a RCIC turbine exhaust pressure-high signal, at least one channel must be functional.

	LFD-1-ECCS-27
	TRM T3.3.5-1, Item 5 RCIC Turbine Trip RCIC Turbine Exhaust Pressure-High
Elem. Ref. H-17148 H-17153 H-19821	TRM REV. 104

Prepared by: _____
Reviewed by: _____



Minimum Channel Requirements for System Trip Capability:

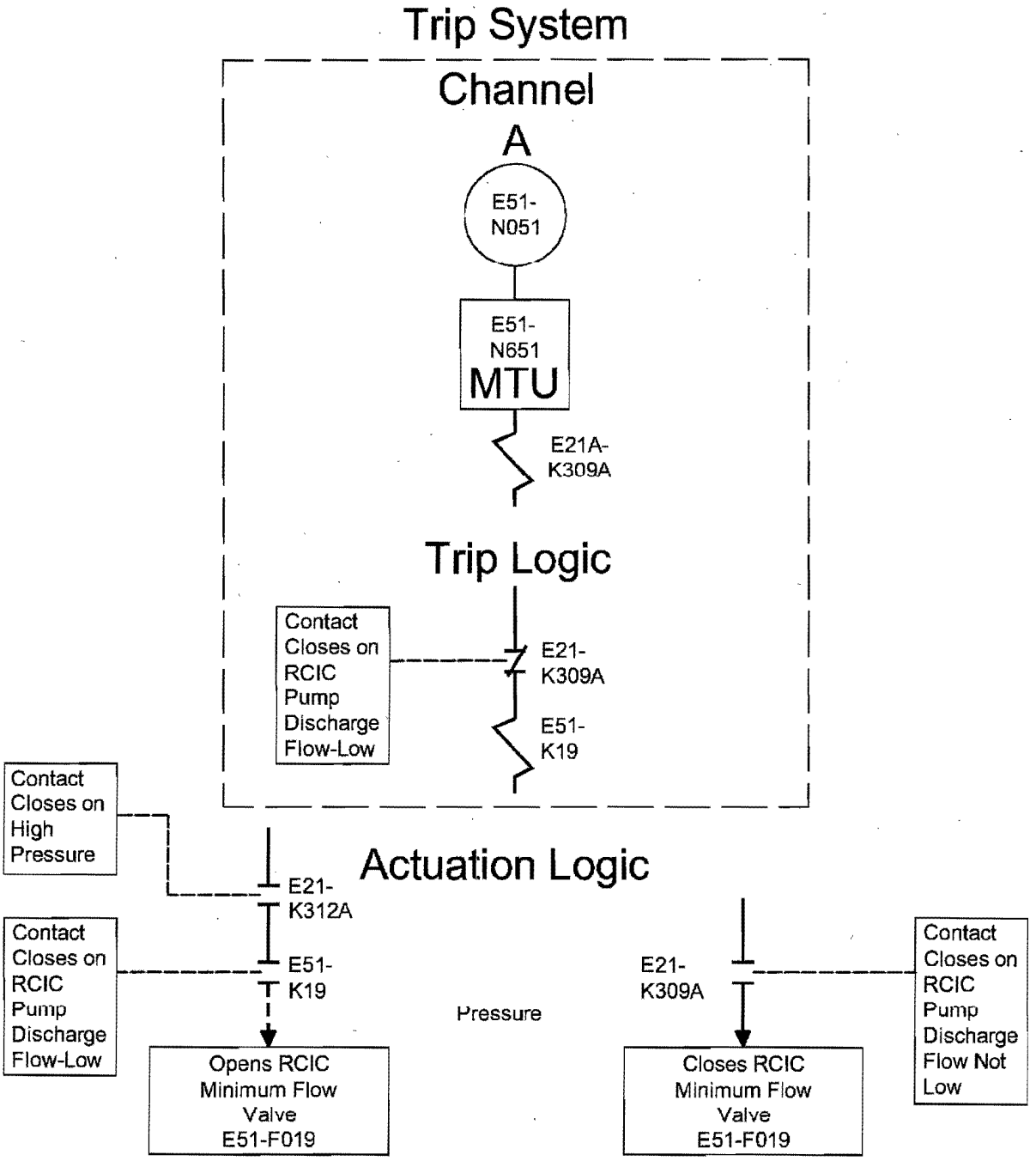
In order to maintain RCIC turbine trip capability with regard to a RCIC pump suction pressure-low signal, this channel must be functional.

Elem. Ref.
H-17148
H-17153
H-19821

Prepared By: RLC

Reviewed By:

LFD-1-ECCS-28
TRM T3.3.5-1, Item 6 RCIC Turbine Trip, RCIC Pump Suction Pressure-Low
TRM REV. 60



Minimum Channel Requirements for System Initiation Capability:

In order to maintain RCIC initiation capability with regard to minimum flow functionality, this channel must be functional.

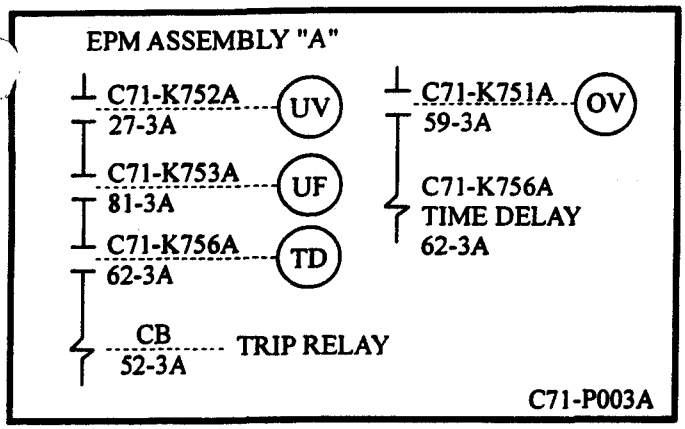
Elem. Ref.
H-17148
H-17152
H-19821

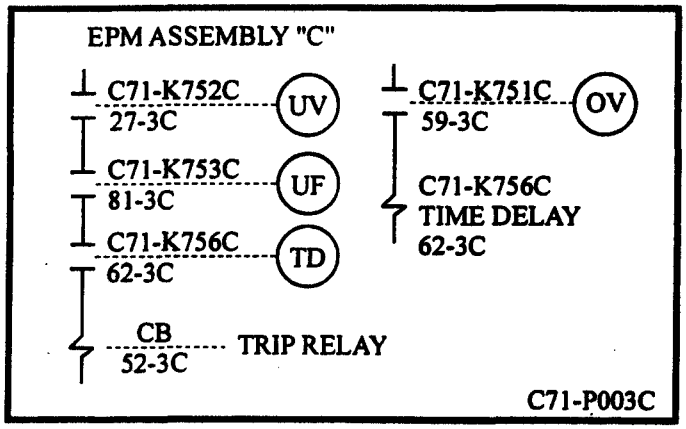
LFD-1-ECCS-29

TRM T3.3.5-1,
Items 7.a and 7.b,
RCIC Pump Discharge
Flow-High, Low

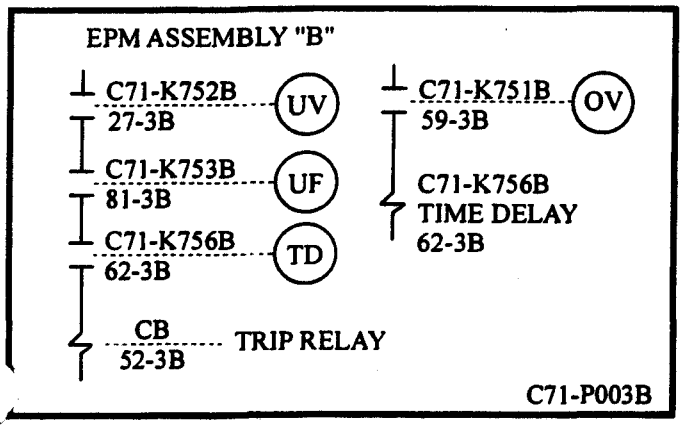
TRM REV. 82

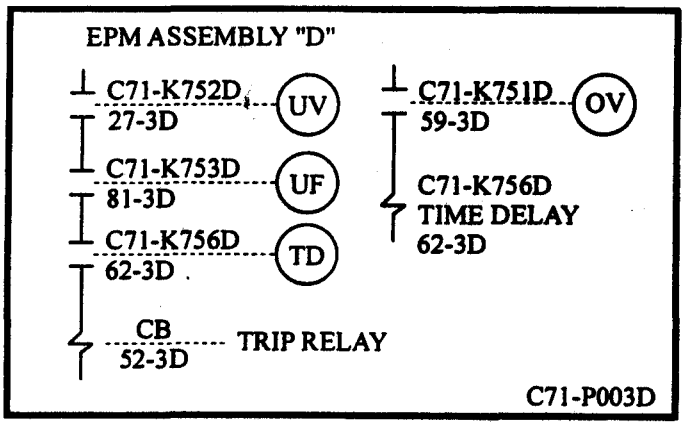
RPS MG SET "A"



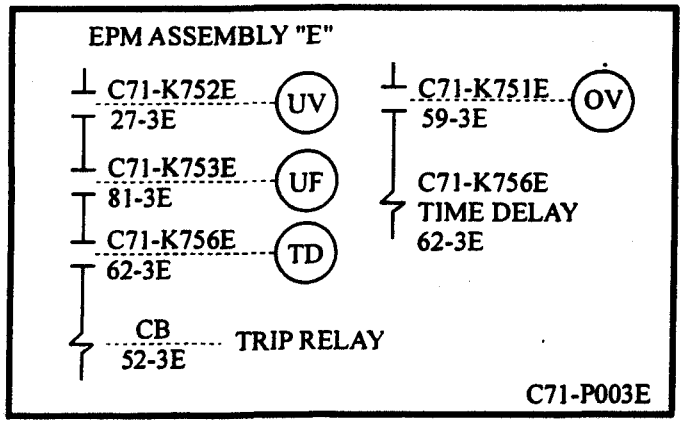


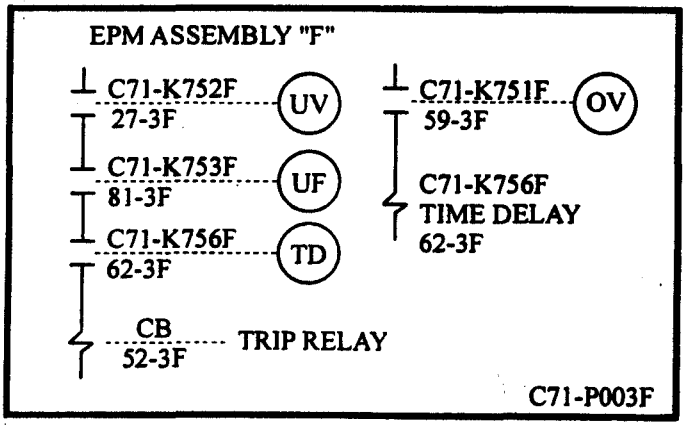
RPS MG SET "B"





RPS ALTERNATE POWER





Minimum Channel Requirements for System Initiation Capability:

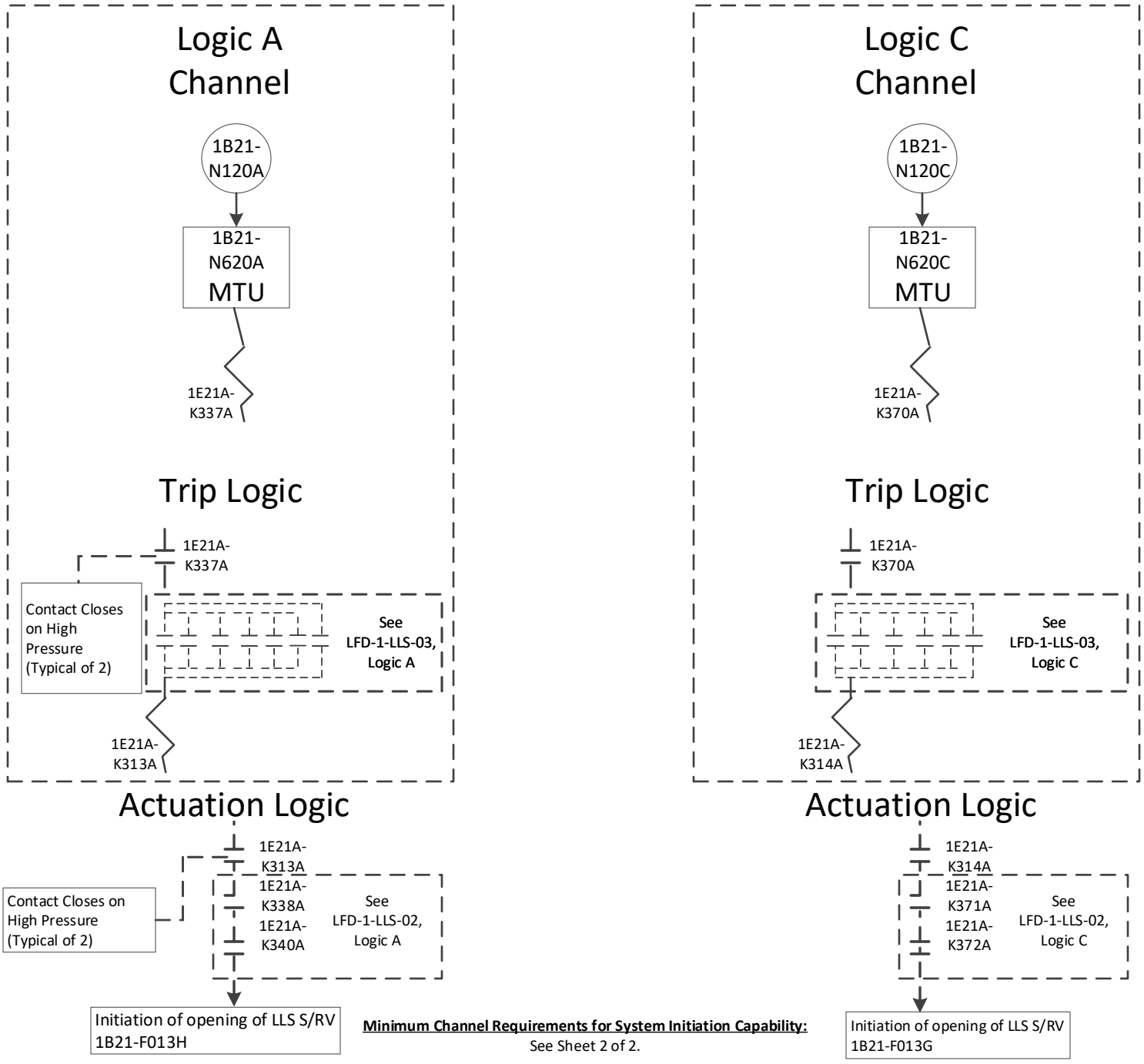
In order to maintain RPS-EPM trip capability, one EPM assembly for each of the inservice power supplies must be operable.

Elem. Ref.
H-17197
H-17499

Prepared By:	
Reviewed By:	

LFD-1-EPM-01
TS 3.3.8.2 RPS Electric Power Monitor Trips
TRM Rev. 33

Division I



Minimum Channel Requirements for System Initiation Capability:
See Sheet 2 of 2.

Elem. Ref.
H-17755 H-19823
H-19822 H19833

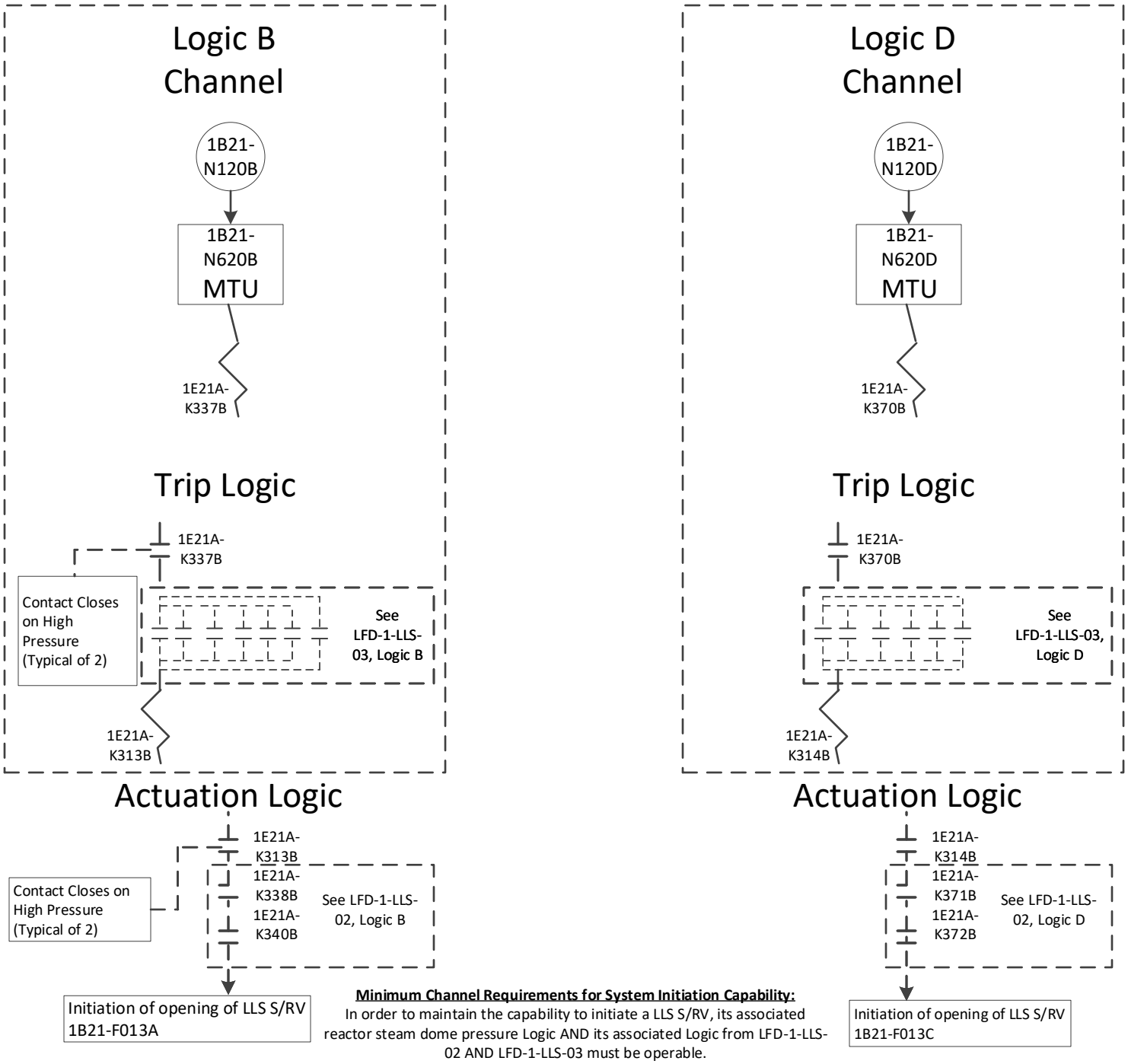
Prepared by: _____
Reviewed by: _____

LFD-1-LLS-01
Sheet 1 of 2

TS 3.3.6.3-1, Item 1
Low-Low Set Instrumentation
Reactor Steam Dome
Pressure-High

Rev. 1 05/11/2016

Division II

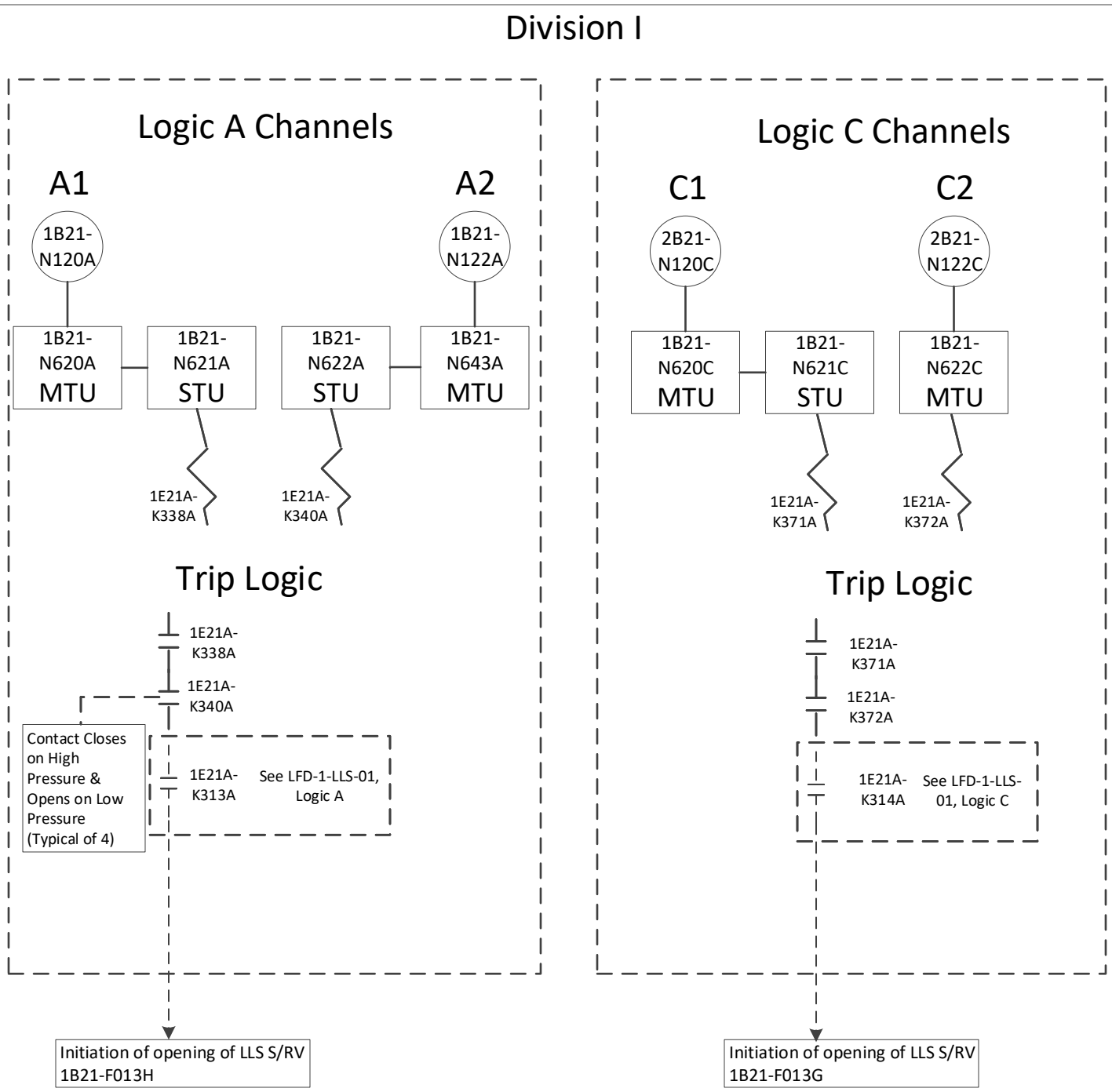


Minimum Channel Requirements for System Initiation Capability:
In order to maintain the capability to initiate a LLS S/RV, its associated reactor steam dome pressure Logic AND its associated Logic from LFD-1-LLS-02 AND LFD-1-LLS-03 must be operable.

LFD-1-LLS-01 Sheet 2 of 2	
TS 3.3.6.3-1, Item 1 Low-Low Set Instrumentation Reactor Steam Dome Pressure-High	
Rev. 1	05/11/2016

Elem. Ref.
H-17755 H-19826
H-19825 H19834

Prepared by: _____
Reviewed by: _____



Minimum Channel Requirements for System Initiation Capability:

See Sheet 2 of 2.

Elem. Ref.
H-17755 H-19823
H-19822 H19833

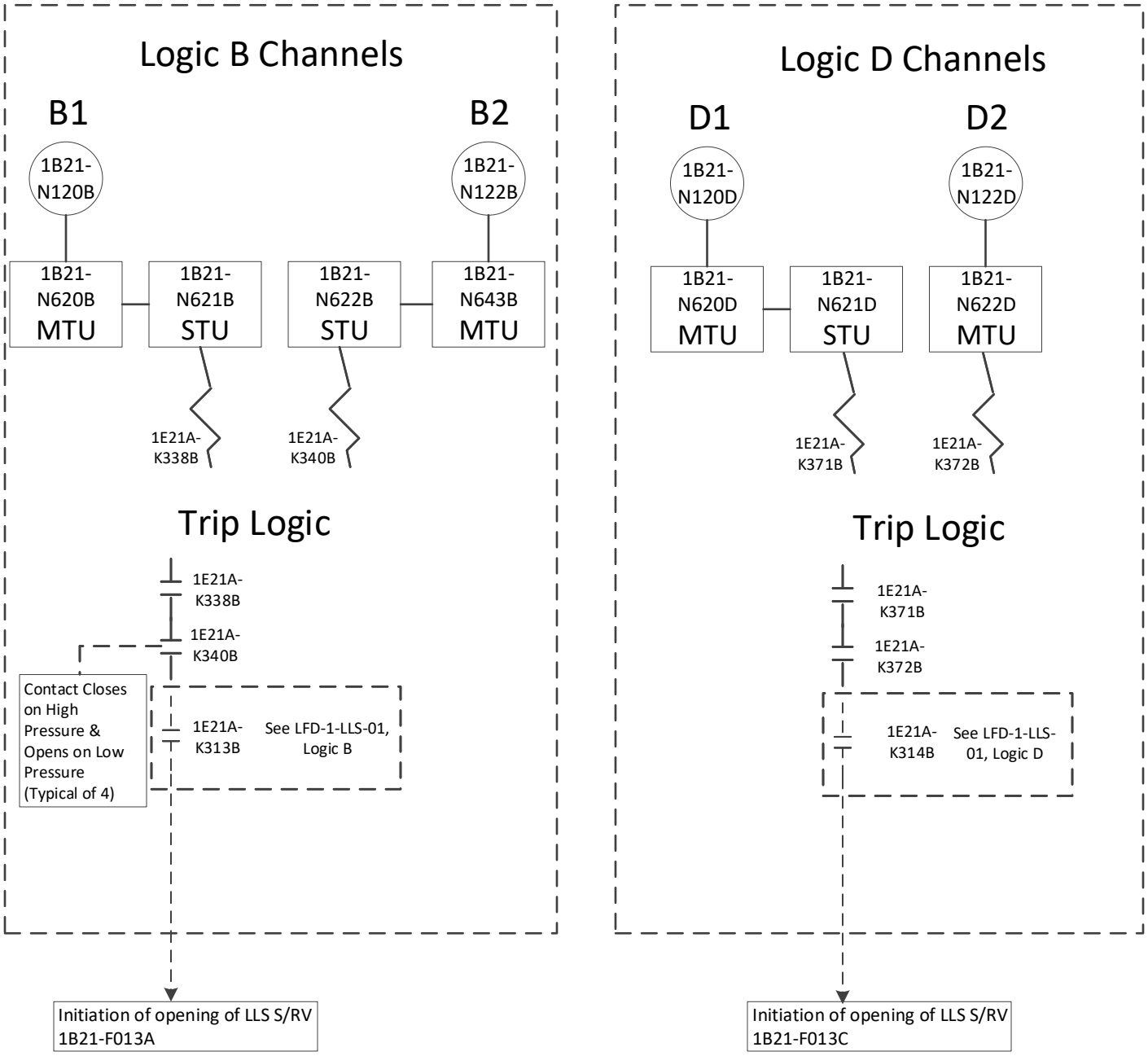
Prepared by: _____
Reviewed by: _____

LFD-1-LLS-02
Sheet 1 of 2

TS 3.3.6.3-1, Item 2
Low-Low Set Instrumentation – Low-Low Set Pressure Setpoints

Rev. 1 05/11/2016

Division II



Minimum Channel Requirements for System Initiation Capability:
In order to maintain the capability to initiate a LLS S/RV, its associated low-low set pressure setpoint Logic AND its associated Logic from LFD-1-LLS-01 AND LFD-1-LLS-03 must be operable.

Elem. Ref.
H-17755 H-19826
H-19825 H19834

Prepared by: _____
Reviewed by: _____

LFD-1-LLS-02
Sheet 2 of 2

TS 3.3.6.3-1, Item 2
Low-Low Set Instrumentation – Low-Low Set Pressure Setpoints

Rev. 1 05/11/2016

Division I

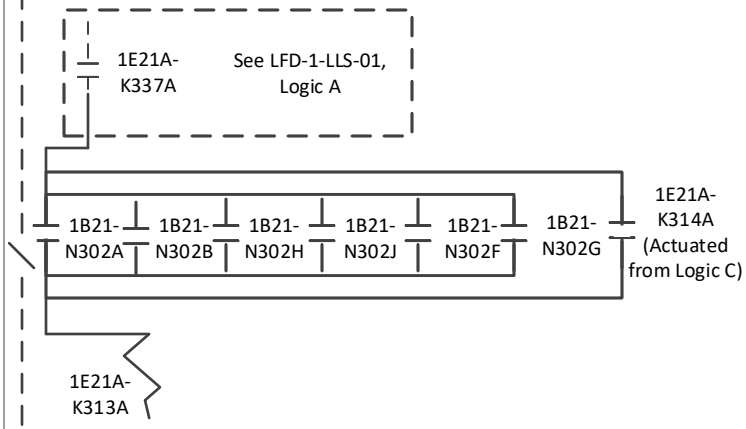
Logic A Channels

A1: 1B21-N302A PS
A2: 1B21-N302B PS
A3: 1B21-N302H PS
A4: 1B21-N302J PS
A5: 1B21-N302F PS
A6: 1B21-N302G PS

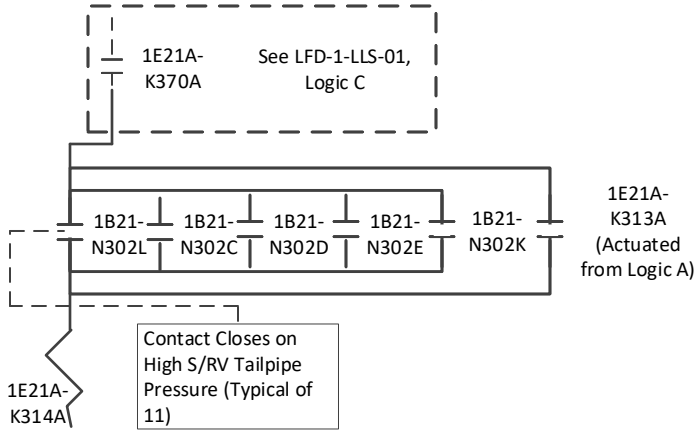
Logic C Channels

C1: 1B21-N302L PS
C2: 1B21-N302C PS
C3: 1B21-N302D PS
C4: 1B21-N302E PS
C5: 1B21-N302K PS

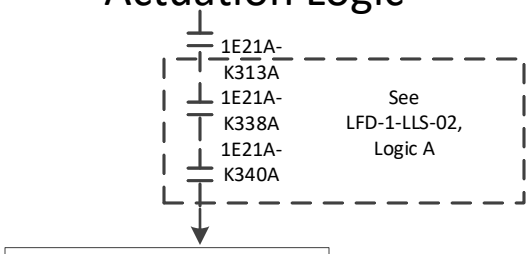
Trip Logic



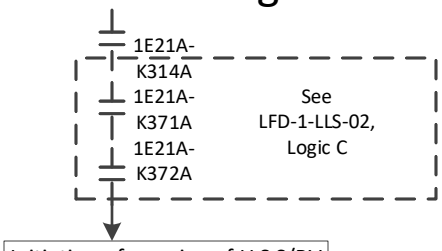
Trip Logic



Actuation Logic



Actuation Logic



Minimum Channel Requirements for LLS S/RV Initiation Capability:

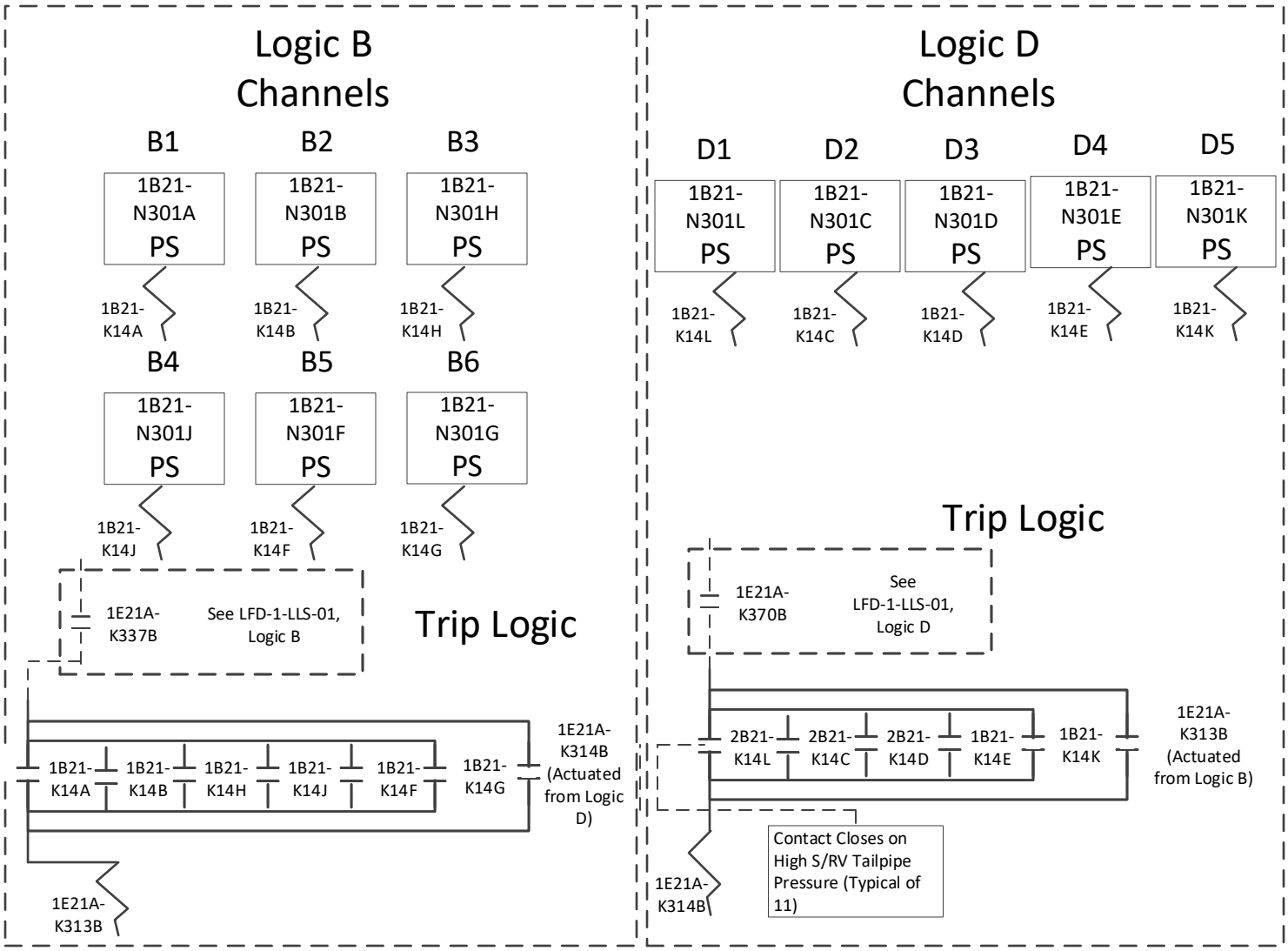
See Sheet 2 of 2.

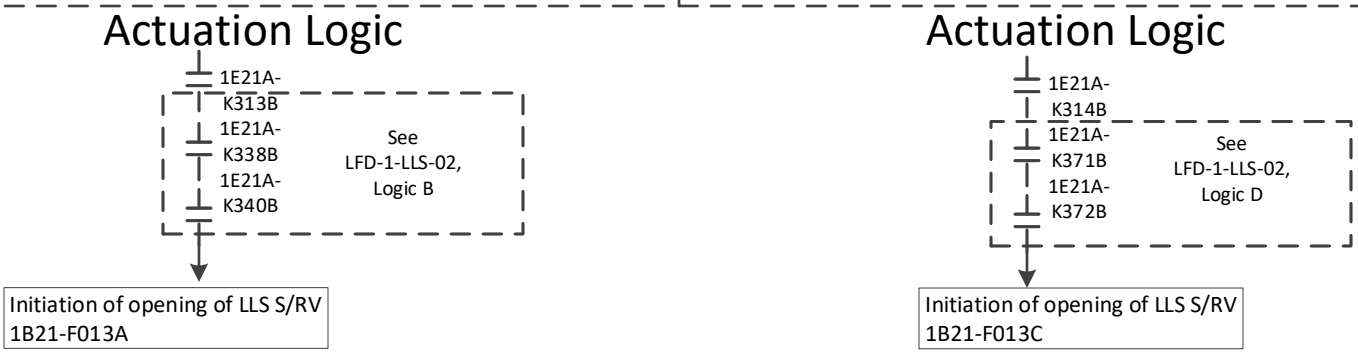
LFD-1-LLS-03 Sheet 1 of 2	
TS 3.3.6.3-1, Item 3 Low-Low Set Instrumentation Tailpipe Pressure Switch	
Rev. 1	05/11/2016

Elem. Ref.
H-17755
H-19833

Prepared by: _____
Reviewed by: _____

Division II





Minimum Channel Requirements for LLS S/RV Initiation Capability:

In order to maintain the capability to initiate a LLS S/RV, its associated tailpipe pressure switch Logic AND its associated Logic from LFD-1-LLS-01 AND LFD-1-LLS-02 must be operable. The tailpipe pressure switch Logic is operable if at least one pressure switch is operable OR at least one pressure switch AND Reactor Steam Dome Pressure-High channel in the opposite Logic in the same Division are operable.

LFD-1-LLS-03
Sheet 2 of 2

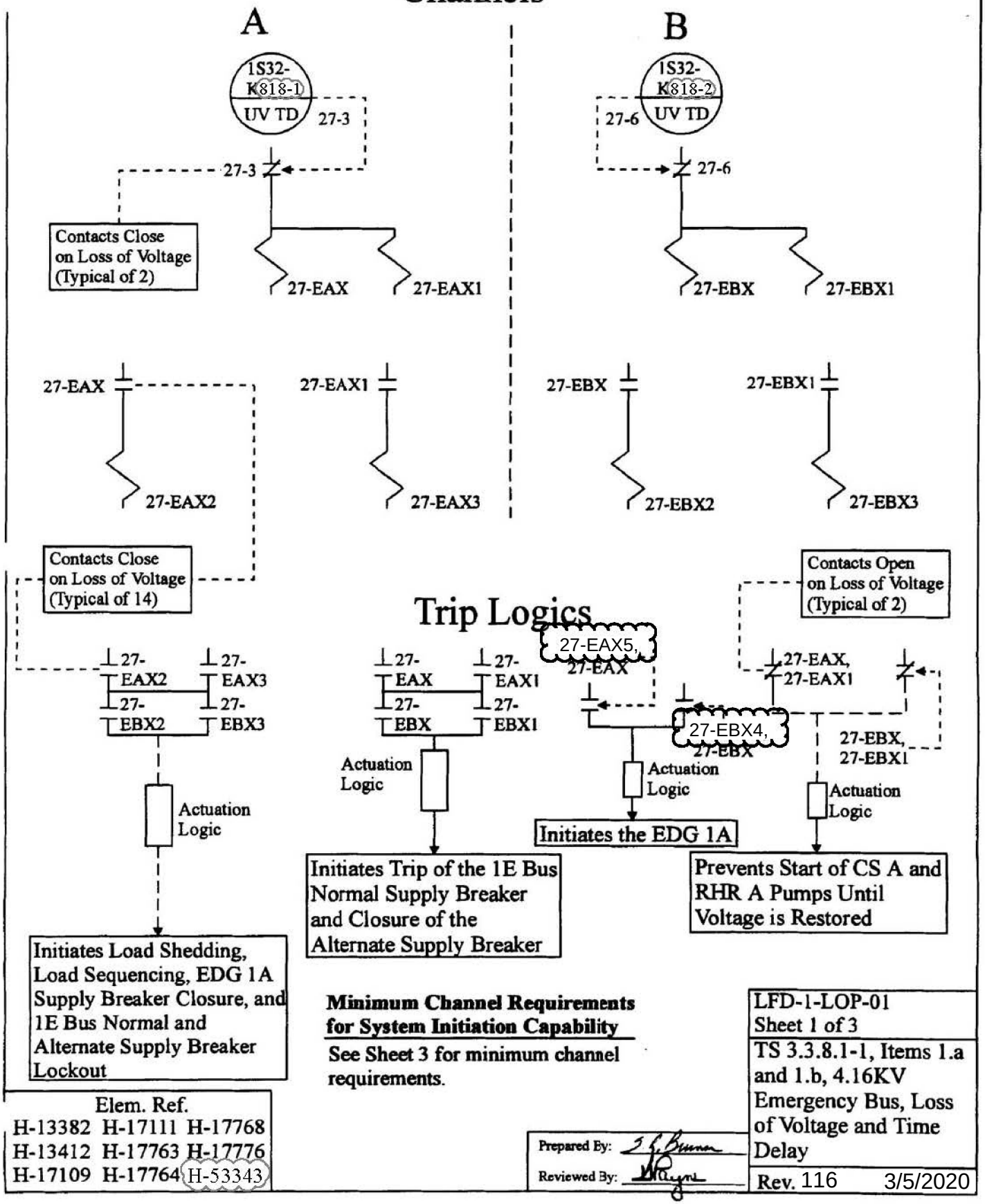
TS 3.3.6.3-1, Item 3
Low-Low Set Instrumentation
Tailpipe Pressure Switch

Rev. 1 05/11/2016

Elem. Ref.
H-17755
H-19606
H-19834

Prepared by: _____
Reviewed by: _____

Trip System: 1E 4.16KV Bus Channels



Minimum Channel Requirements for System Initiation Capability

See Sheet 3 for minimum channel requirements.

Elem. Ref.
H-13382 H-17111 H-17768
H-13412 H-17763 H-17776
H-17109 H-17764 H-53343

Prepared By: J. G. Brunn

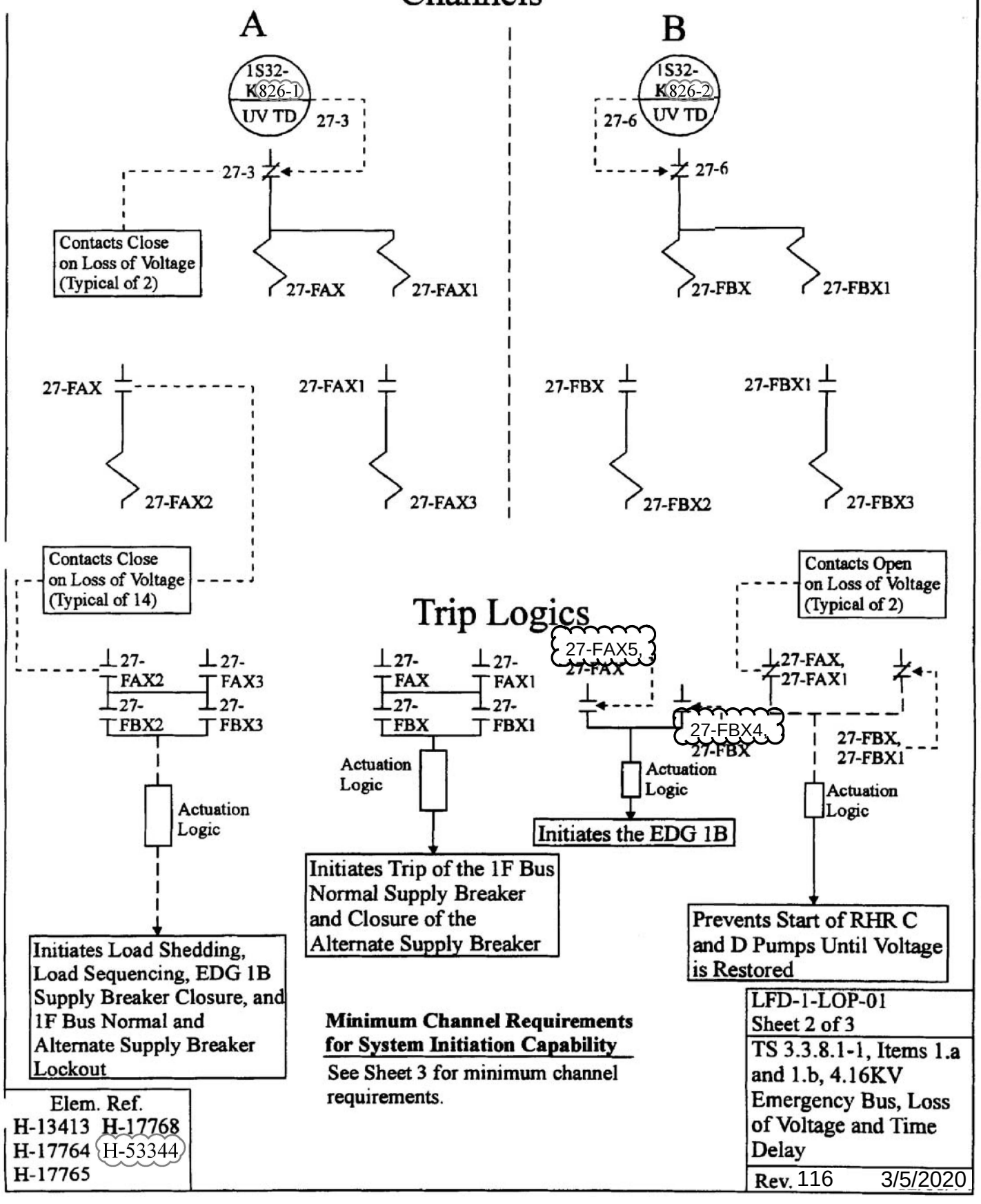
Reviewed By: W. Wright

LFD-1-LOP-01
Sheet 1 of 3

TS 3.3.8.1-1, Items 1.a and 1.b, 4.16KV Emergency Bus, Loss of Voltage and Time Delay

Rev. 116 3/5/2020

Trip System: 1F 4.16KV Bus Channels



Minimum Channel Requirements for System Initiation Capability

See Sheet 3 for minimum channel requirements.

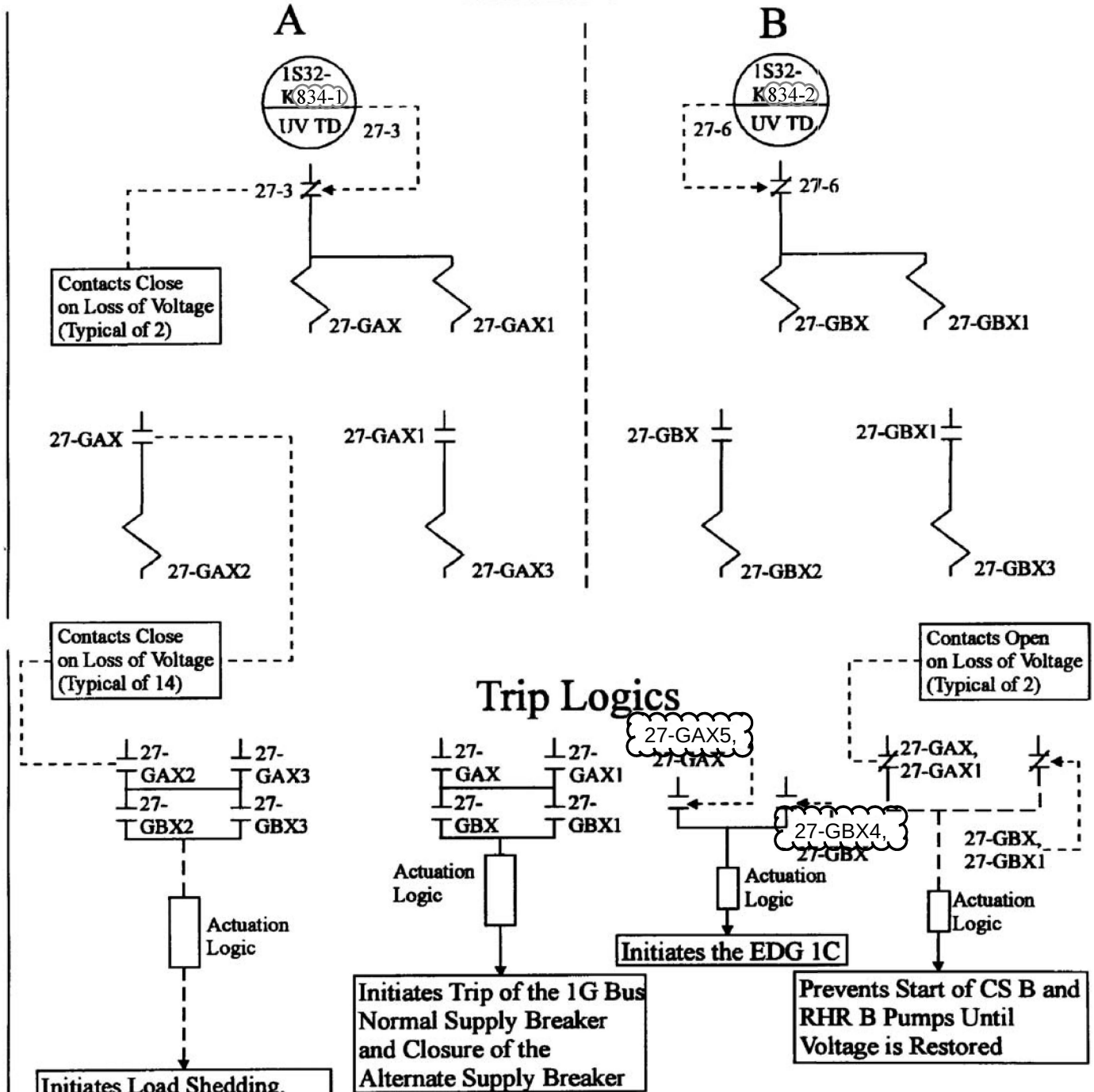
Elem. Ref.
H-13413 H-17768
H-17764 H-53344
H-17765

LFD-1-LOP-01
Sheet 2 of 3

TS 3.3.8.1-1, Items 1.a and 1.b, 4.16KV Emergency Bus, Loss of Voltage and Time Delay

Rev. 116 3/5/2020

Trip System: 1G 4.16KV Bus Channels



Minimum Channel Requirements for System Initiation Capability:

In order to maintain Diesel Generator function initiation capability on a loss of voltage condition, both channels associated with each of two emergency busses are required to be operable.

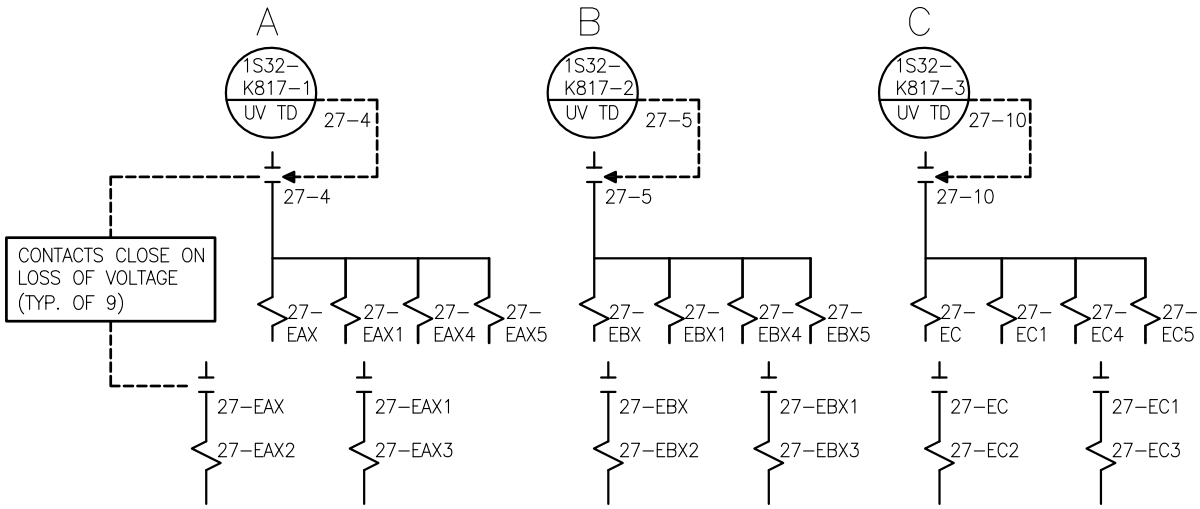
Elem. Ref.
H-13382 H-17111 H-17767
H-13414 H-17765 H-53345
H-17109 H-17766

LFD-1-LOP-01
Sheet 3 of 3

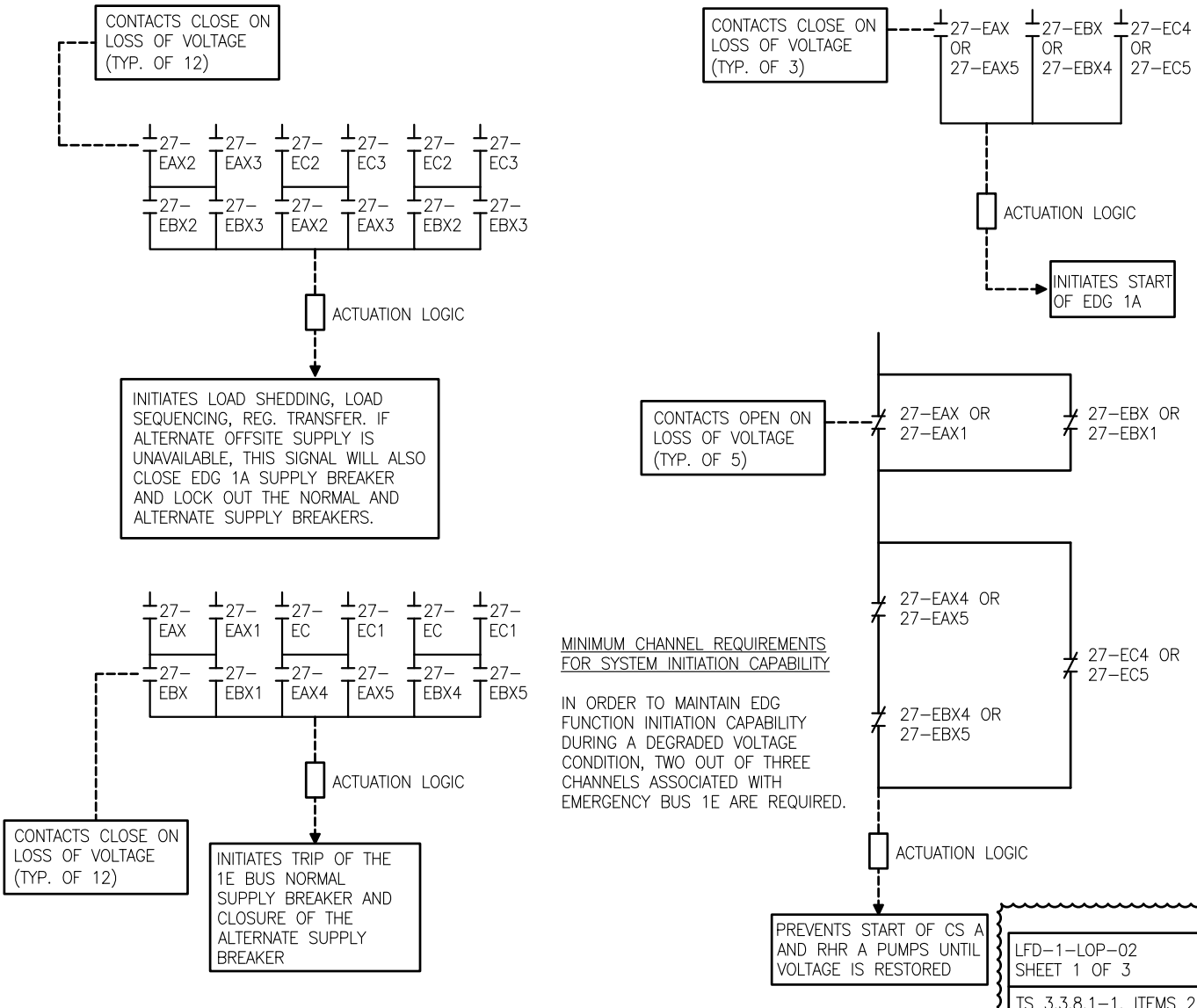
TS 3.3.8.1-1, Items 1.a and 1.b, 4.16KV Emergency Bus, Loss of Voltage and Time Delay

Rev. 116 3/5/2020

TRIP SYSTEM: 1E 4.16KV BUS CHANNELS



TRIP LOGICS



MINIMUM CHANNEL REQUIREMENTS FOR SYSTEM INITIATION CAPABILITY

IN ORDER TO MAINTAIN EDG FUNCTION INITIATION CAPABILITY DURING A DEGRADED VOLTAGE CONDITION, TWO OUT OF THREE CHANNELS ASSOCIATED WITH EMERGENCY BUS 1E ARE REQUIRED.

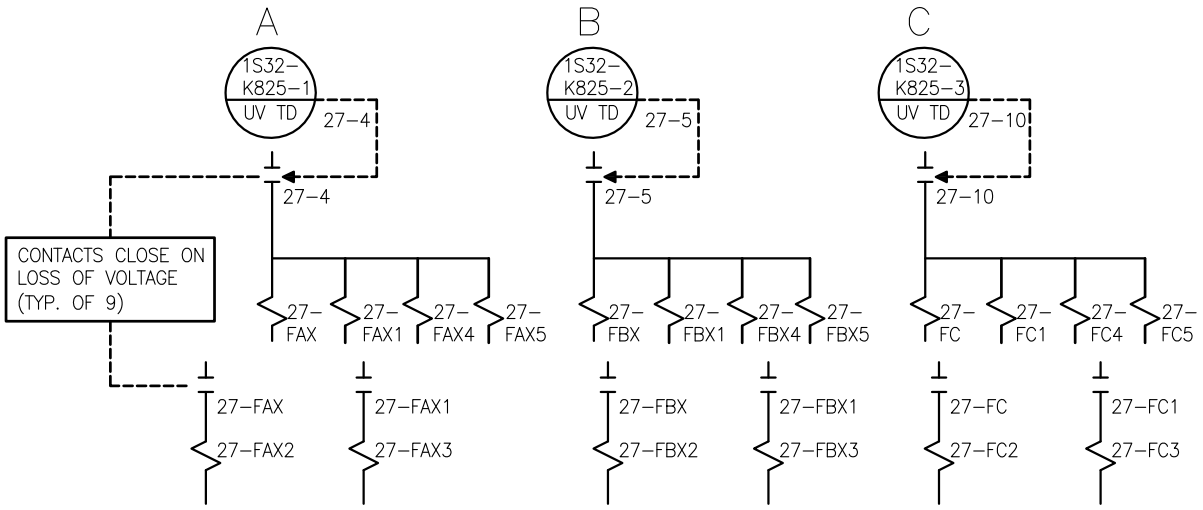
ELEM. REF.
H-13382 H-17111 H-17768 H-13412
H-17763 H-17776 H-17109 H-17764
H-53343

LFD-1-LOP-02
SHEET 1 OF 3

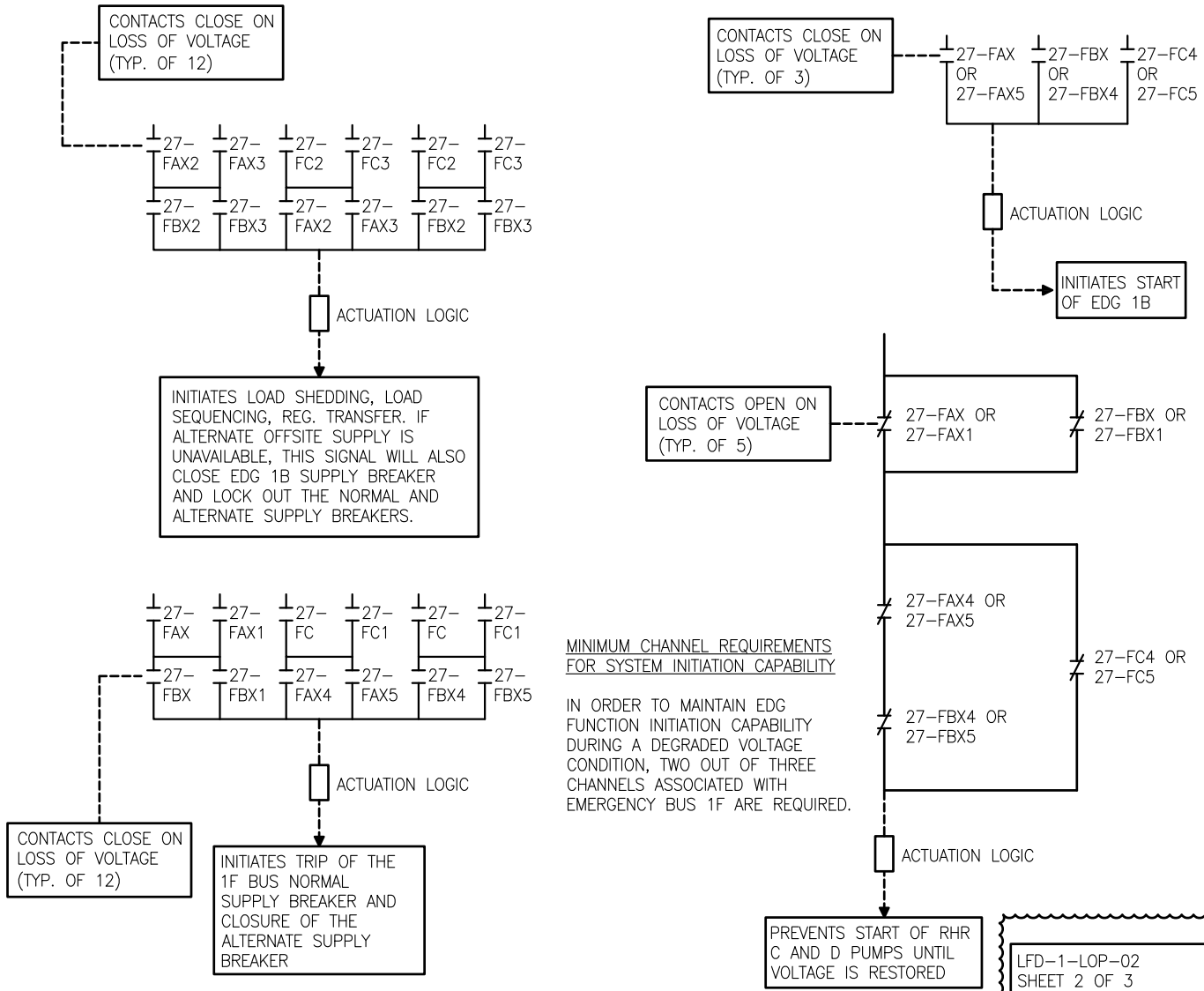
TS 3.3.8.1-1, ITEMS 2.A AND 2.B, 4.16KV EMERGENCY BUS, DEGRADED VOLTAGE AND TIME DELAY

REV. 116 3/5/2020

TRIP SYSTEM: 1F 4.16KV BUS CHANNELS



TRIP LOGICS



MINIMUM CHANNEL REQUIREMENTS FOR SYSTEM INITIATION CAPABILITY

IN ORDER TO MAINTAIN EDG FUNCTION INITIATION CAPABILITY DURING A DEGRADED VOLTAGE CONDITION, TWO OUT OF THREE CHANNELS ASSOCIATED WITH EMERGENCY BUS 1F ARE REQUIRED.

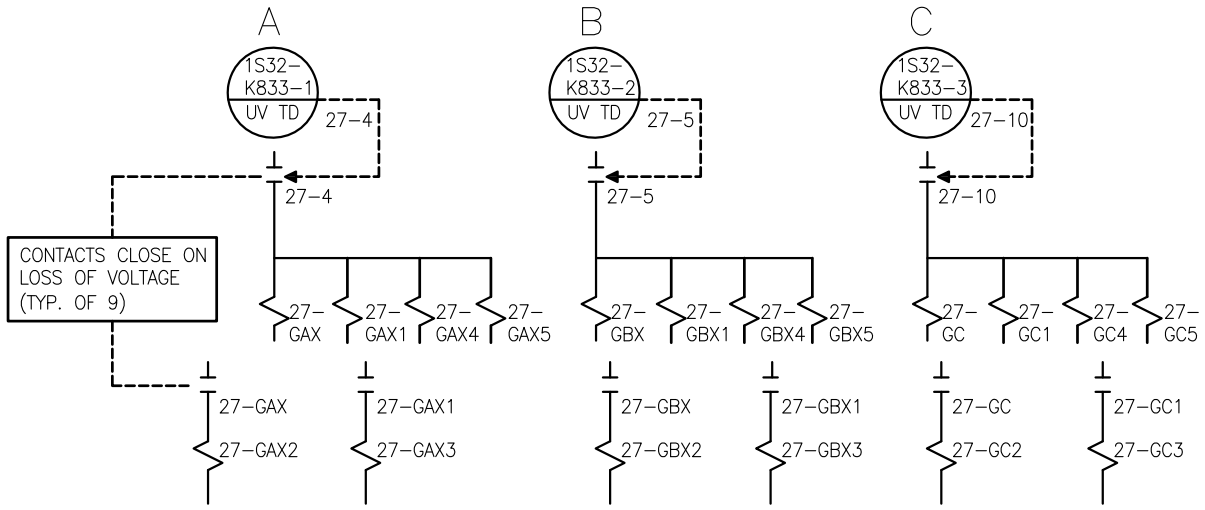
ELEM. REF.
H-13413 H-17768 H-17764 H-53343
H-17765

LFD-1-LOP-02
SHEET 2 OF 3

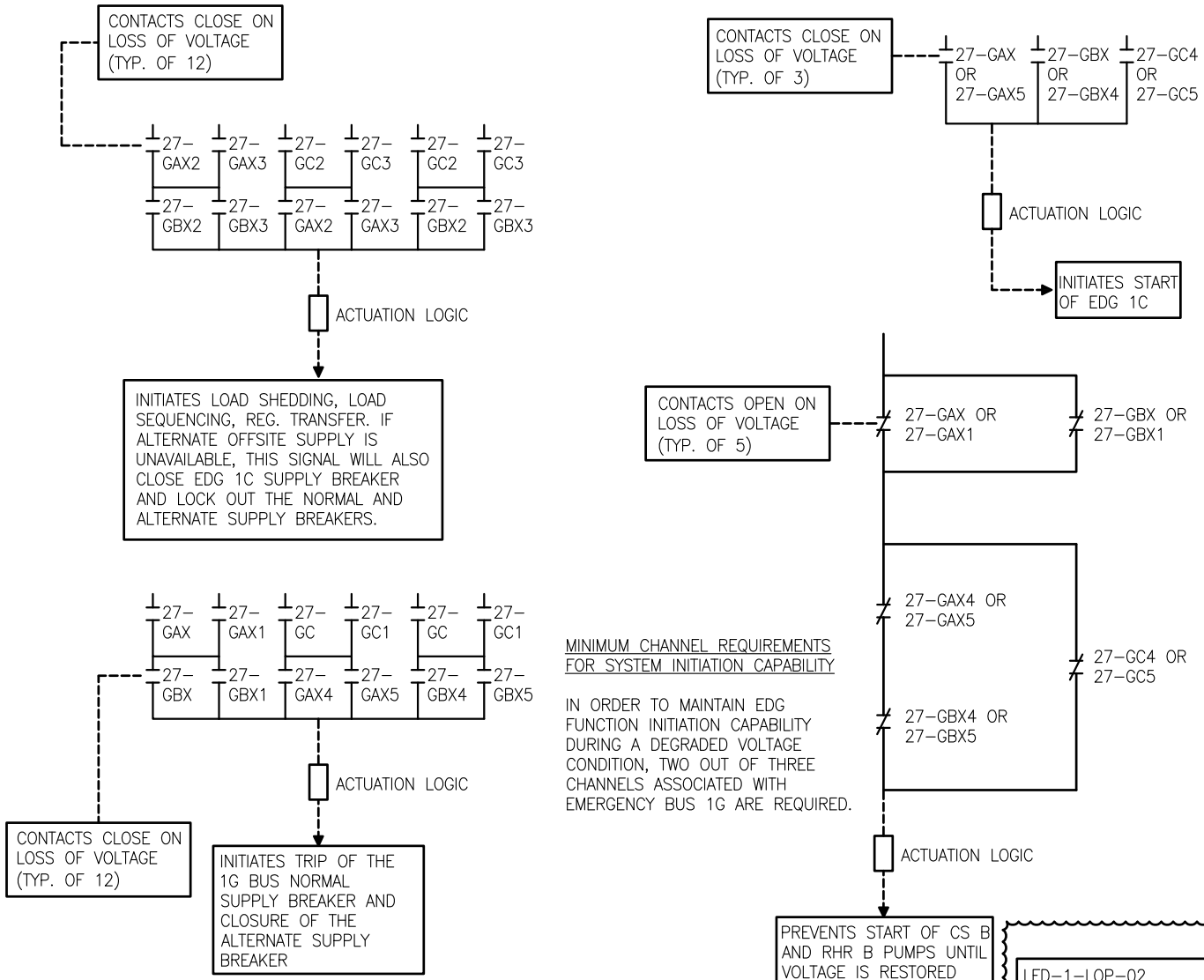
TS 3.3.8.1-1, ITEMS 2.A AND 2.B, 4.16KV EMERGENCY BUS, DEGRADED VOLTAGE AND TIME DELAY

REV. 116 3/5/2020

TRIP SYSTEM: 1G 4.16KV BUS CHANNELS



TRIP LOGICS



MINIMUM CHANNEL REQUIREMENTS FOR SYSTEM INITIATION CAPABILITY

IN ORDER TO MAINTAIN EDG FUNCTION INITIATION CAPABILITY DURING A DEGRADED VOLTAGE CONDITION, TWO OUT OF THREE CHANNELS ASSOCIATED WITH EMERGENCY BUS 1G ARE REQUIRED.

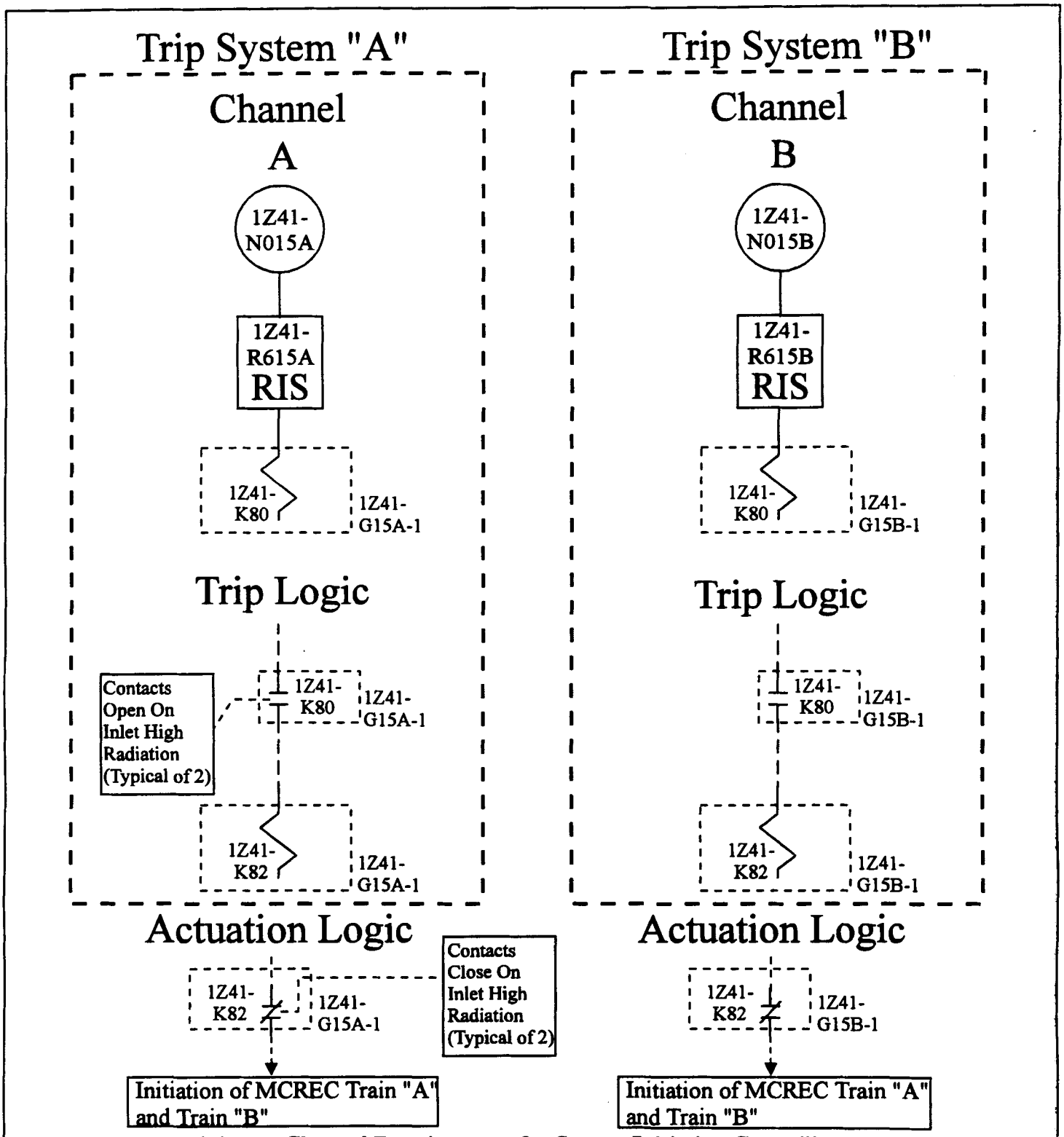
ELEM. REF.
H-13382 H-17111 H-17767 H-13414
H-17765 H-53345 H-17109 H-17766

LFD-1-LOP-02
SHEET 3 OF 3

TS 3.3.8.1-1, ITEMS 2.A AND 2.B, 4.16KV EMERGENCY BUS, DEGRADED VOLTAGE AND TIME DELAY

REV. 116 3/5/2020

LFD-1-LOP-03 - DELETED



Minimum Channel Requirements for System Initiation Capability:

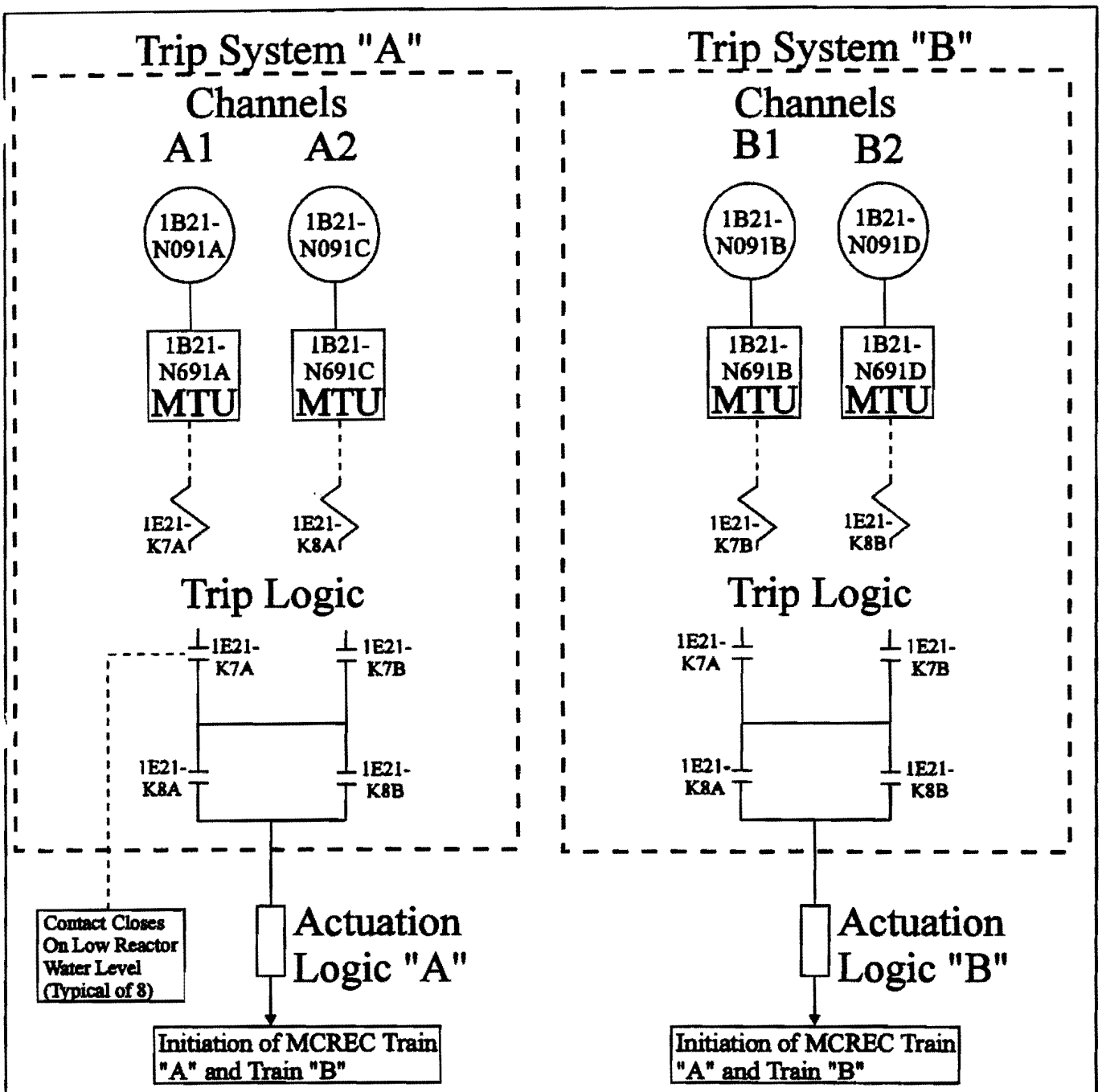
In order to maintain MCREC System initiation capability for the pressurization mode on Control Room air inlet high radiation, at least one channel is required to be operable or maintained in the tripped condition.

Elem. Ref.	
H-17069	H-17073
H-17070	H-17121
H-17071	H-17142

Prepared By: J.F. Burner

Reviewed By: Stephen Reed

LFD-1-MCREC-01	
TS 3.3.7.1 MCREC System Initiation Control Room Air Inlet Radiation - High	
Rev. 0	1/12/95



Minimum Channel Requirements for System Initiation Capability:

In order to maintain MCREC System initiation capability on Reactor Water Level - Low Low Low (Level 1), channels in one of the following combinations must be either functional or maintained in the tripped condition.

A1 and A2
A1 and B2
B1 and A2
B1 and B2

Elem. Ref.	
H-17109	H-19826
H-17121	H-19829
H-19823	H-19830

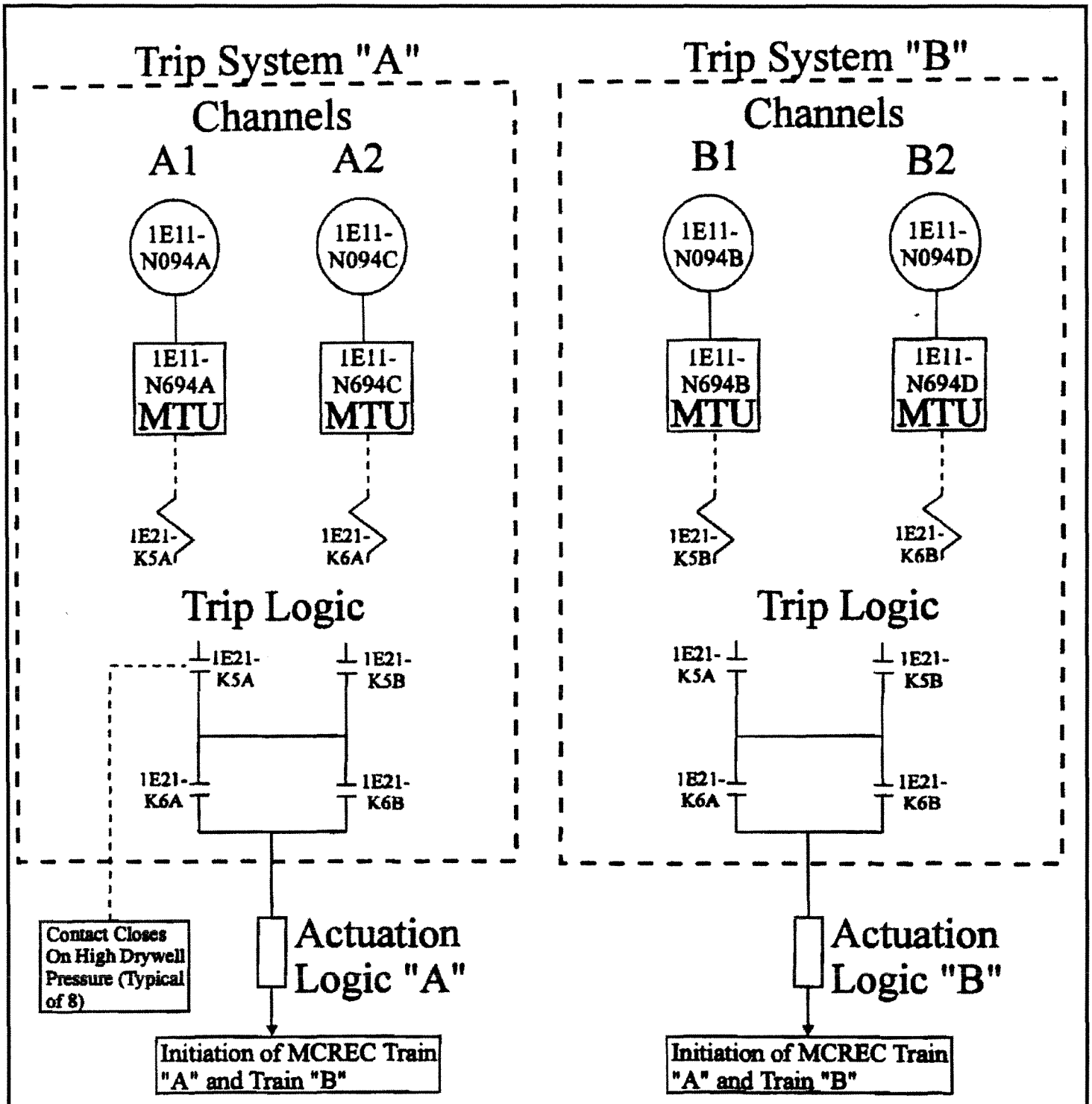
Prepared By: RLC

Reviewed By: [illegible]

LFD-1-MCREC-02

TRM T3.3.7-1, Item 1 MCREC System Instrumentation, Reactor Vessel Water Level - Low Low Low, Level 1

TRM REV. 60



Minimum Channel Requirements for System Initiation Capability:

In order to maintain MCREC System initiation capability on high Drywell pressure, channels in one of the following combinations must be either functional or maintained in the tripped condition.

A1 and A2
A1 and B2
B1 and A2
B1 and B2

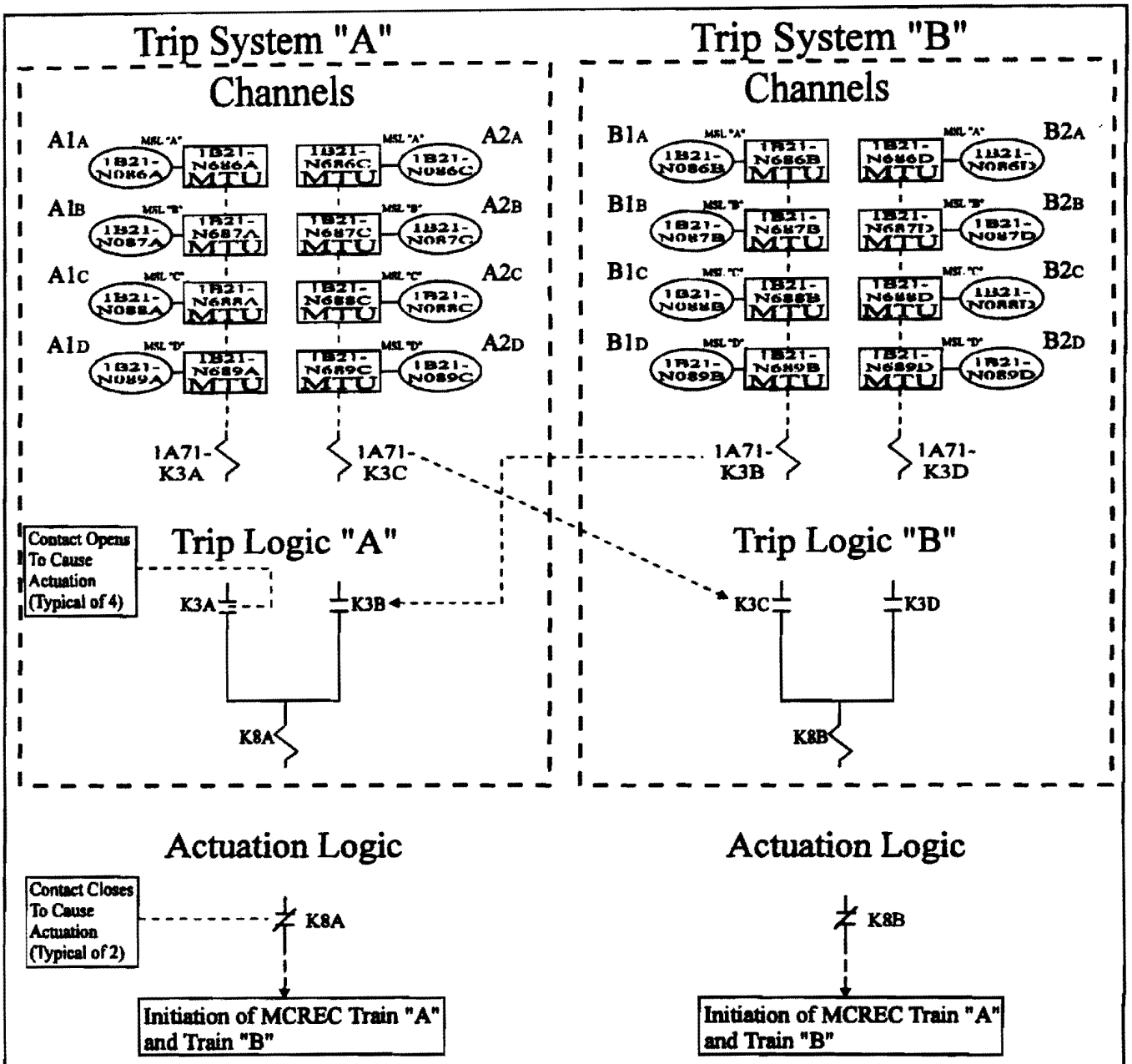
Elem. Ref.
H-17109 H-19827
H-17121 H-19830
H-19823
H-19826

Prepared By: B.G. Thigpin
Reviewed By: S.B. Tipps (printed) (signature)

LFD-1-MCREC-03

TRM T3.3.7-1, Item 2
MCREC System Instrumentation, Drywell Pressure-High

TRM Rev. 93



Minimum Channel Requirements for System Initiation Capability:

In order to maintain MCREC System initiation capability on Main Steam Line high flow, channels in one of the following combinations must be either functional or maintained in the tripped condition.

One A1 and One B1 Channel for Each Main Steam Line

OR

One A2 and One B2 Channel for Each Main Steam Line

Elem. References	
H-19809	H-17810
H-19812	H-17811
H-19815	H-17818
H-19818	H-17121

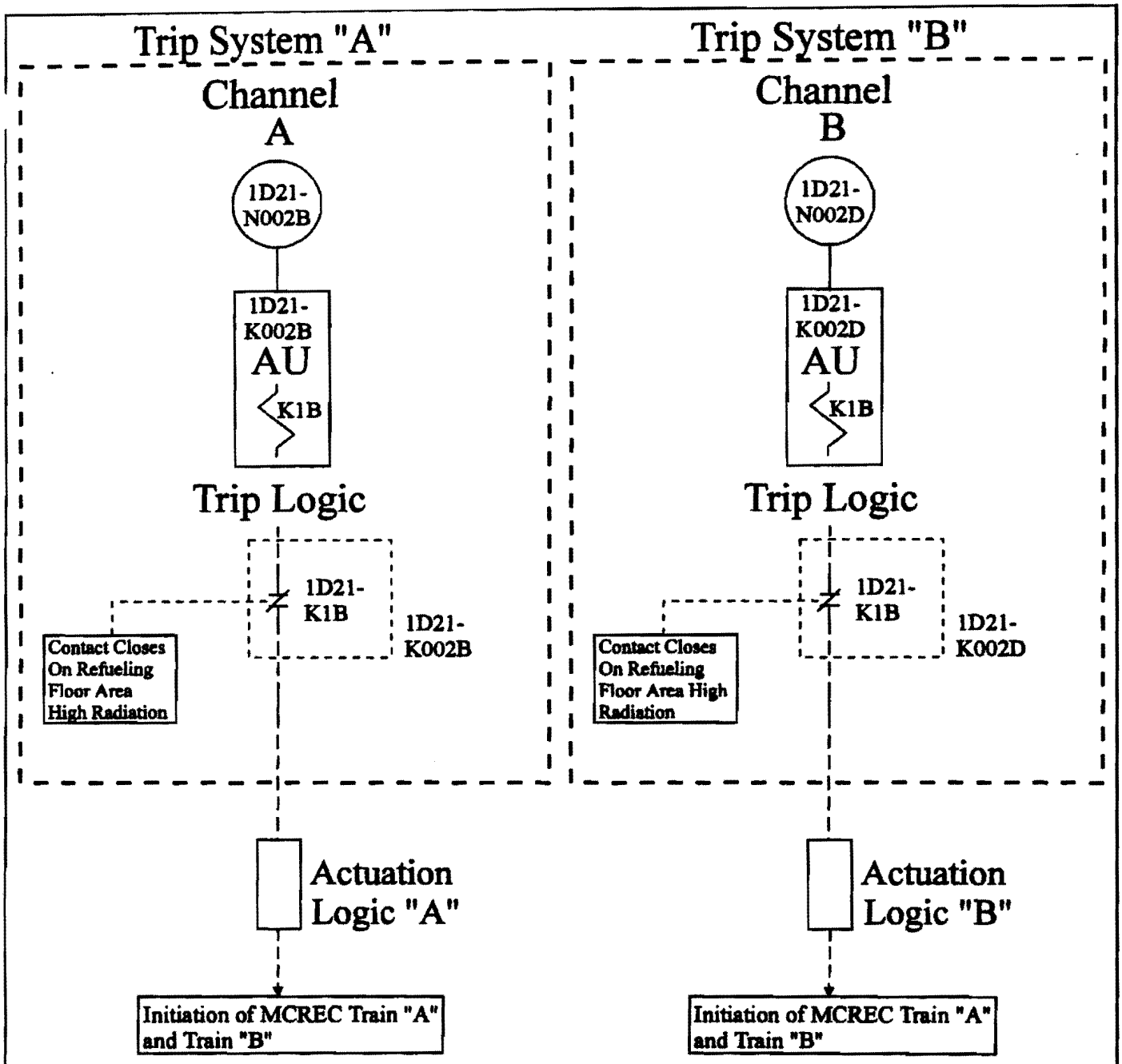
Prepared By: DLC

Reviewed By:

LFD-1-MCREC-04

TRM T3.3.7-1, Item 3 MCREC System Instrumentation, Main Steam Line Flow - High

TRM REV. 60



Minimum Channel Requirements for System Initiation Capability:

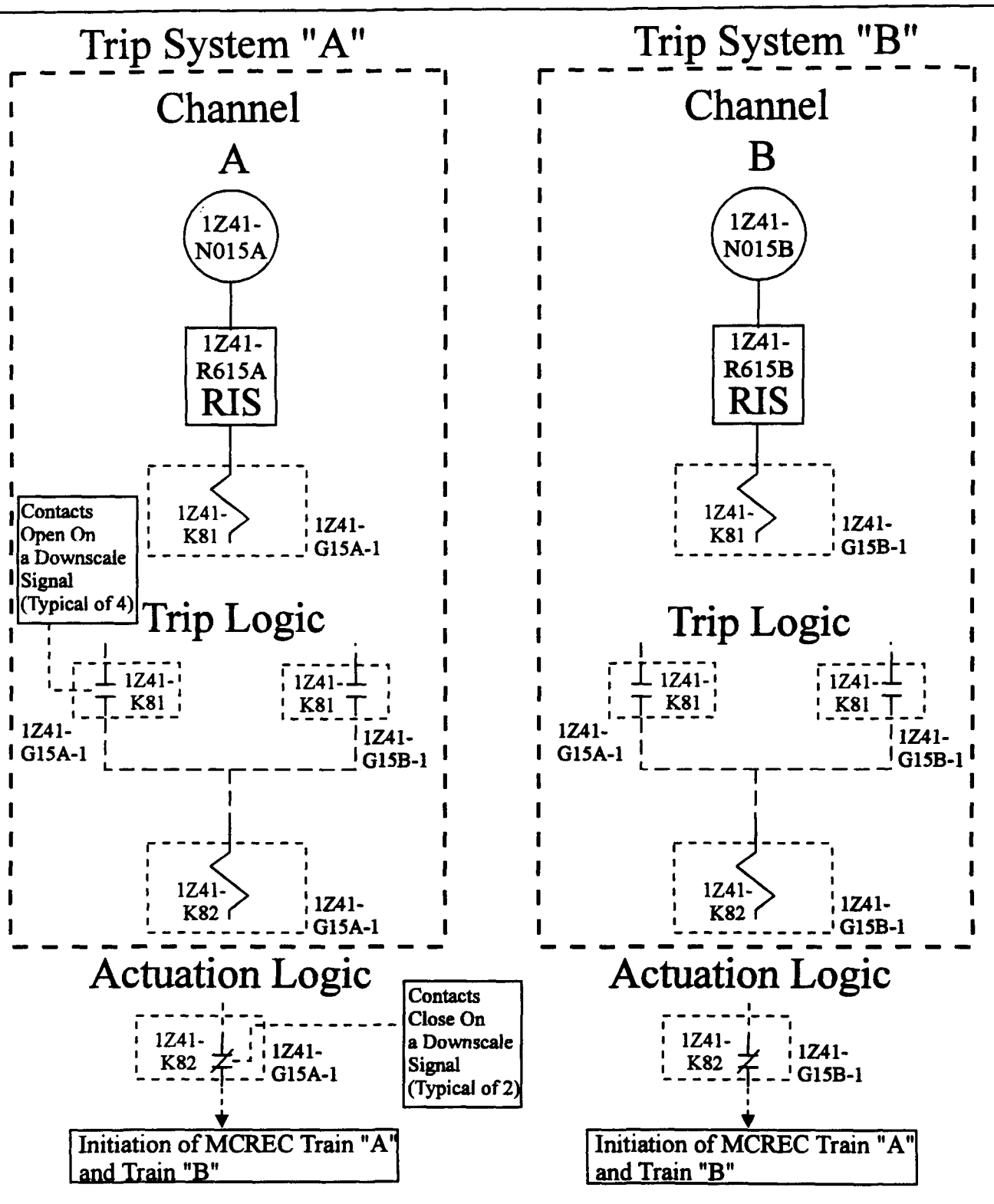
In order to maintain MCREC System initiation capability on Unit 1 Refueling Floor area high radiation, either channel A or channel B must be functional or maintained in the tripped condition.

Elem. Ref.
H-17854
H-17121

Prepared By: RLC

Reviewed By:

LFD-1-MCREC-05
TRM T3.3.7-1, Item 4
MCREC System Instrumentation, Refueling Floor Area Radiation - High
TRM REV. 60



Minimum Channel Requirements for System Initiation Capability:

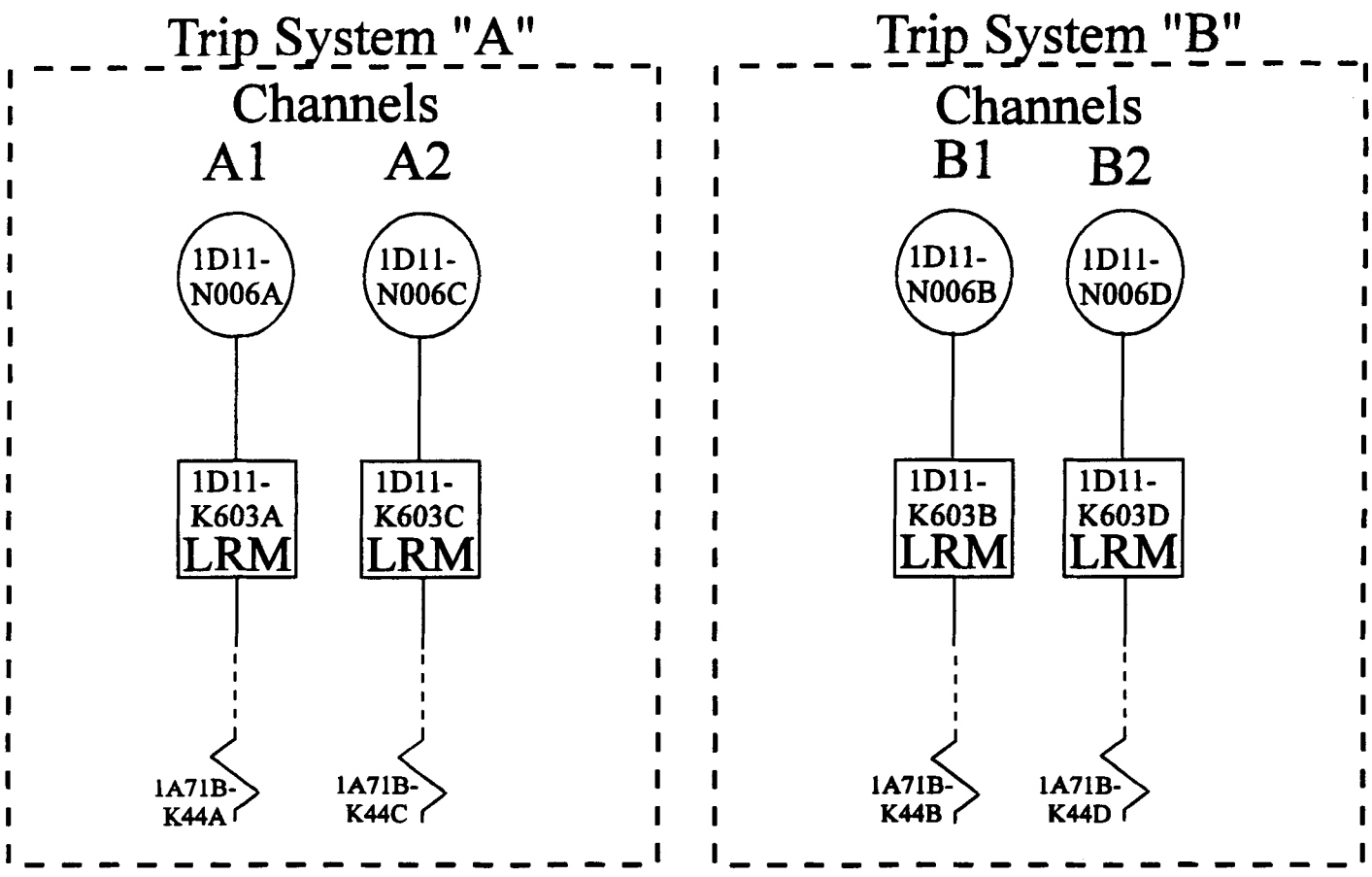
In order to maintain MCREC System initiation capability for the pressurization mode on a Main Control Room Intake Radiation Monitor downscale signal, each channel must be operable or maintained in the tripped condition.

LFD-1-MCREC-06
TRM T3.3.7-1, Item 5 MCREC System Instrumentation, Main Control Room Intake Radiation - Downscale
Rev. 0 1/13/95

Elem. Ref.
H-17121
H-17142

Prepared By: _____

Reviewed By: _____



Refer to sheet 2 of 2 for the trip logic, actuation logic and the minimum channels required to maintain functional capability regarding isolation of the Reactor Water Sample line and tripping of the Steam Packing Exhausters and the Mechanical Vacuum Pump. Both functions must be considered in determining the channel minimum requirements.

Elem. Ref.

H-13377 H-17790 H-17811
H-17076 H-17804 H-17812
H-17077 H-17805 H-17814
H-17789 H-17810 H-19556

Prepared By: J. R. Brunner

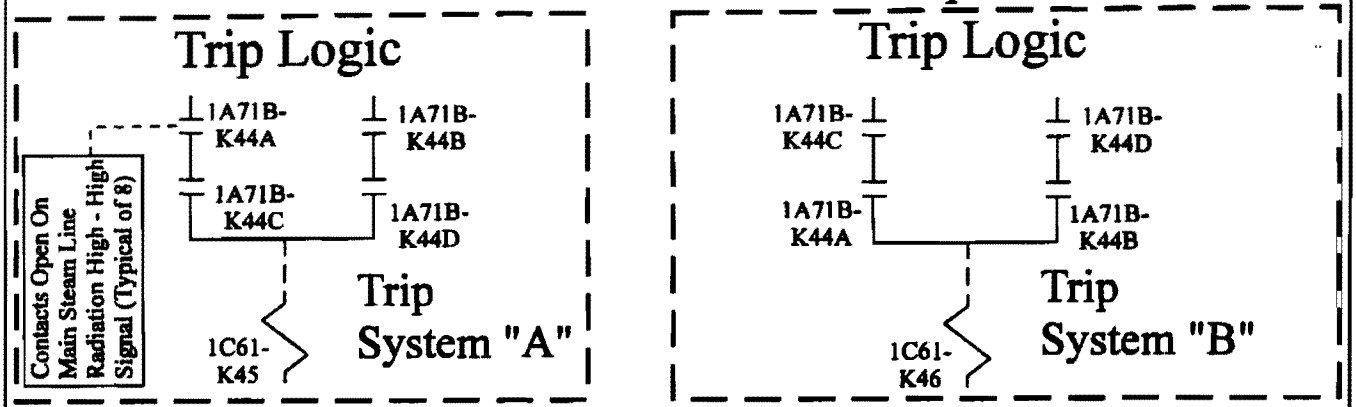
Reviewed By: M. Wayne

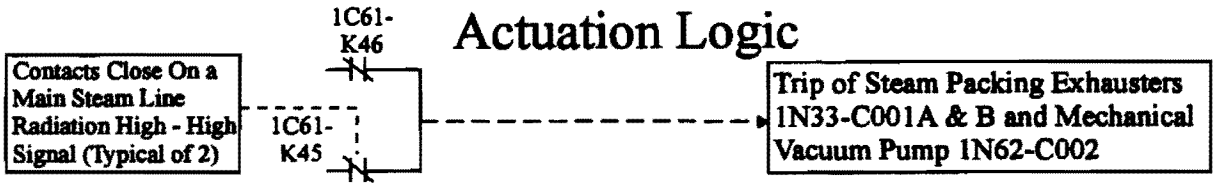
LFD-1-MSLR-01
Sheet 1 of 2

TRM T3.3.11
Main Steam Line
Radiation High - High

Rev. 0 3/30/95

Trip of Steam Packing Exhausters and Mechanical Vacuum Pump



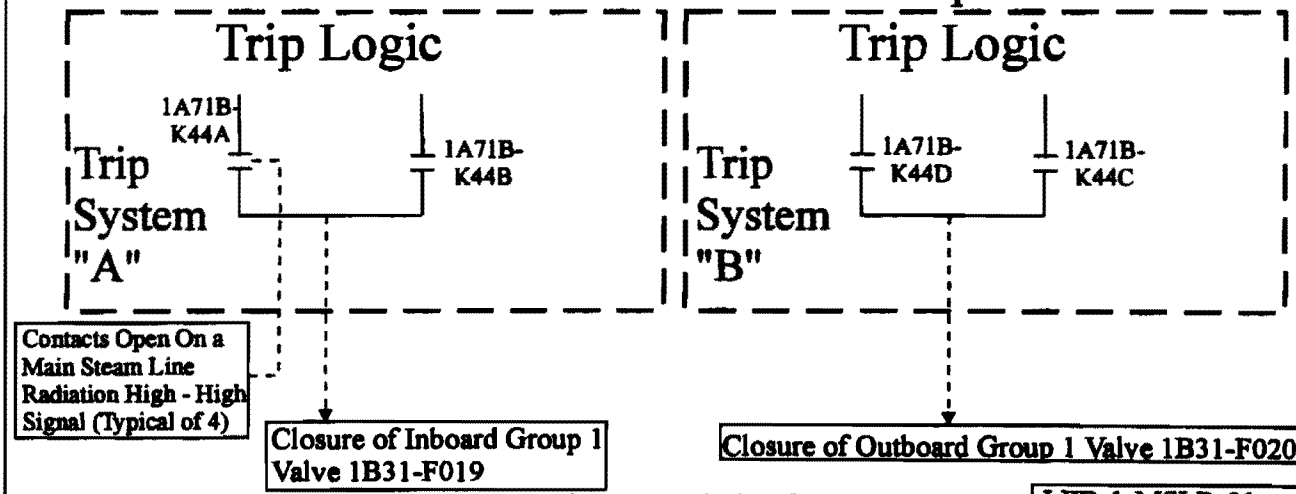


Minimum Channel Requirements for System Initiation Capability:

In order to maintain trip capability of the Steam Packing Exhausters and the Mechanical Vacuum Pump on a Main Steam Line Radiation high - high condition, channels in one of the following combinations must either be functional or maintained in the tripped condition.

A1 or A2
and
B1 or B2

Closure of the Reactor Water Sample Valves



Minimum Channel Requirements for System Isolation Capability:

In order to maintain isolation capability of the Reactor Water Sample line on a Main Steam Line Radiation high - high condition, channels in one of the following combinations must either be functional or maintained in the tripped condition.

A1 and B1
OR
A2 and B2

Elem. Ref.: See sheet 1.

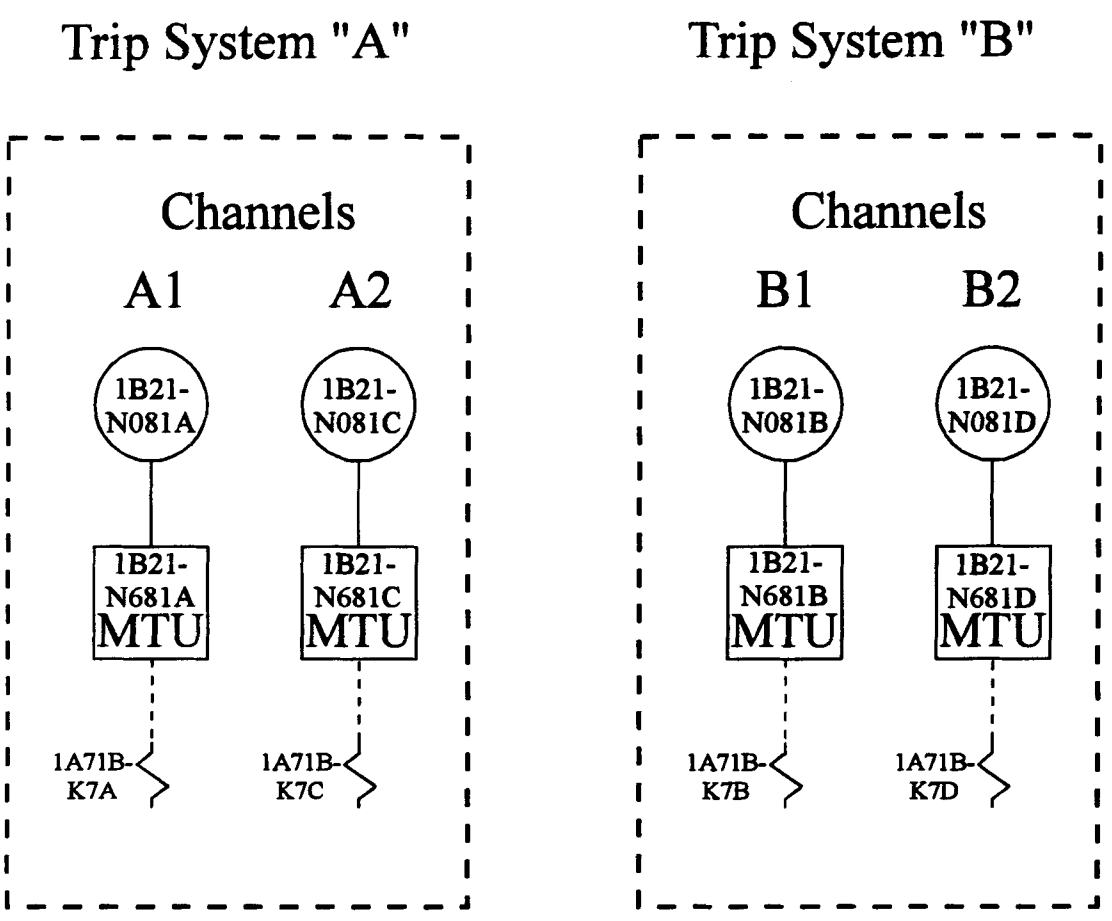
Prepared By: RLC

Reviewed By:

LFD-1-MSLR-01
Sheet 2 of 2

TRM T3.3.11
Main Steam Line
Radiation High - High

TRM REV. 60



Minimum Channel Requirements for System Isolation Capability:

See Sheet 2 of 2.

Elem. Ref.	
H-17810	H-17816
H-17811	H-19809
H-17812	H-19812
H-17813	H-19815
H-17814	H-19818
H-17815	

Prepared By:

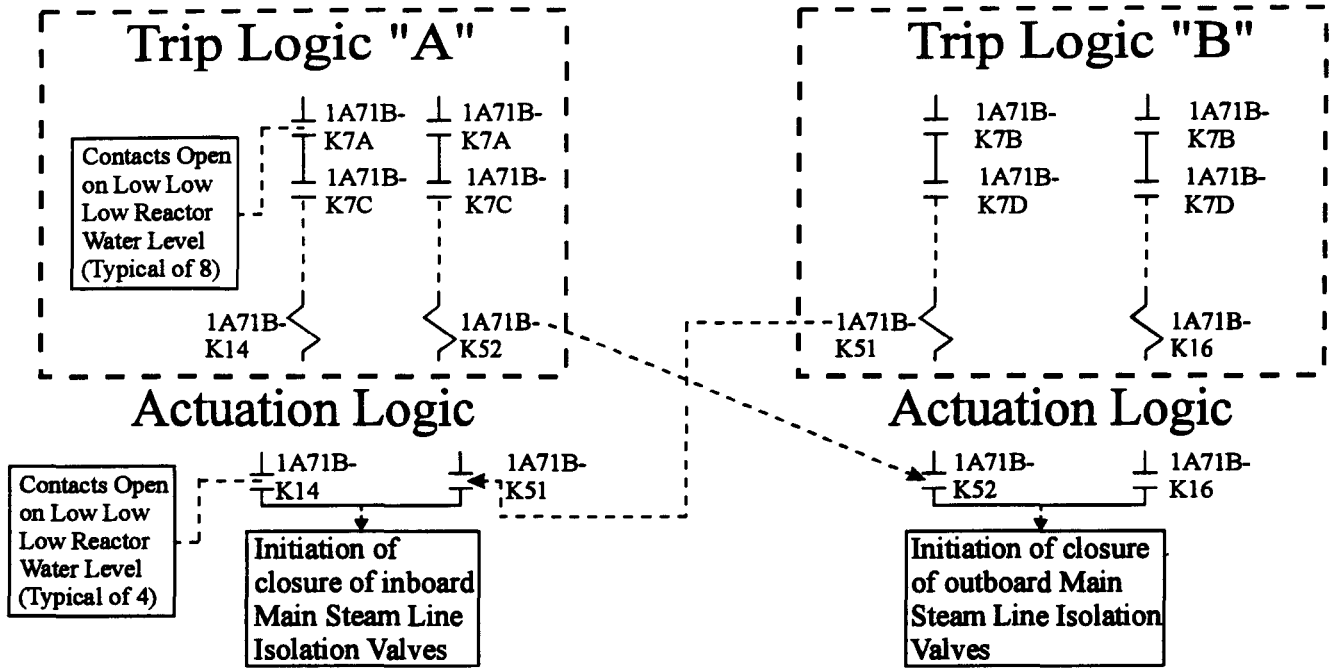
Reviewed By:

LFD-1-PCIS-01
Sheet 1 of 2

TS 3.3.6.1-1, Item 1.a
Main Steam Line Isolation - Reactor Vessel Water Level - Low Low Low, Level 1

Rev. 0 1/13/95

Main Steam Line Isolation Valve Isolation Function

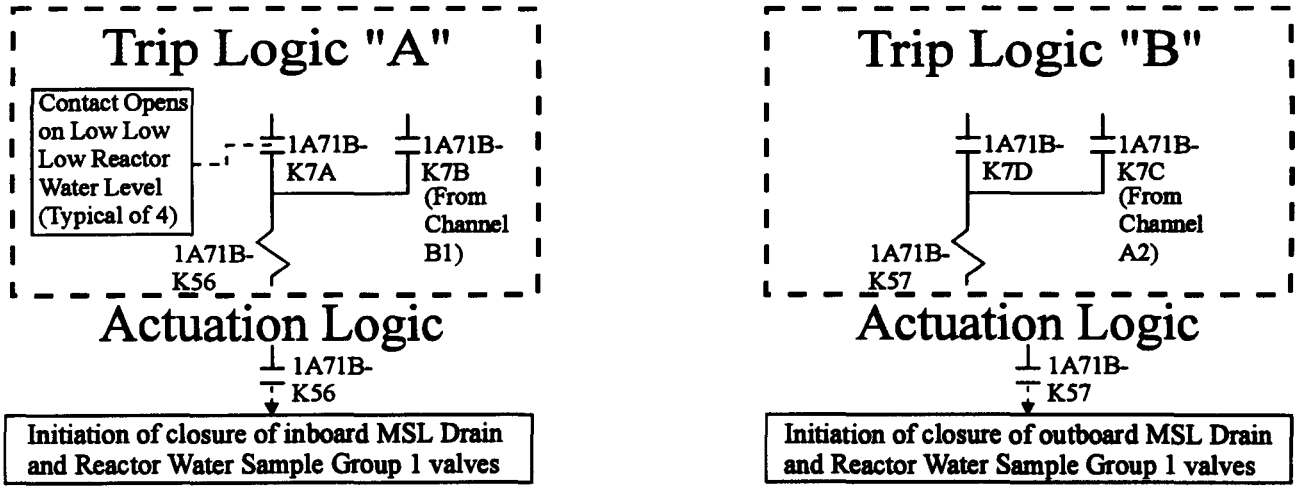


Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the main steam lines on low low low reactor vessel water level, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 or A2
AND
B1 or B2

Drain Line and Reactor Water Sample Line Valve Isolation Function



Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the main steam line drain and reactor water sample lines on low low low reactor vessel water level, channels in one of the following combinations must be either operable or maintained in the tripped condition.

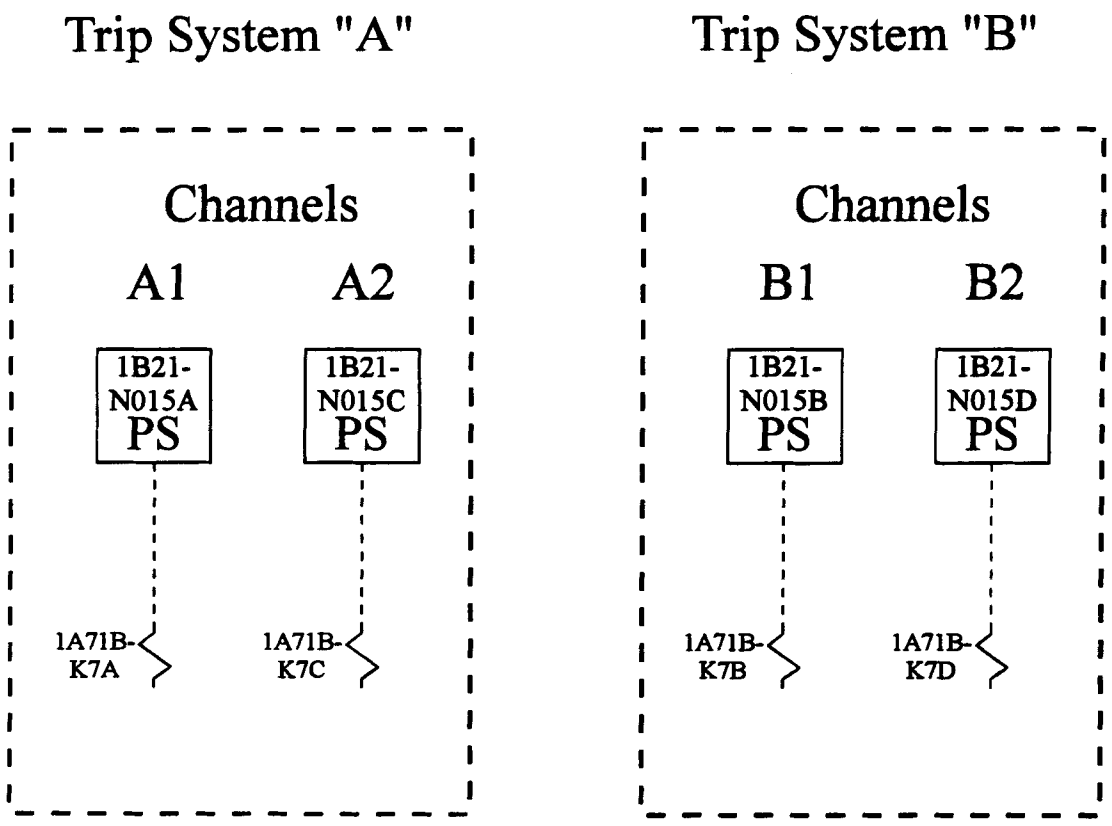
A1 and B1
OR
A2 and B2

Elem. Ref.	
H-17810	H-17816
H-17811	H-19809
H-17812	H-19812
H-17813	H-19815
H-17814	H-19818
H-17815	

LFD-1-PCIS-01
Sheet 2 of 2

TS 3.3.6.1-1, Item 1.a
Main Steam Line Isolation - Reactor Vessel Water Level - Low Low Low, Level 1

Rev. 0 1/13/95



Minimum Channel Requirements for System Isolation Capability:

See Sheet 2 of 2.

Elem. Ref.	
H-17810	H-17814
H-17811	H-17815
H-17812	H-17816
H-17813	

Prepared By:

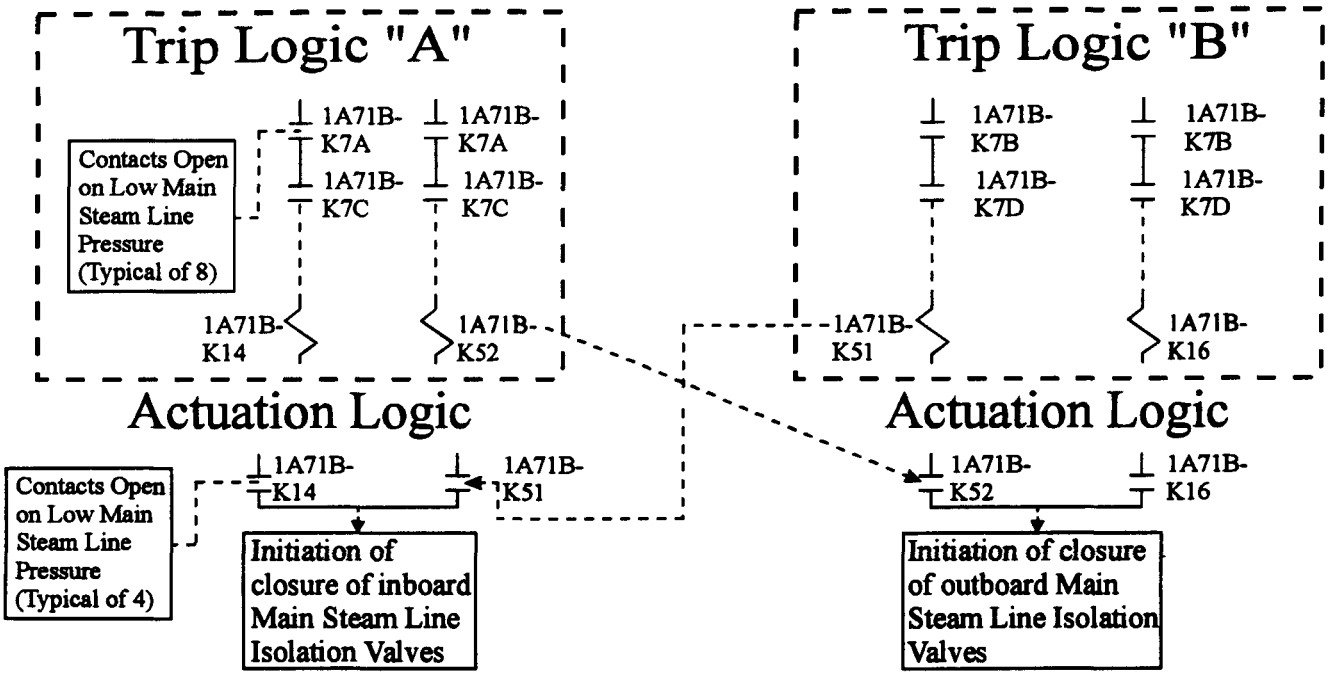
Reviewed By:

LFD-1-PCIS-02
Sheet 1of 2

TS 3.3.6.1-1, Item 1.b
Main Steam Line Isolation - Main Steam Line Pressure - Low

Rev. 0 1/13/95

Main Steam Line Isolation Valve Isolation Function

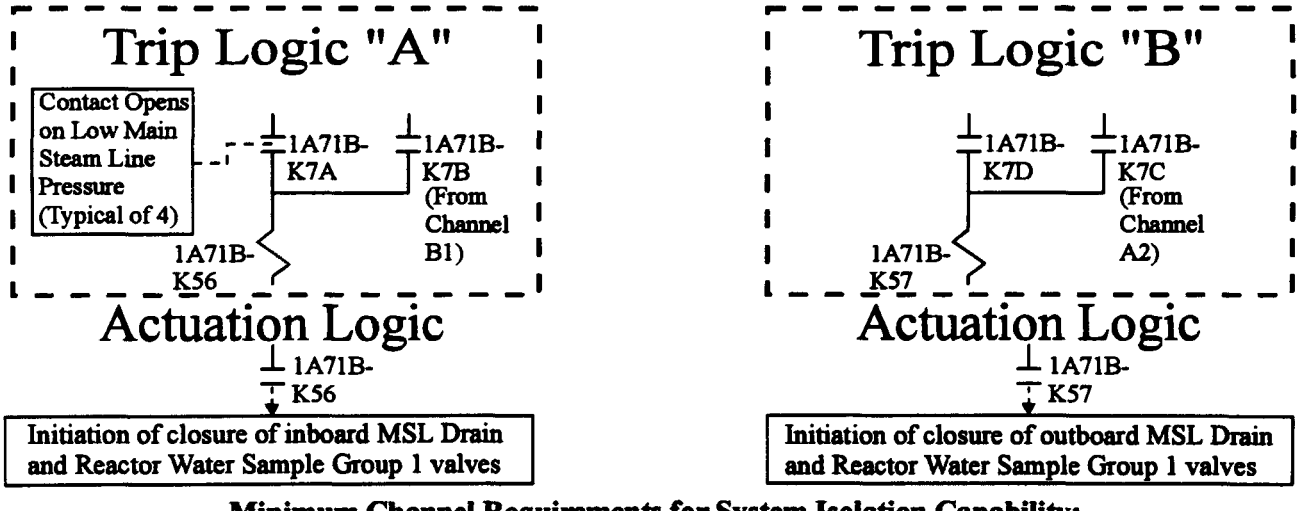


Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the main steam lines on low main steam line pressure, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 or A2
AND
B1 or B2

Drain Line and Reactor Water Sample Line Valve Isolation Function



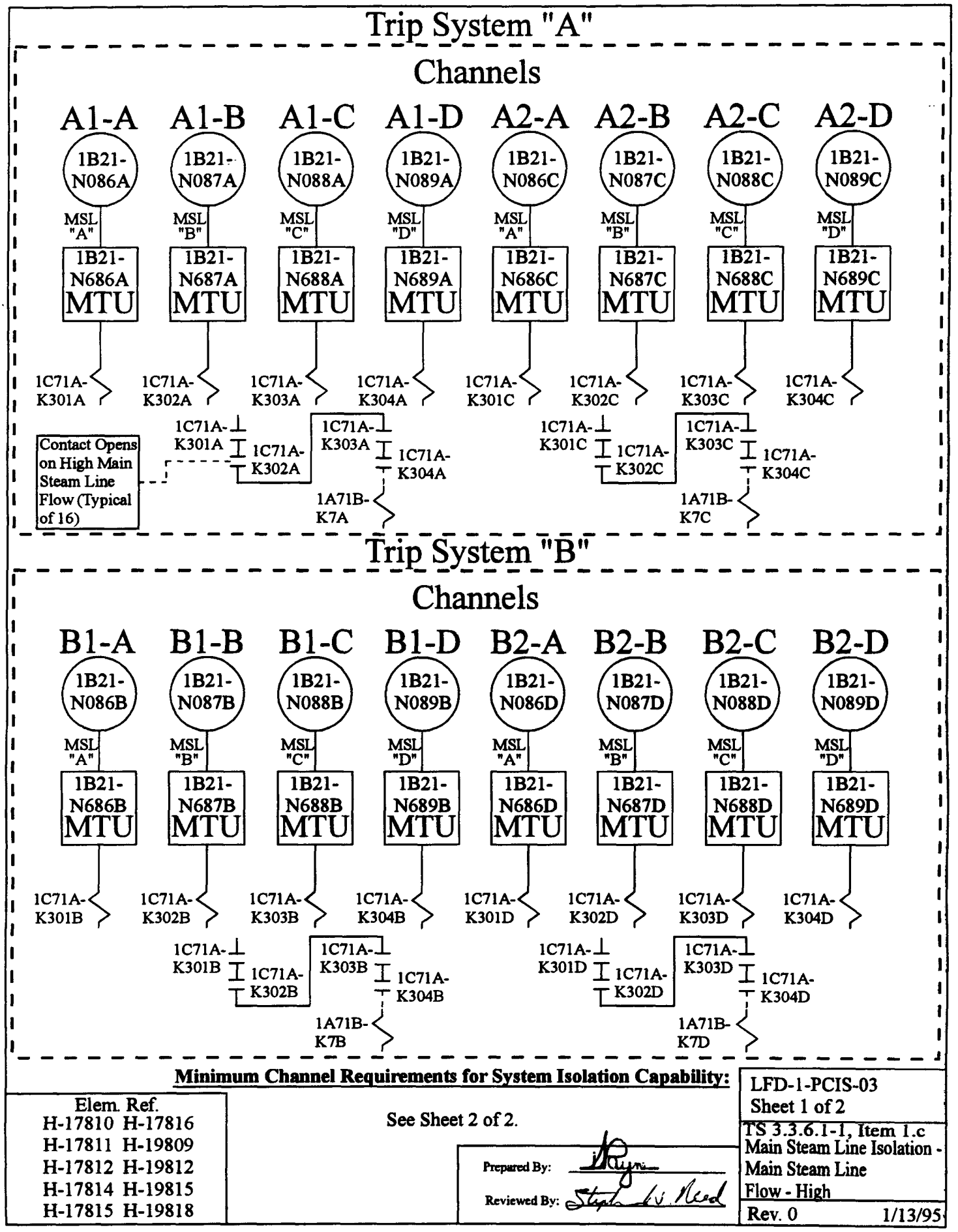
Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the main steam line drain and reactor water sample lines on low main steam line pressure, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 and B1
OR
A2 and B2

Elem. Ref.	
H-17810	H-17814
H-17811	H-17815
H-17812	H-17816
H-17813	

LFD-1-PCIS-02 Sheet 2 of 2	
TS 3.3.6.1-1, Item 1.b Main Steam Line Isolation - Main Steam Line Pressure - Low	
Rev. 0	1/13/95



Minimum Channel Requirements for System Isolation Capability:

Elem. Ref.
H-17810 H-17816
H-17811 H-19809
H-17812 H-19812
H-17814 H-19815
H-17815 H-19818

See Sheet 2 of 2.

Prepared By:

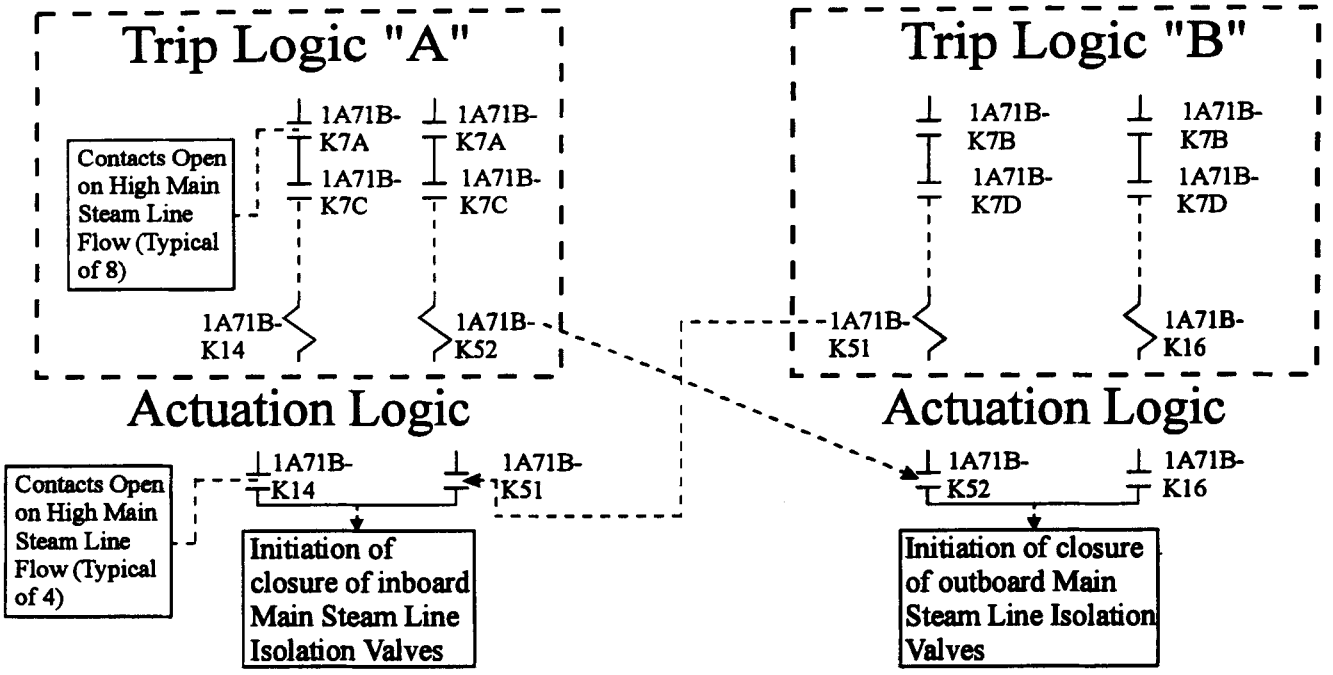
Reviewed By:

LFD-1-PCIS-03
Sheet 1 of 2

TS 3.3.6.1-1, Item 1.c
Main Steam Line Isolation - Main Steam Line Flow - High

Rev. 0 1/13/95

Main Steam Line Isolation Valve Isolation Function

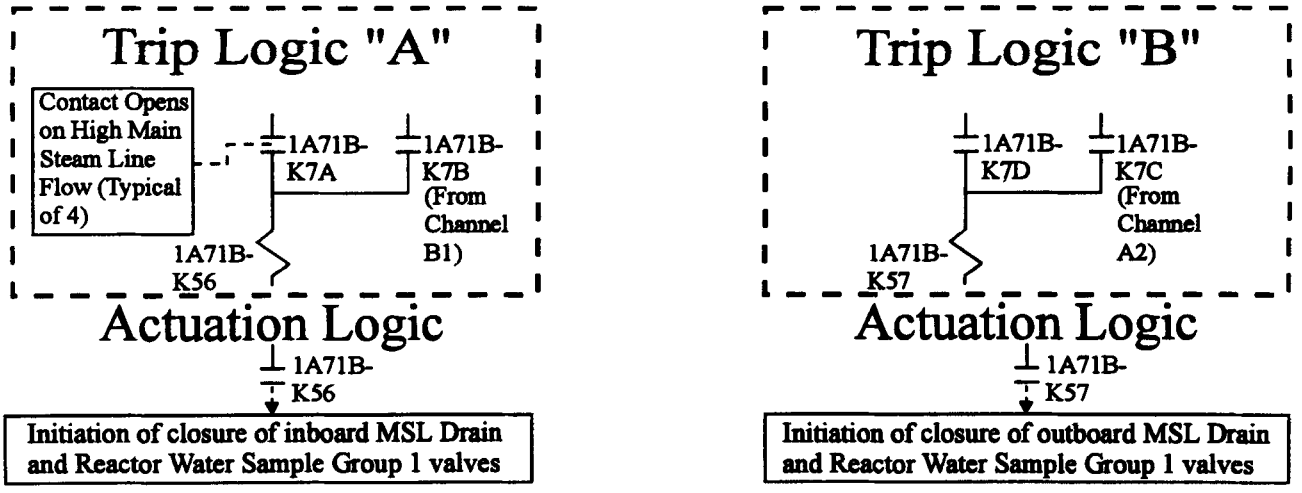


Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate a main steam line on high main steam line flow, channels in one of the following combinations must be either operable or maintained in the tripped condition.

One A channel AND one B channel for EACH main steam line

Drain Line and Reactor Water Sample Line Valve Isolation Function

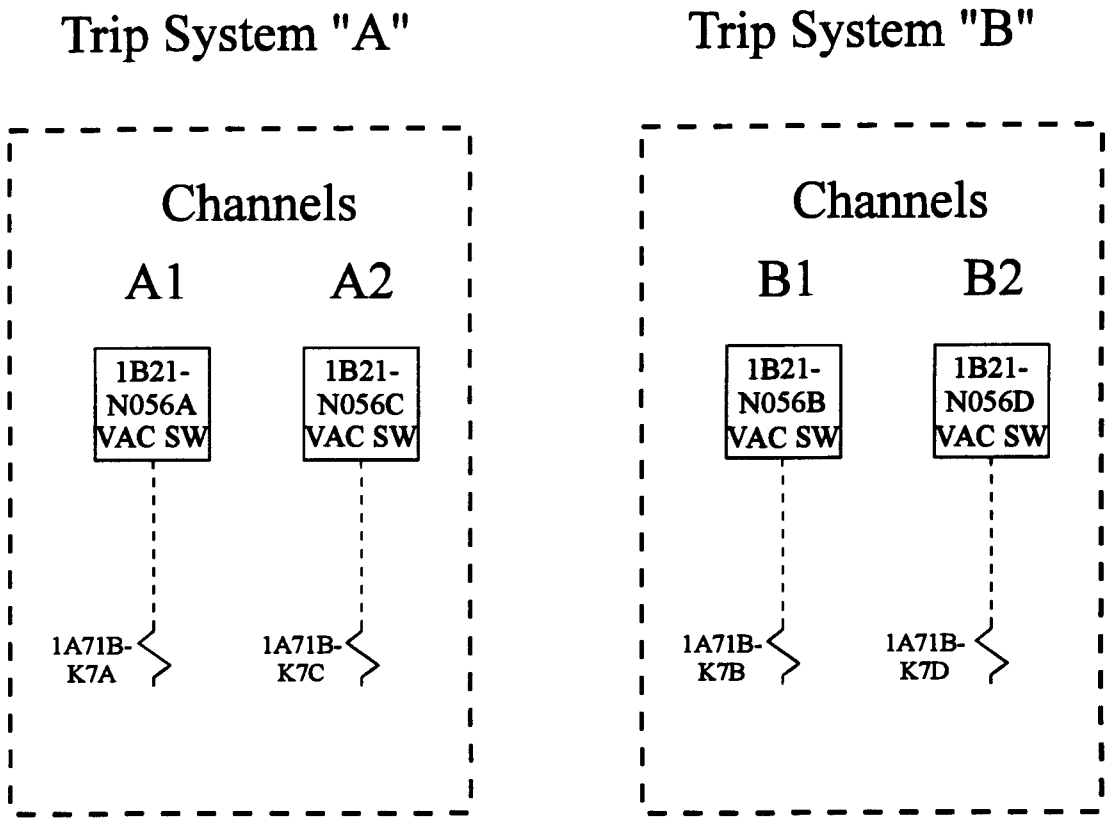


Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the main steam line drain and reactor water sample lines on high main steam line flow, channels in one of the following combinations must be either operable or maintained in the tripped condition.

Elem. Ref.	
H-17810 H-17816 H-17811 H-19809 H-17812 H-19812 H-17814 H-19815 H-17815 H-19818	One A1 channel and one B1 channel for EACH main steam line OR One A2 channel and one B2 channel for EACH main steam line

LFD-1-PCIS-03 Sheet 2 of 2	
TS 3.3.6.1-1, Item 1.c Main Steam Line Isolation - Main Steam Line Flow - High	
Rev. 0	1/13/95



Minimum Channel Requirements for System Isolation Capability:

See Sheet 2 of 2.

Elem. Ref.	
H-17810	H-17814
H-17811	H-17815
H-17812	H-17816
H-17813	

Prepared By:

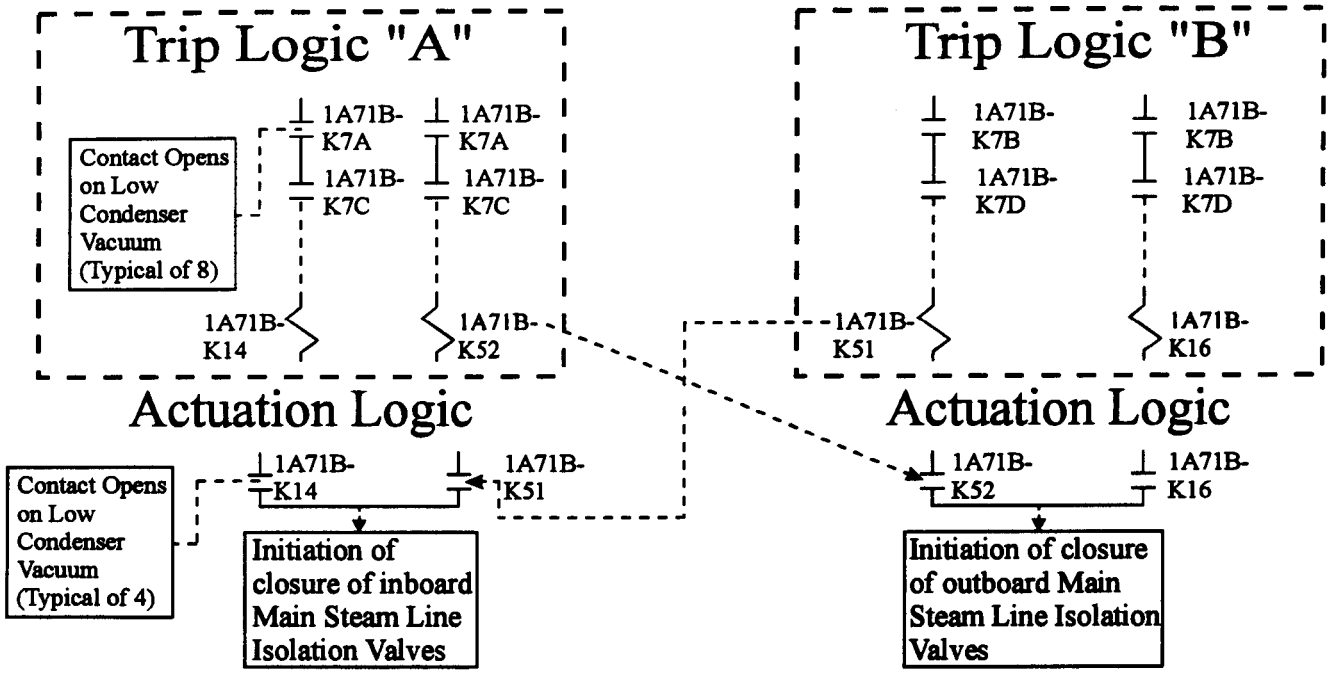
Reviewed By:

LFD-1-PCIS-04
Sheet 1 of 2

TS 3.3.6.1-1, Item 1.d
Main Steam Line Isolation - Condenser Vacuum - Low

Rev. 0 1/13/95

Main Steam Line Isolation Valve Isolation Function

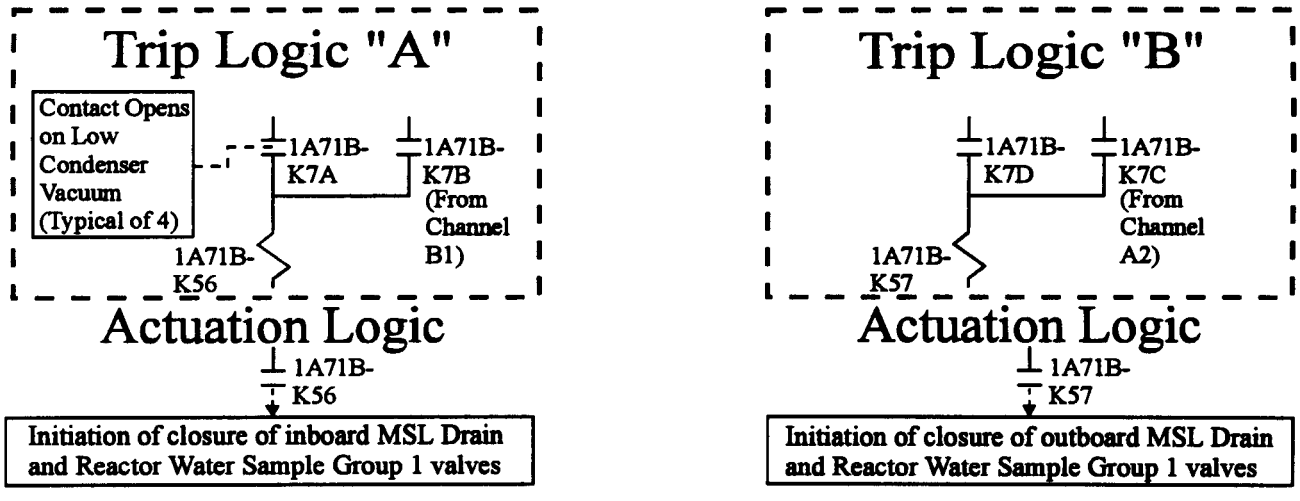


Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the main steam lines on low condenser vacuum, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 or A2
AND
B1 or B2

Drain Line and Reactor Water Sample Line Valve Isolation Function



Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the main steam line drain and reactor water sample lines on low condenser vacuum, channels in one of the following combinations must be either operable or maintained in the tripped condition.

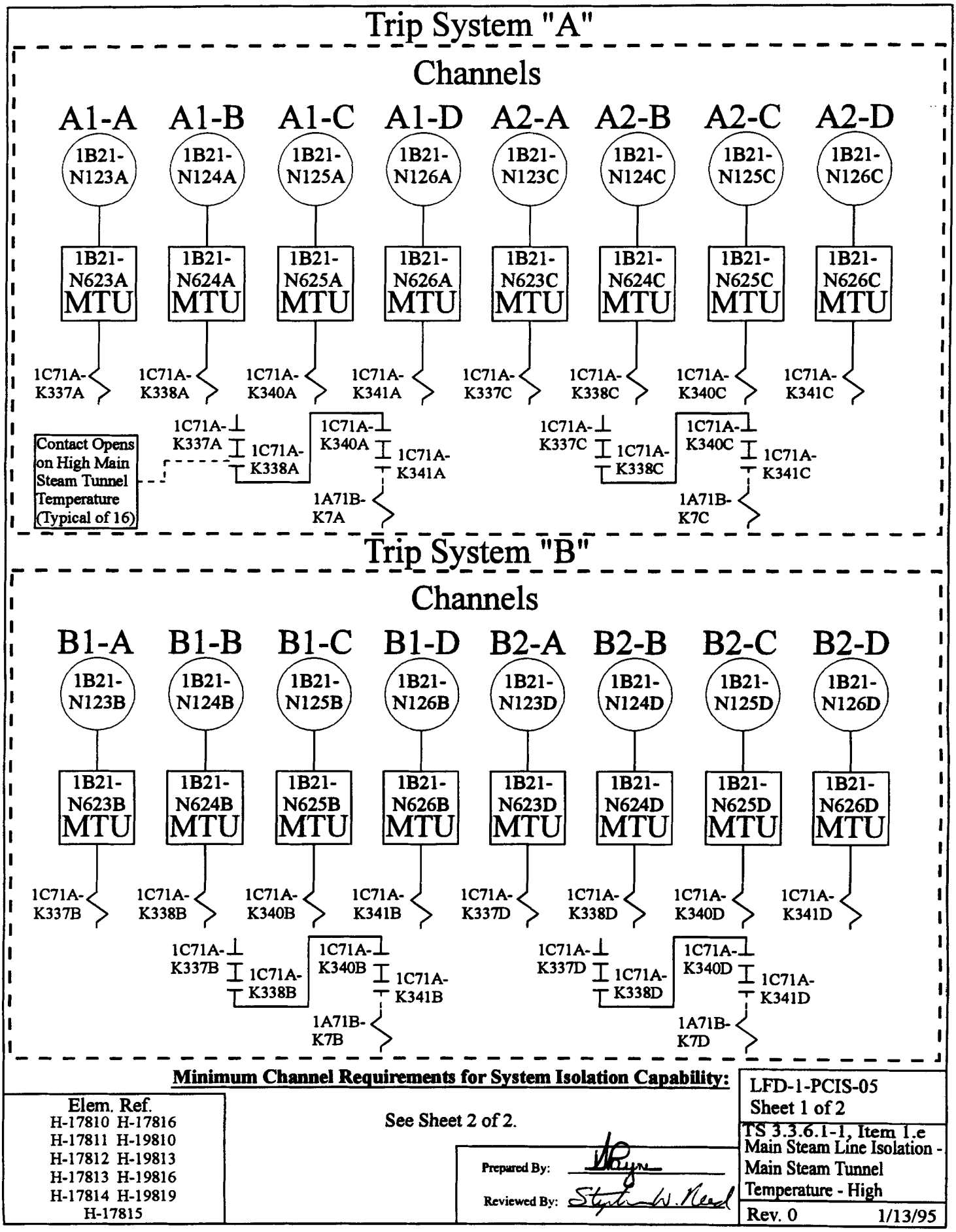
A1 and B1
OR
A2 and B2

Elem. Ref.	
H-17810	H-17814
H-17811	H-17815
H-17812	H-17816
H-17813	

LFD-1-PCIS-04
Sheet 2 of 2

TS 3.3.6.1-1, Item 1.d
Main Steam Line Isolation - Condenser Vacuum - Low

Rev. 0 1/13/95



Minimum Channel Requirements for System Isolation Capability:

See Sheet 2 of 2.

Elem. Ref.
H-17810 H-17816
H-17811 H-19810
H-17812 H-19813
H-17813 H-19816
H-17814 H-19819
H-17815

Prepared By: [signature]

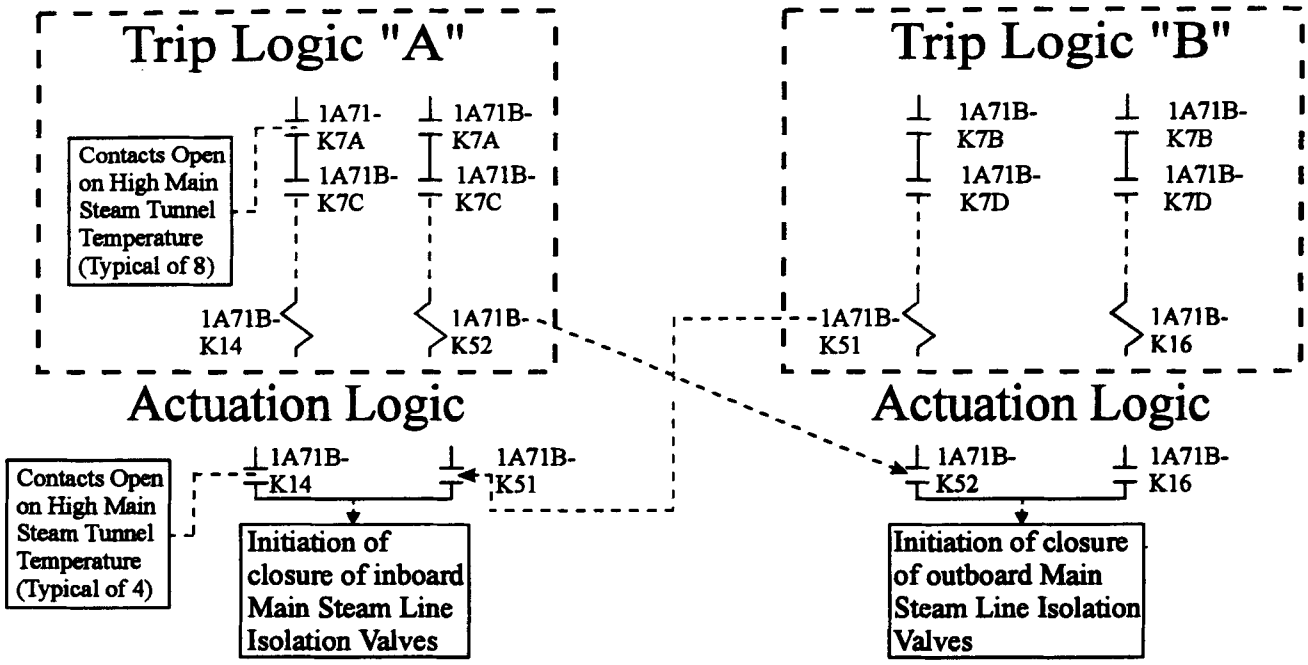
Reviewed By: [signature]

LFD-1-PCIS-05
Sheet 1 of 2

TS 3.3.6.1-1, Item 1.e
Main Steam Line Isolation - Main Steam Tunnel Temperature - High

Rev. 0 1/13/95

Main Steam Line Isolation Valve Isolation Function

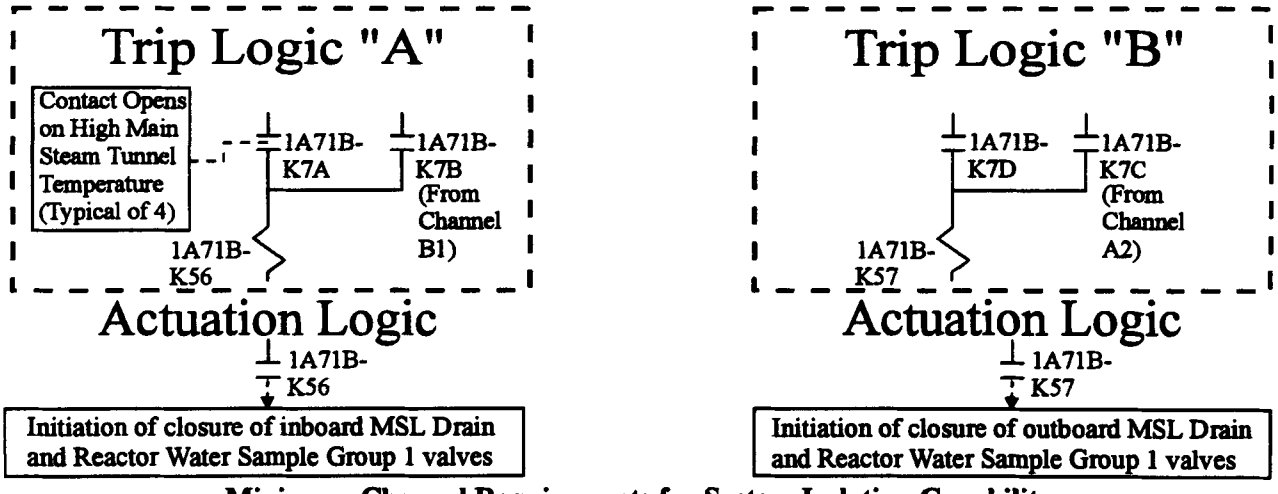


Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the main steam lines on high main steam tunnel temperature, channels in one of the following combinations must be either operable or maintained in the tripped condition.

One A1 channel or one A2 channel
AND
One B1 channel or one B2 channel

Drain Line and Reactor Water Sample Line Valve Isolation Function



Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the main steam line drain and reactor water sample lines on high main steam tunnel temperature, channels in one of the following combinations must be either operable or maintained in the tripped condition.

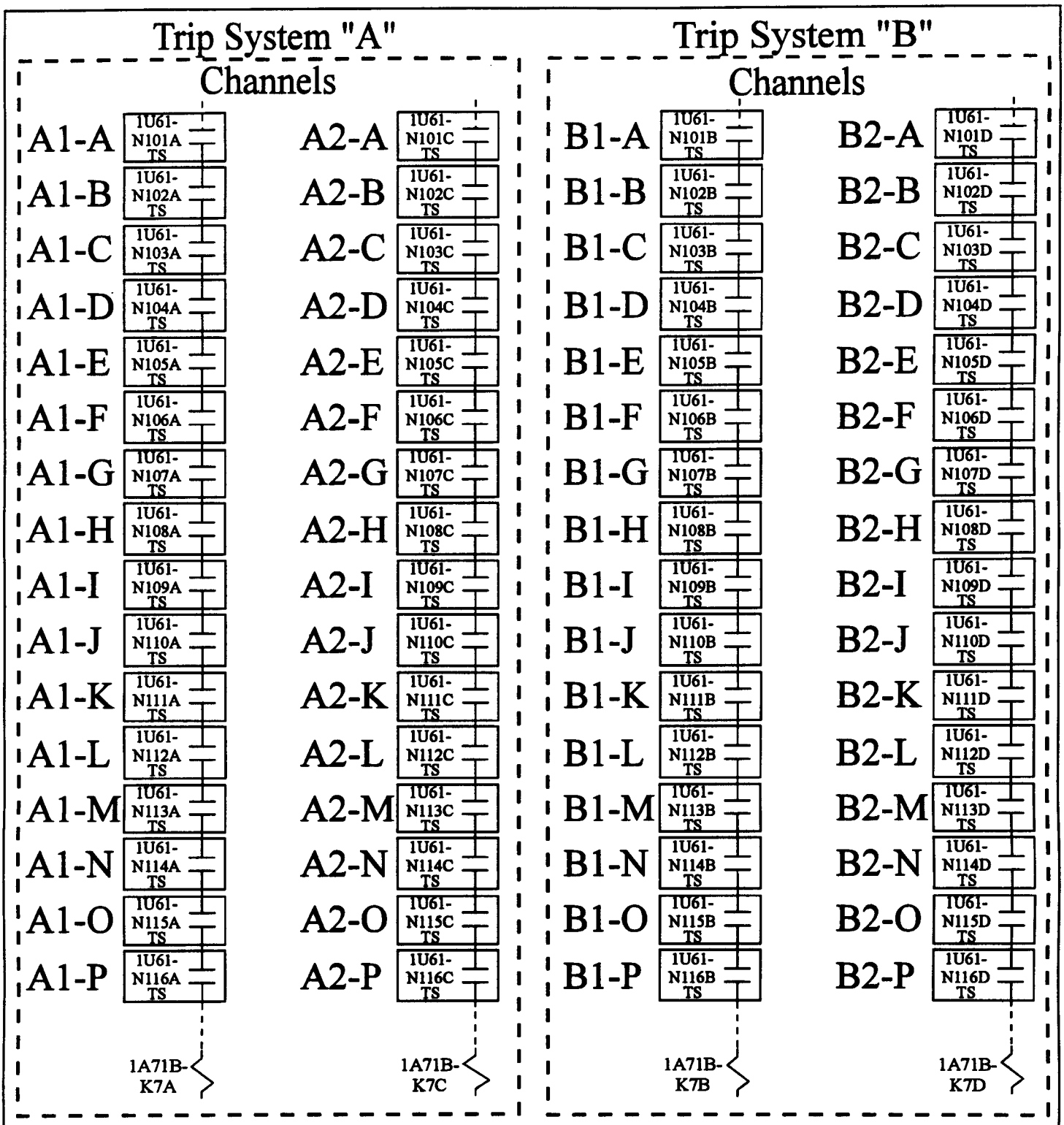
One A1 channel and one B1 channel
OR
One A2 channel and one B2 channel

Elem. Ref.
H-17810 H-17816
H-17811 H-19810
H-17812 H-19813
H-17813 H-19816
H-17814 H-19819
H-17815

LFD-1-PCIS-05
Sheet 2 of 2

TS 3.3.6.1-1, Item 1.e
Main Steam Line Isolation - Main Steam Tunnel Temperature - High

Rev. 0 1/13/95



Minimum Channel Requirements for System Isolation Capability:

See Sheet 2 of 4.

Elem. Ref.	
H-17810	H-17814
H-17811	H-17815
H-17812	H-17816
H-17813	H-16071

Prepared By: _____

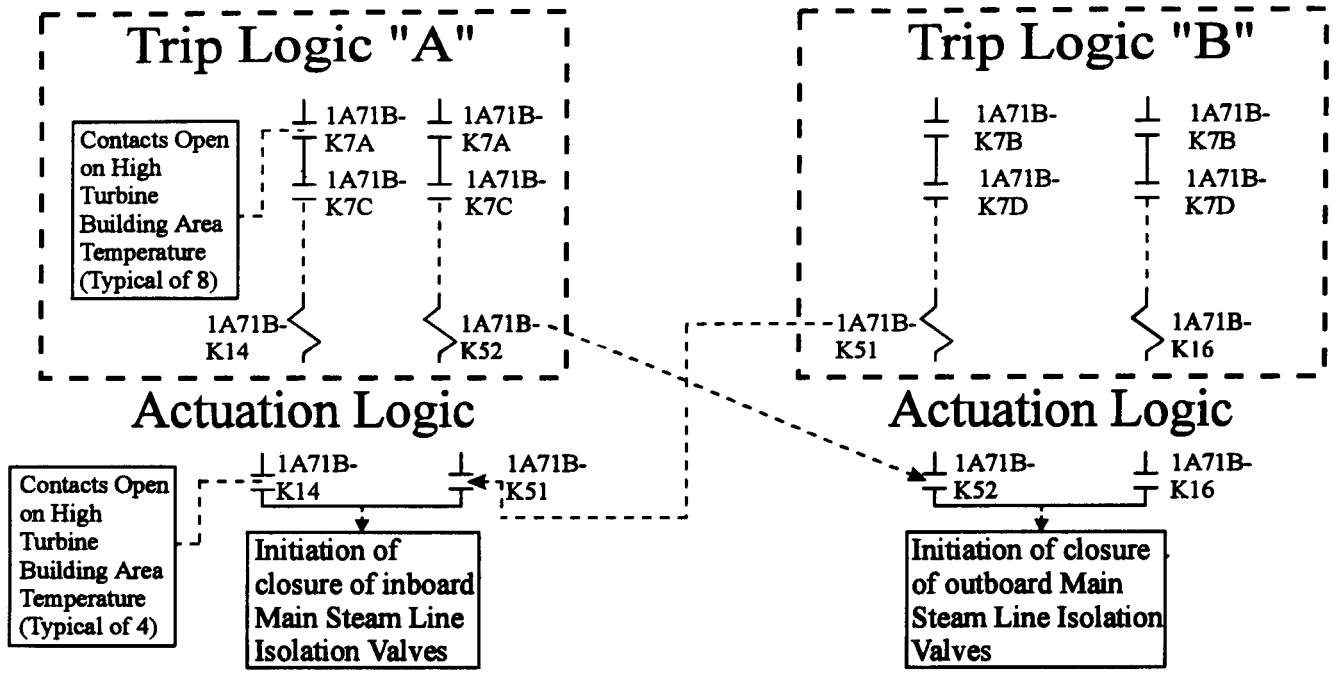
Reviewed By: _____

LFD-1-PCIS-06
Sheet 1 of 4

TS 3.3.6.1-1, Item 1.f
Main Steam Line Isolation - Turbine Building Area Temperature - High

Rev. 0 4/4/95

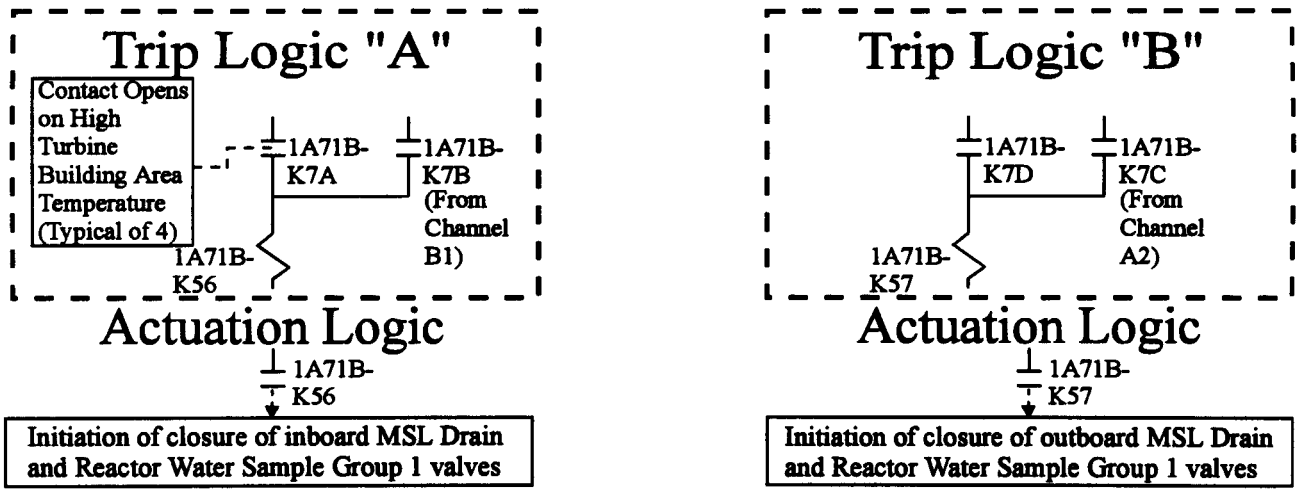
Main Steam Line Isolation Valve Isolation Function



Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the main steam lines on high turbine building area temperature, channels in one of the combinations listed on Sheet 3 must be either operable or maintained in the tripped condition.

Drain Line and Reactor Water Sample Line Valve Isolation Function



Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the main steam line drain and reactor water sample lines on high turbine building area temperature, channels in one of the combinations listed on Sheet 4 must be either operable or maintained in the tripped condition.

Elem. Ref.	
H-17810	H-17814
H-17811	H-17815
H-17812	H-17816
H-17813	H-16071

LFD-1-PCIS-06
Sheet 2 of 4

TS 3.3.6.1-1, Item 1.f
Main Steam Line Isolation - Turbine Building Area Temperature - High

Rev. 0 4/4/95

Main Steam Line Isolation Valve Isolation Function

Any ONE of the following instruments:

N101A	N101C
N102A	N102C
N103A	N103C
N104A	N104C
N105A	N105C
N106A	N106C
N107A	N107C
N108A	N108C
N111A	

AND

Any ONE of the following instruments:

N101B	N101D
N102B	N102D
N103B	N103D
N104B	N104D
N105B	N105D
N106B	
N107B	N107D
N108B	N108D

AND

Any ONE of the following instruments:

N111C	
N112A	N112C
N113A	N113C
N114A	N114C
N115A	N115C
N116A	N116C

AND

Any ONE of the following instruments:

N110D	
N111B	N111D
N112B	N112D
N113B	N113D
N114B	N114D
N115B	N115D
N116B	N116D

Elem. Ref.

H-17810	H-17814
H-17811	H-17815
H-17812	H-17816
H-17813	H-16071

Drain Line and Reactor Water Sample Line Valve Isolation Function

Any ONE of the following instruments:

N101A N105A
N102A N106A
N103A N107A
N104A N108A
N111A

AND

Any ONE of the following instruments:

N101B N105B
N102B N106B
N103B N107B
N104B N108B

OR

Any ONE of the following instruments:

N101C N105C
N102C N106C
N103C N107C
N104C N108C

AND

Any ONE of the following instruments:

N101D N104D
N102D N105D
N103D N107D
N108D

AND

Any ONE of the following instruments:

N112A N114A
N113A N115A
N116A

AND

Any ONE of the following instruments:

N111B N114B
N112B N115B
N113B N116B

OR

Any ONE of the following instruments:

N111C N114C
N112C N115C
N113C N116C

AND

Any ONE of the following instruments:

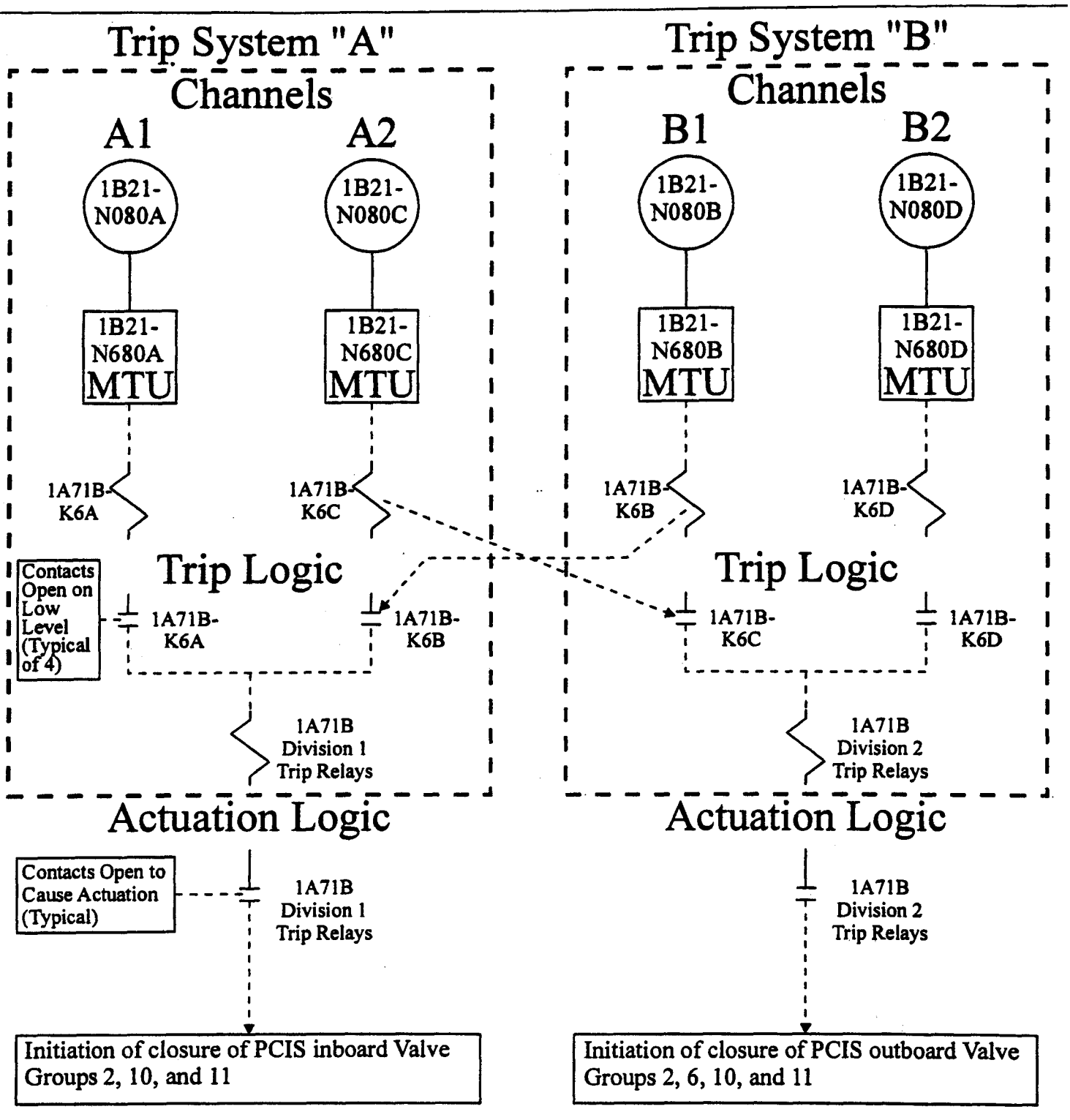
N110D N113D
N111D N114D
N112D N115D
N116D

Elem. Ref.	
H-17810	H-17814
H-17811	H-17815
H-17812	H-17816
H-17813	H-16071

LFD-1-PCIS-06
Sheet 4 of 4

TS 3.3.6.1-1, Item 1.f
Main Steam Line Isolation - Turbine Building Area Temperature - High

Rev. 0 4/4/95



Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate Valve Groups 2, 6, 10, and 11 on low reactor water level (Level 3), channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 and B1
OR
A2 and B2

Elem. Ref.
H-17810 H-19809
H-17811 H-19812
H-17812 H-19815
H-17814 H-19818

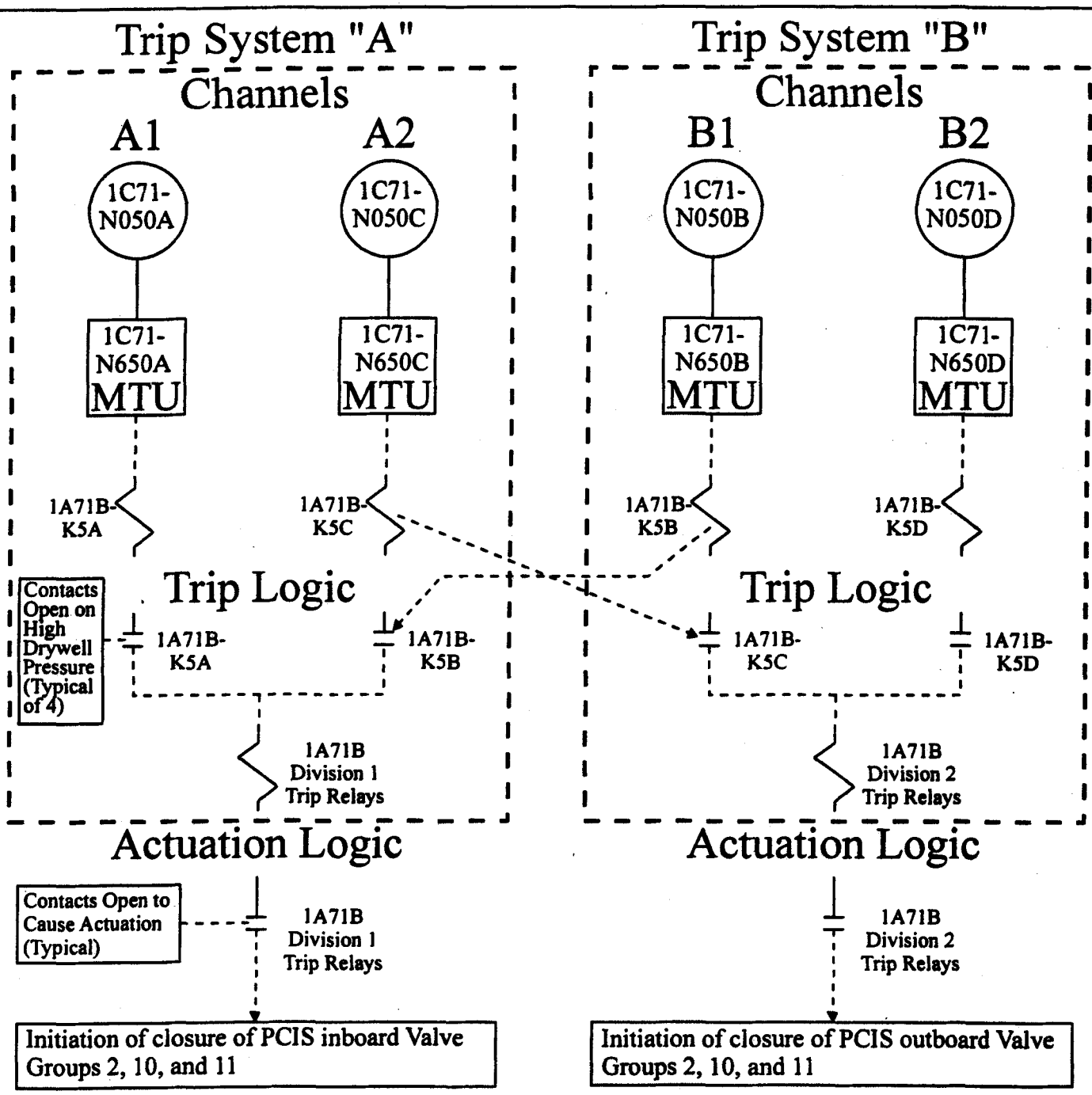
Prepared By: _____

Reviewed By: Stephen W. Reed

LFD-1-PCIS-07

TS 3.3.6.1-1, Item 2.a Primary Containment Isolation, Reactor Vessel Water Level - Low, Level 3

TRM Rev. 10



Minimum Channel Requirements for System Isolation Capability:

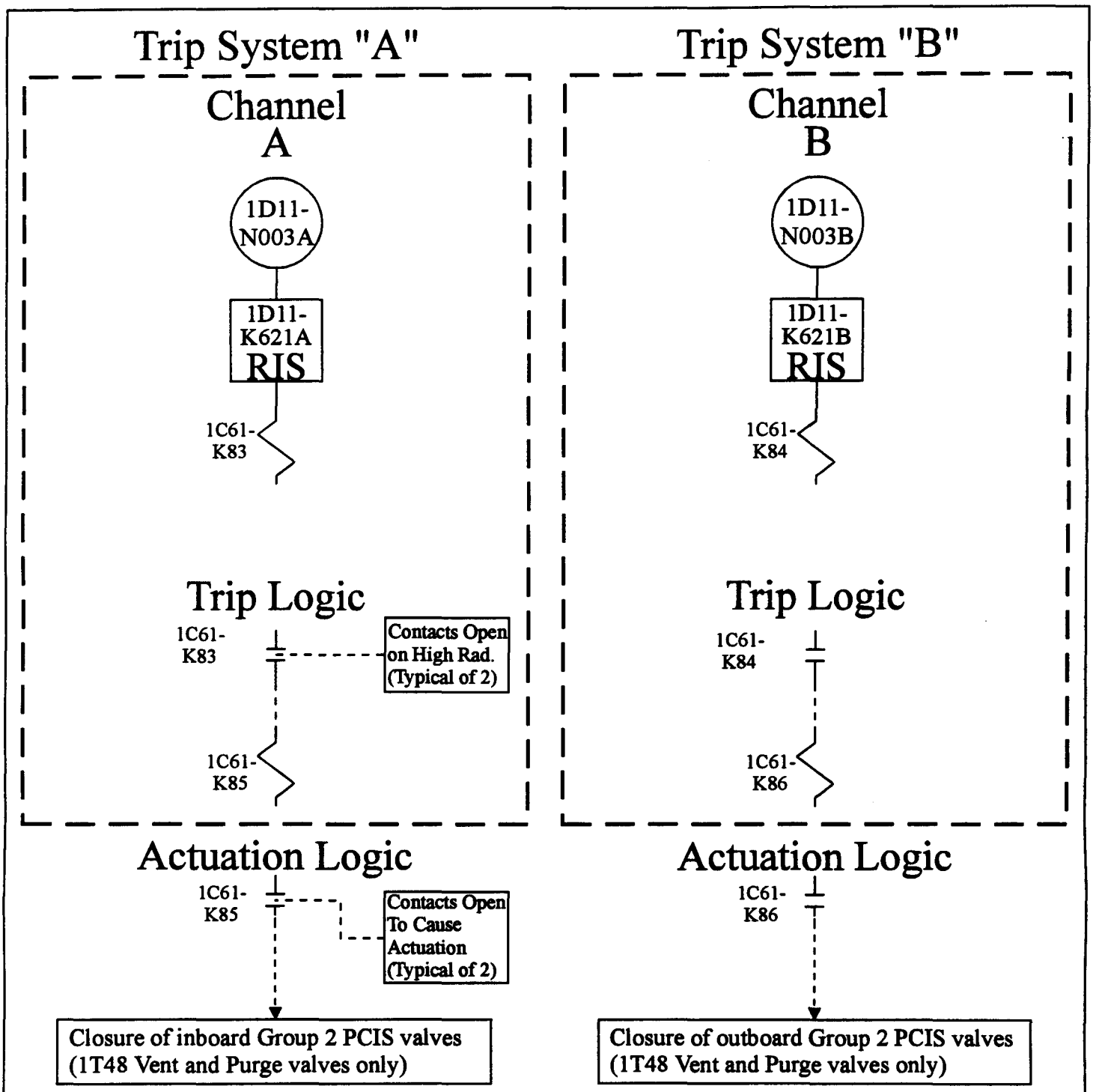
In order to maintain the capability to isolate Valve Groups 2, 10, and 11 on high drywell pressure, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 and B1
OR
A2 and B2

Elem. Ref.
H-17810 H-19809
H-17811 H-19812
H-17812 H-19815
H-17814 H-19818

Prepared By:
Reviewed By:

LFD-1-PCIS-08
TS 3.3.6.1-1, Item 2.b
Primary Containment Isolation, Drywell Pressure - High
TRM Rev. 33



Minimum Channel Requirements for System Isolation Capability:

In order to maintain Group 2 PCIS isolation capability of the Vent and Purge Valves on drywell high radiation, at least one of the two channels must be either operable or maintained in the tripped condition.

Elem. Ref.
H-17802
H-17803
H-19643

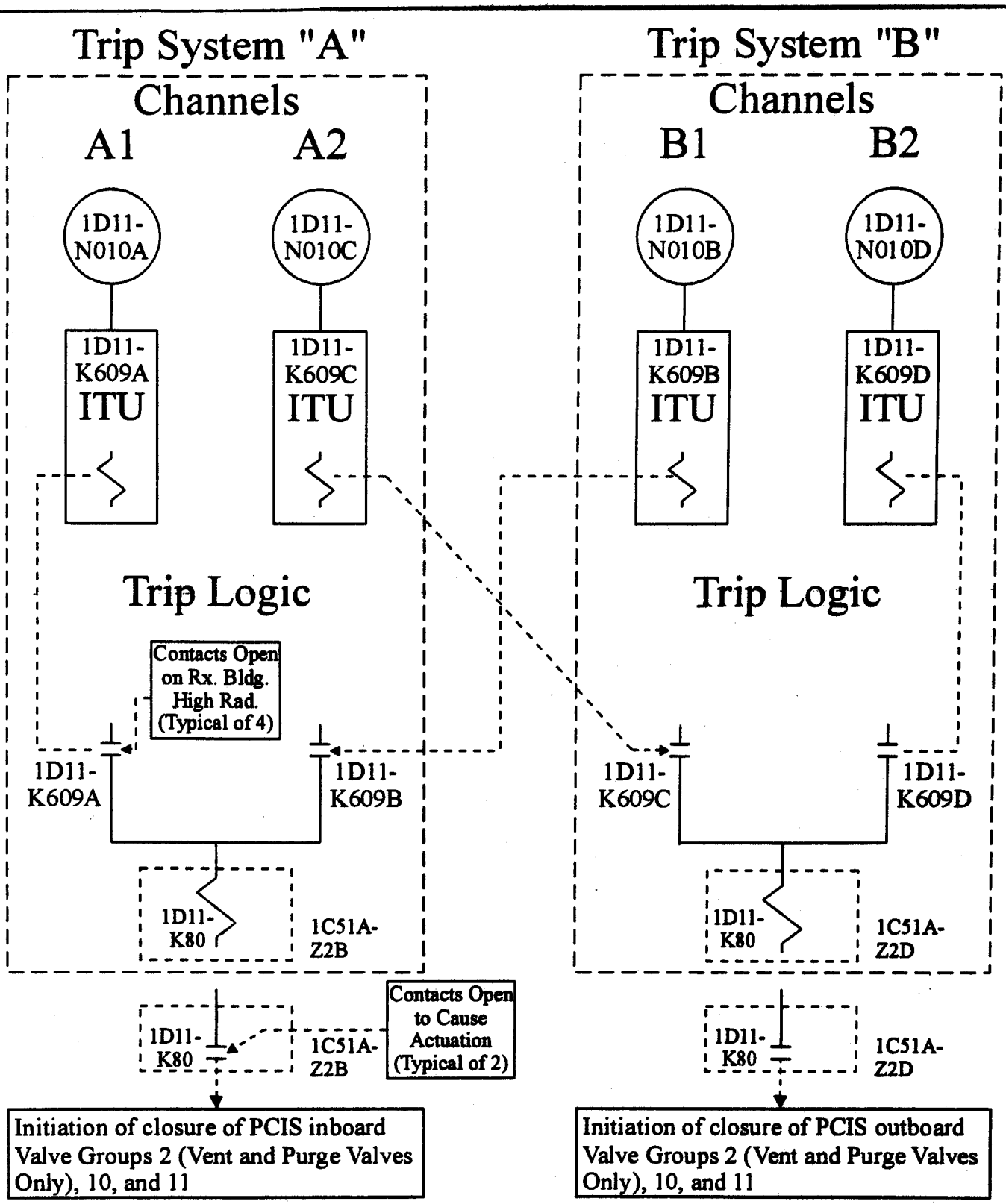
Prepared By: Stephen W. Reed

Reviewed By: Bryce Clark

LFD-1-PCIS-09

TS 3.3.6.1-1, Item 2.c
Primary Containment Isolation
Drywell Radiation-High

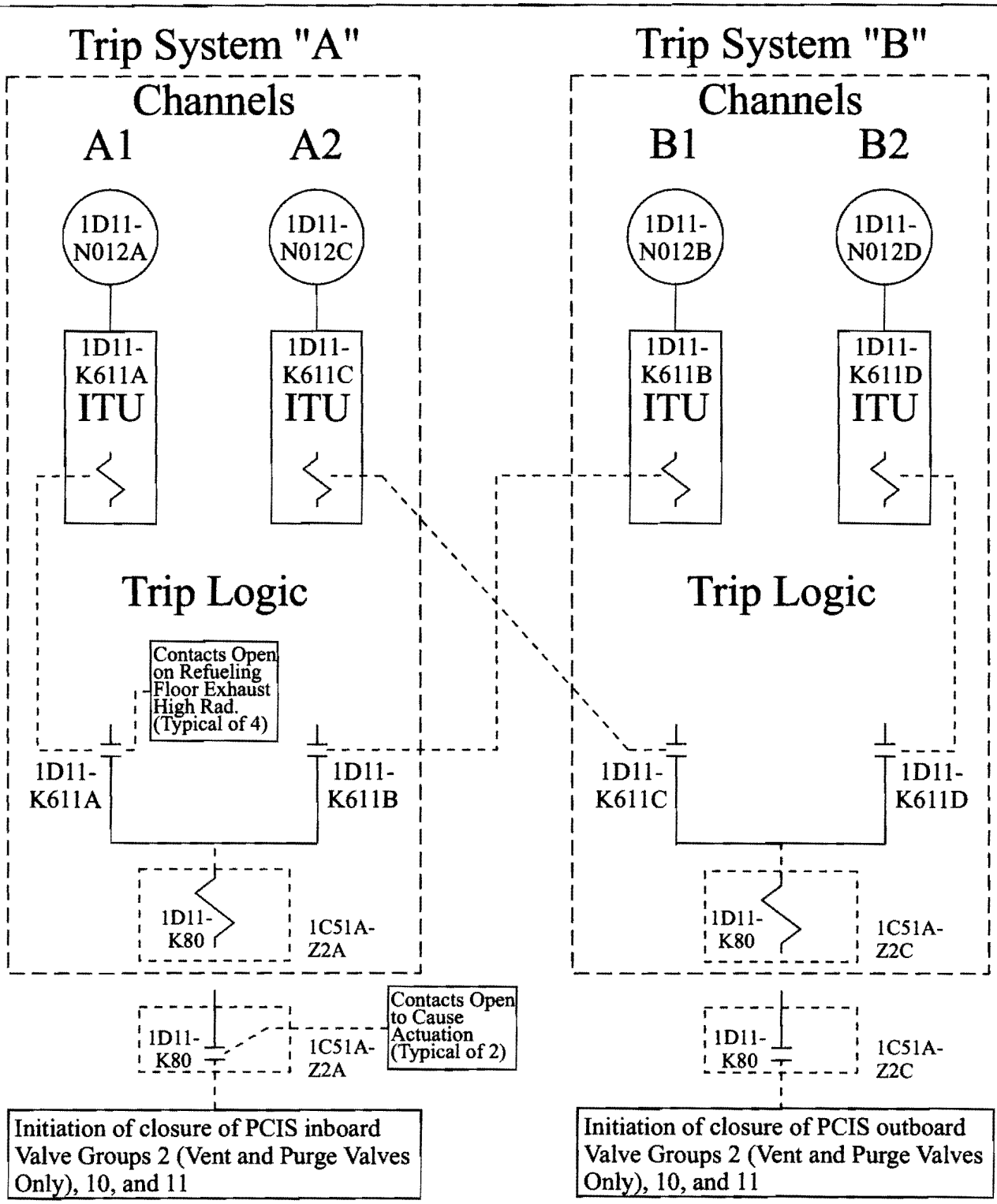
Rev. 0 1/13/95



Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate Valve Groups 2, 10, and 11 on Reactor Building Exhaust High Radiation, channels in one of the following combinations must be either operable or maintained in the tripped condition.

Elem. Ref.		A1 and B1 OR A2 and B2	LFD-1-PCIS-10
H-17802	H-19563		TS 3.3.6.1-1, Item 2.d Primary Containment Isolation Reactor Building Exhaust Radiation - High
H-17803	H-19564		
H-19561	H-19566		
		Prepared By:	TRM Rev. 24
		Reviewed By:	



Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate Valve Groups 2, 10, and 11 on Refueling Floor Exhaust High Radiation, channels in one of the following combinations must be either operable or maintained in the tripped condition.

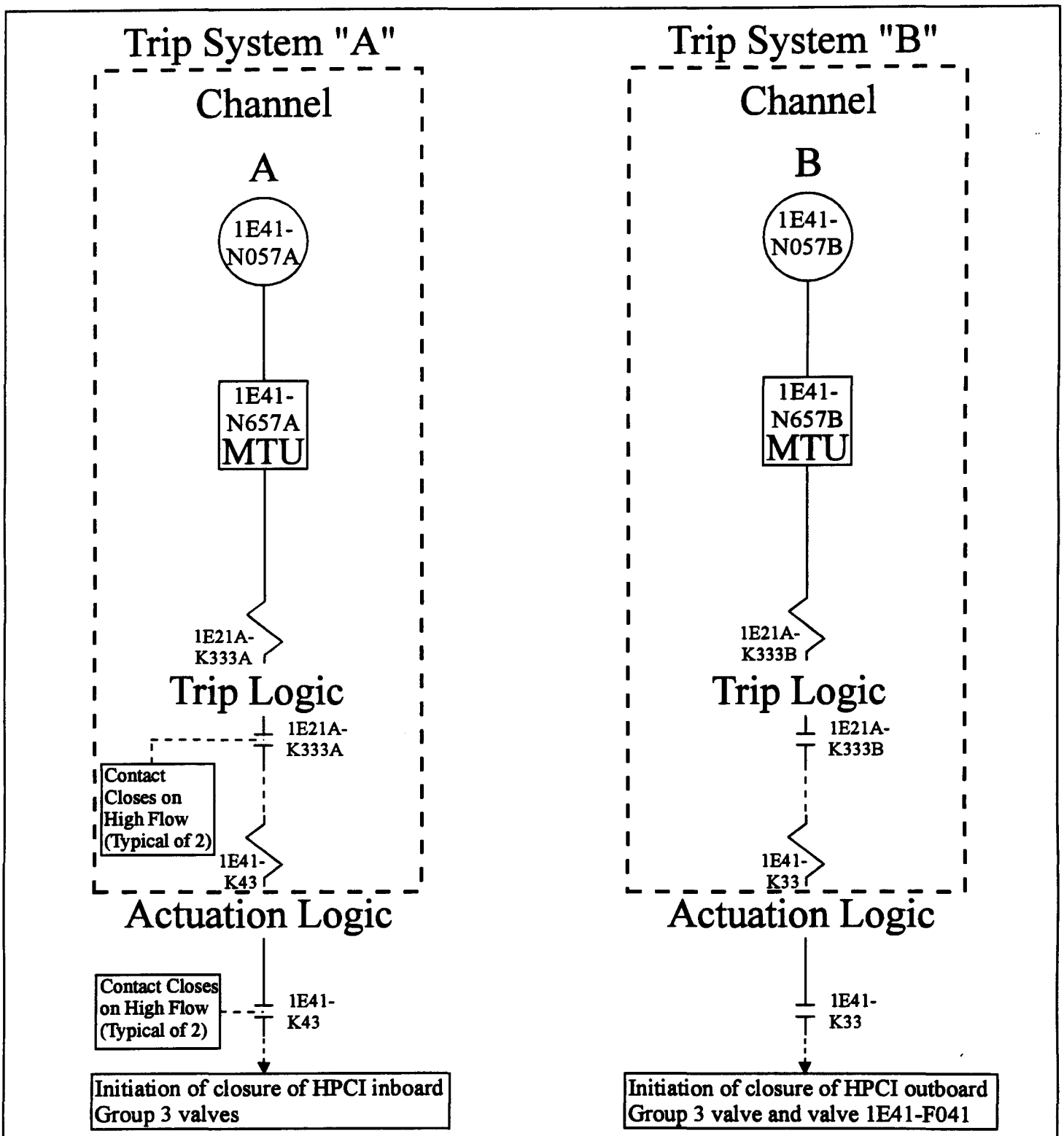
A1 and B1
OR
A2 and B2

Elem. Ref.	
H-17802	H-19563
H-17803	H-19564
H-19561	H-19566

Prepared By:

Reviewed By:

LFD-1-PCIS-11
TS 3.3.6.1-1, Item 2.e Primary Containment Isolation
Refueling Floor Exhaust Radiation - High
TRM Rev. 53



Minimum Channel Requirements for System Isolation Capability:

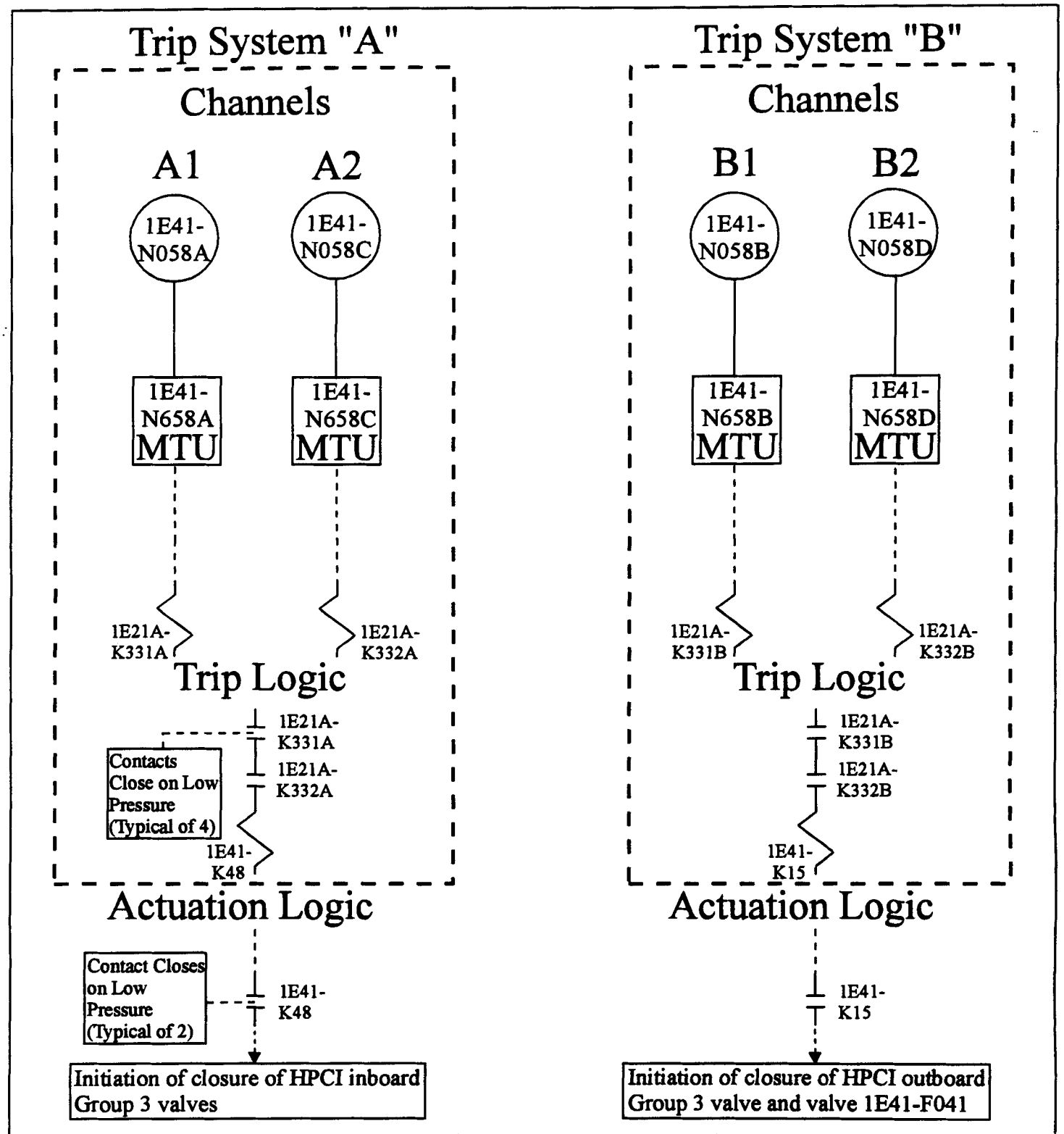
In order to maintain the capability to isolate the HPCI steam supply and torus suction lines on high flow, at least one channel is required to be operable or maintained in the tripped condition.

Elem. Ref.
H-17157 H-17163
H-17159 H-19822
H-17160 H-19825

Prepared By: John D. Payne

Reviewed By: Steph W. Reed

LFD-1-PCIS-12	
TS 3.3.6.1-1, Item 3.a HPCI System Isolation- HPCI Steam Line Flow - High	
Rev. 0	1/13/95



Minimum Channel Requirements for System Isolation Capability:

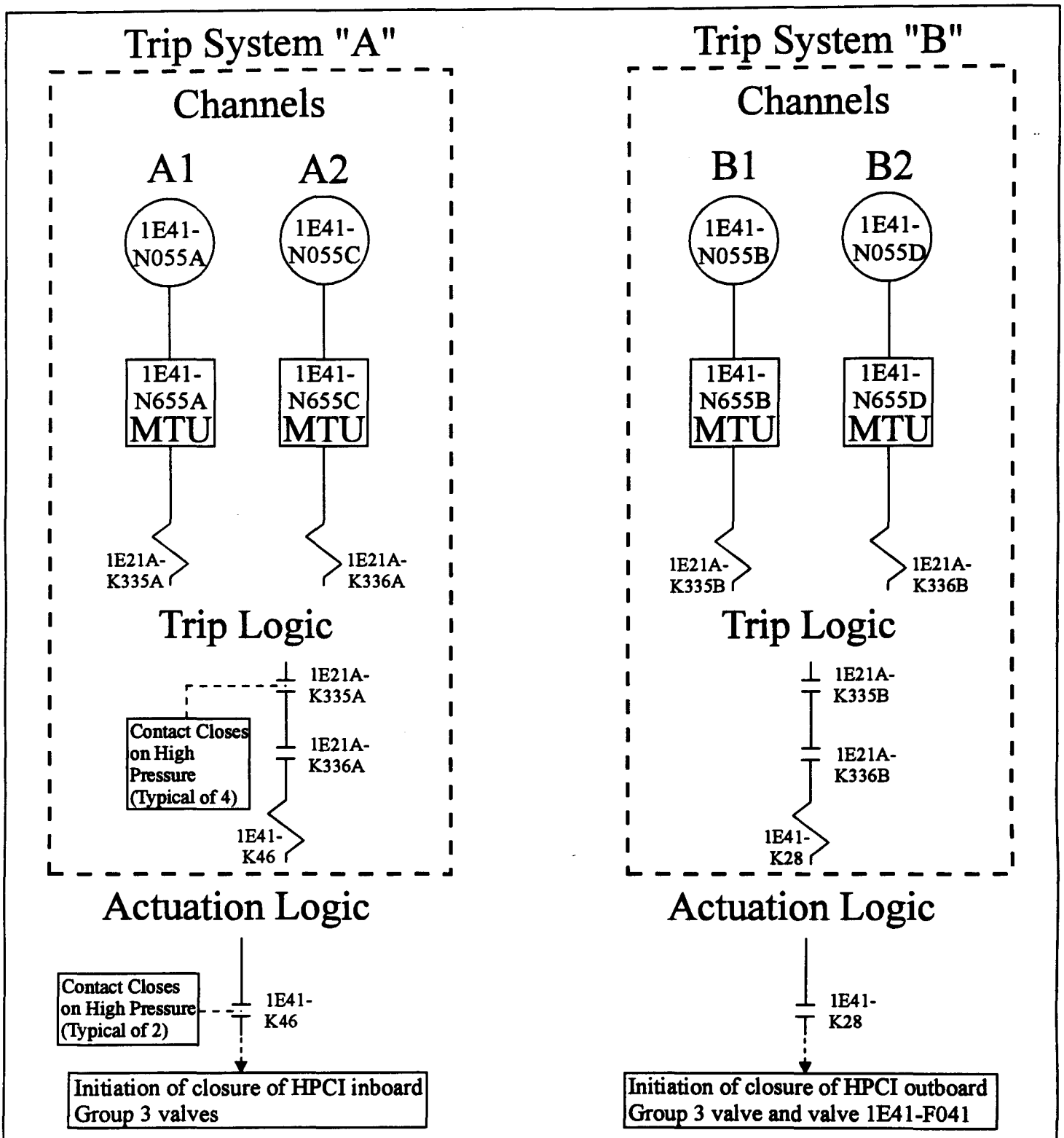
In order to maintain the capability to isolate the HPCI steam supply and torus suction lines on low pressure, channels in one of the following combinations must be either operable or maintained in the tripped condition.

Elem. Ref.		
H-17157	H-17163	A1 and A2
H-17159	H-19822	OR
H-17160	H-19825	B1 and B2

Prepared By: John J. Ryan

Reviewed By:

LFD-1-PCIS-13	
TS 3.3.6.1-1, Item 3.b HPCI System Isolation- HPCI Steam Supply Line Pressure - Low	
Rev. 0	1/13/95



Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the HPCI steam supply and torus suction lines on high turbine exhaust diaphragm pressure, channels in one of the following combinations must be either operable or maintained in the tripped condition.

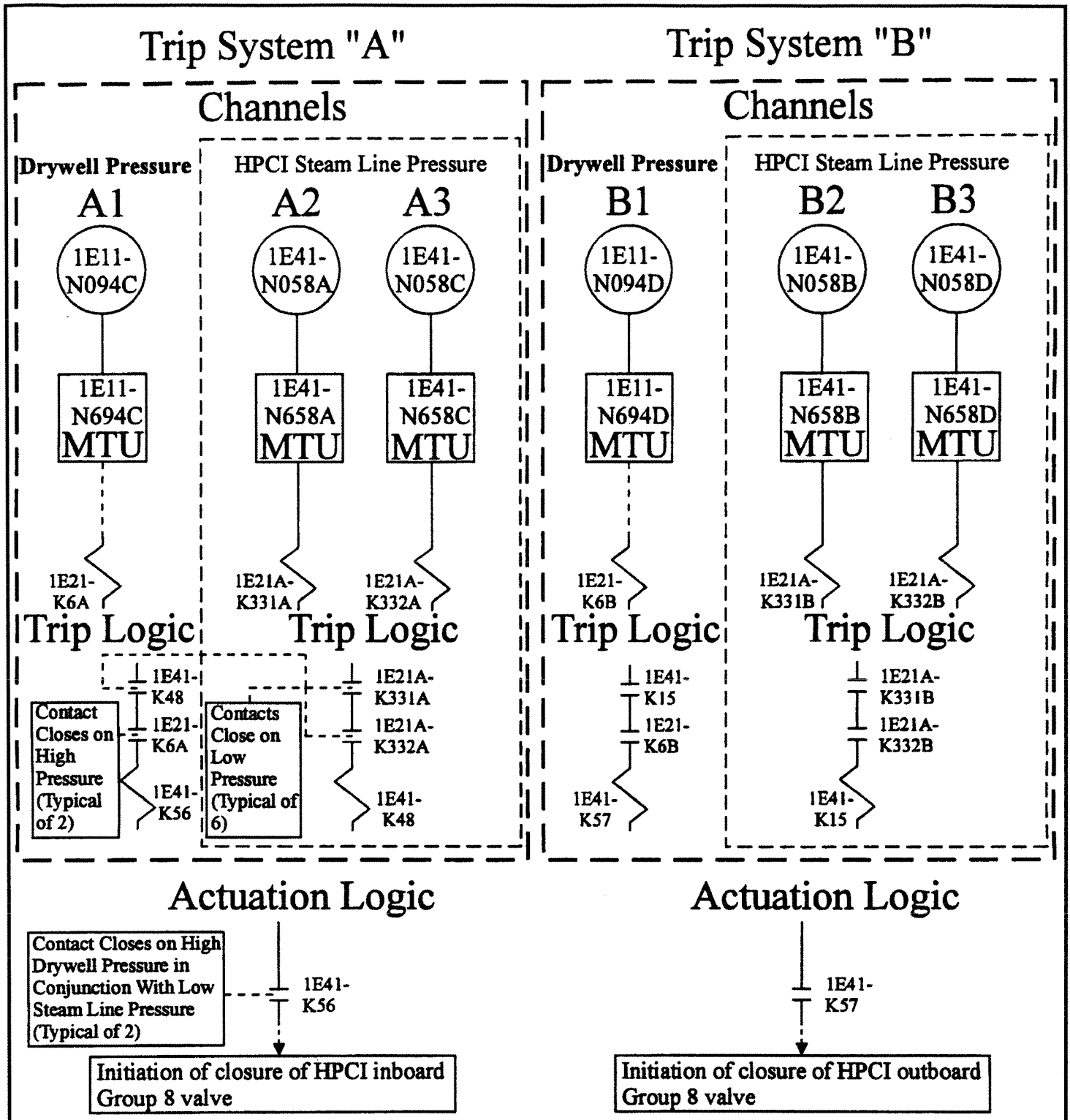
A1 and A2
OR
B1 and B2

Elem. Ref.
H-17157 H-17163
H-17159 H-19822
H-17160 H-19825

Prepared By: John J. Payne

Reviewed By: Steph W Reed

LFD-1-PCIS-14	
TS 3.3.6.1-1, Item 3.c HPCI System Isolation- HPCI Turbine Exhaust Diaphragm Pressure - High	
Rev. 0	1/13/95



Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the turbine exhaust line on high drywell pressure, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 and A2 and A3
OR
B1 and B2 and B3

Elem. Ref.

H-17109 **H-19822**
H-17157 H-19823
H-17159 **H-19825**
H-17160 H-19826
H-19586

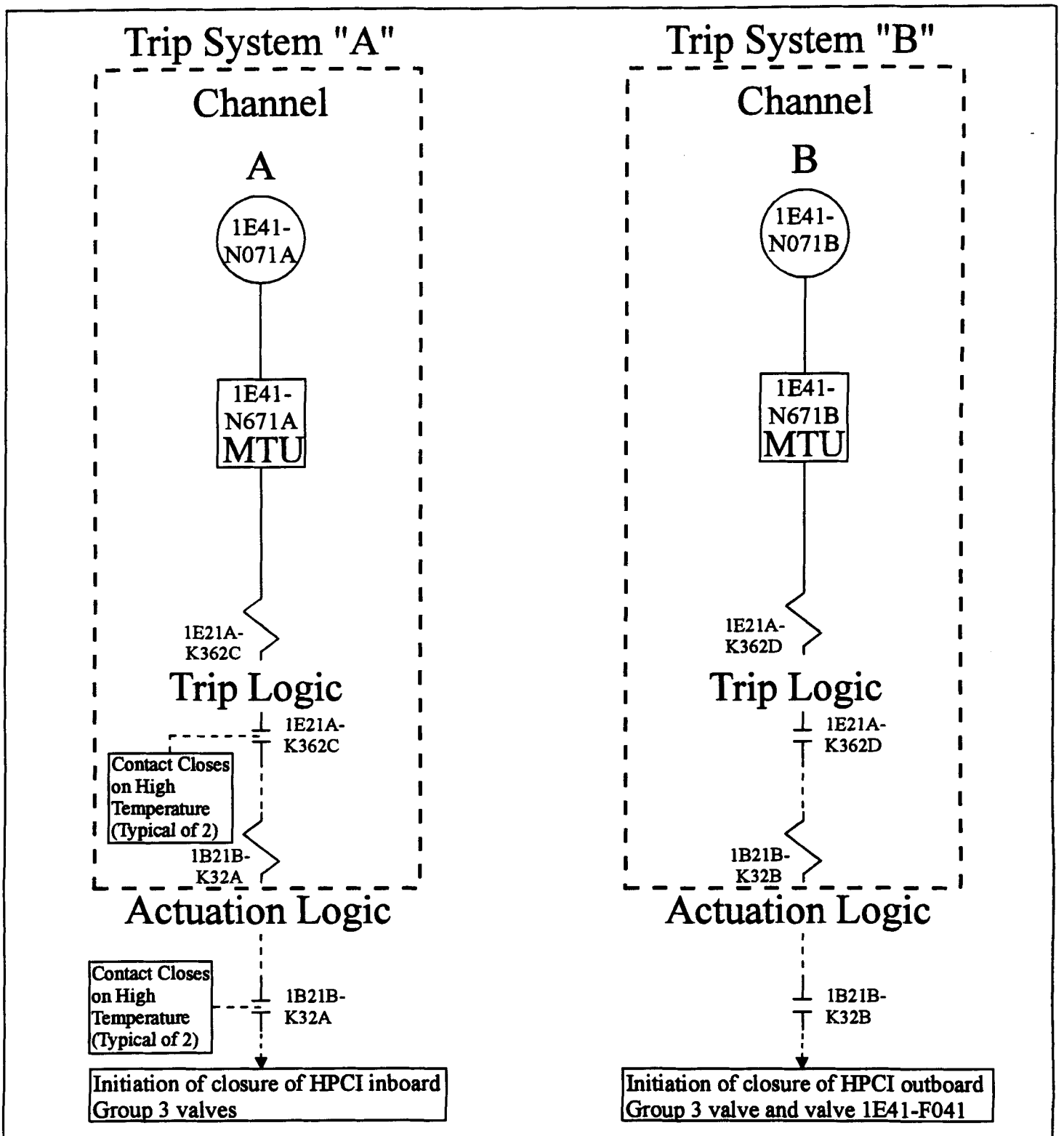
Prepared By: B.G. Thigpin

Reviewed By: S. B. Tipps (printed) (signature)

LFD-1-PCIS-15

TS 3.3.6.1-1, Item 3.d
HPCI System Isolation - Drywell Pressure-High

TRM Rev. 93



Minimum Channel Requirements for System Isolation Capability:

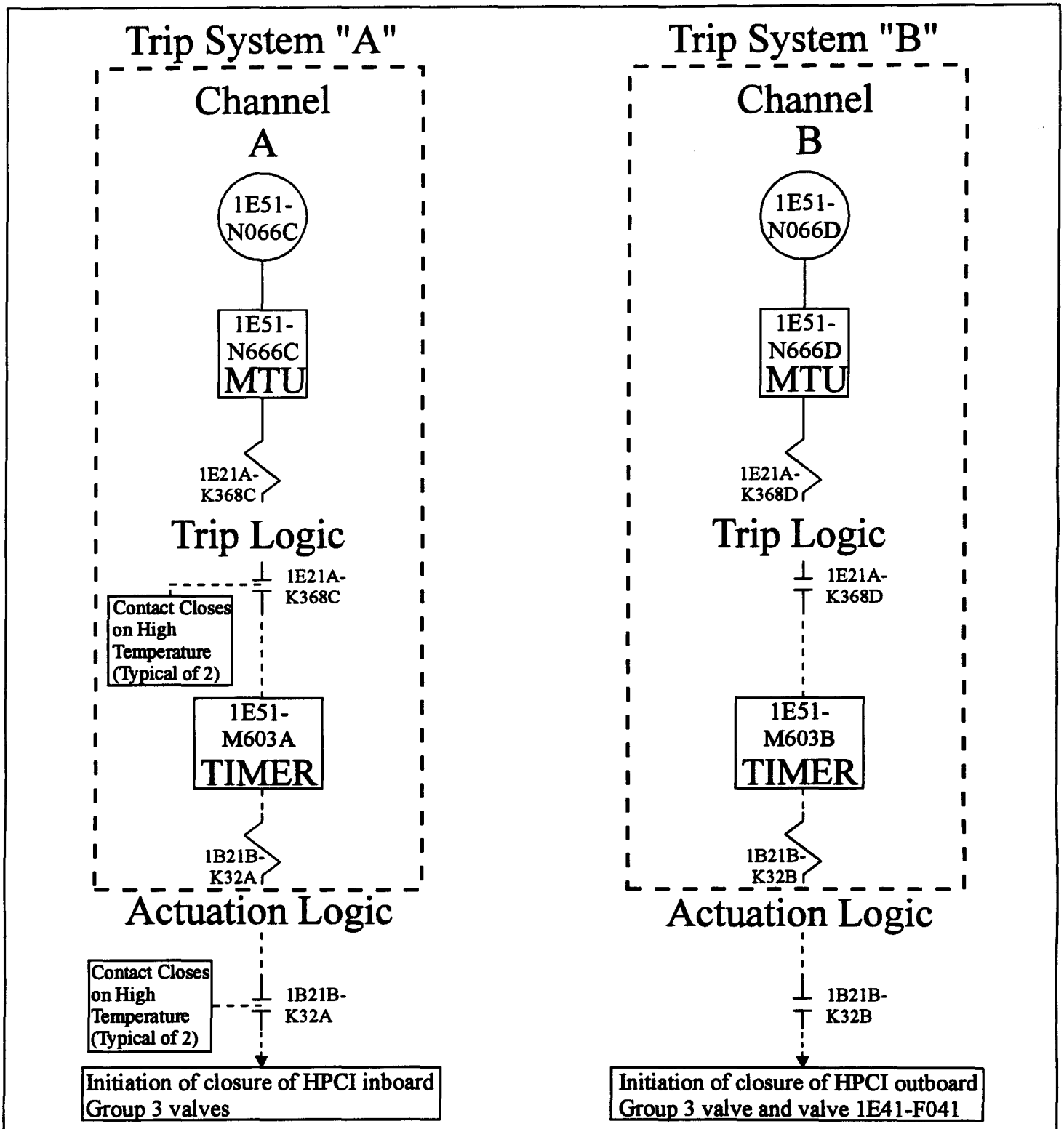
In order to maintain the capability to isolate the HPCI steam supply and torus suction lines on high pipe penetration room temperature, at least one channel is required to be operable or maintained in the tripped condition.

Elem. Ref.
H-17157 H-17748
H-17160 H-19829
H-17163 H-19832
H-17746

Prepared By: John J. Payne

Reviewed By: Stephen Neal

LFD-1-PCIS-16	
TS 3.3.6.1-1, Item 3.e HPCI System Isolation- HPCI Pipe Penetration Room Temperature - High	
Rev. 0	1/13/95



Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the HPCI steam supply and torus suction lines on high suppression pool area ambient temperature, at least one channel including its associated timer is required to be operable or maintained in the tripped condition.

Elem. Ref.
H-17157 H-17748
H-17160 H-19829
H-17163 H-19832
H-17746

Prepared By: John D. Payne

Reviewed By: Stephen W. Reed

LFD-1-PCIS-17	
TS 3.3.6.1-1, Items 3.f and 3.g HPCI System Isolation - Suppression Pool Area Ambient Temperature - High, and Suppression Pool Area Temperature - Time Delay Relays	
Rev. 0	1/13/95

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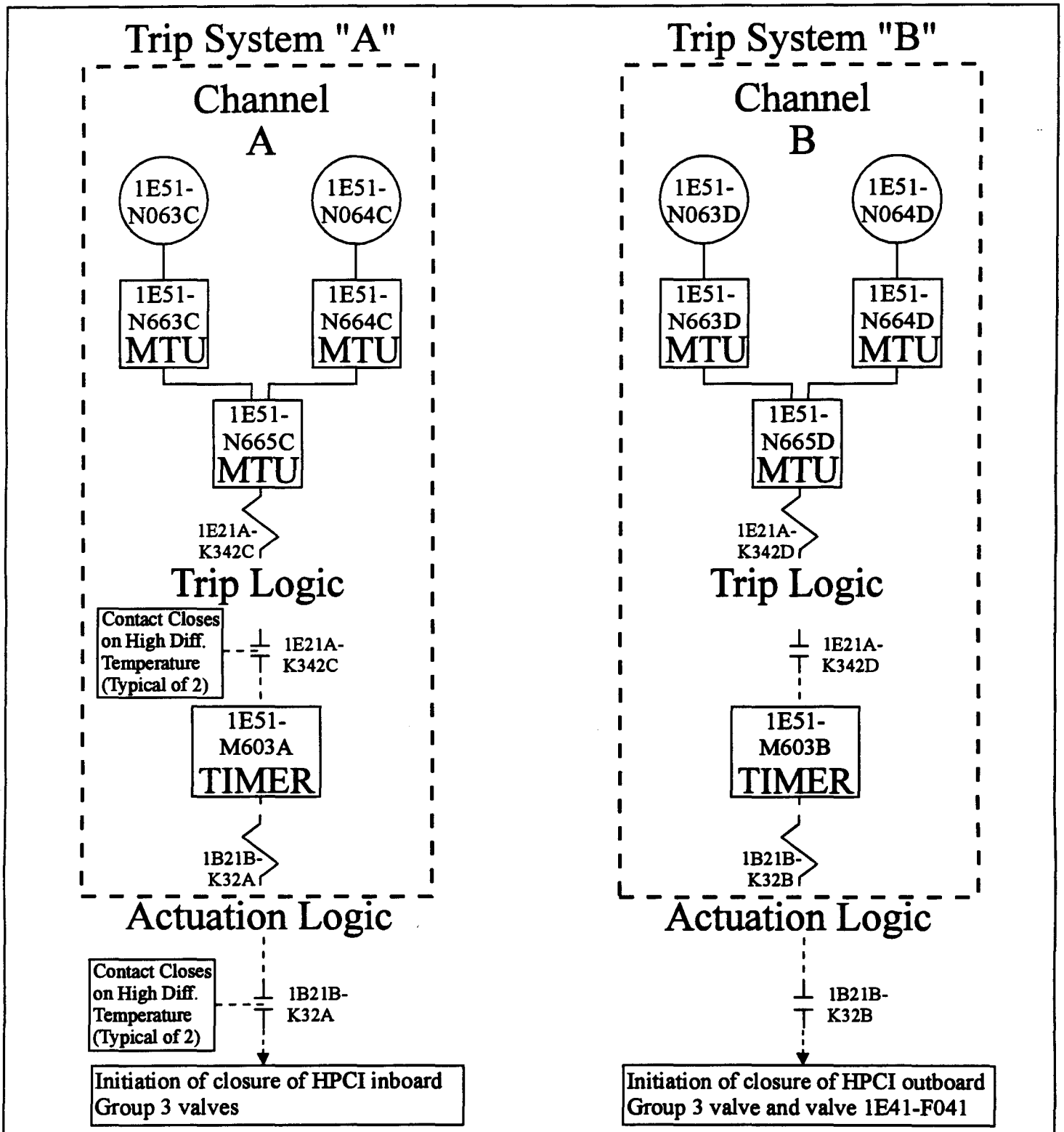


Minimum Channel Requirements for System Isolation Capability:

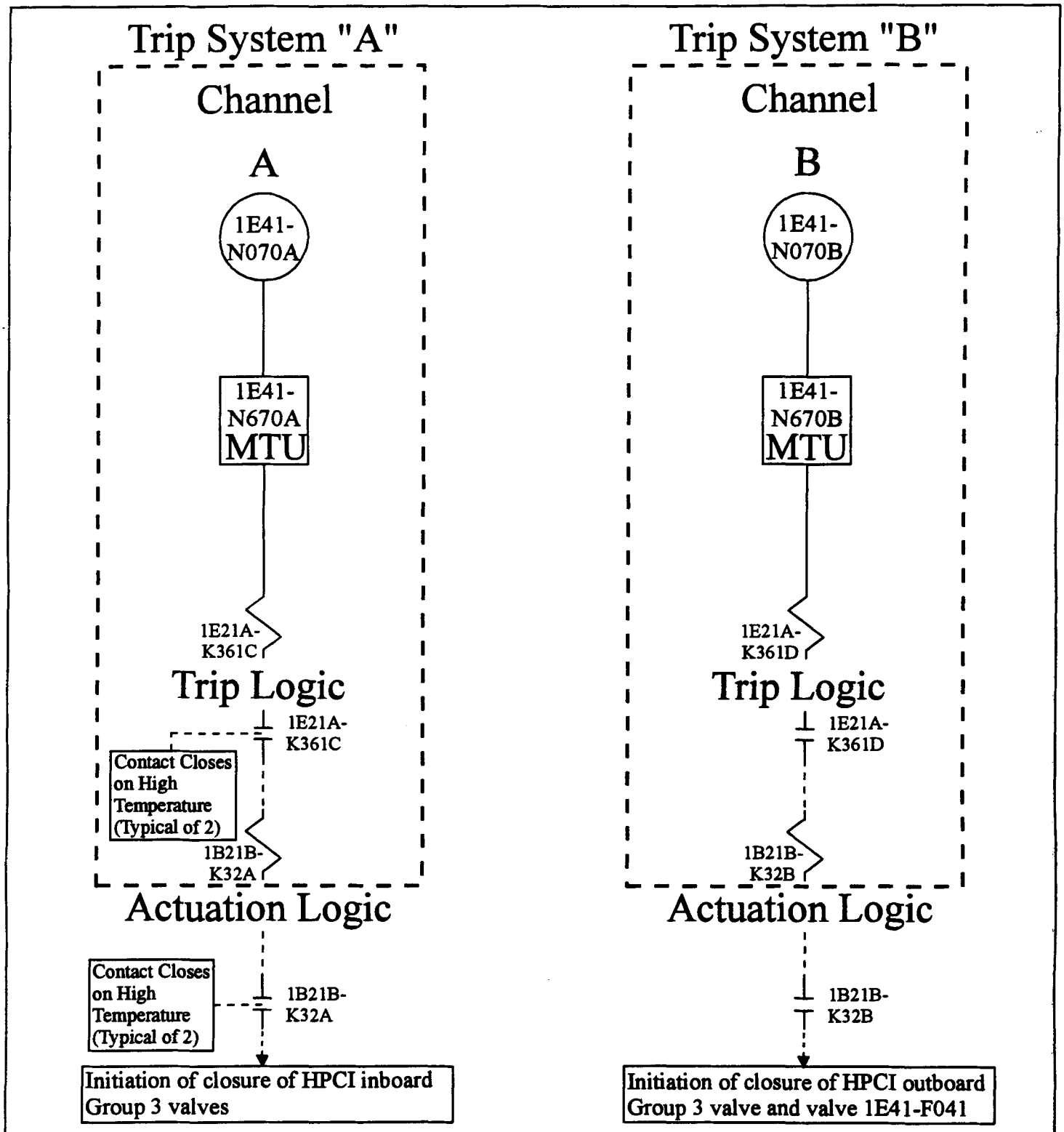
In order to maintain the capability to isolate the HPCI steam supply and torus suction lines on high suppression pool area differential temperature, at least one channel including its associated timer is required to be operable or maintained in the tripped condition.

Elem. Ref.	
H-17157	H-17748
H-17160	H-19828
H-17163	H-19831
H-17746	

Prepared By: John D. Payne

Reviewed By: Stephen Reed

LFD-1-PCIS-19
TS 3.3.6.1-1, Items 3.h and 3.g HPCI System Isolation - Suppression Pool Area Differential Temperature - High, and Suppression Pool Area Temperature - Time Delay Relays
Rev. 0 1/13/95



Minimum Channel Requirements for System Isolation Capability:

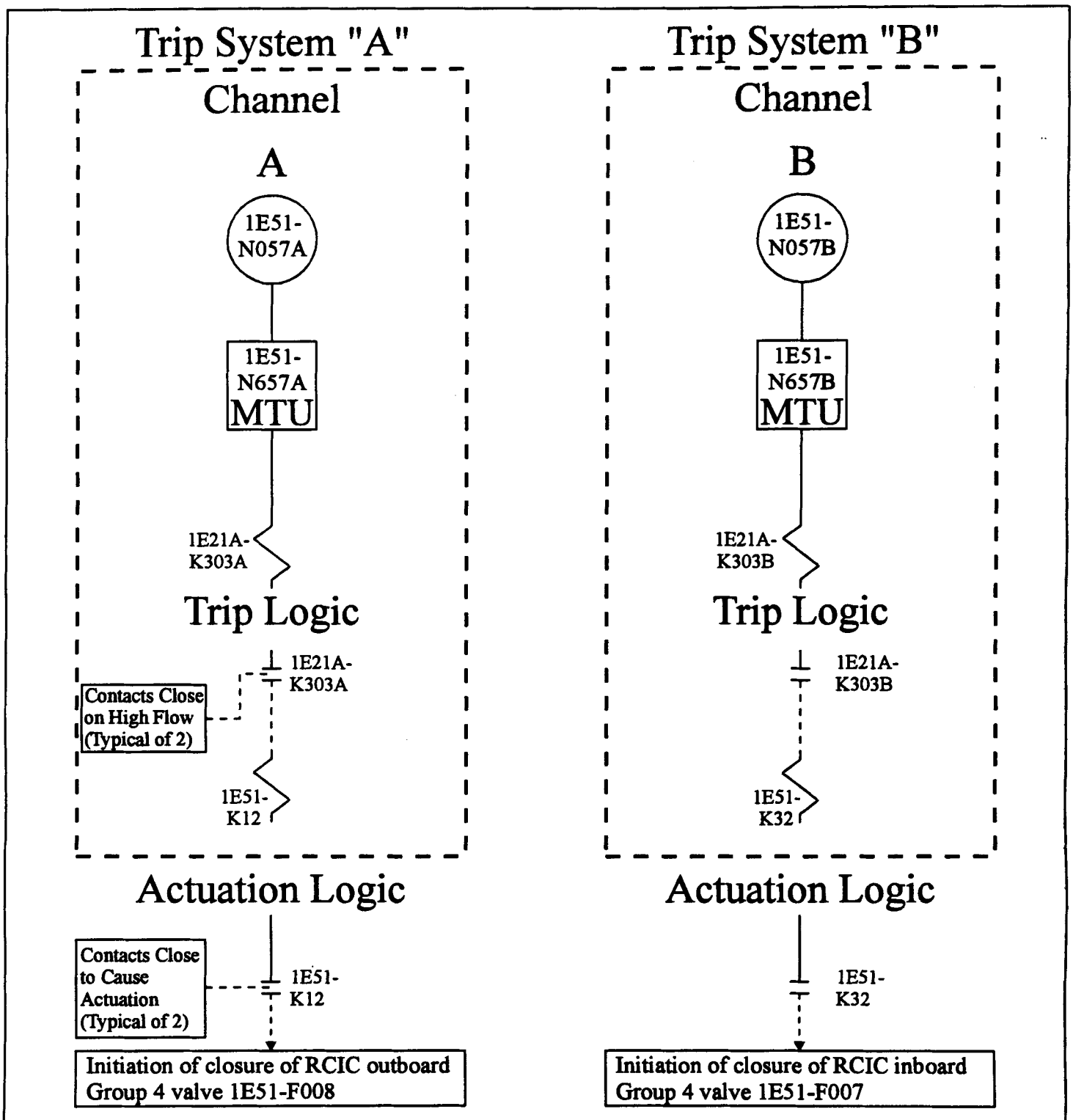
In order to maintain the capability to isolate the HPCI steam supply and torus suction lines on high emergency area cooler temperature, at least one channel is required to be operable or maintained in the tripped condition.

Elem. Ref.
H-17157 H-17748
H-17160 H-19829
H-17163 H-19832
H-17746

Prepared By: John J. Payne

Reviewed By: Steph W. Reed

LFD-1-PCIS-20	
TS 3.3.6.1-1, Item 3.i HPCI System Isolation- Emergency Area Cooler Temperature - High	
Rev. 0	1/13/95



Minimum Channel Requirements for System Isolation Capability:

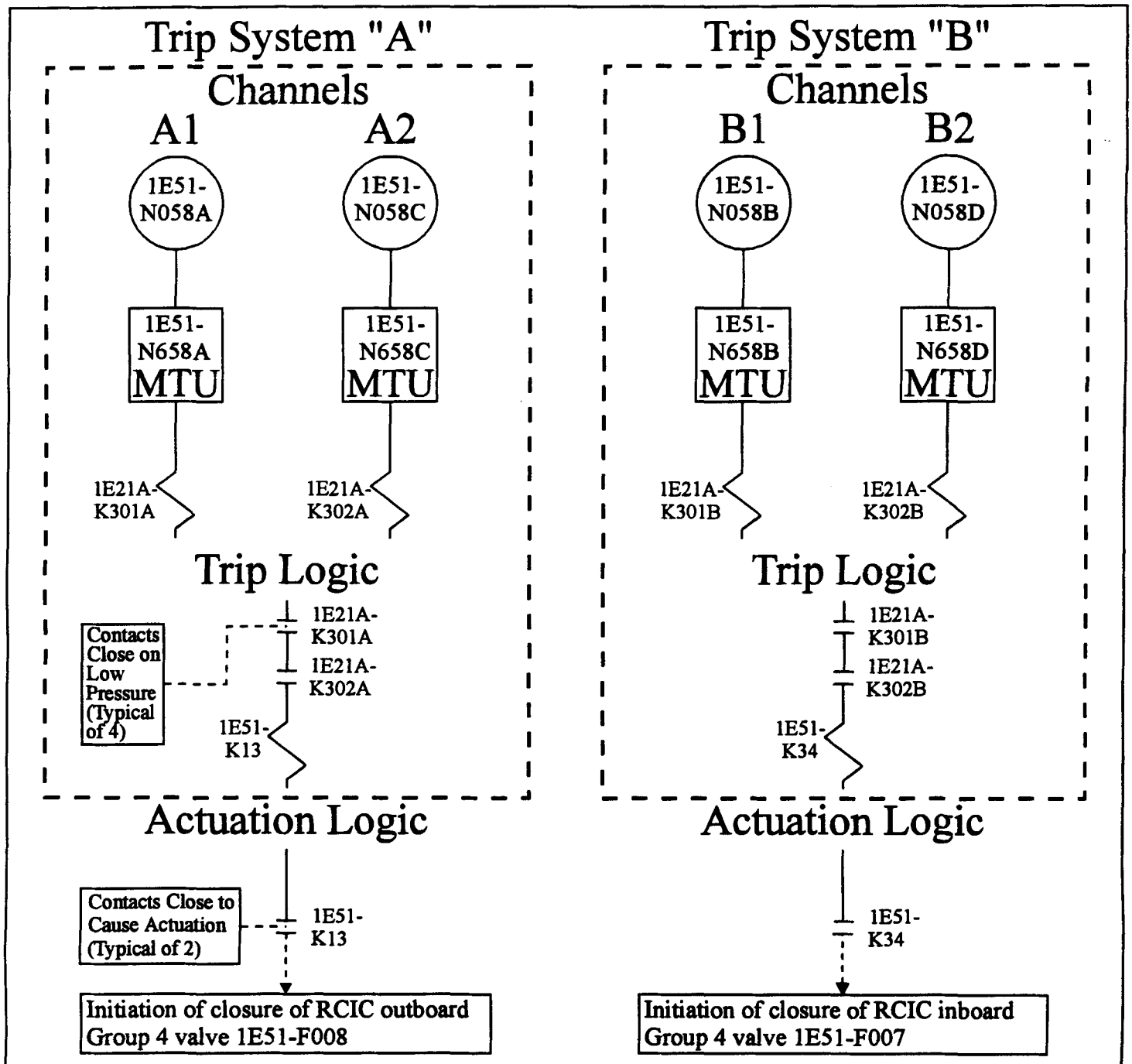
In order to maintain the capability to isolate the RCIC steam supply line on high flow, at least one channel is required to be operable or maintained in the tripped condition.

Elem. Ref.
H-19821 H-17149
H-19824 H-17151
H-17148

Prepared By: Stephen Mell

Reviewed: [illegible]

LFD-1-PCIS-21	
TS 3.3.6.1-1, Item 4.a RCIC System Isolation - RCIC Steam Line Flow - High	
Rev. 0	11/10/94



Minimum Channel Requirements for System Isolation Capability:

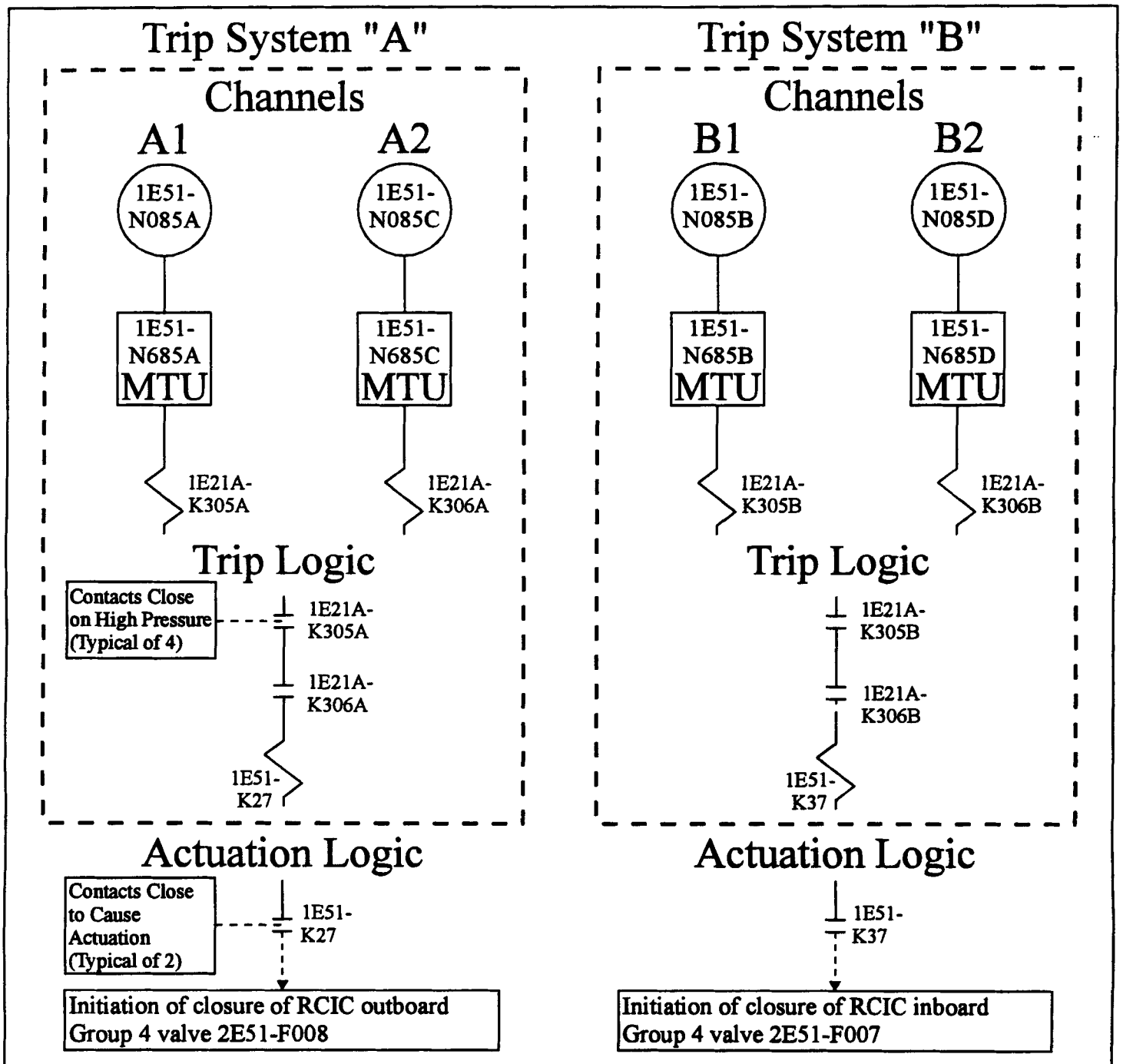
In order to maintain the capability to isolate the RCIC steam supply line on RCIC steam supply line low pressure, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 and A2
OR
B1 and B2

Elem. Ref.
H-19821 H-17149
H-19824 H-17151
H-17148

Prepared By: [signature]
Reviewed: [signature]

LFD-1-PCIS-22
TS 3.3.6.1-1, Item 4.b
RCIC System Isolation
RCIC Steam Supply Line
Pressure - Low
Rev. 0 1/13/95



Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the RCIC steam supply line on high RCIC turbine exhaust pressure, channels in one of the following combinations must be either operable or maintained in the tripped condition.

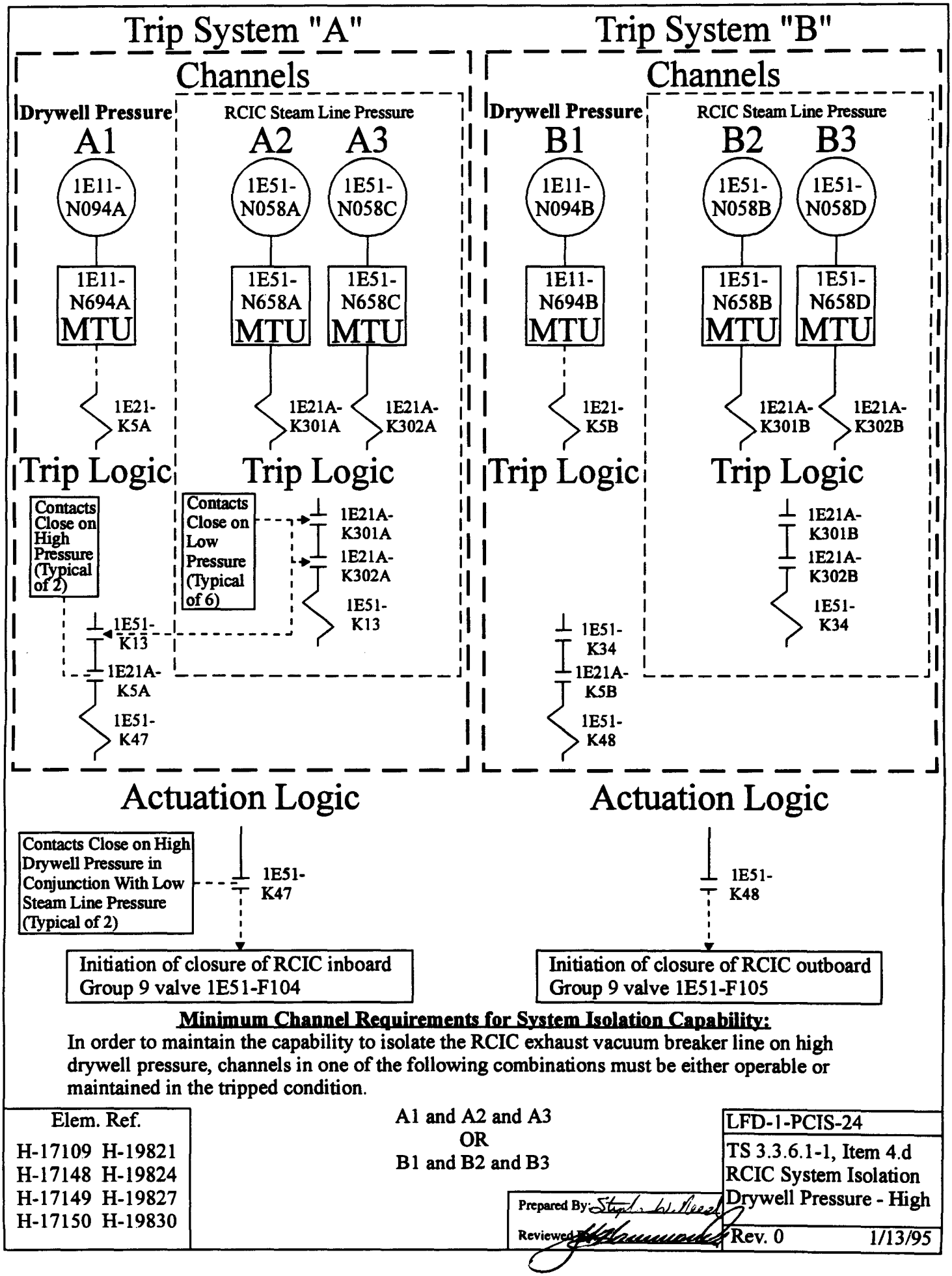
A1 and A2
OR
B1 and B2

Elem. Ref.
H-19821 H-17149
H-19824 H-17151
H-17148

Prepared By: _____

Reviewed By: _____

LFD-1-PCIS-23	
TS 3.3.6.1-1, Item 4.c RCIC System Isolation RCIC Turbine Exhaust Diaphragm Pressure - High	
Rev. 0	1/13/95



Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the RCIC exhaust vacuum breaker line on high drywell pressure, channels in one of the following combinations must be either operable or maintained in the tripped condition.

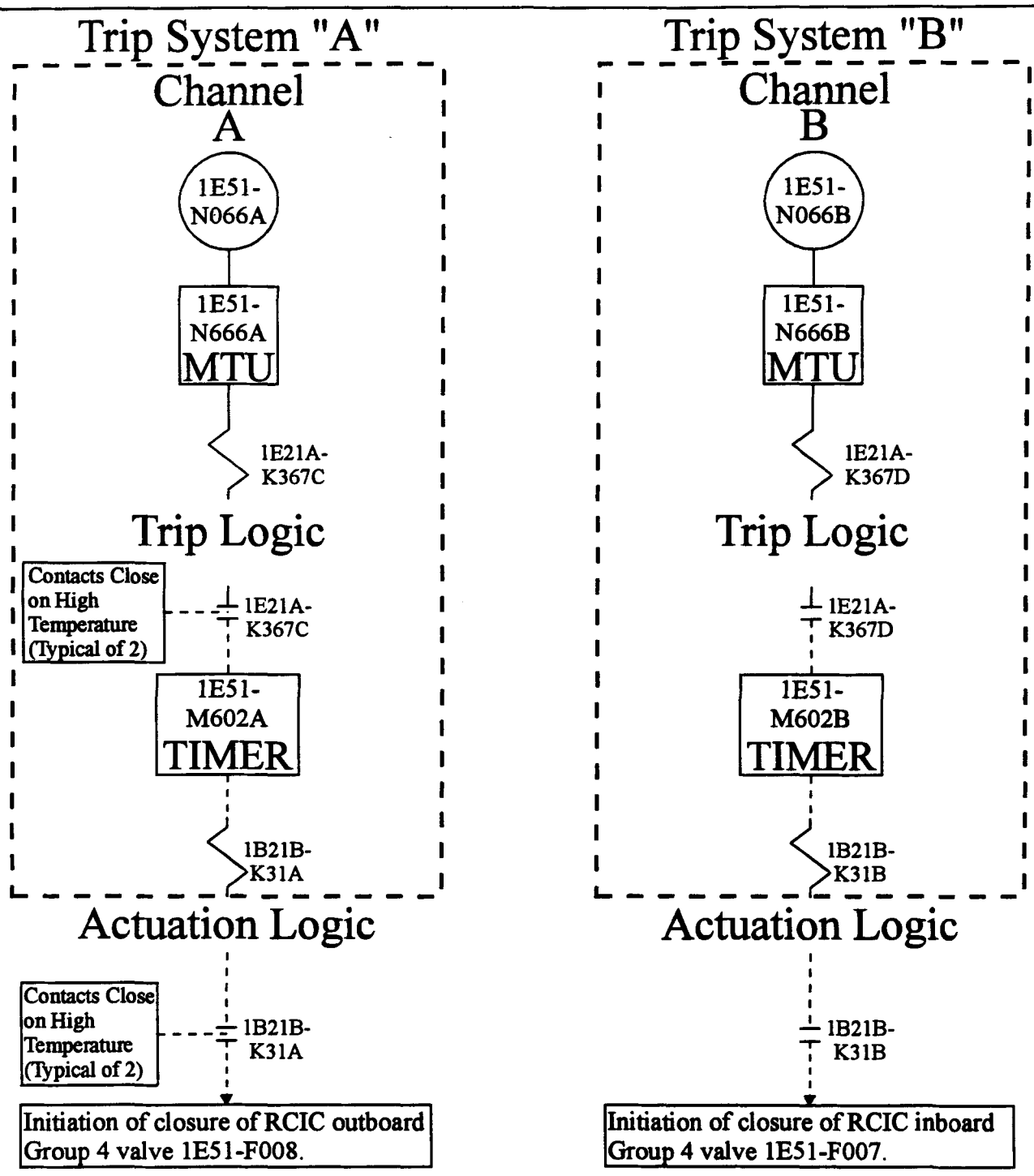
Elem. Ref.		
H-17109	H-19821	
H-17148	H-19824	
H-17149	H-19827	
H-17150	H-19830	

A1 and A2 and A3
OR
B1 and B2 and B3

Prepared By: Stephen W. Reed

Reviewed:

LFD-1-PCIS-24	
TS 3.3.6.1-1, Item 4.d RCIC System Isolation Drywell Pressure - High	
Rev. 0	1/13/95



Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the RCIC steam supply line on high suppression pool ambient area temperature, at least one channel including its associated timer is required to be operable or maintained in the tripped condition.

Elem. Ref.
H-17148 H-17748
H-17149 H-19829
H-17151 H-19832

Prepared By: Stephen W. Neal

Reviewed By:

LFD-1-PCIS-25	
TS 3.3.6.1-1, Items 4.e and f RCIC System Isolation RCIC Suppression Pool Ambient Area Temperature - High and Suppression Pool Area Temperature-Time Delay Relays	
Rev. 0	1/13/95

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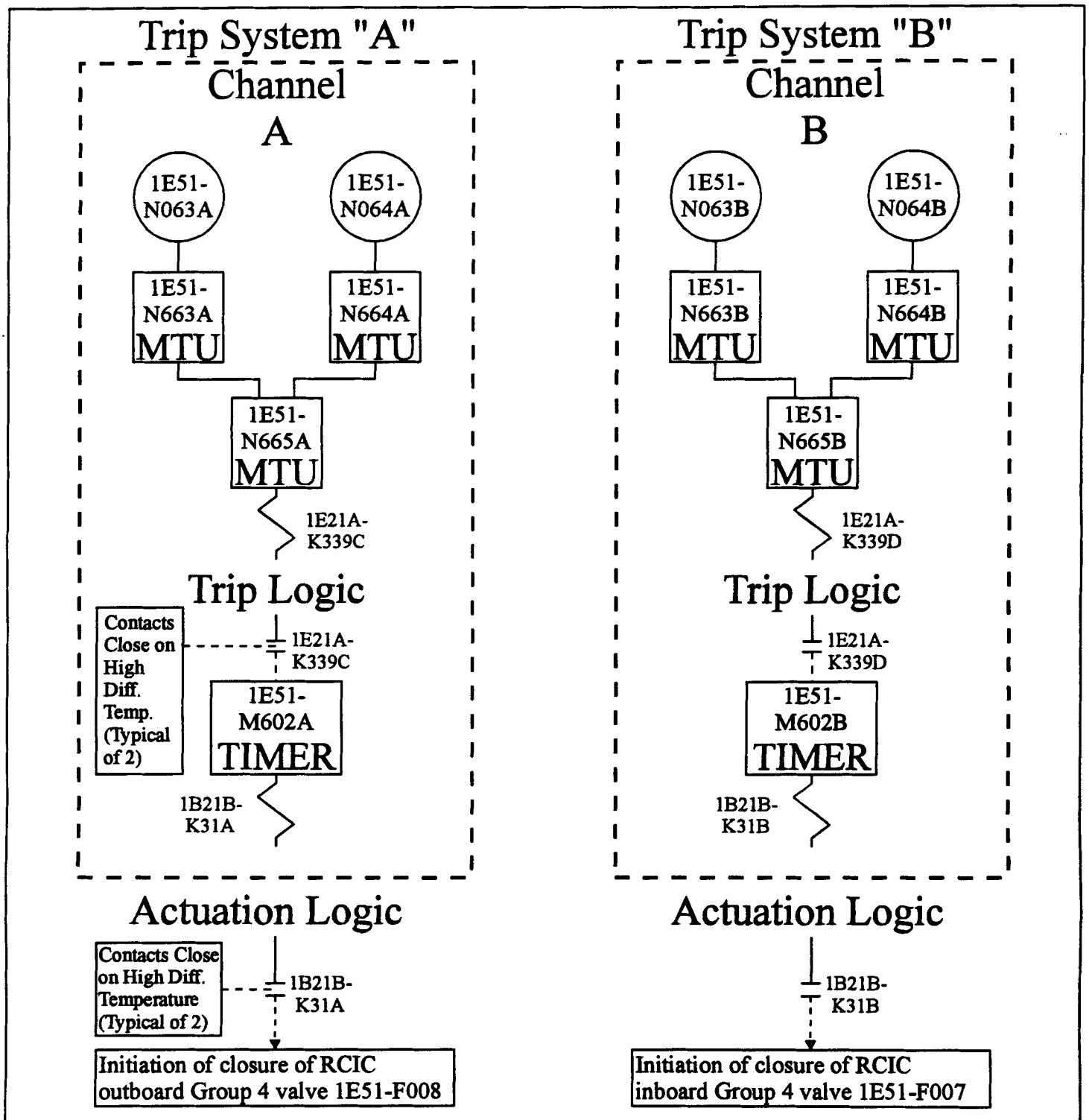


Minimum Channel Requirements for System Isolation Capability:

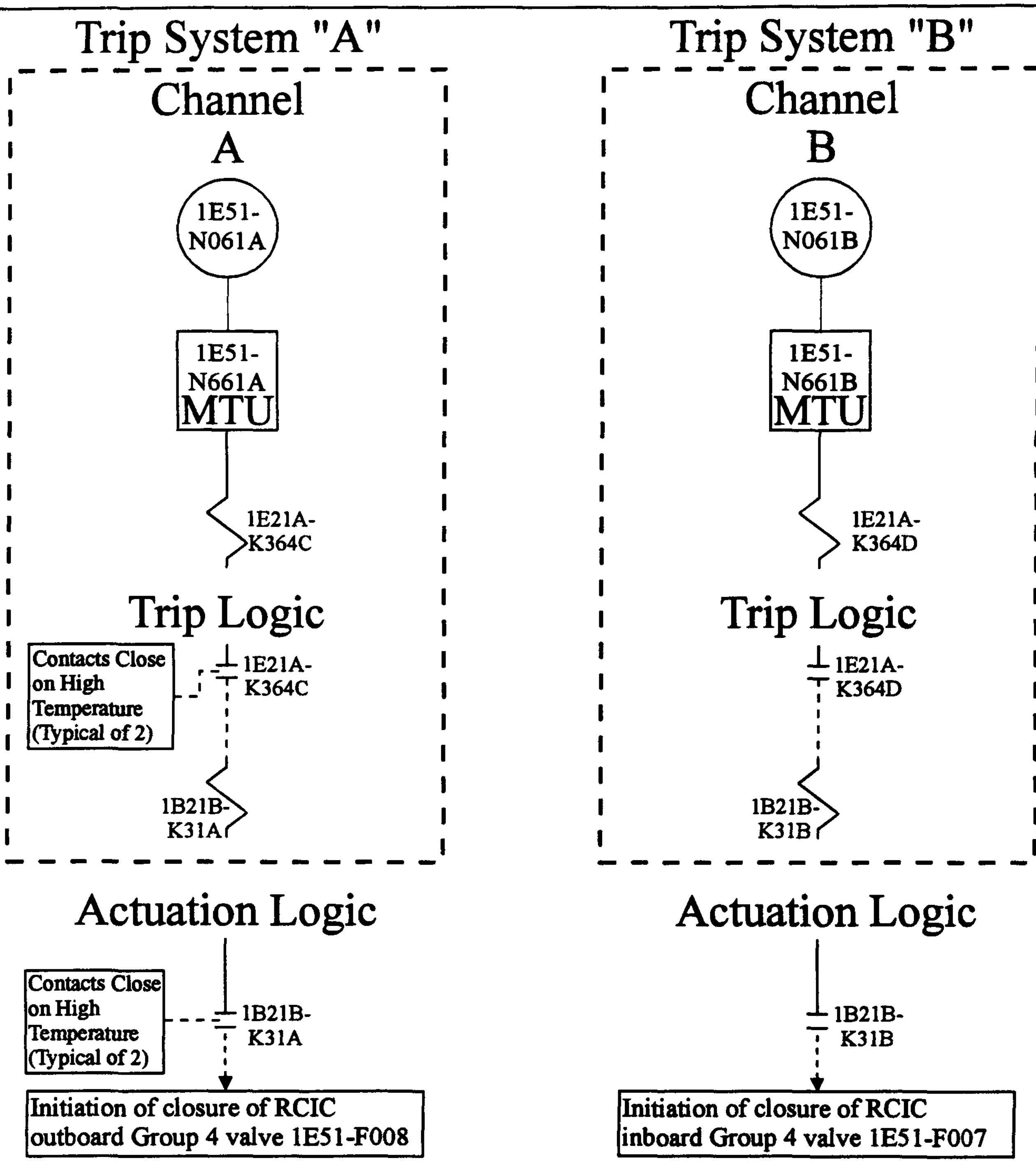
In order to maintain the capability to isolate the RCIC steam supply line on high suppression pool area differential temperature, at least one channel including its associated timer is required to be operable or maintained in the tripped condition.

Elem. Ref.
H-17148 H-17748
H-17149 H-19828
H-17151 H-19831

Prepared By: Steven W. Neal

Reviewed:

LFD-1-PCIS-27	
TS 3.3.6.1-1, Items 4.f and g RCIC System Isolation Suppression Pool Area Temperature Time Delay Relays and RCIC Suppression Pool Area Differential Temp. - High	
Rev. 0	1/13/95

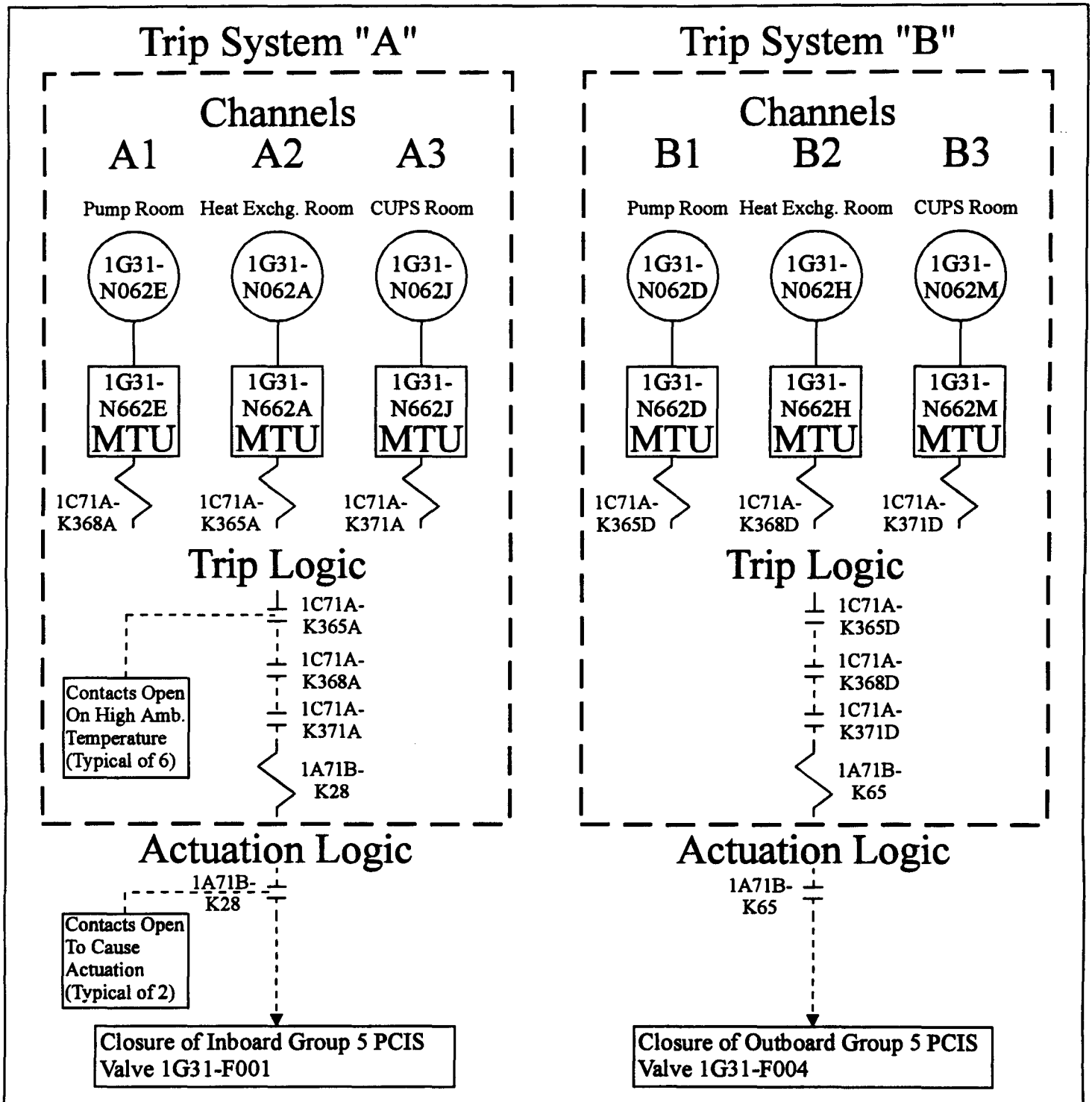


Minimum Channel Requirements for System Isolation Capability:
In order to maintain the capability to isolate the RCIC steam supply line on high emergency area equipment cooler temperature, at least one channel is required to be operable or maintained in the tripped condition.

Elem. Ref.	
H-17148	H-17748
H-17149	H-19829
H-17151	H-19832

Prepared By:
Reviewed By:

LFD-1-PCIS-28
TS 3.3.6.1-1, Item 4.h
RCIC System Isolation
Emergency Area Cooler Temperature - High
Rev. 0 1/13/95



Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the RWCU system on high area temperature, channels in one of the following combinations must be either operable or maintained in the tripped condition.

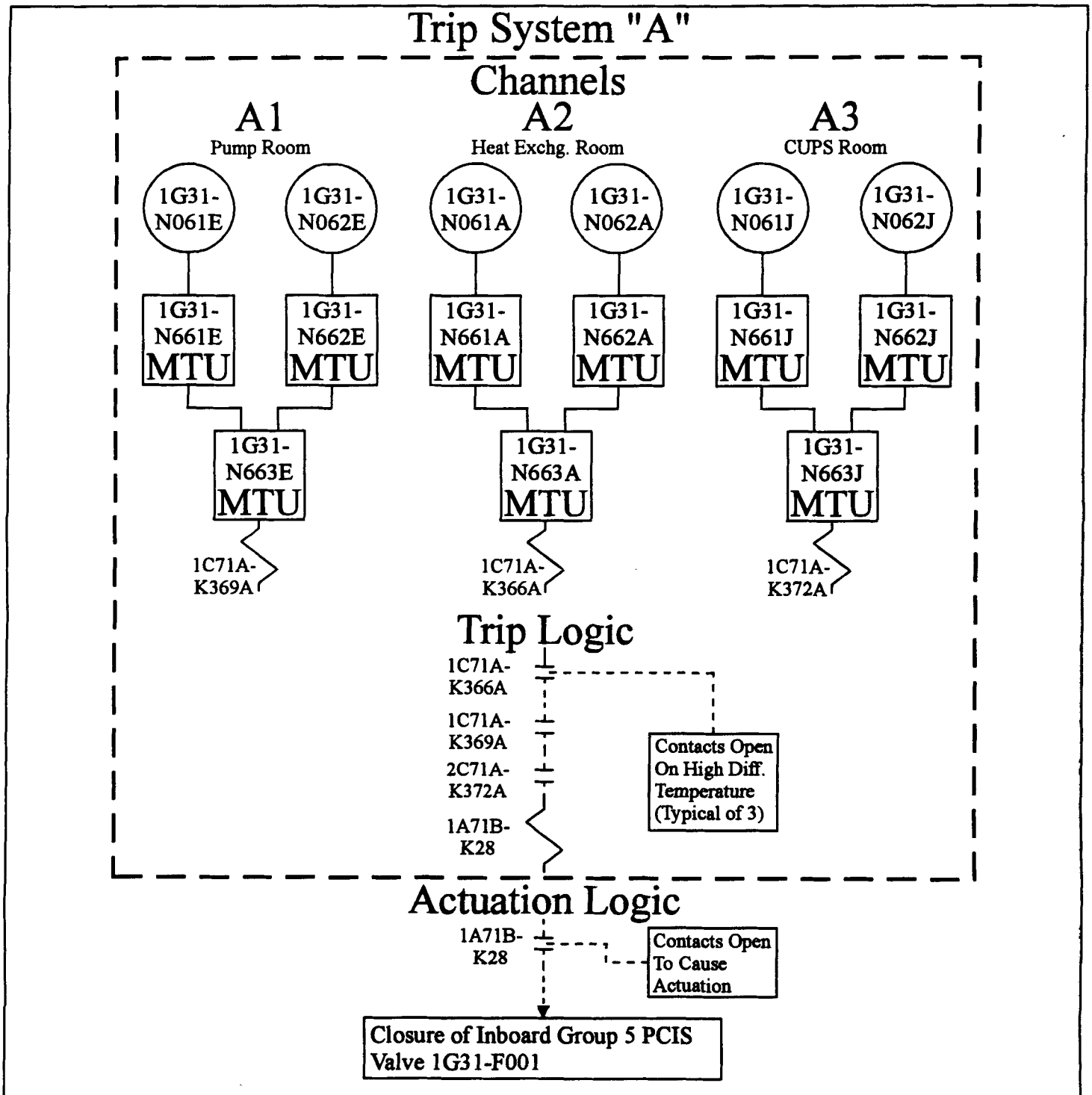
A1 or B1
AND
A2 or B2
AND
A3 or B3

Elem. Ref.
H-16231
H-17817
H-17818
H-19811
H-19820

Prepared By: Stephen W. Reed

Reviewed By:

LFD-1-PCIS-29	
TS 3.3.6.1-1, Item 5.a RWCU System Isolation Area Temperature - High	
Rev. 0	1/13/95



Minimum Channel Requirements for System Isolation Capability:

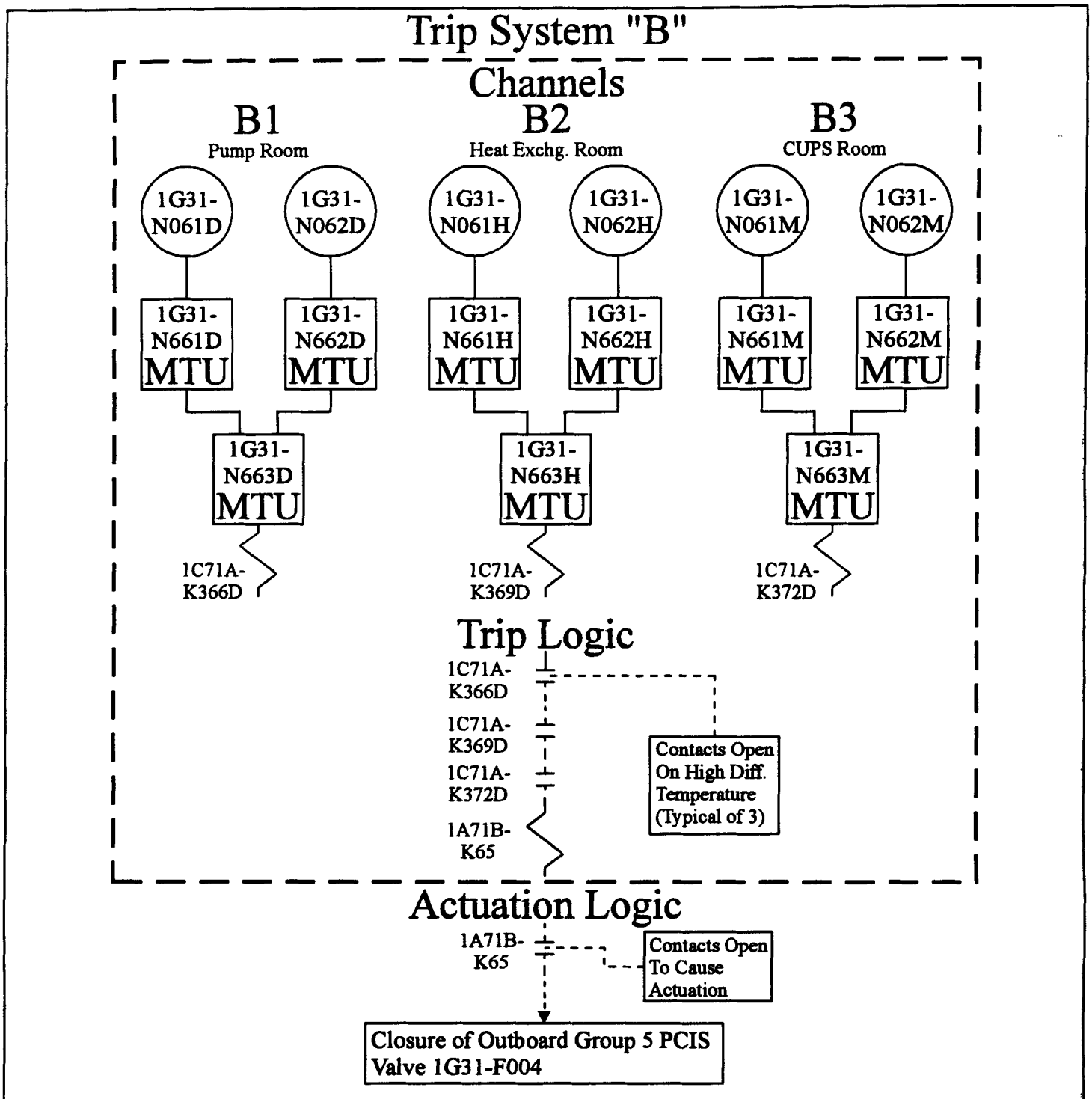
See Sheet 2 of 2 for statement of minimum channel requirements.

Elem. Ref.
H-16231
H-17817
H-17818
H-19811
H-19820

Prepared By: Stephen Reed

Reviewed By:

LFD-1-PCIS-30 Sheet 1 of 2	
TS 3.3.6.1-1 Item 5.b RWCU System Isolation Area Ventilation Diff. Temperature - High	
Rev. 0	1/13/95



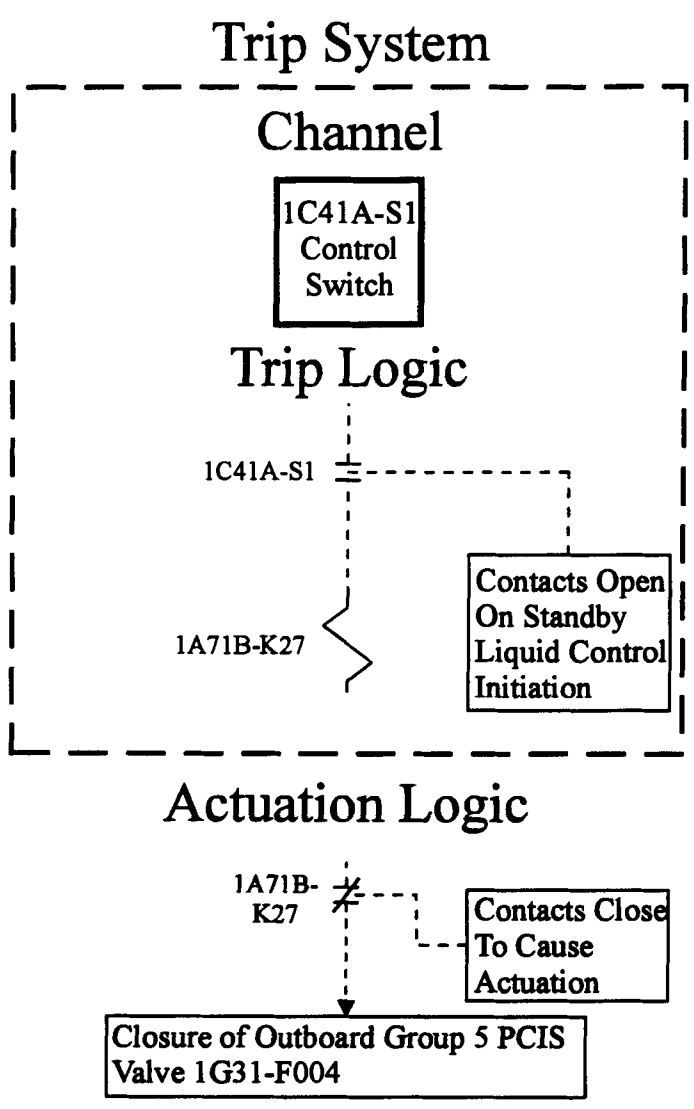
Minimum Channel Requirements for System Isolation Capability:

In order to maintain Group 5 PCIS isolation capability on high ventilation differential temperature, channels in one of the following combinations must be either operable or maintained in the tripped condition.

Elem. Ref.
H-16231
H-17817
H-17818
H-19811
H-19820

A1or B1
AND
A2 or B2
AND
A3 or B3

LFD-1-PCIS-30
Sheet 2 of 2
TS 3.3.6.1-1 Item 5.b RWCU System Isolation Area Ventilation Diff. Temperature - High
Rev. 0 1/13/95



Minimum Channel Requirements for System Isolation Capability

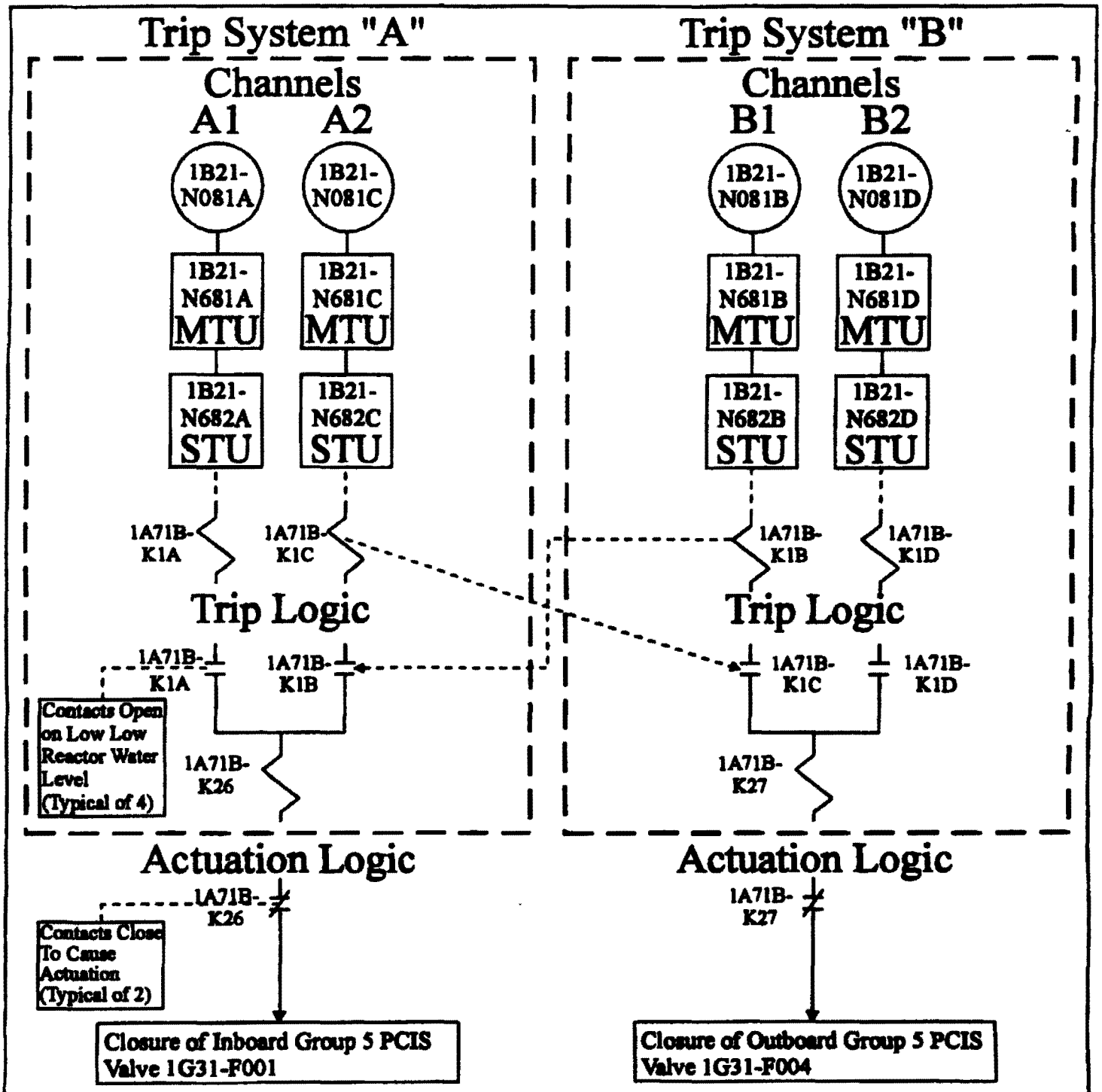
In order to maintain the capability to isolate the RWCU system on Standby Liquid Control System initiation, this channel must be operable or maintained in the tripped condition.

Elem. Ref.
H-17120
H-17817
H-17818

Prepared By: _____

Revi[illegible]

LFD-1-PCIS-31	
TS 3.3.6.1-1, Item 5.c RWCU System Isolation SLC System Initiation	
Rev. 0	1/13/95



Minimum Channel Requirements for System Isolation Capability:

In order to maintain the capability to isolate the RWCU system on low low reactor water level, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 and B1
OR
A2 and B2

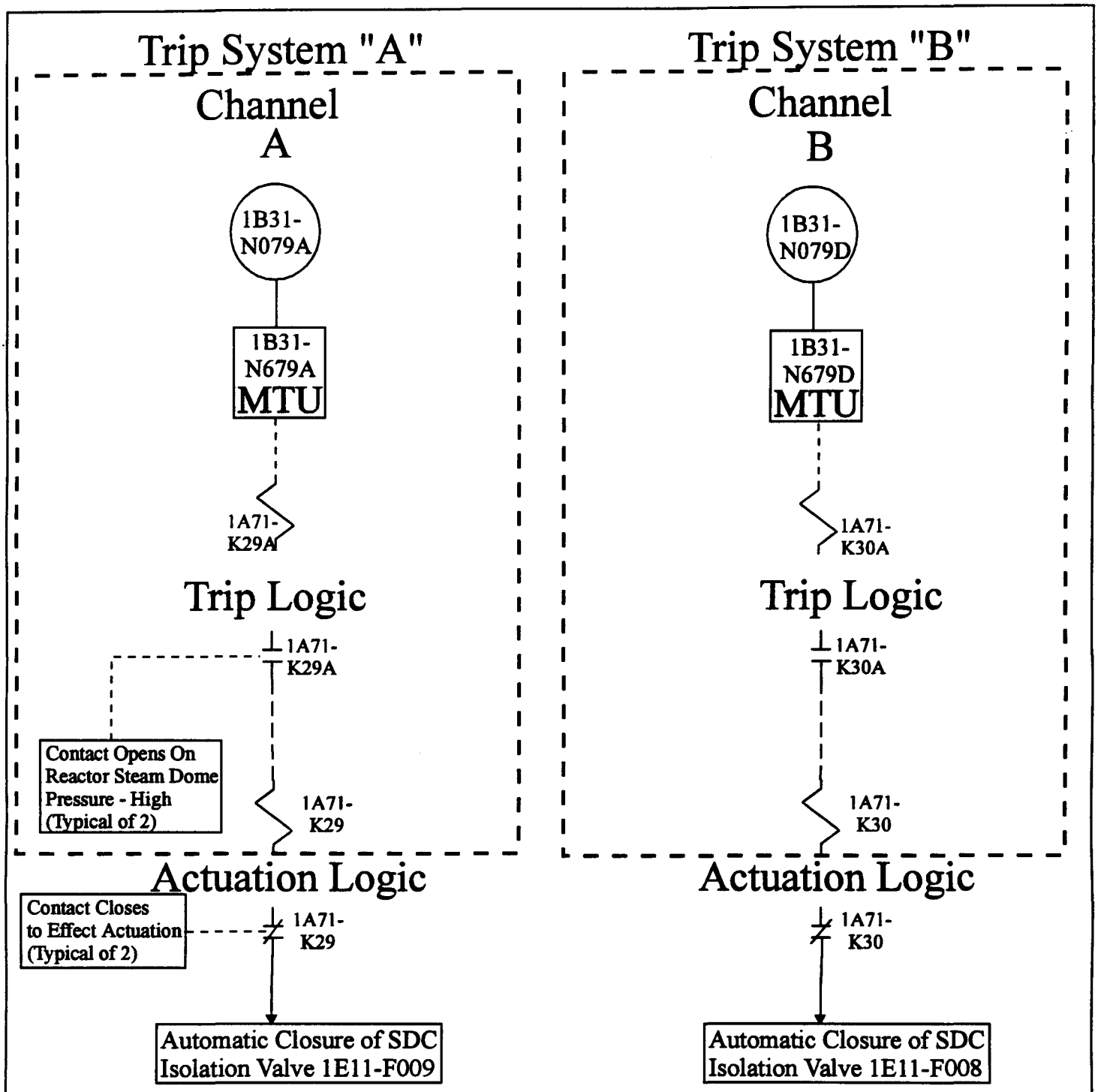
Elem. Ref.	
H-17810	H-19809
H-17811	H-19812
H-17817	H-19815
H-17818	H-19818

Prepared By: [signature]

Reviewed: [signature]

LFD-1-PCIS-32

TS 3.3.6.1-1, Item 5.d
TS 3.3.5.2-1, Item 4.a
RWCU System Isolation
Reactor Vessel Water Level - Low Low, Level 2
Rev. 1 12/06/18



Minimum Channel Requirements for System Initiation Capability:

In order to maintain RHR Shutdown Cooling System isolation capability on a Reactor Steam Dome Pressure - High signal, either channel "A" or "B" is required to be operable or maintained in the tripped condition.

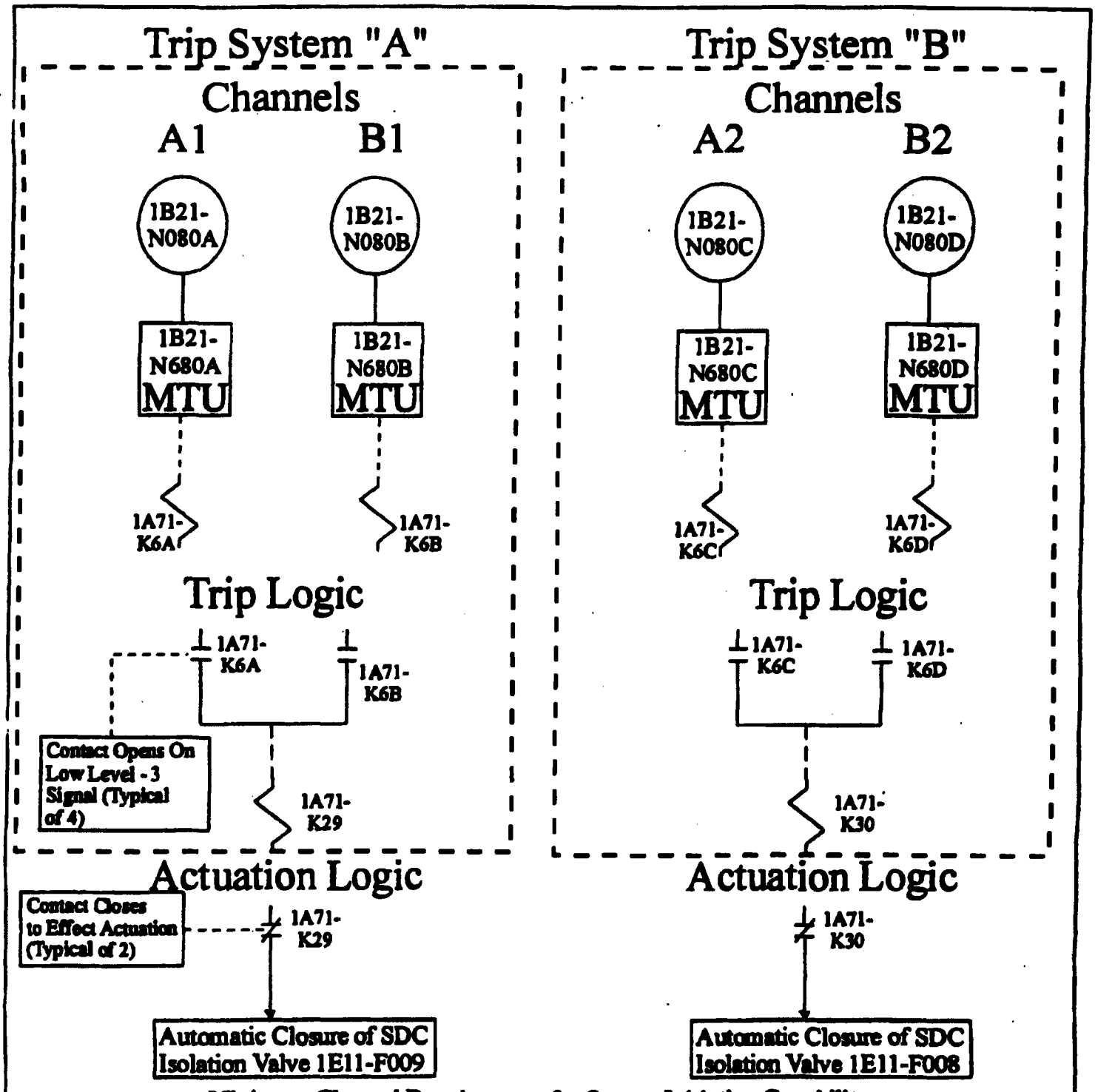
Note: This is not a PCIS function; however, it is an SDC isolation function. Therefore, automatic isolation capability of 1E11-F009 is required even though it is not a PCIS valve.

Elem. Ref.	
H-17817	H-19809
H-17818	H-19818

Prepared By: J. R. Brunner

Reviewed By: Royce Clark

LFD-1-PCIS-33	
TS 3.3.6.1-1, Item 6.a RHR SDC System Isolation, Reactor Steam Dome Pressure - High	
Rev. 0	1/15/95



Minimum Channel Requirements for System Initiation Capability:

In order to maintain RHR Shutdown Cooling System isolation capability on a Reactor Vessel Water Level - Low, Level 3 signal, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 and B1
OR
A2 and B2

Note: This is not a PCIS function; however, it is an SDC isolation function. Therefore, automatic isolation capability of 1E11-F009 is required even though it is not a PCIS valve.

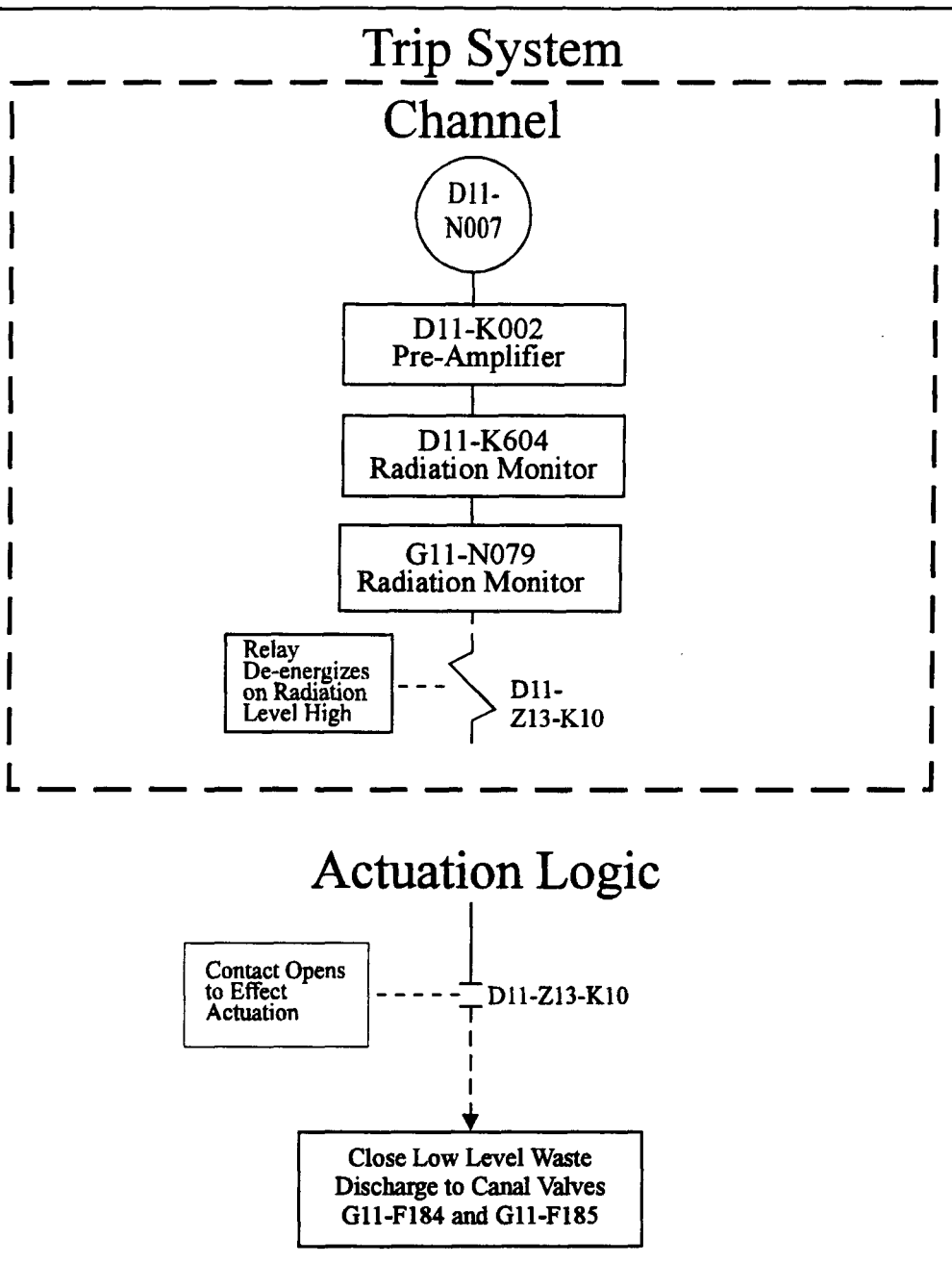
Elem. Ref.	
H-17789	H-17818
H-17790	H-19809
H-17810	H-19812
H-17811	H-19815
H-17817	H-19818

Prepared By: _____

Reviewed By: _____

LFD-1-PCIS-34

TS 3.3.6.1-1, Item 6.b
TS 3.3.5.2-1, Item 3.a
RHR SDC System Isolation, Reactor Vessel Water Level - Low, Level 3
TRM Rev. 113



Minimum Channel Requirements for System Initiation Capability:

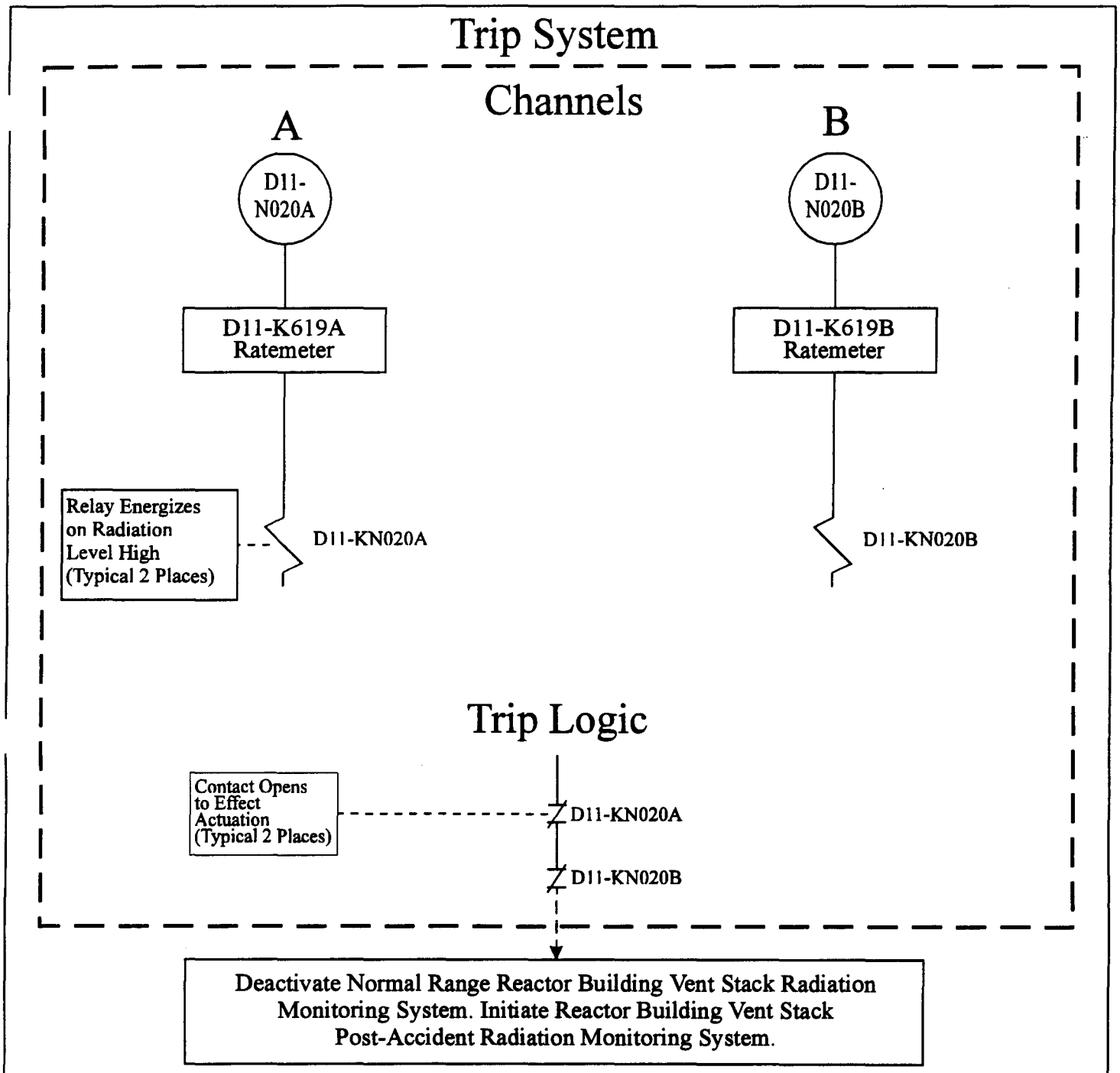
In order to maintain automatic isolation capability of the liquid radwaste discharge line (to the river) on a Liquid Radwaste Effluent Line Radiation-High signal, this channel must be operable.

LFD-1-PRM-01
ODCM 2-1, Item 1 Liquid Radwaste Effluent Line Radiation High
Rev. 0 11/16/94

Elem. Ref.
H-19533
H-19560

Prepared By: RBR

Reviewed By: JSB



Minimum Channel Requirements for System Initiation Capability:

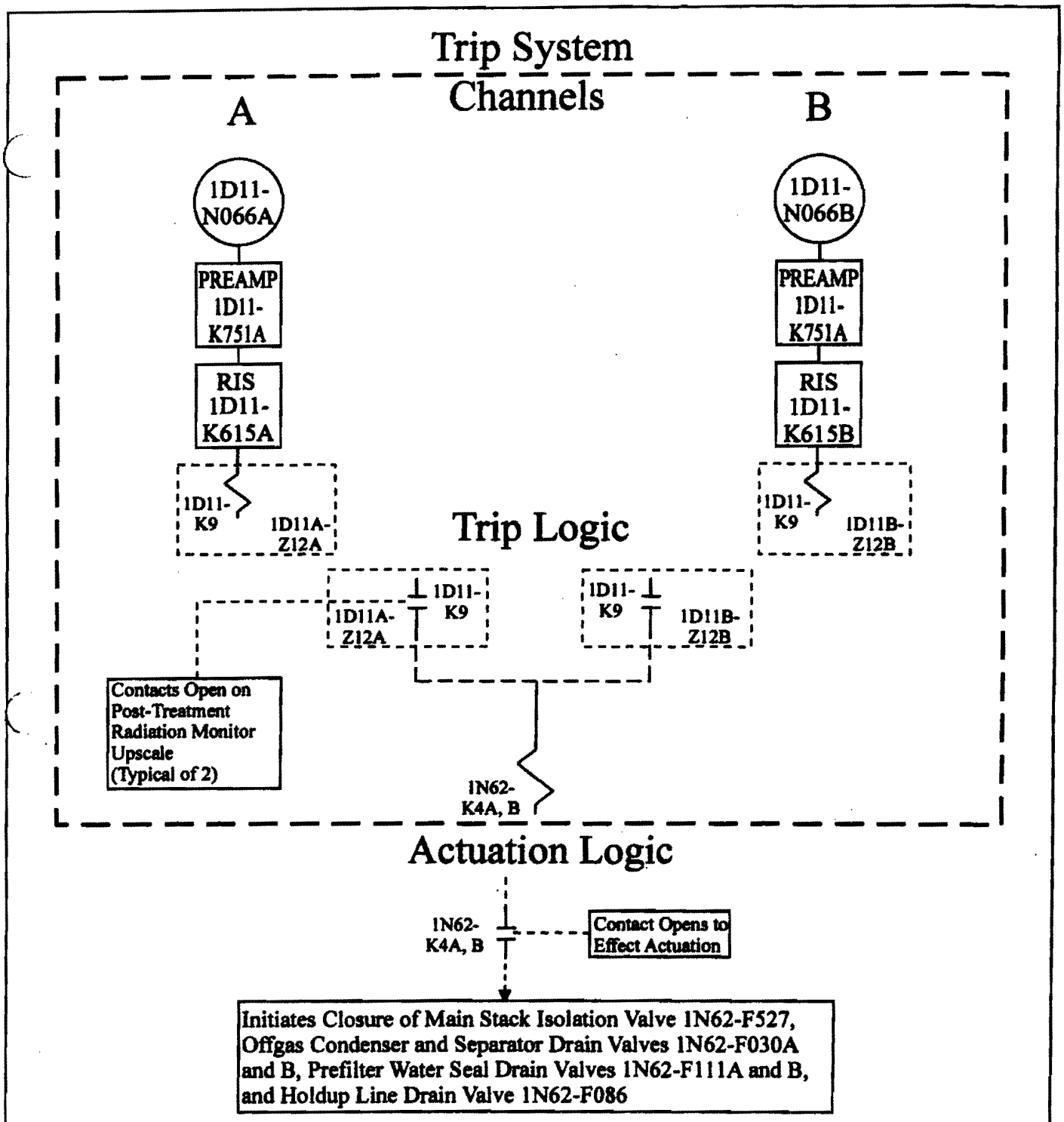
In order to maintain accident range monitoring automatic initiation capability due to a reactor building vent stack monitor high radiation signal, at least one channel must be operable.

Elem. Ref.
H-19559
H-19596
H-19661
H-19662

Prepared By: RBR

Reviewed By: JSB

LFD-1-PRM-02	
ODCM 3-1, Item 1.a Reactor Building Vent Stack Monitoring System Radiation High	
Rev. 0	11/16/94



Minimum Channel Requirements for System Isolation Capability:

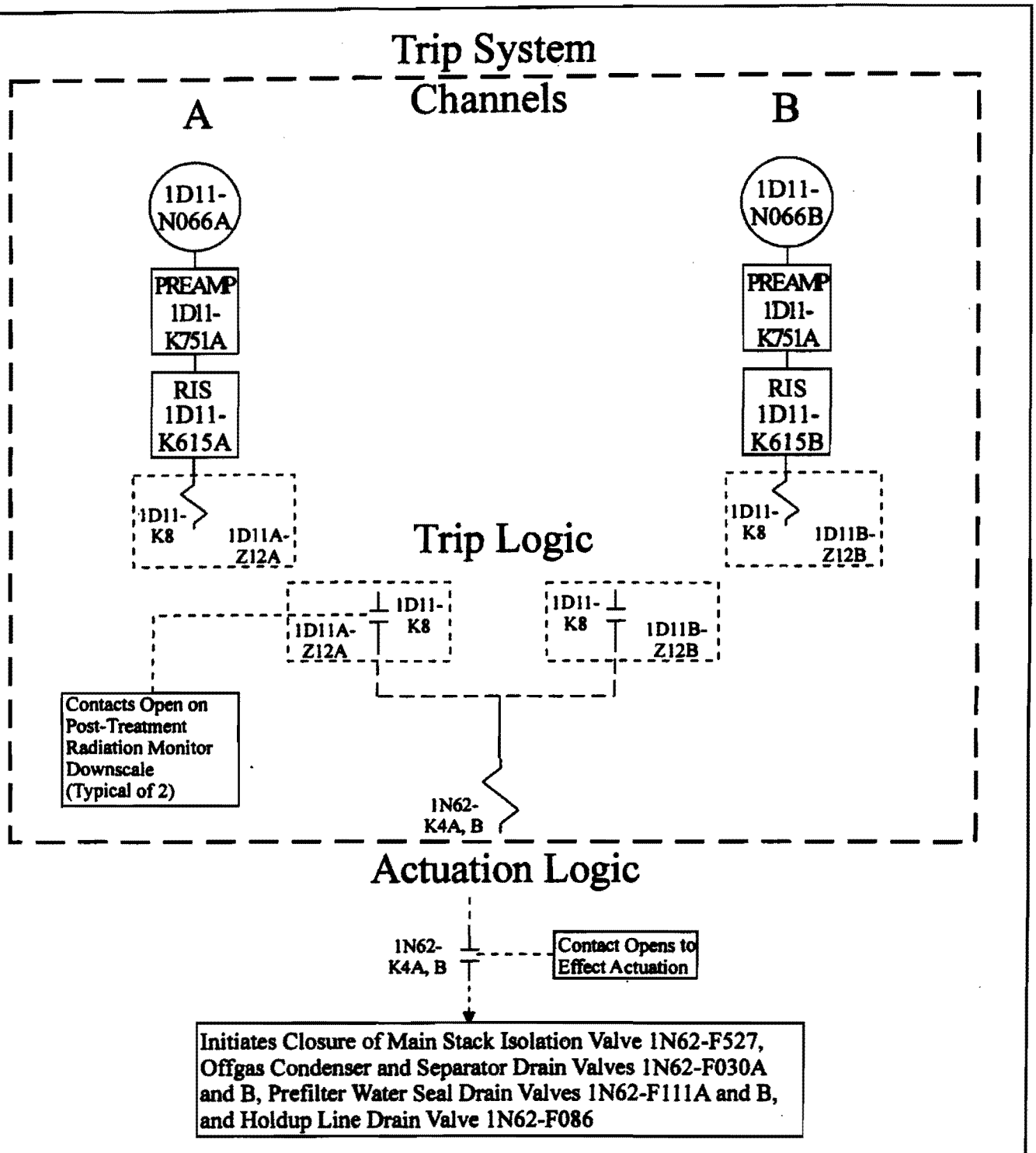
In order to maintain Offgas System isolation capability on a Post-Treatment Radiation Monitor upscale condition, each channel must be functional or maintained in the tripped condition.

Elem. Ref.	
H-17076	H-17133
H-17077	H-17134
H-17126	H-19558
H-17127	

Prepared By: RLC

Reviewed By: [signature]

LFD-1-PRM-03
TRM T3.3.8-1, Item 1 Offgas System Isolation Post-Treatment Radiation Monitor Upscale
TRM REV. 60



Minimum Channel Requirements for System Isolation Capability:

In order to maintain Offgas System isolation capability on a Post-Treatment Radiation Monitor downscale condition, each channel must be functional or maintained in the tripped condition.

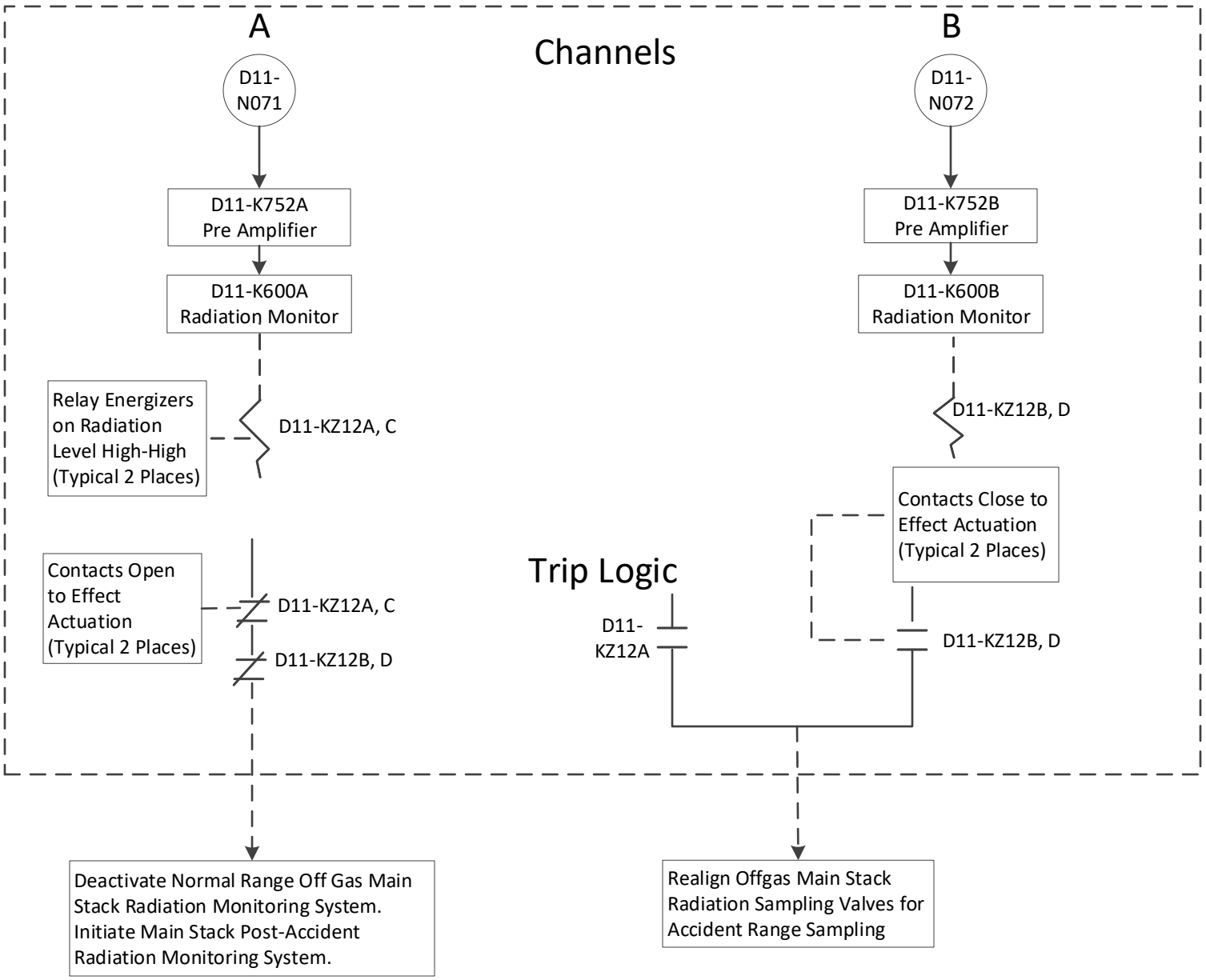
Elem. Ref.	
H-17076	H-17133
H-17077	H-17134
H-17126	H-19558
H-17127	

Prepared By:

Reviewed By:

LFD-1-PRM-04
TRM T3.3.8-1, Item 2 Offgas System Isolation Post-Treatment Radiation Monitor Downscale
TRM REV. 60

Trip System



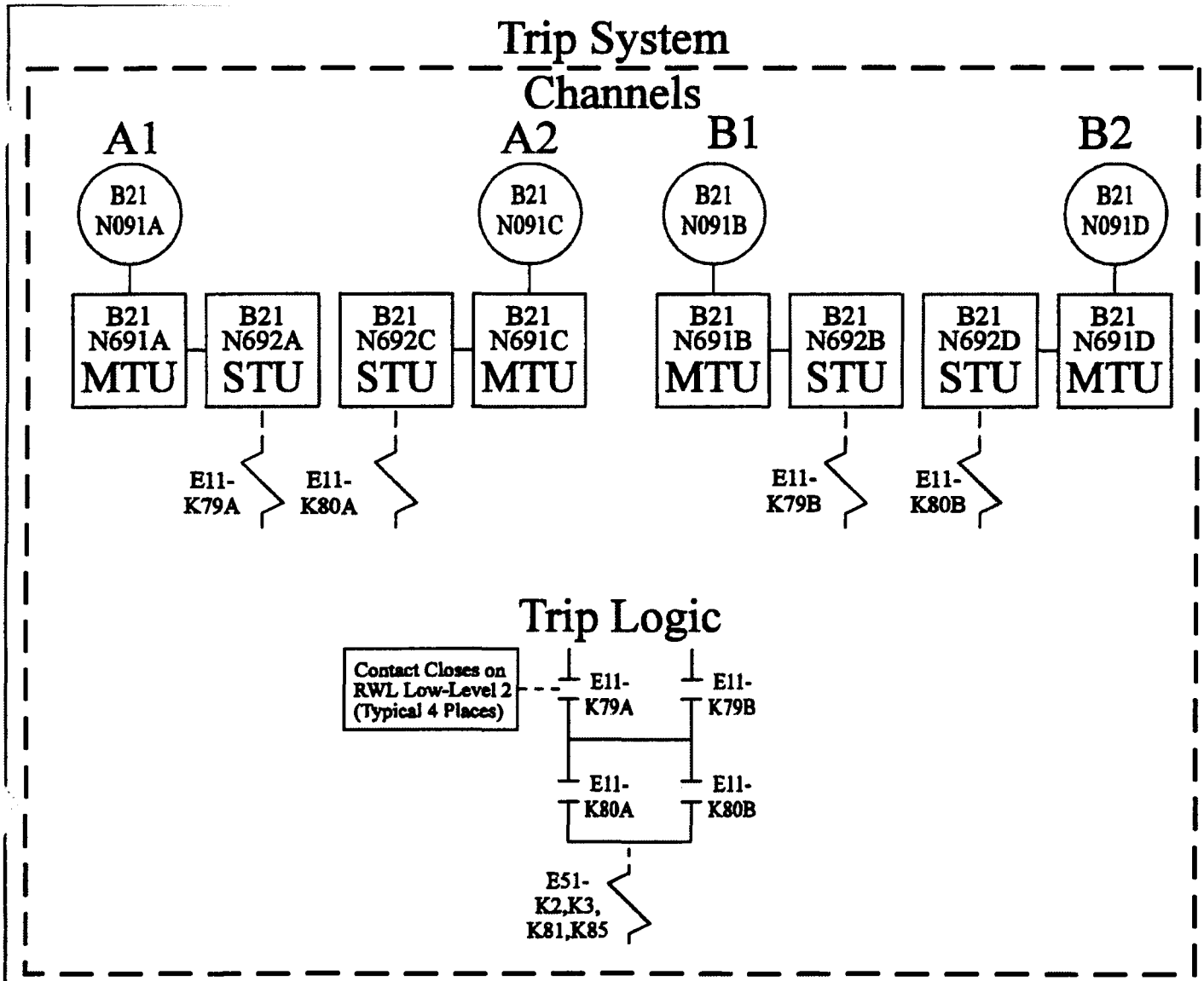
Minimum Channel Requirements for System Initiation Capability:

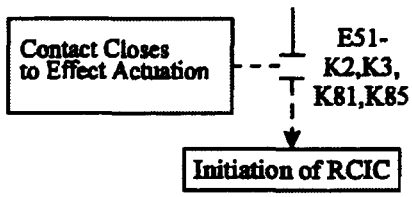
In order to maintain accident range monitoring automatic initiation capability due to a main stack monitor high-high radiation signal, at least one channel must be operable.

LFD-1-PRM-05	
ODCM 3-1, Item 3.a Main Stack Monitoring System, Noble Gas Activity Monitor	
Rev. 1	08/25/2016

Elem. Ref.
H-19559
H-19596
H-19661

Prepared by: _____
Reviewed by: _____





Minimum Channel Requirements for System Initiation Capability:

In order to maintain RCIC initiation capability due to low reactor water level, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 & A2
A1 & B2
B1 & A2
B1 & B2

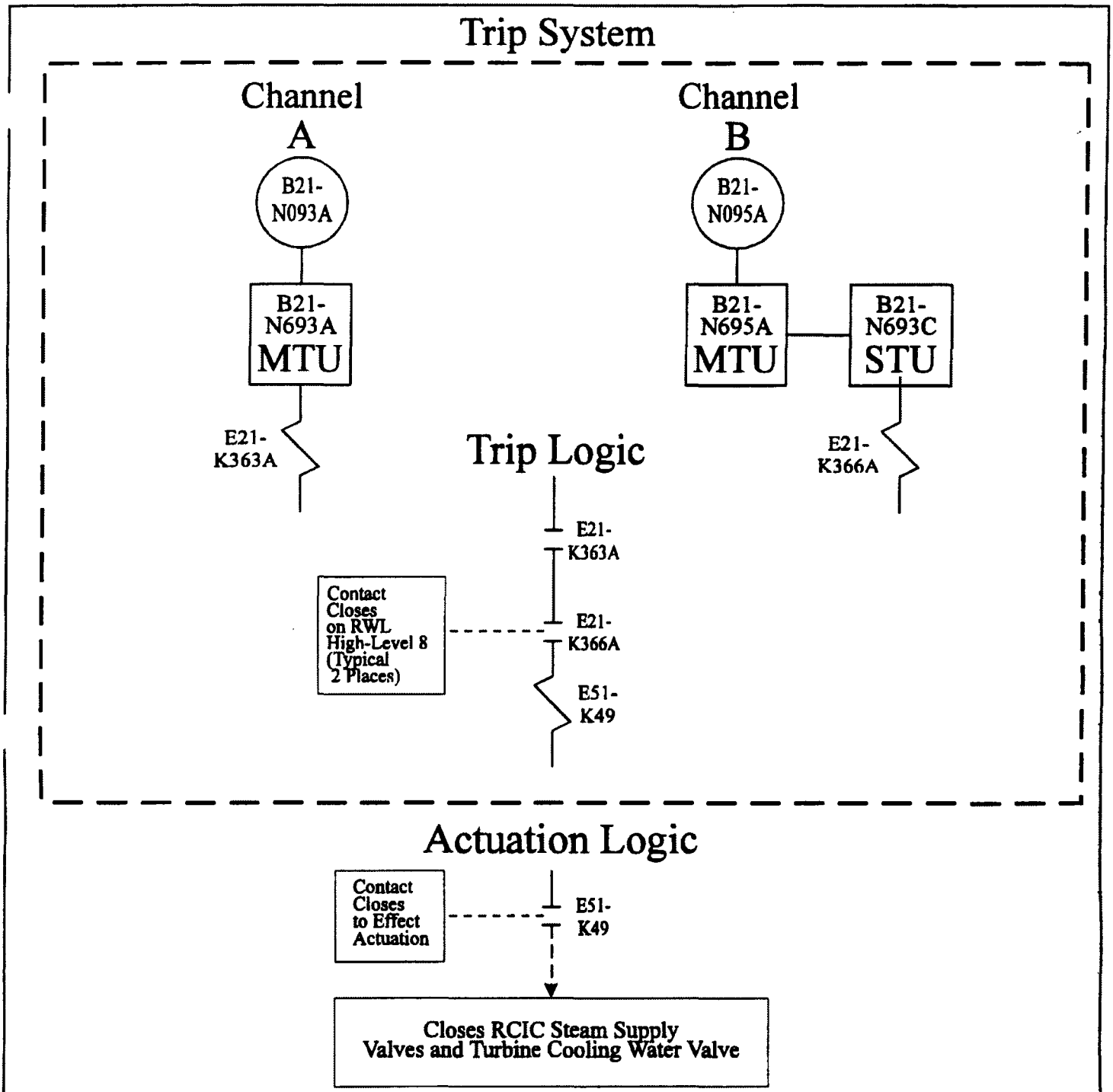
Elem. Ref.	
H-17148	H-19826
H-17763	H-19829
H-17766	H-19830
H-19823	

Prepared By: [signature]
Reviewed By: [signature]

LFD-1-RCIC-01

TS 3.3.5.3-1, Item 1
RCIC system
Reactor Vessel
Water Level-
Low Low, Level 2

TRM Rev. 113



Minimum Channel Requirements for System Trip Capability:

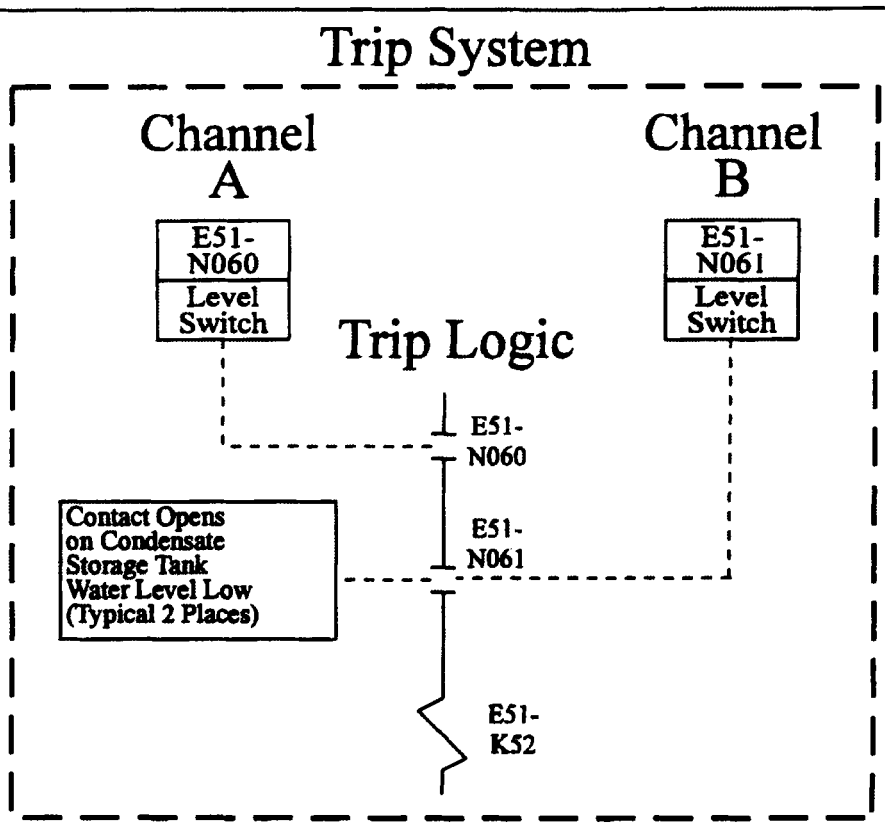
In order to ensure RCIC system trip capability on a RWL-HIGH- Level 8 signal, both channels must be operable.

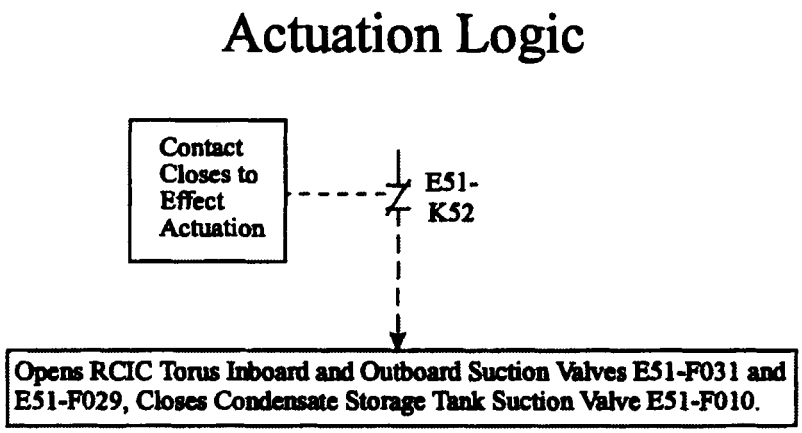
Elem. Ref.
H-17148
H-17152
H-19823
H-44120

Prepared By: RBR

Reviewed By: JSG

LFD-1-RCIC-02	
TS 3.3.5.3-1, Item 2 RCIC System Reactor Vessel Water Level - High, Level 8	
Rev. 1	12/03/18





Minimum Channel Requirements for System Initiation Capability:

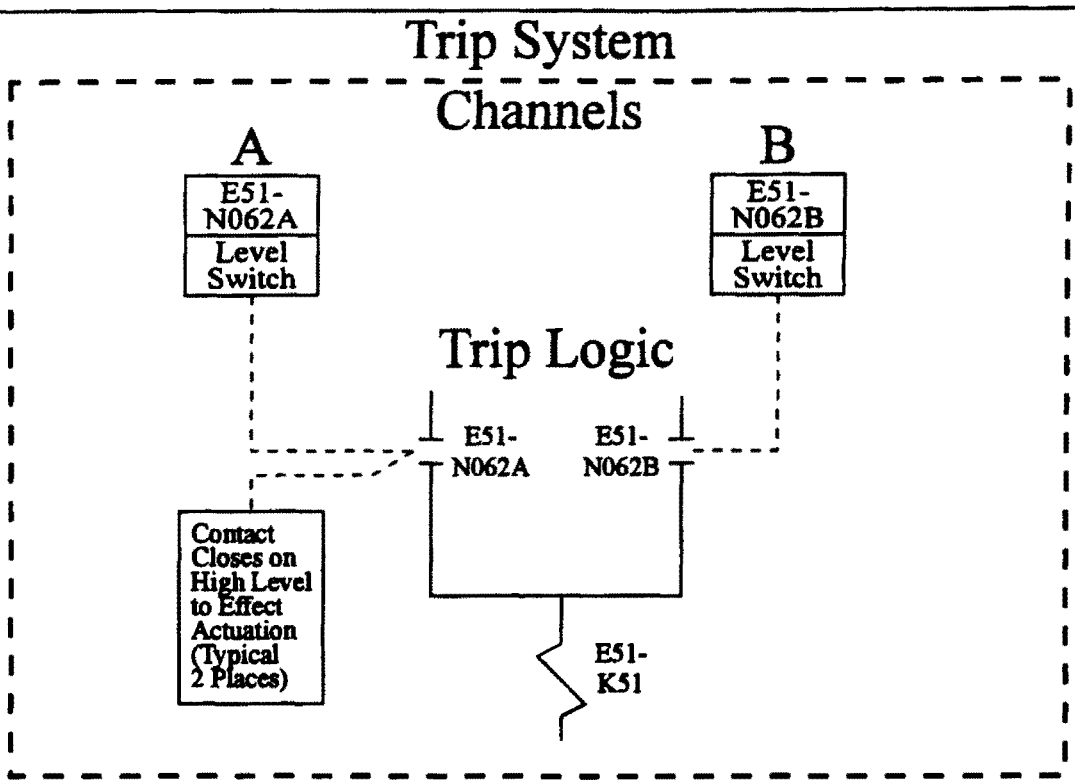
In order to maintain the ability to automatically transfer the RCIC pump suction from the CST to the Suppression Pool on a CST low level signal, one of the two channels must be operable or maintained in the tripped condition.

Elem. Ref.
H-17148
H-17152

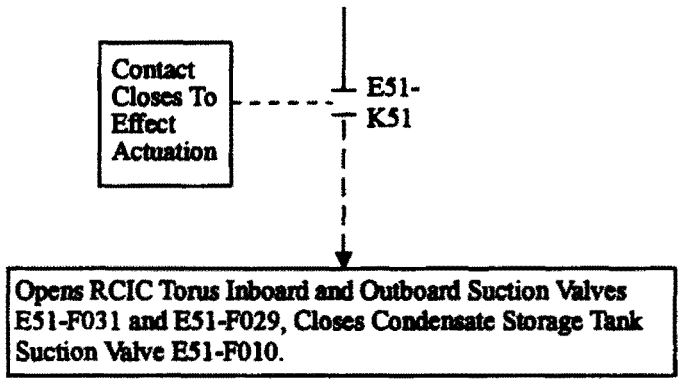
Prepared By: RBR

Reviewed By: JDB

LFD-1-RCIC-03
TS 3.3.5.3-1. Item 3 RCIC System Condensate Storage Tank Level-Low
Rev. 1 12/03/18



Actuation Logic



Minimum Channel Requirements for System Initiation Capability:

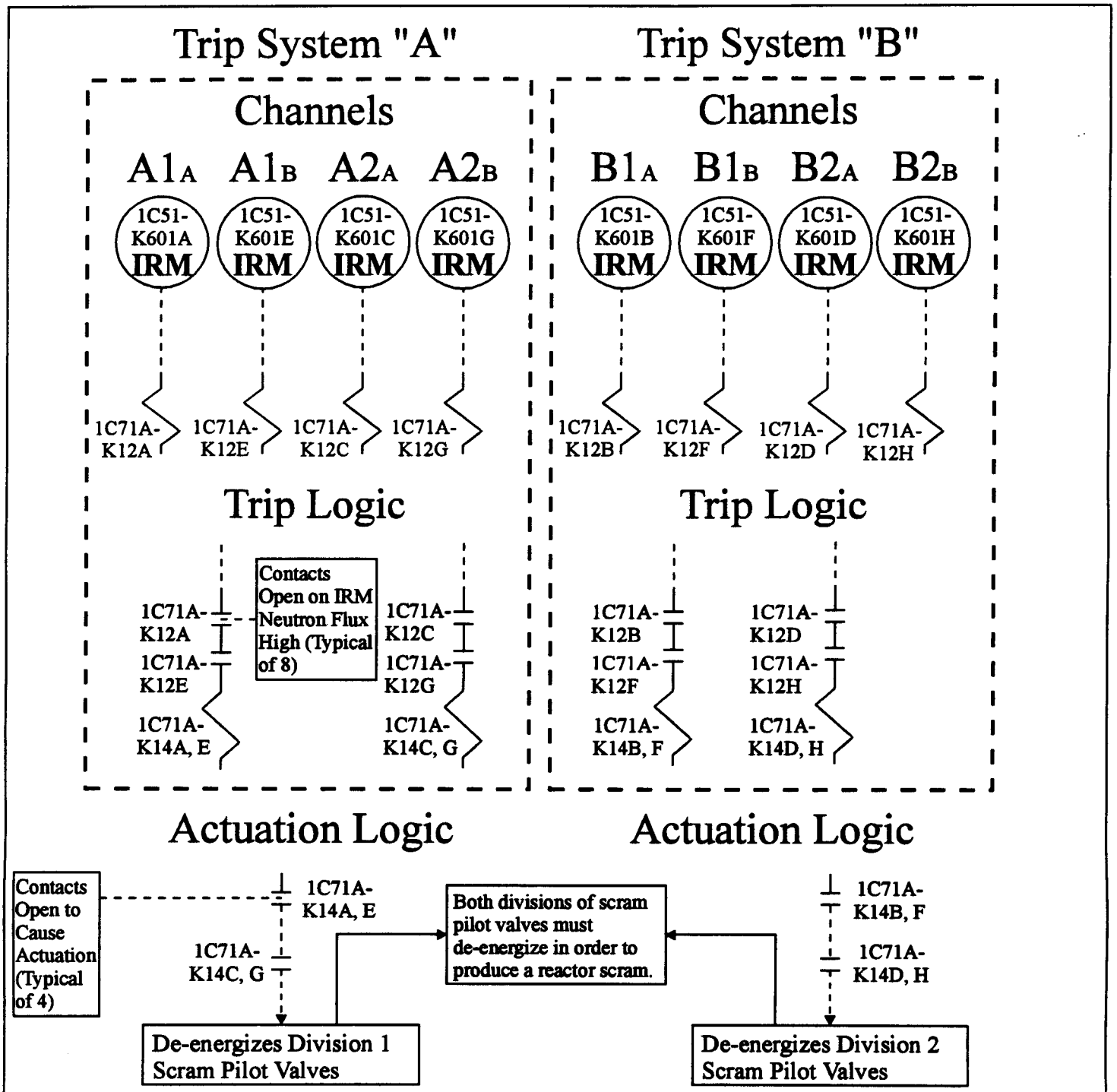
In order to maintain the ability to automatically transfer the RCIC pump suction from the CST to the Suppression Pool on a high Suppression Pool water level signal, one of the two channels must be operable or maintained in the tripped condition.

Elem. Ref.
H-17148
H-17152

Prepared By: RBR

Reviewed By: JDG

LFD-1-RCIC-04	
TS 3.3.5.3-1. Item 4 RCIC System Suppression Pool Water Level-High	
Rev. 1	12/03/18



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor on IRM neutron flux high, channels in one of the following combinations must be either operable or maintained in the tripped condition.

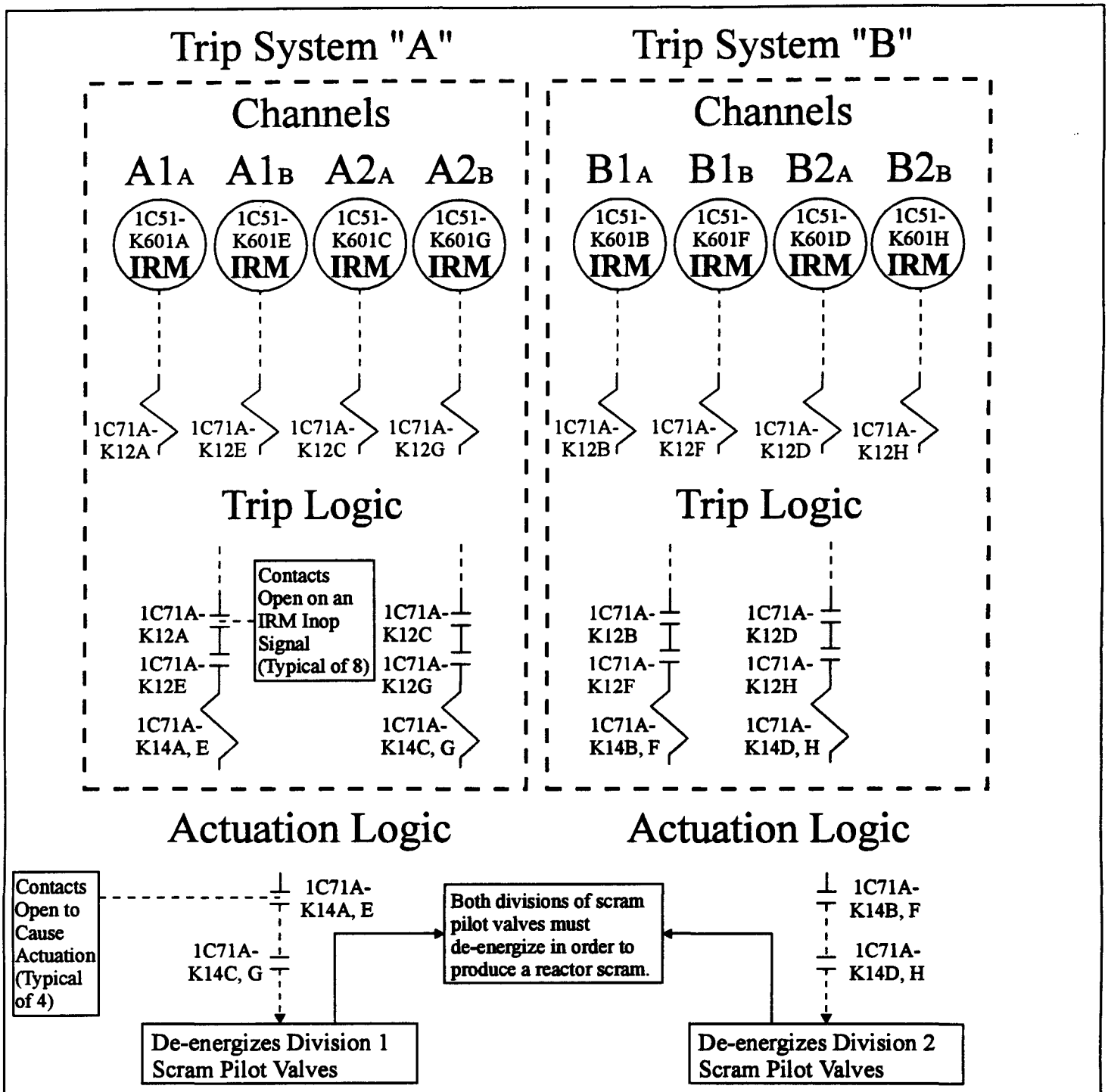
A1A or A1B or A2A or A2B
AND
B1A or B1B or B2A or B2B

Elem. Ref.
H-17789 H-17792
H-17790 H-17793
H-17791

Prepared By: Royce Clark

Reviewed By:

LFD-1-RPS-01
TS 3.3.1.1-1, Item 1.a
Reactor Protection System Instrumentation
IRM Neutron Flux - High
Rev. 0 1/16/95



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor on an IRM inop signal, channels in one of the following combinations must be either operable or maintained in the tripped condition.

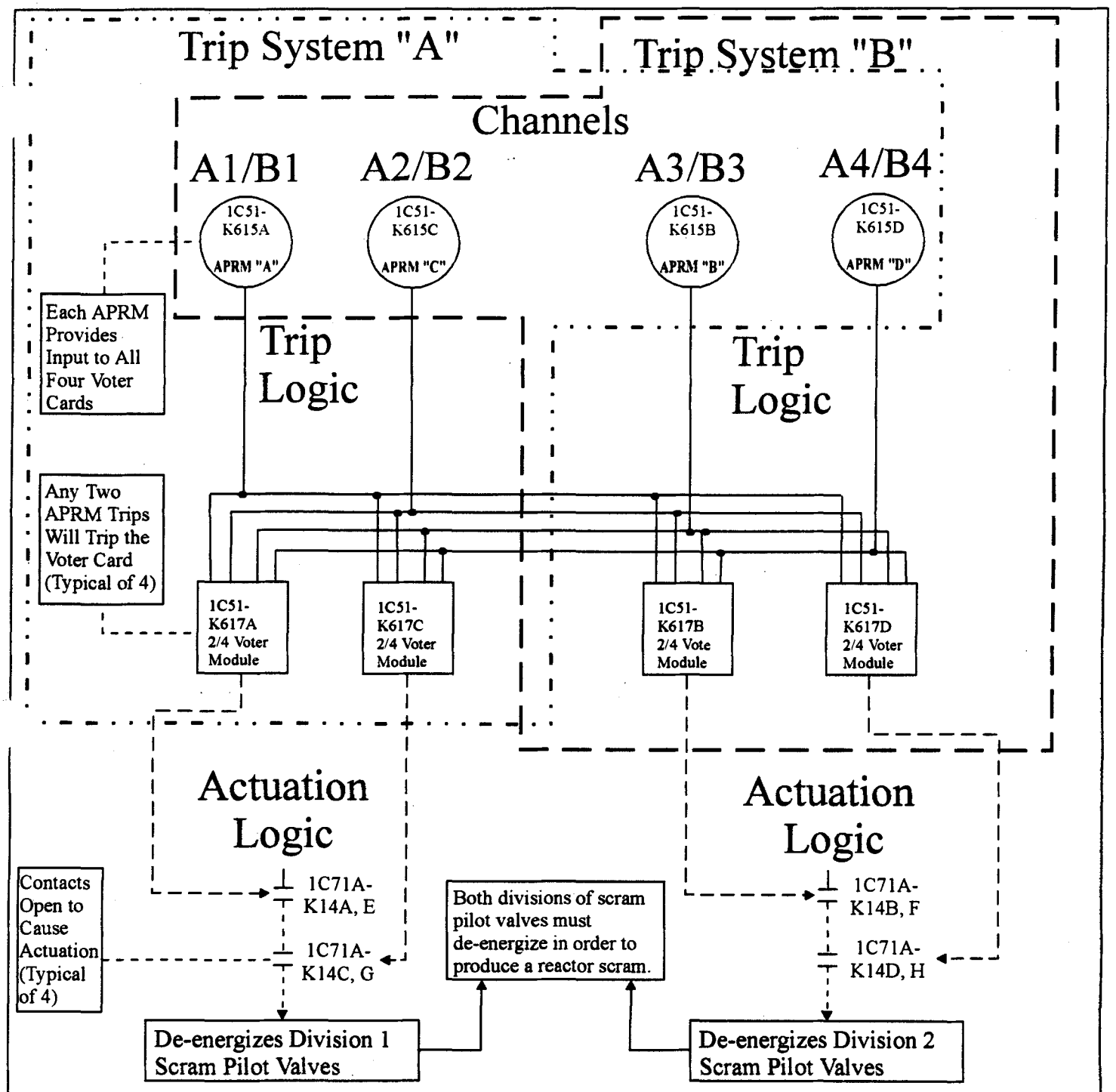
A1A or A1B or A2A or A2B
AND
B1A or B1B or B2A or B2B

Elem. Ref.
H-17789 H-17792
H-17790 H-17793
H-17791

Prepared By: Royce Clark

Reviewed By:

LFD-1-RPS-02
TS 3.3.1.1-1, Item 1.b
Reactor Protection System Instrumentation - IRM Inop
Rev. 0 1/16/95



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor on APRM neutron flux high (setdown), channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1/B1 and A2/B2
A1/B1 and A3/B3
A1/B1 and A4/B4
A2/B2 and A3/B3
A2/B2 and A4/B4
A3/B3 and A4/B4

Elem. Ref.	
H-17789	H-44705
H-17790	H-44706
H-17791	H-44707
H-17792	H-44708
H-17793	H-44712

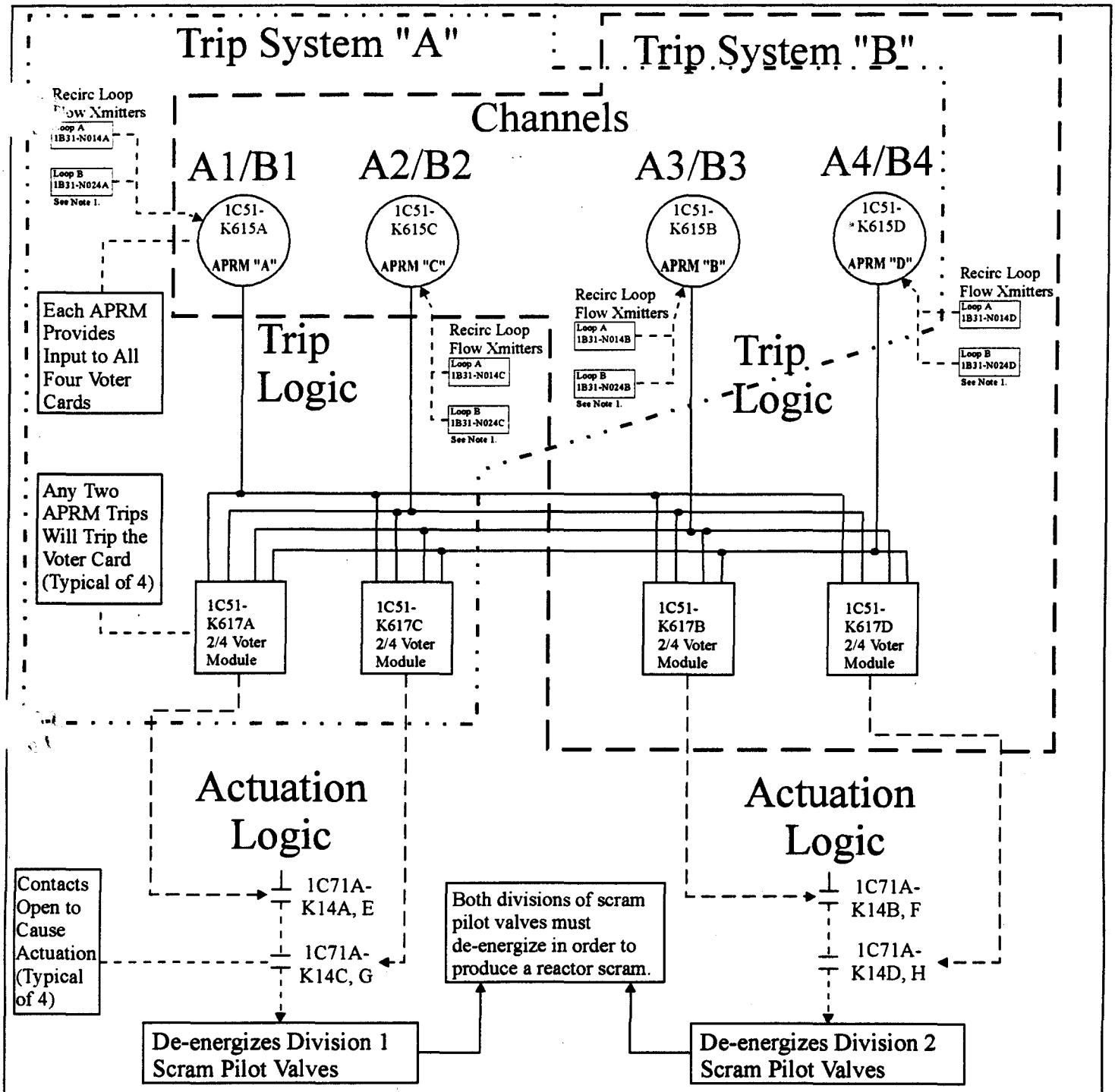
Prepared By:

Reviewed By:

LFD-1-RPS-03

TS 3.3.1.1-1, Item 2.a
Reactor Protection System Instrumentation - APRM Neutron Flux - High (Setdown)

TRM Rev. 12



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor on APRM Simulated Thermal Power - High, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1/B1 and A2/B2
A1/B1 and A3/B3
A1/B1 and A4/B4
A2/B2 and A3/B3
A2/B2 and A4/B4
A3/B3 and A4/B4

Note 1: For the STP High function of an APRM to be considered operable, both of the associated Recirc Flow transmitters must be operable.

Elem. Ref.	
H-17789	H-44705
7790	H-44706
H-17791	H-44707
H-17792	H-44708
H-17793	H-44712

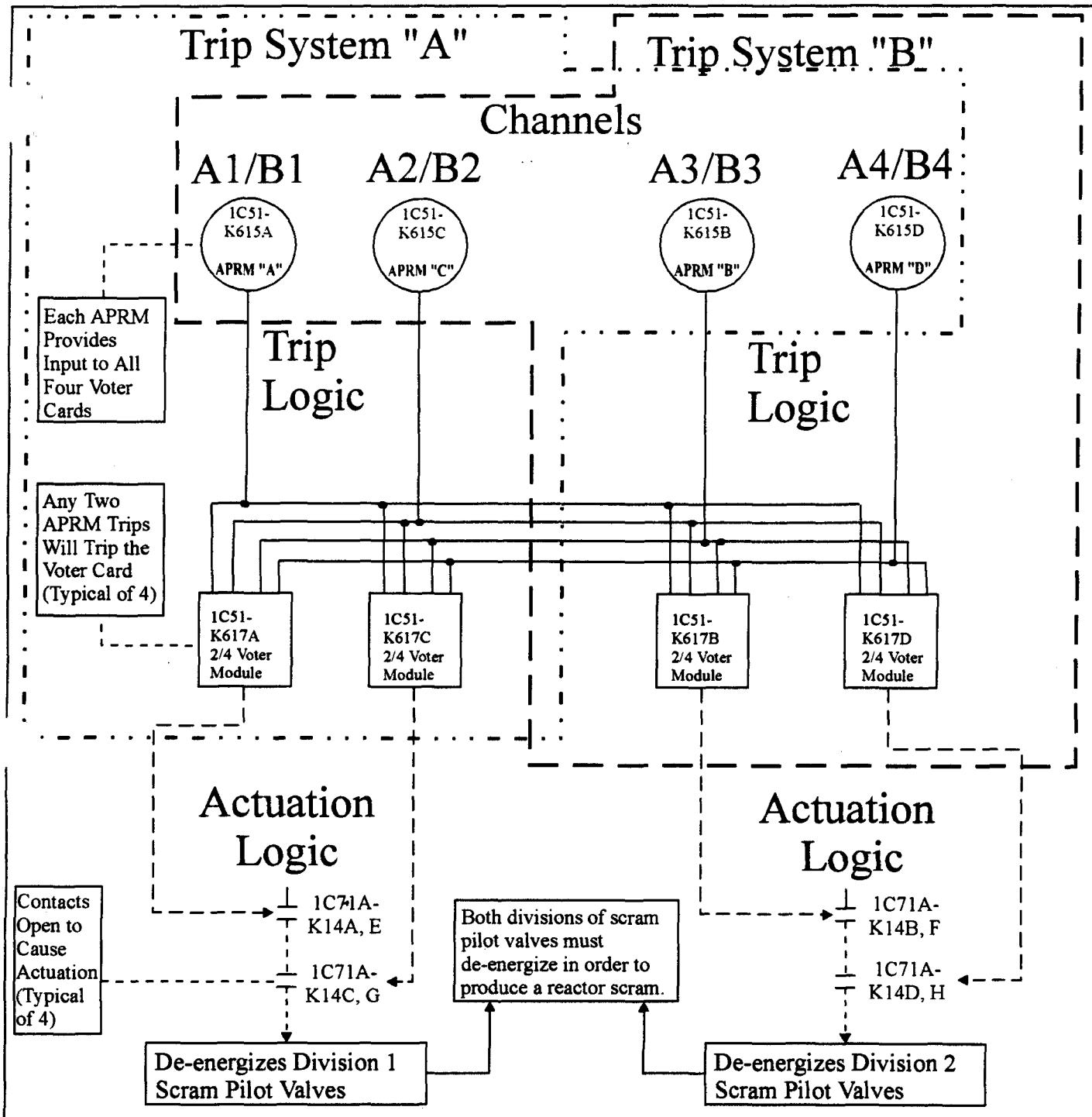
Prepared By: Wayne

Reviewed By: Shaun

LFD-1-RPS-04

TS 3.3.1.1-1, Item 2.b
Reactor Protection System Instrumentation - Simulated Thermal Power - High

TRM Rev. 12



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor on APRM Neutron Flux - High, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1/B1 and A2/B2
A1/B1 and A3/B3
A1/B1 and A4/B4
A2/B2 and A3/B3
A2/B2 and A4/B4
A3/B3 and A4/B4

Elem. Ref.	
H-17789	H-44705
H-17790	H-44706
H-17791	H-44707
H-17792	H-44708
H-17793	H-44712

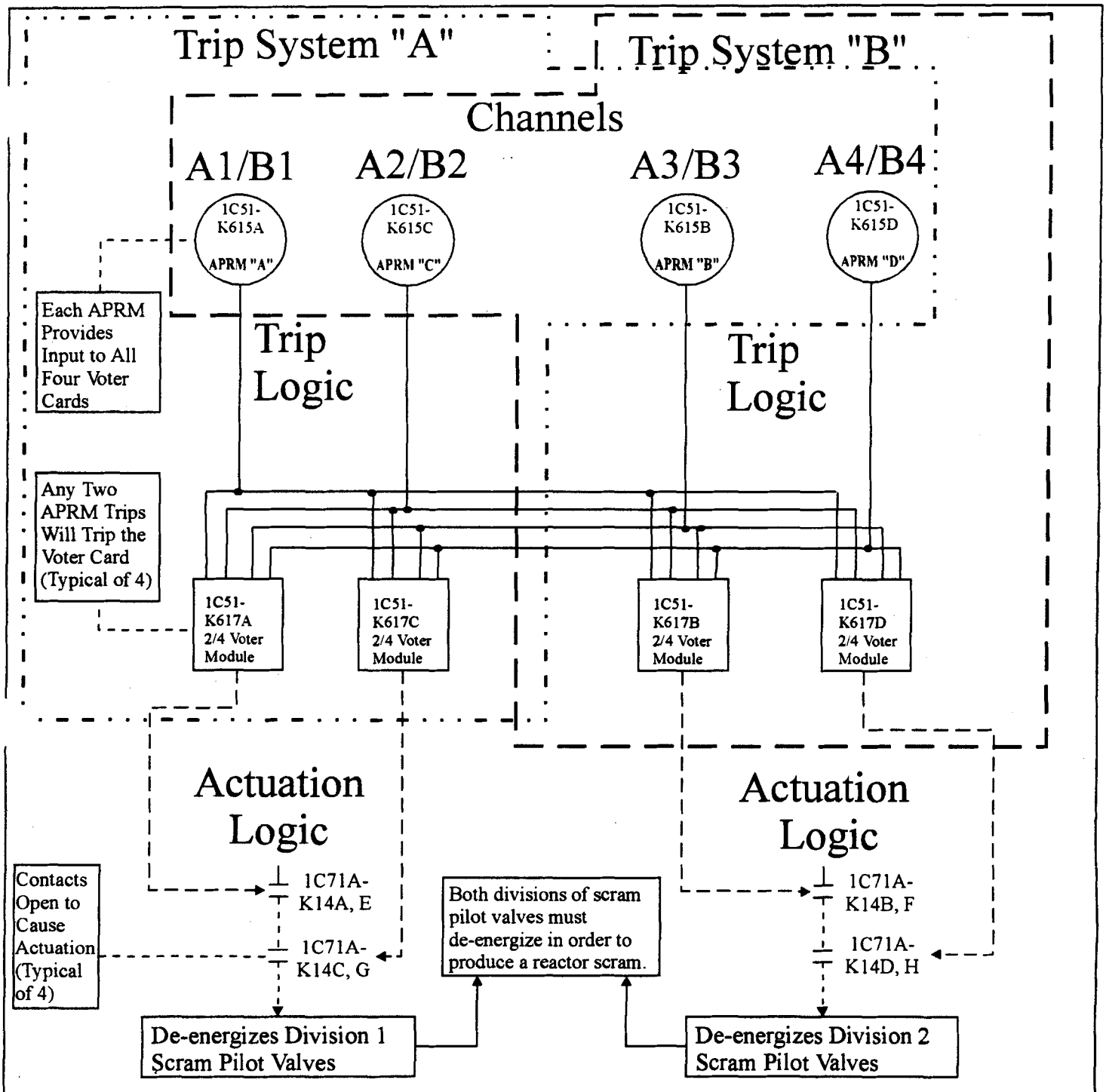
Prepared By: _____

Reviewed By: _____

LFD-1-RPS-05

TS 3.3.1.1-1, Item 2.c
Reactor Protection System Instrumentation - Neutron Flux - High

TRM Rev. 12



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor on APRM Inop, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1/B1 and A2/B2
A1/B1 and A3/B3
A1/B1 and A4/B4
A2/B2 and A3/B3
A2/B2 and A4/B4
A3/B3 and A4/B4

Elem. Ref.	
H-17789	H-44705
H-17790	H-44706
H-17791	H-44707
H-17792	H-44708
H-17793	H-44712

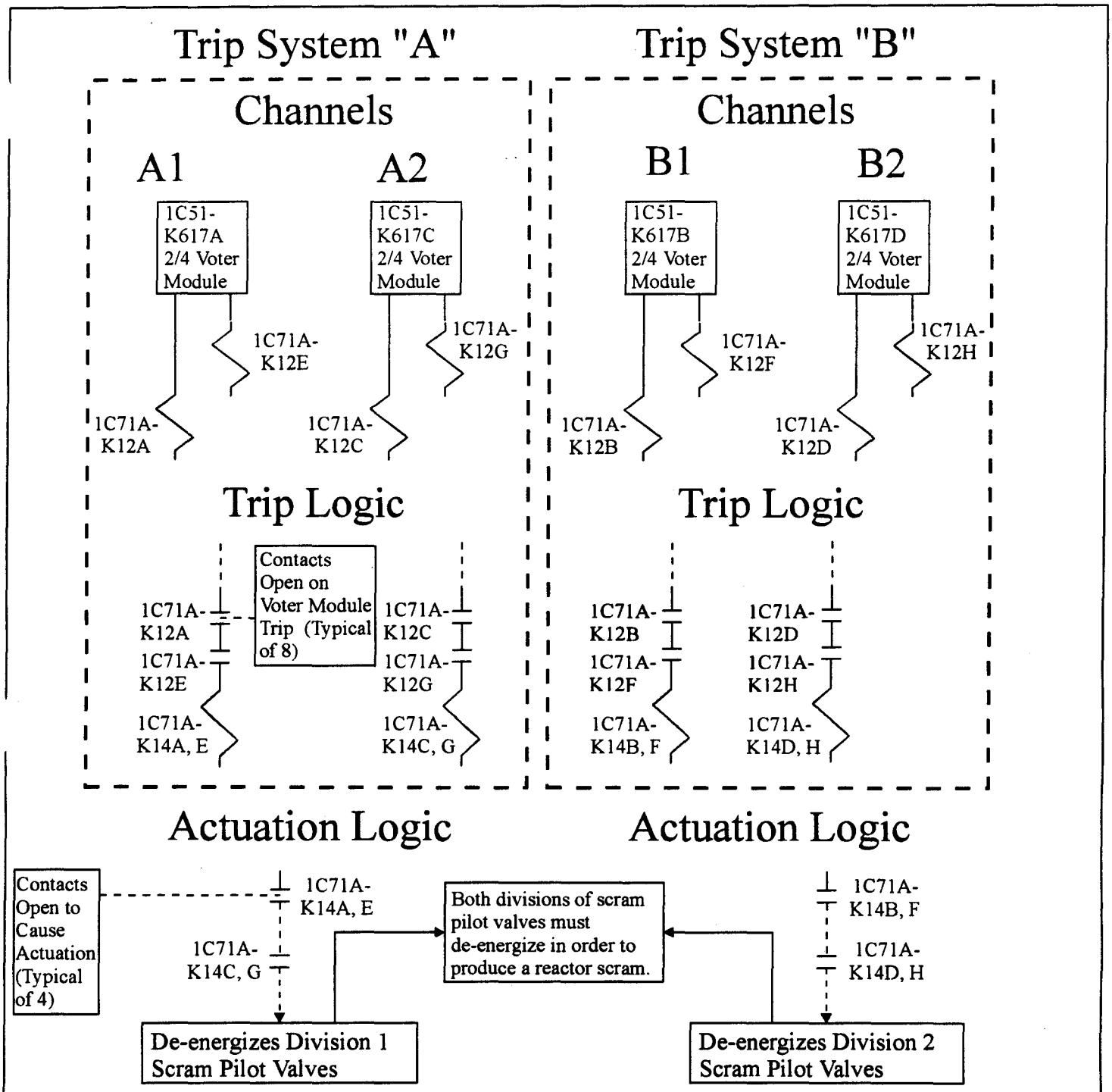
Prepared By: _____

Reviewed By: _____

LFD-1-RPS-06

TS 3.3.1.1-1, Item 2.d
Reactor Protection System Instrumentation - APRM Inop

TRM Rev. 12



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor on APRM Voter Module circuit function, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 or A2
AND
B1 or B2

Elem. Ref.
H-17789 H-17792
H-17790 H-17793
H-17791 H-44712

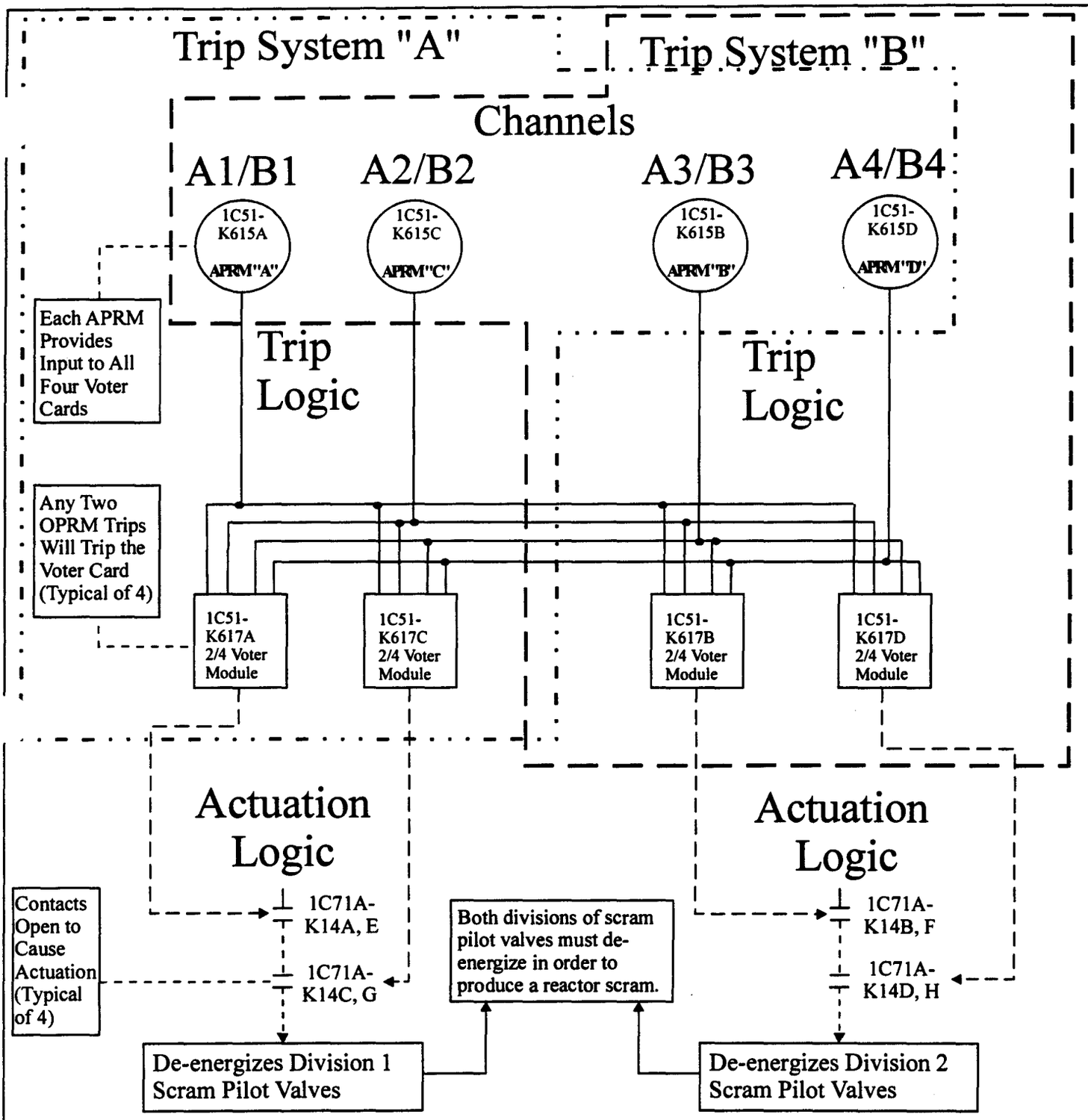
Prepared By:

Reviewed By:

LFD-1-RPS-07

TS 3.3.1.1-1, Item 2.e
Reactor Protection System Instrumentation - APRM Two-Out-of-Four Voter Circuit

TRM Rev. 12



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor on OPRM Upscale, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1/B1 and A2/B2
A1/B1 and A3/B3
A1/B1 and A4/B4
A2/B2 and A3/B3
A2/B2 and A4/B4
A3/B3 and A4/B4

Elem. Ref.	
H-17789	H-44705
H-17790	H-44706
H-17791	H-44707
H-17792	H-44708
H-17793	H-44712

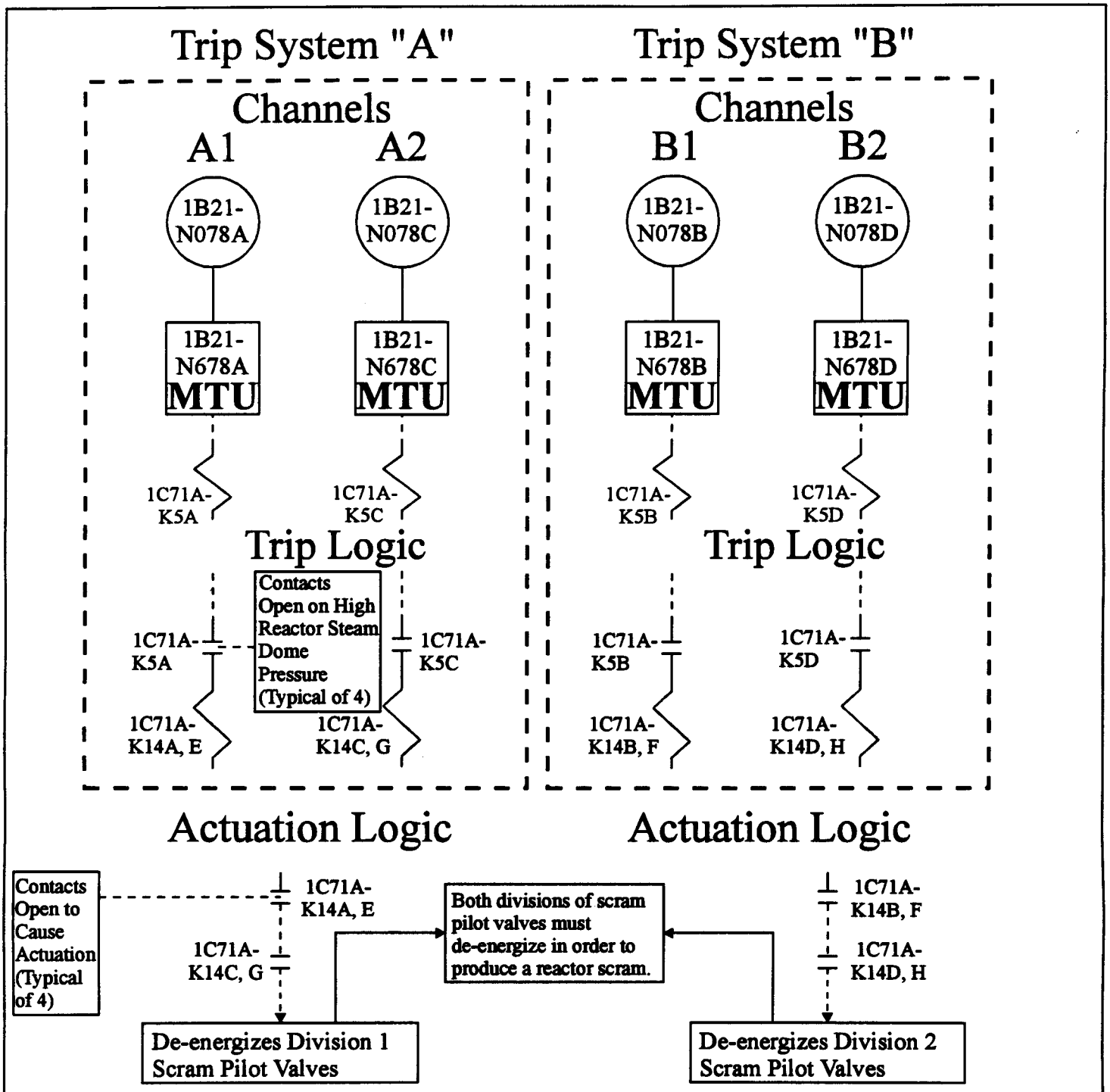
Prepared By: [signature]

Reviewed By: Stephen W. Reed

LFD-1-RPS-07a

TS 3.3.1.1-1, Item 2.f
Reactor Protection System Instrumentation - OPRM Upscale

TRM Rev. 26



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor on high reactor vessel steam dome pressure, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 or A2
AND
B1 or B2

Elem. Ref.	
H-17789	H-19809
H-17790	H-19812
H-17791	H-19815
H-17792	H-19818
H-17793	

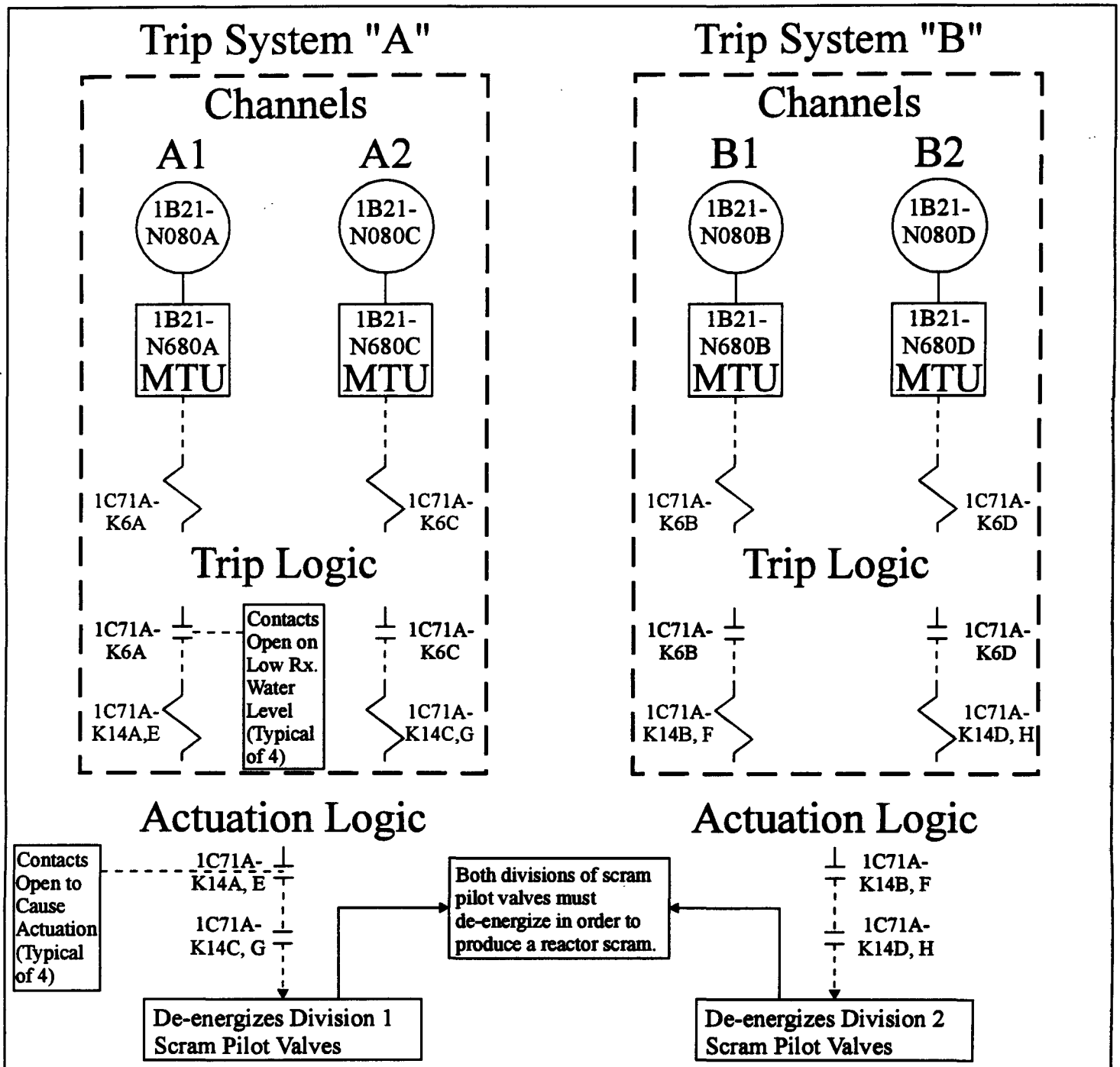
Prepared By: Royce Clark

Reviewed By:

LFD-1-RPS-08

TS 3.3.1.1-1, Item 3
Reactor Protection System Instrumentation - Reactor Vessel Steam Dome Pressure - High

Rev. 0 1/16/95



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor on low reactor water level (Level 3), channels in one of the following combinations must be either operable or maintained in the tripped condition.

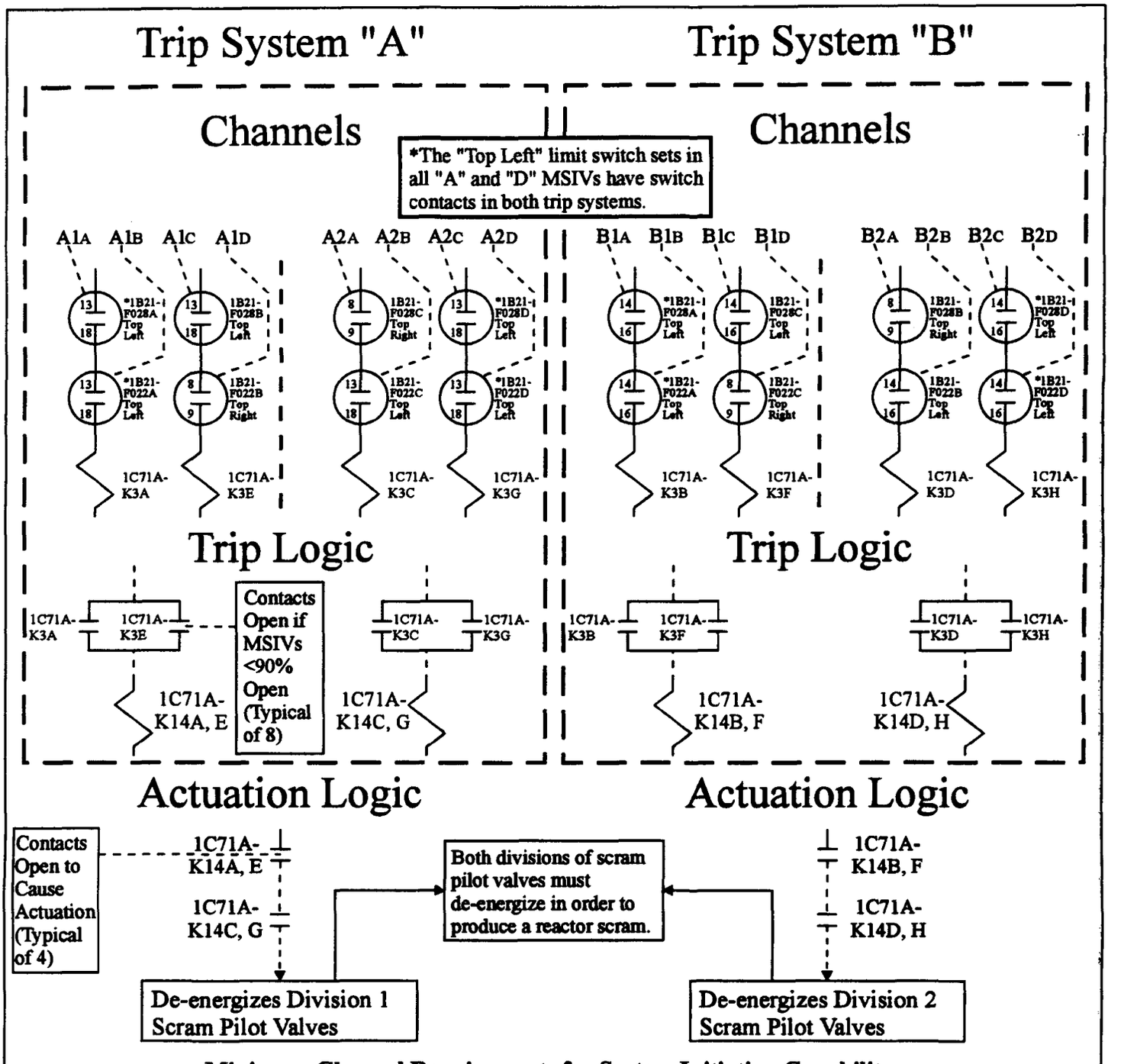
A1 or A2
AND
B1 or B2

Elem. Ref.	
H-17789	H-19809
H-17790	H-19812
H-17791	H-19815
H-17792	H-19818
H-17793	

Prepared By: Kayce Clark

Reviewed By: Stephen W. Miesel

LFD-1-RPS-09	
TS 3.3.1.1-1, Item 4 Reactor Protection System Instrumentation Reactor Vessel Water Level - Low, Level 3	
Rev. 0	1/16/95



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor on Main Steam Isolation Valve closure, channels in one of the following combinations must be either operable or maintained in the tripped condition.

(A1A or A1B) and (A1C or A1D)
OR
(A2A or A2B) and (A2C or A2D)

AND

(B1A or B1B) and (B1C or B1D)
OR
(B2A or B2B) and (B2C or B2D)

Elem. Ref.
H-17789 H-17793
H-17790 H-17815
H-17791 H-17816
H-17792 H-17943

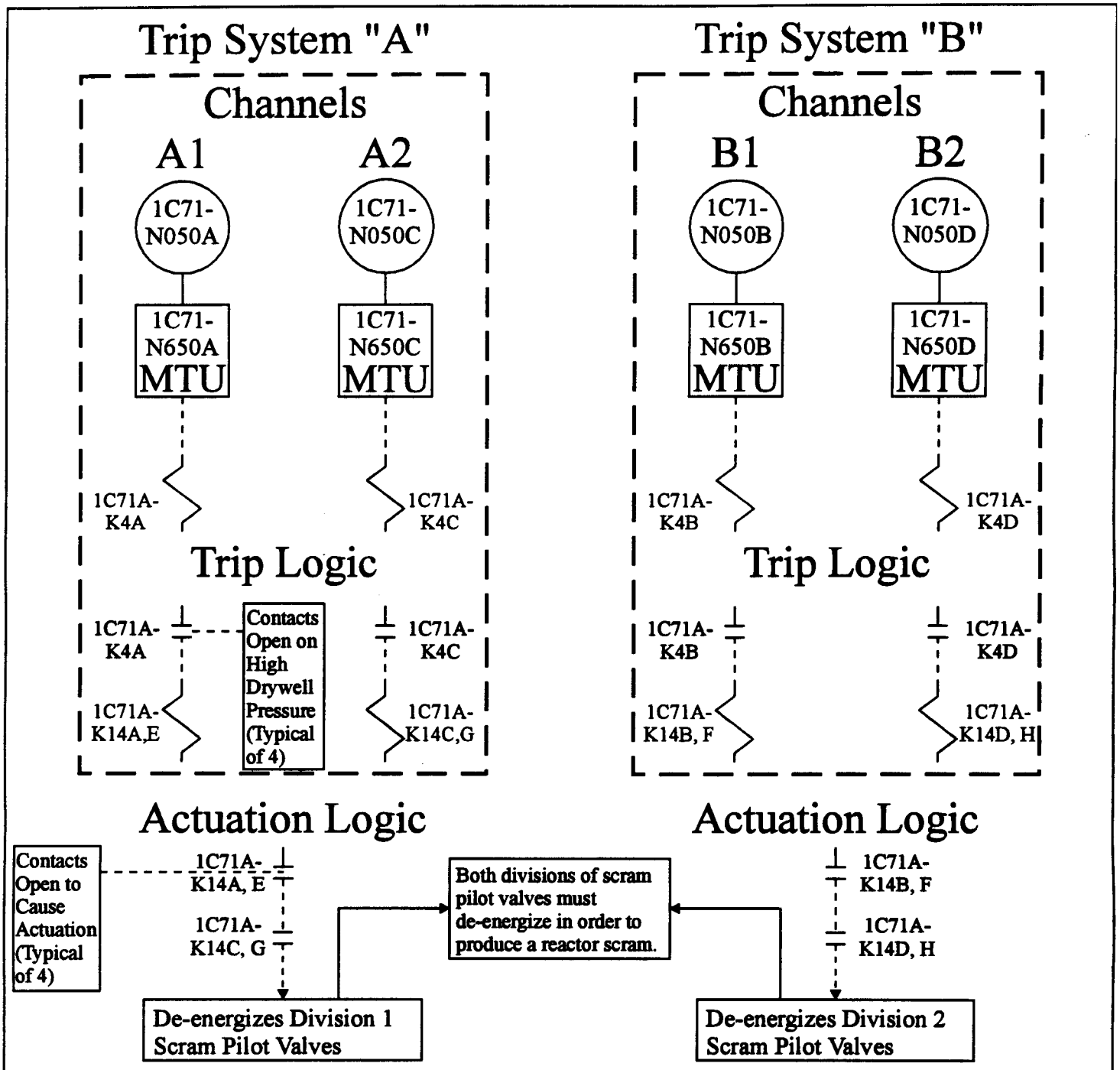
Prepared By: Stephen W. Reed

Reviewed By: Roger Clark

LFD-1-RPS-10

TS 3.3.1.1-1, Item 5
Reactor Protection System Instrumentation - Main Steam Isolation Valve - Closure

Rev. 0 1/16/95



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor on high drywell pressure, channels in one of the following combinations must be either operable or maintained in the tripped condition.

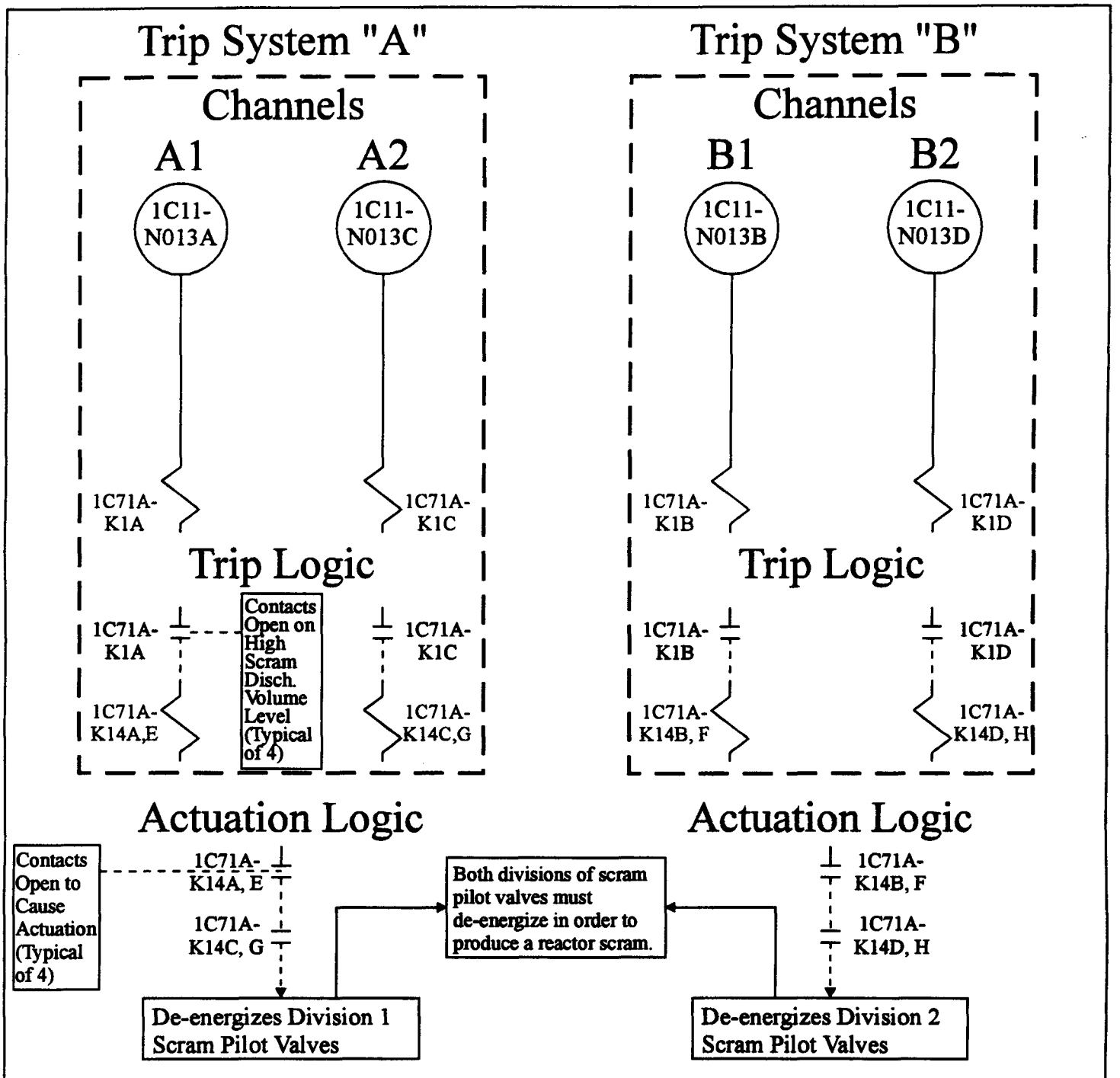
A1 or A2
AND
B1 or B2

Elem. Ref.
H-17789 H-19809
H-17790 H-19812
H-17791 H-19815
H-17792 H-19818
H-17793

Prepared By: Royce Clark

Reviewed By: Steve W. Reed

LFD-1-RPS-11
TS 3.3.1.1-1, Item 6
Reactor Protection System Instrumentation
Drywell Pressure - High
Rev. 0 1/16/95



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor on scram discharge volume high level (float switches), channels in one of the following combinations must be either operable or maintained in the tripped condition.

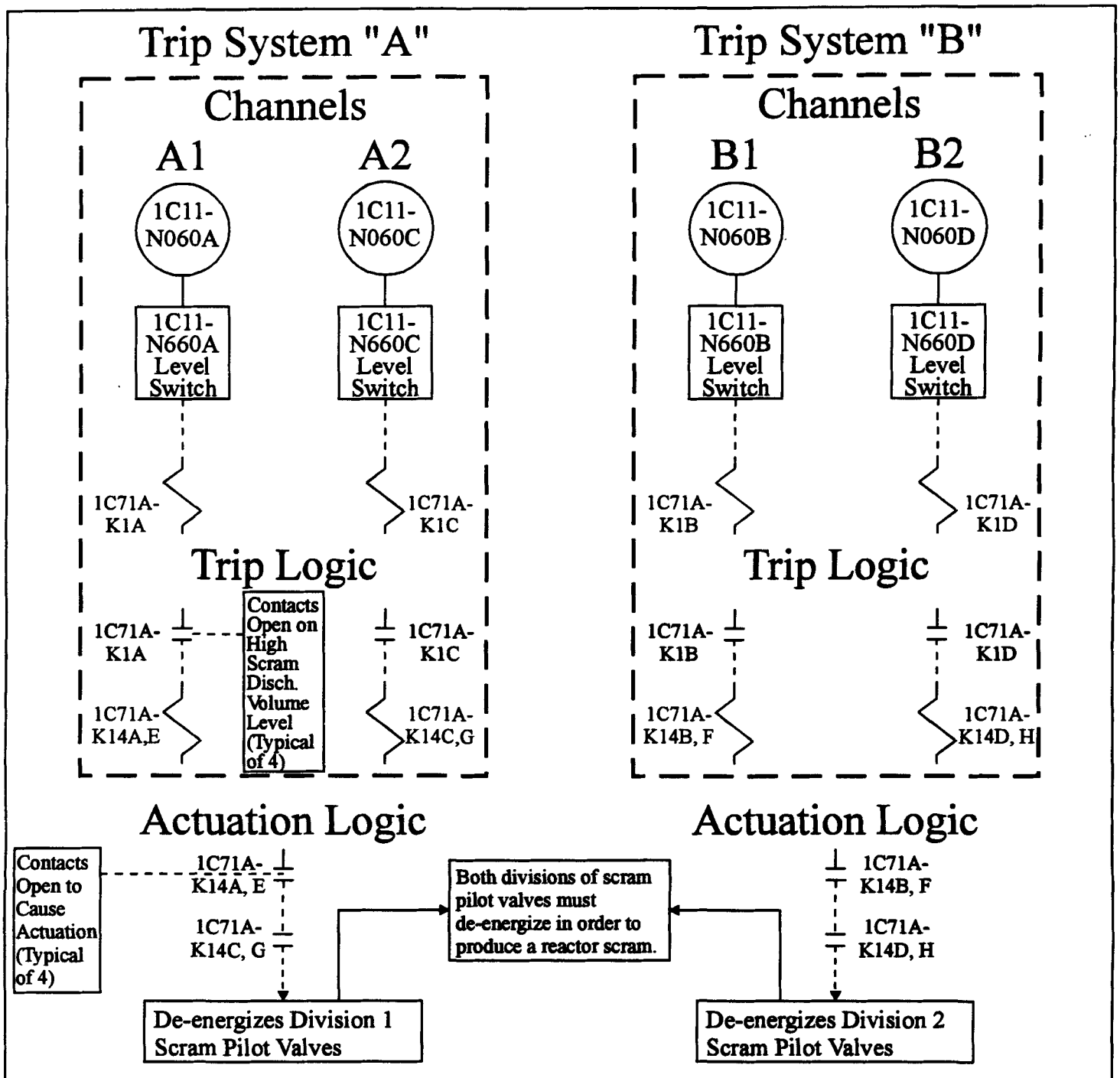
A1 or A2
AND
B1 or B2

Elem. Ref.
H-17789 H-17792
H-17790 H-17793
H-17791

Prepared By: Royce Clark

Reviewed By: Stephen W Reed

LFD-1-RPS-13
TS 3.3.1.1-1, Item 7.b
Reactor Protection System Instrumentation - Scram Discharge Volume Water Level - High, Float Switch
Rev. 0 1/16/95



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor on scram discharge volume high level (resistance temperature detectors), channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 or A2
AND
B1 or B2

Elem. Ref.
H-17789 H-17792
H-17790 H-17793
H-17791 H-17796

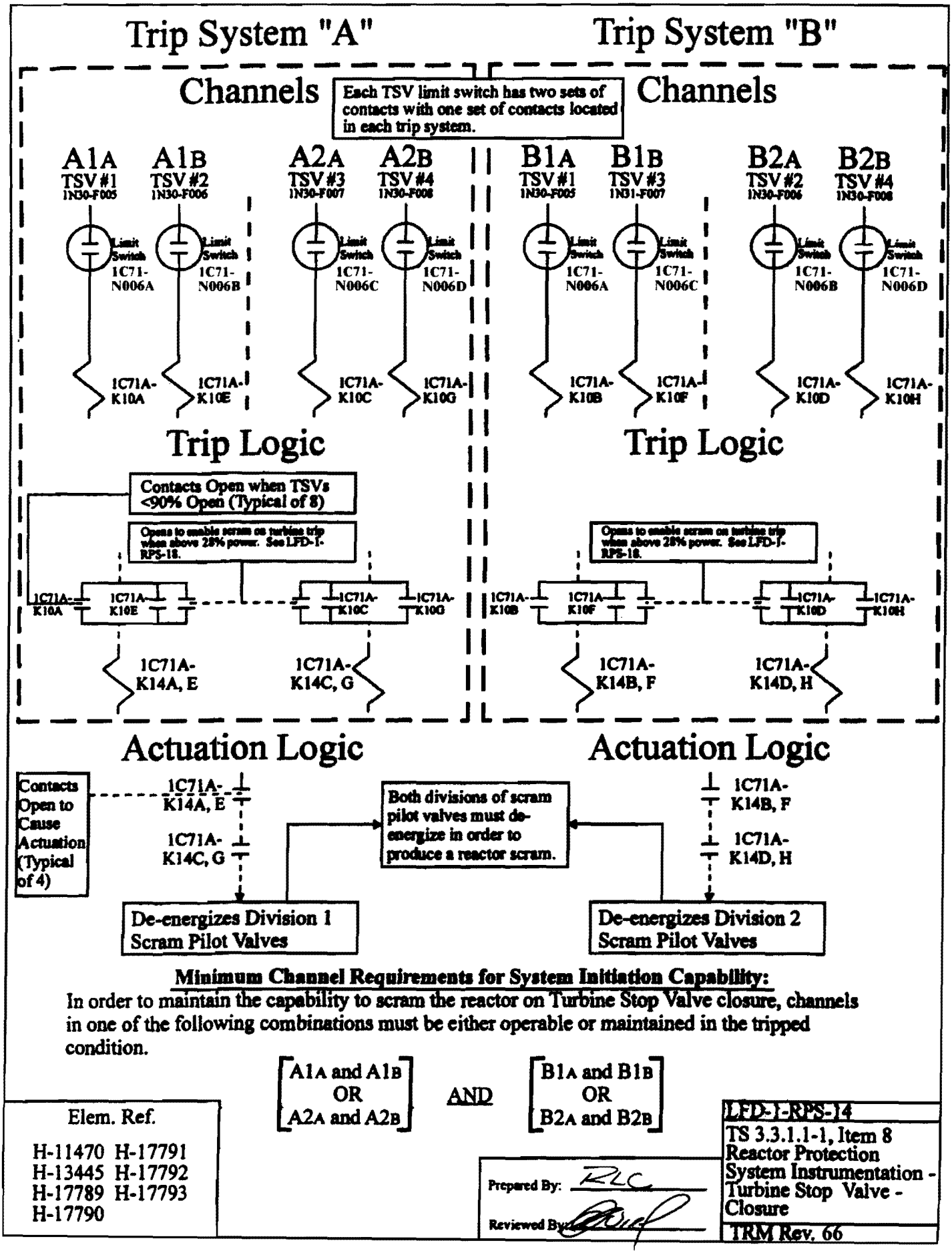
Prepared By: Roger Clark

Reviewed By: Stephen W. Reed

LFD-1-RPS-12

TS 3.3.1.1-1, Item 7.a
Reactor Protection System Instrumentation - Scram Discharge Volume Water Level - High, Resistance Temperature Detector

Rev. 0 1/16/95



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor on Turbine Stop Valve closure, channels in one of the following combinations must be either operable or maintained in the tripped condition.

[A1A and A1B OR A2A and A2B] AND [B1A and B1B OR B2A and B2B]

Elem. Ref.

H-11470 H-17791
H-13445 H-17792
H-17789 H-17793
H-17790

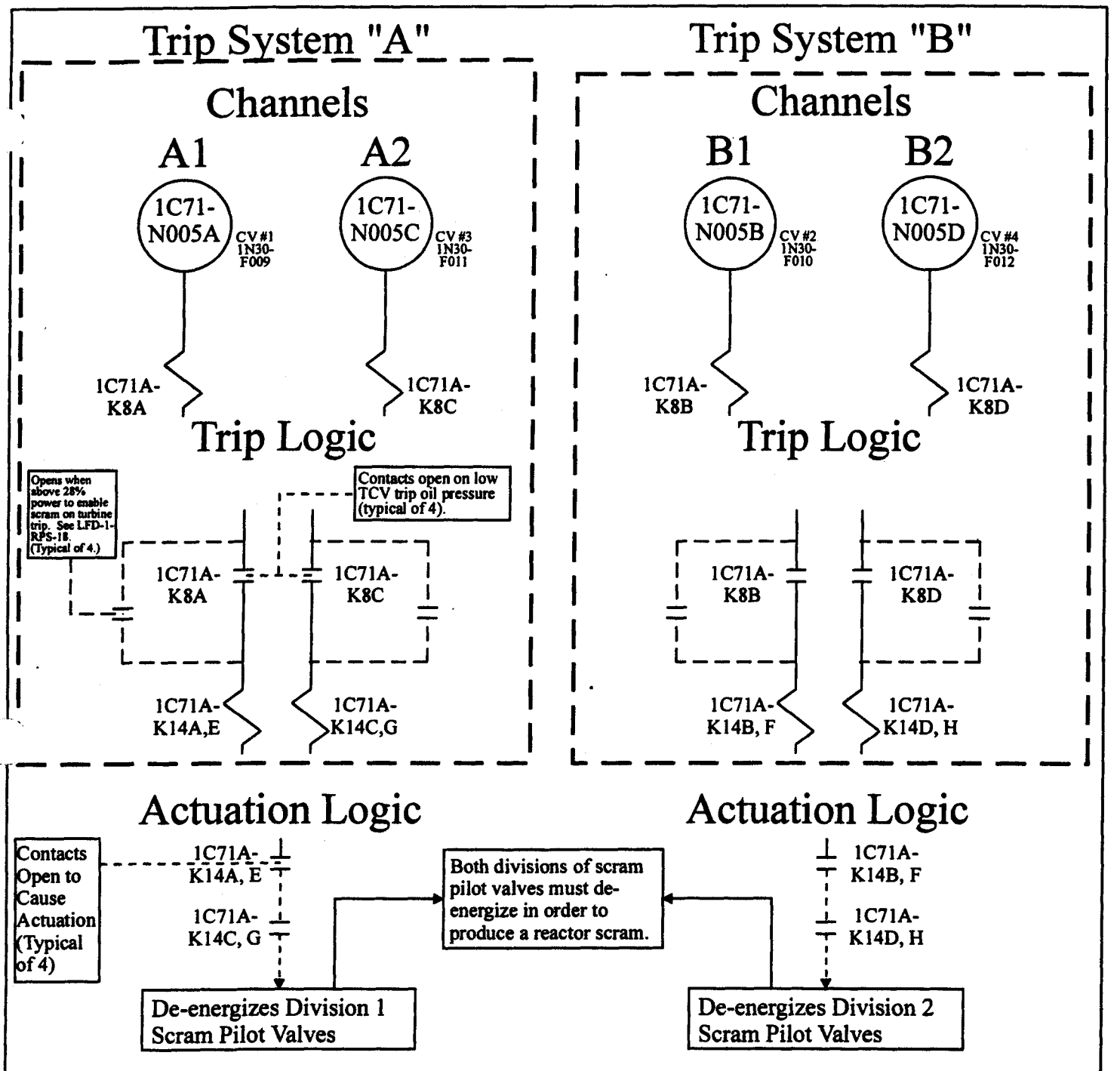
Prepared By: RLC

Reviewed By:

LFD-1-RPS-14

TS 3.3.1.1-1, Item 8 Reactor Protection System Instrumentation - Turbine Stop Valve - Closure

TRM Rev. 66



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor on Turbine Control Valve fast closure, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 or A2
AND
B1 or B2

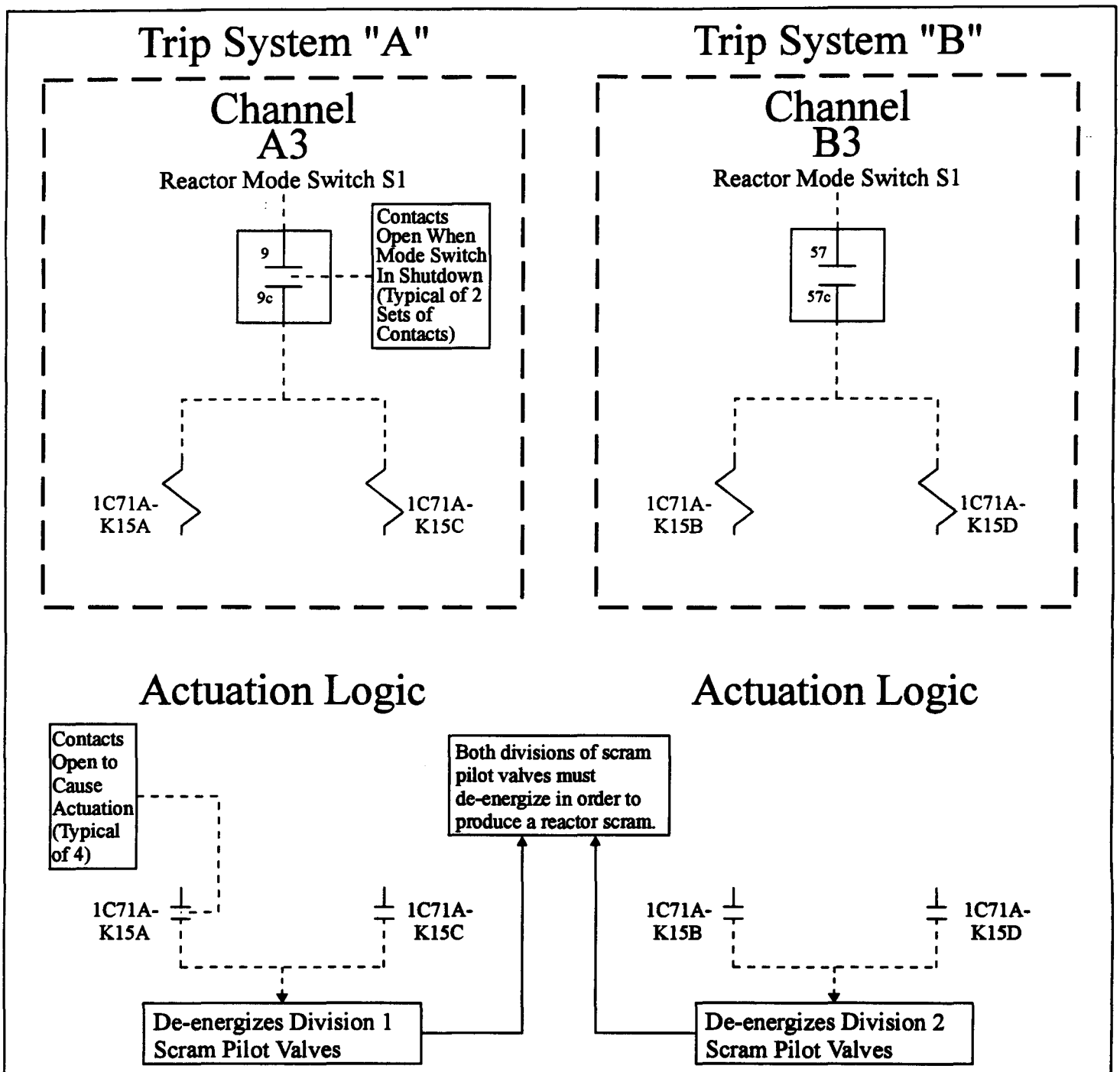
Elem. Ref.

H-11470 H-17791
H-17789 H-17792
H-17790 H-17793

Prepared By:

Reviewed By:

LFD-1-RPS-15
TS 3.3.1.1-1, Item 9
Reactor Protection System Instrumentation - Turbine Control Valve Fast Closure, Trip Oil Pressure - Low
TRM Rev. 33



Minimum Channel Requirements for System Initiation Capability:

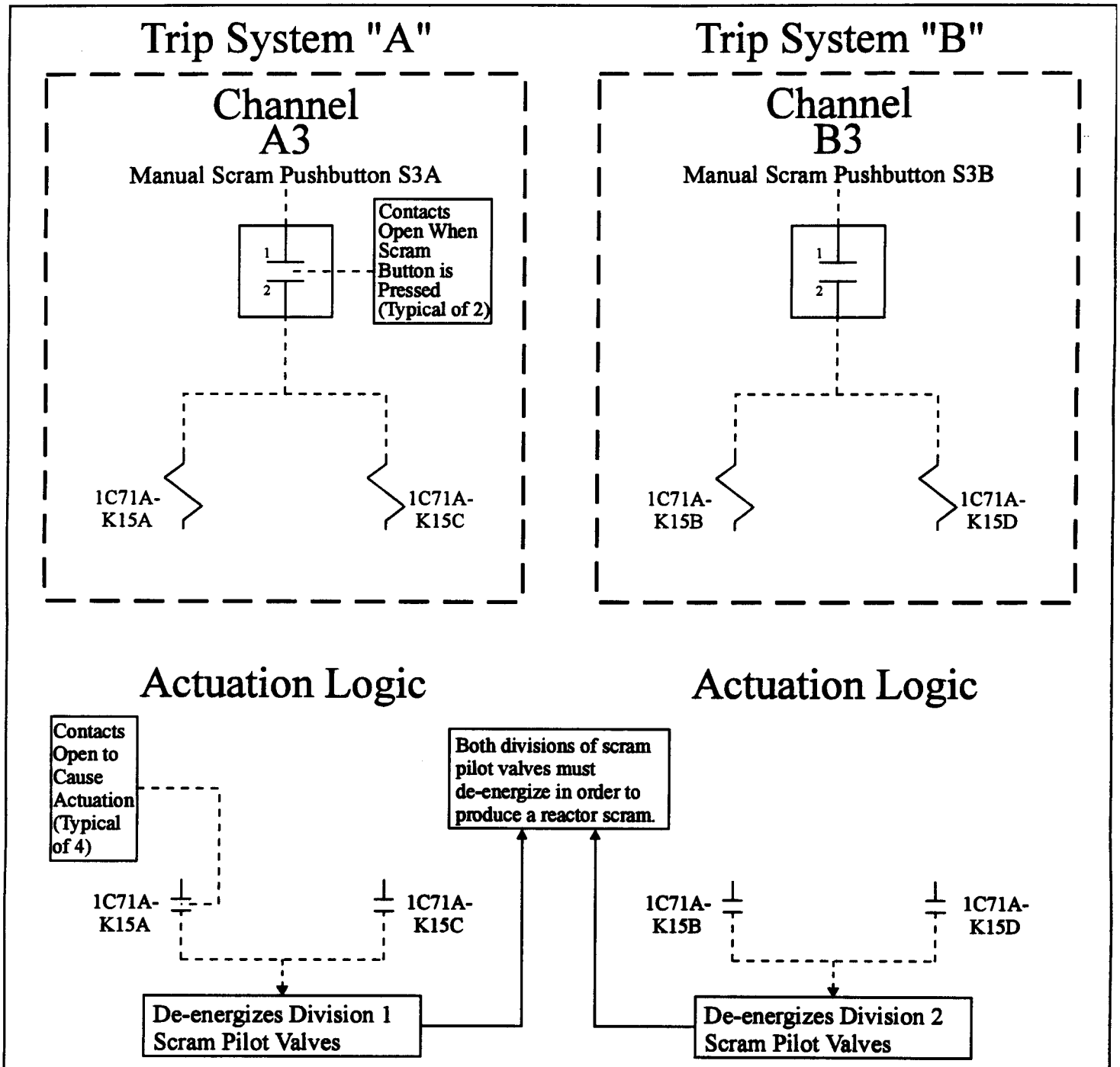
In order to maintain the capability to scram the reactor on Reactor Mode Switch position (Mode Switch in Shutdown), each channel must be either operable or maintained in the tripped condition.

Elem. Ref.
H-17786
H-17791
H-17792
H-17793

Prepared By: Roger Clark

Reviewed By: Stuart W. Reed

LFD-1-RPS-16
TS 3.3.1.1-1, Item 10 Reactor Protection System Instrumentation Reactor Mode Switch - Shutdown Position
Rev. 0 1/16/95



Minimum Channel Requirements for System Initiation Capability:

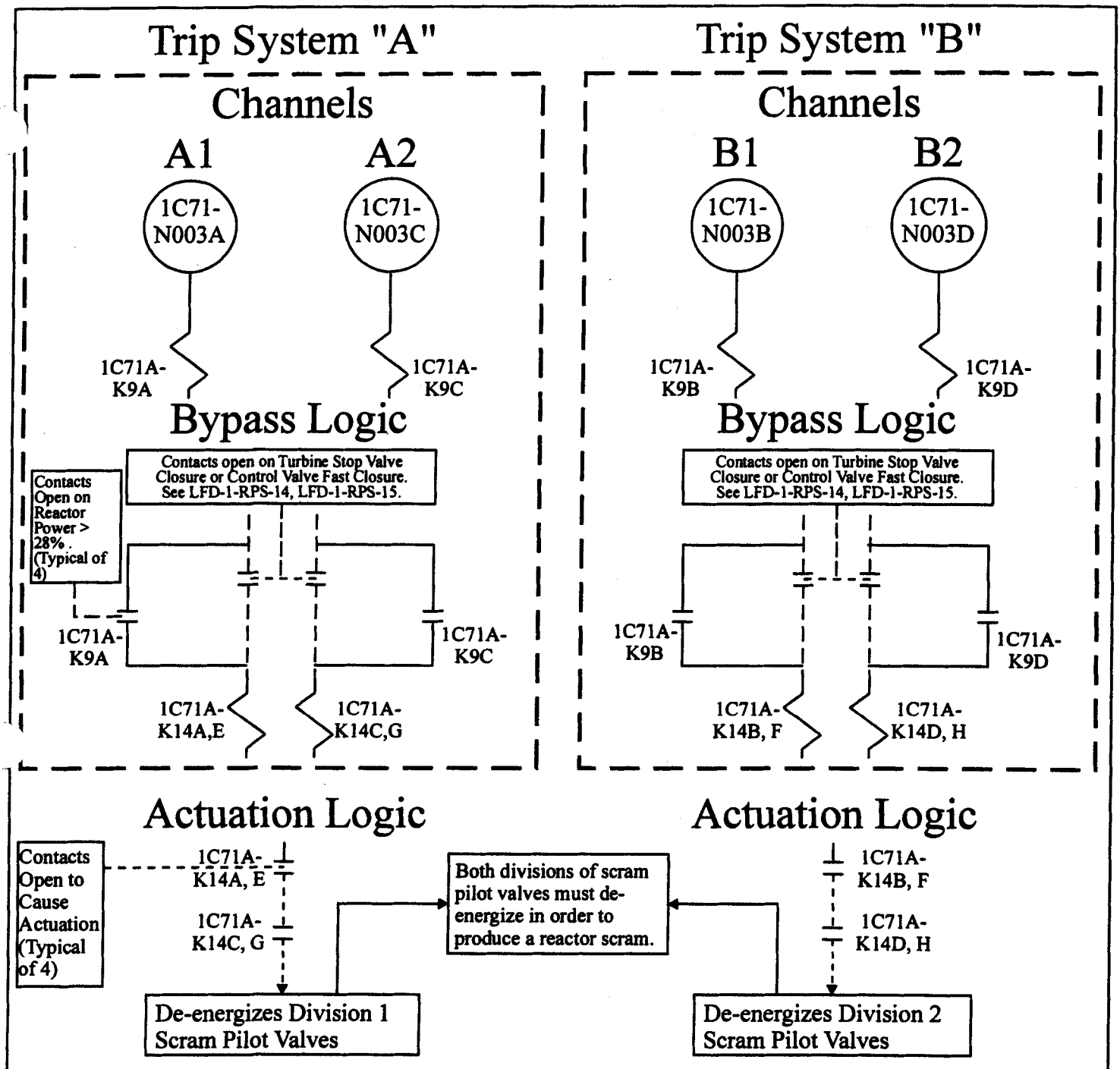
In order to maintain the capability to scram the reactor using the Manual Scram Pushbuttons, each channel must be either operable or maintained in the tripped condition.

Elem. Ref.
H-17786
H-17791
H-17792
H-17793

Prepared By: Roger Clark

Reviewed By: Stephen L. Reed

LFD-1-RPS-17	
TS 3.3.1.1-1, Item 11 Reactor Protection System Instrumentation Manual Scram	
Rev. 0	1/16/95



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to scram the reactor above 28 percent power on Turbine Stop Valve closure or Turbine Control Valve fast closure, channels in one of the following combinations must be either operable or circuit continuity otherwise interrupted.

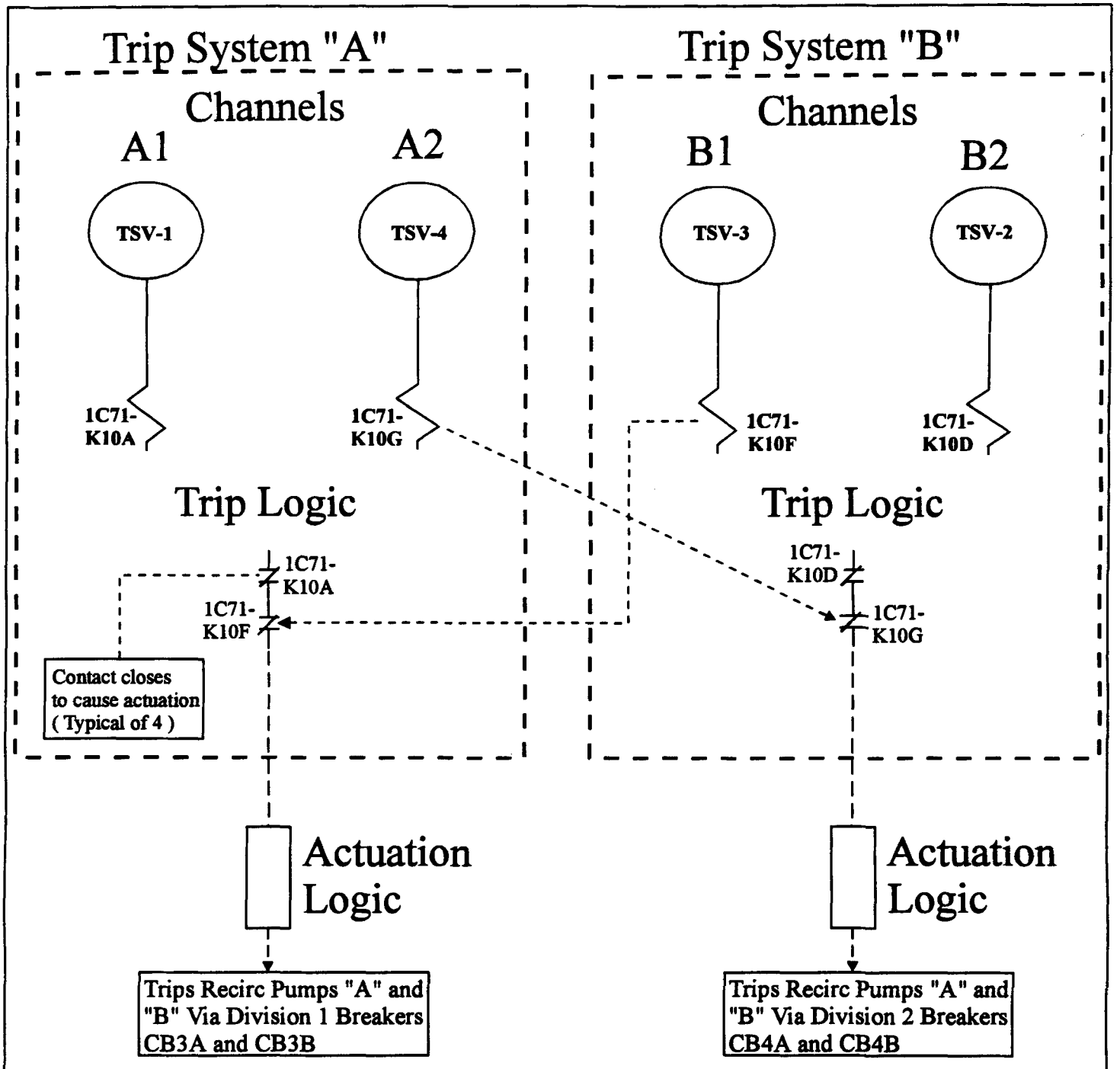
A1 or A2
AND
B1 or B2

Elem. Ref.
H-17789 H-17790
H-17791 H-17792
H-17793

Prepared By: Wayne

Reviewed By: Dan Shipman

LFD-1-RPS-18
TS SR 3.3.1.1.11
Reactor Protection System Instrumentation
Bypass, Items 8 & 9
TRM Rev. 33



Minimum Channel Requirements to Maintain Trip Capability:

In order to maintain Recirc pump trip capability on a TSV Closure signal, channels in one of the following combinations must be either operable or maintained in the tripped condition.

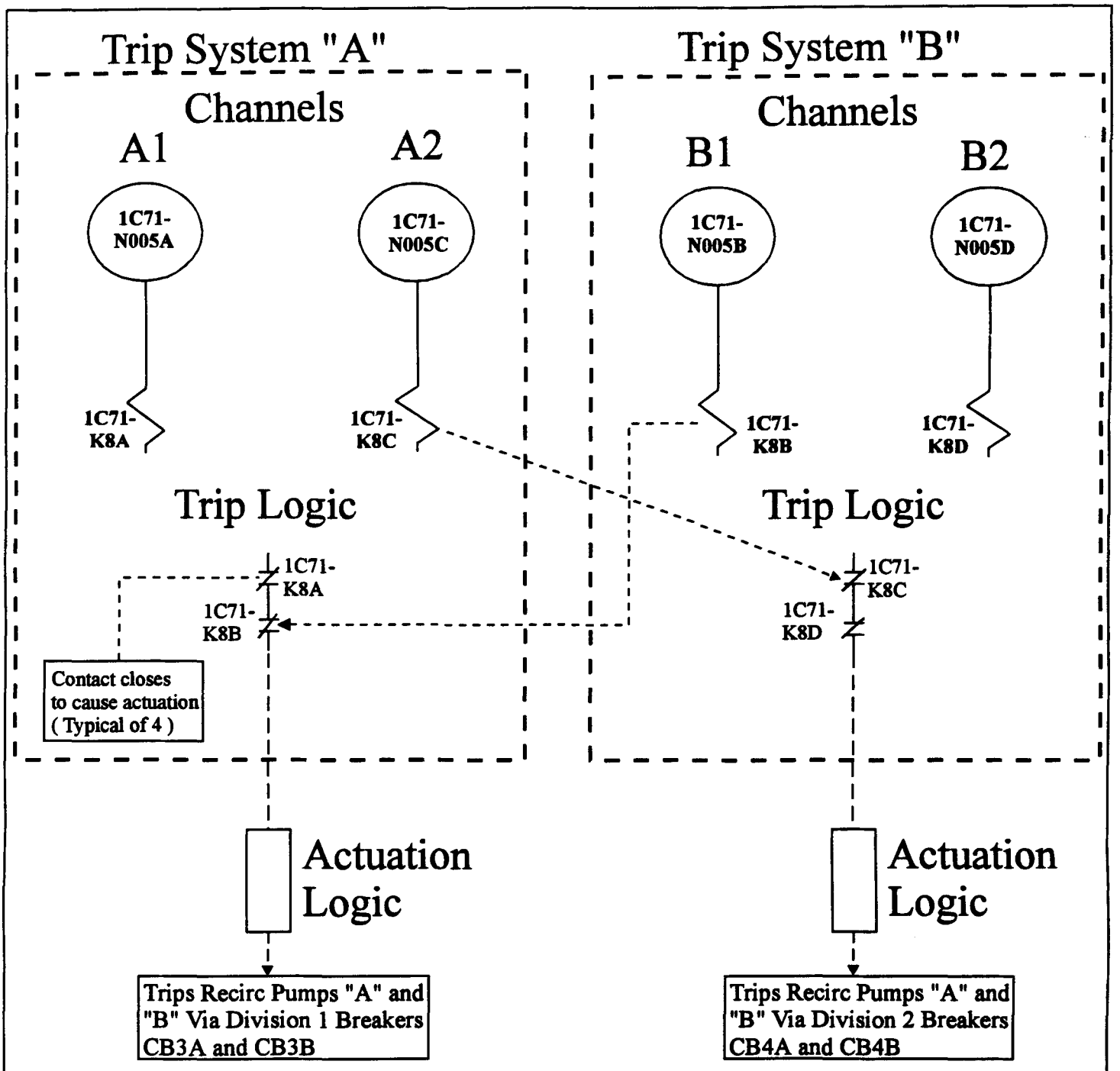
A1 and B1
OR
A2 and B2

Elem. Ref.
H-13445
H-17789
H-17790
H-17822

Prepared By: J. L. Burns

Reviewed:

LFD-1-RPT-01	
TS 3.3.4.1.a.1 EOC-RPT, TSV CLOSURE	
Rev. 0	1/16/95



Minimum Channel Requirements to Maintain Trip Capability:

In order to maintain Recirc pump trip capability on a TCV Fast Closure signal, channels in one of the following combinations must be either operable or maintained in the tripped condition.

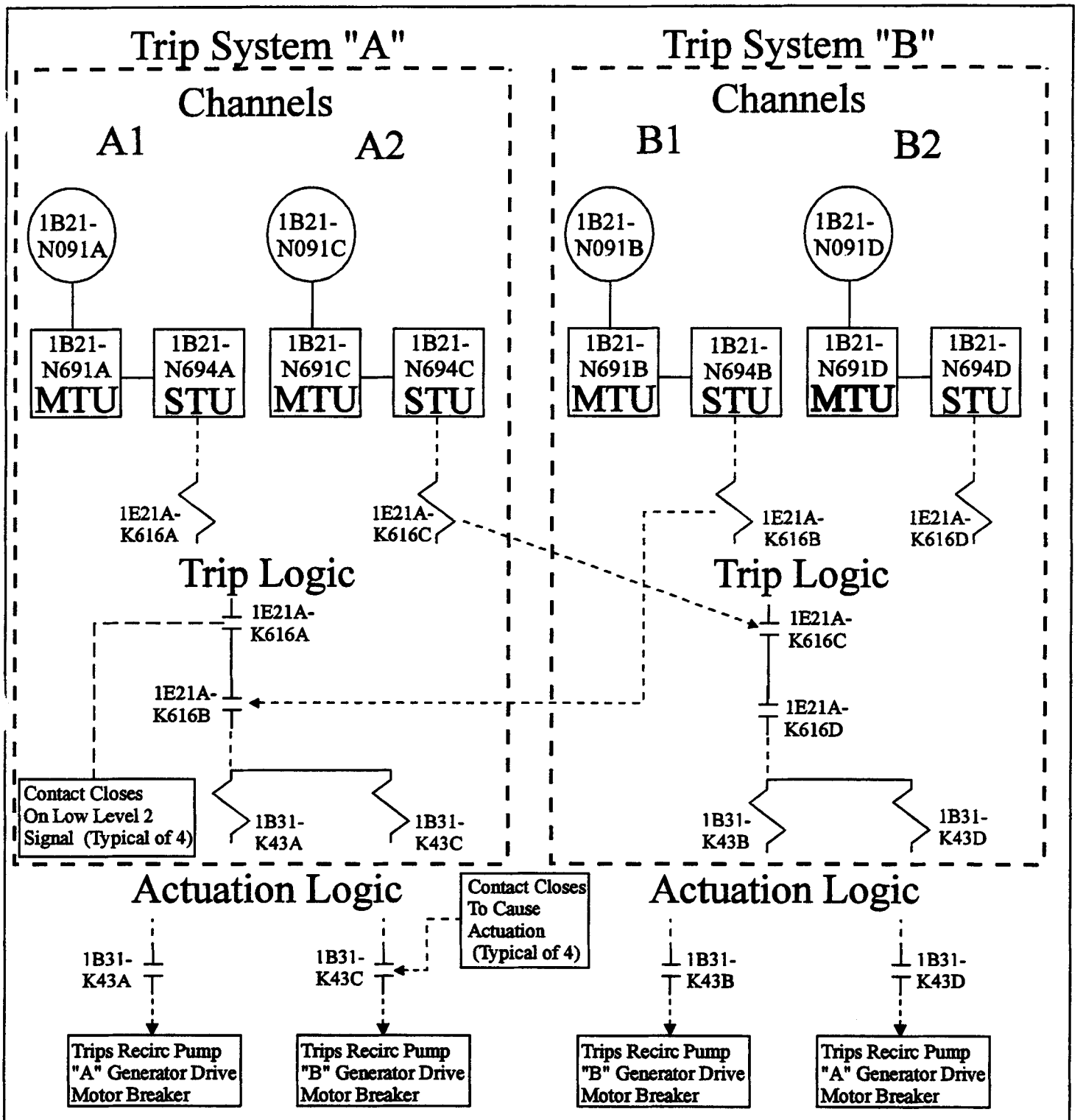
A1 and B1
OR
A2 and B2

Elem. Ref.
H-13444
H-17789
H-17790
H-17822

Prepared By: J. R. Brunner

Rev

LFD-1-RPT-02	
TS 3.3.4.1.a.2 EOC-RPT, TCV FAST CLOSURE.	
Rev. 0	1/16/95



Minimum Channel Requirements for System Trip Capability:

In order to maintain ATWS-RPT trip capability of the Recirc Pumps on a Reactor Vessel Water Level - ATWS-RPT Level signal, channels in one of the following combinations must be either operable or maintained in the tripped condition.

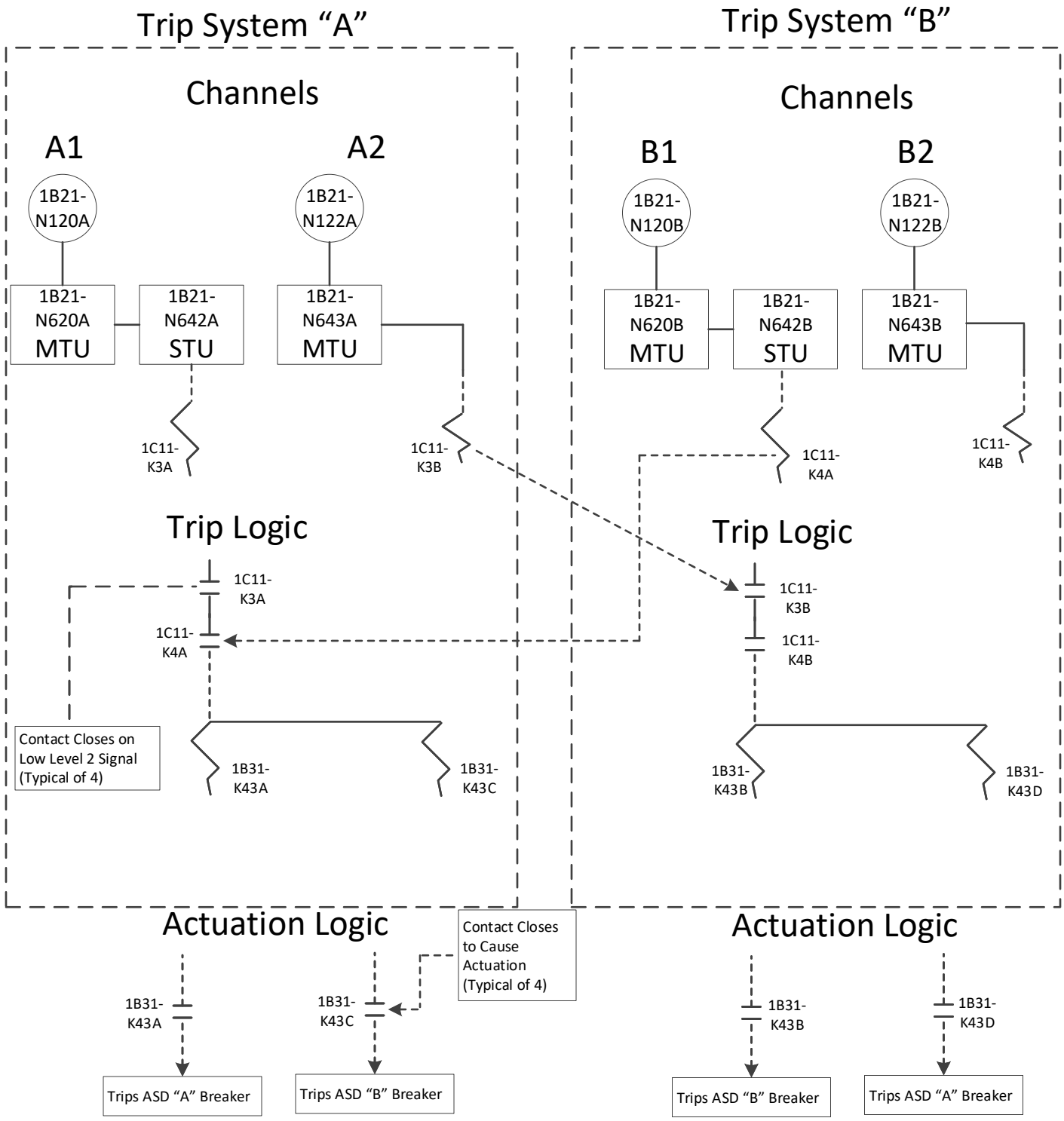
Elem. Ref.	
H-17860	H-19826
H-17861	H-19829
H-17902	H-19830
H-17903	H-42173
H-19823	

A1 and B1
OR
A2 and B2

Prepared By: T. L. Cremer

Reviewed By: Kathryn Wilkins

LFD-1-RPT-03
TS 3.3.4.2.a, Reactor Vessel Water Level - ATWS-RPT Level
TRM Rev. 6



Minimum Channel Requirements for System Trip Capability:

In order to maintain ATWS-RPT trip capability of the Recirc Pumps on a Reactor Steam Dome Pressure-High signal, channels in one of the following combinations must be either operable or maintained in the tripped condition.

A1 and B1
OR
A2 and B2

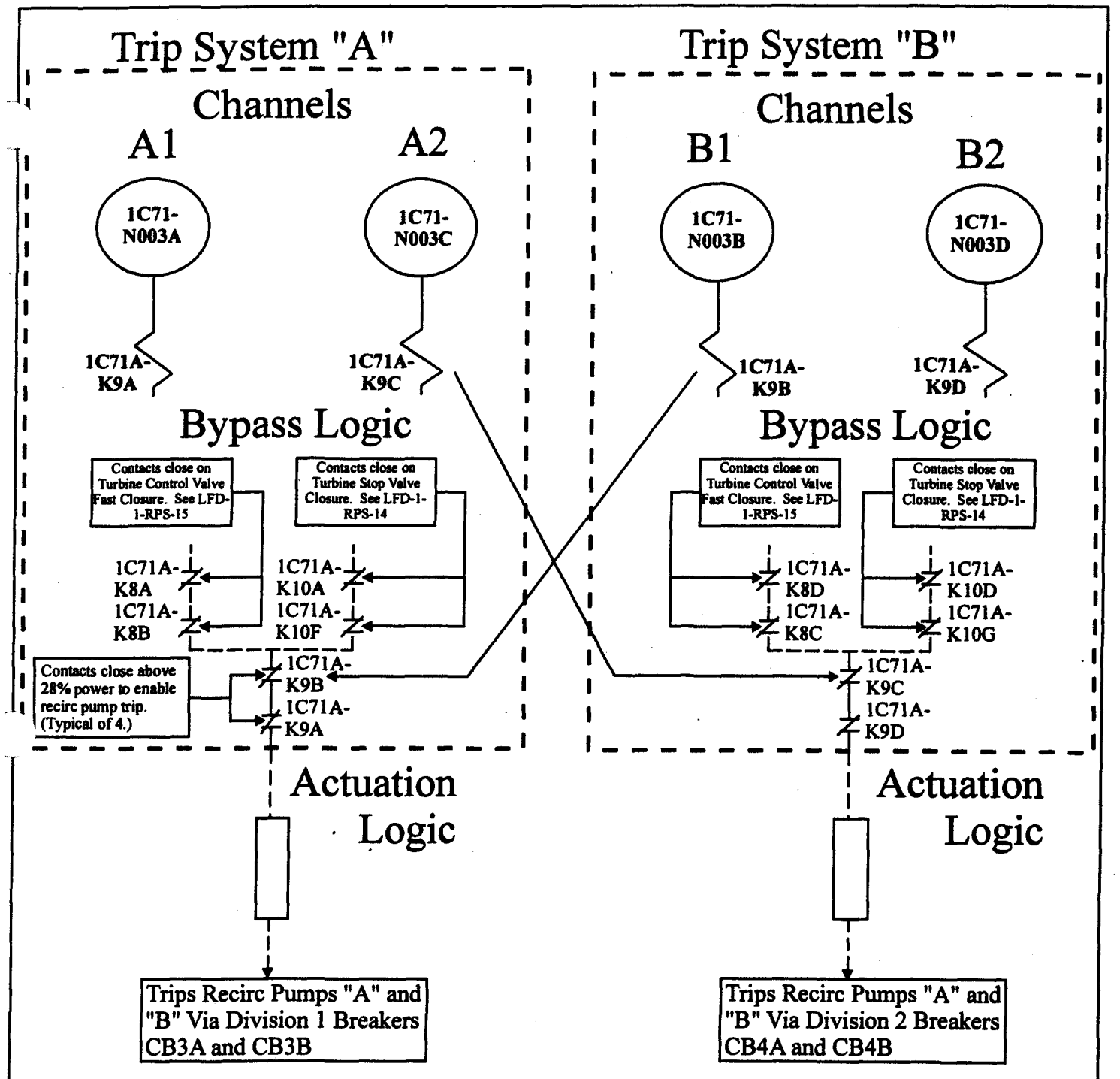
Elem. Ref.	
H-17860	H-19822
H-17861	H-19825
H-17902	H-42173
H-17903	

Prepared by: _____
Reviewed by: _____

LFD-1-RPT-04

TS 3.3.4.2.b,
ATWS-RPT, Reactor Steam Dome Pressure-High

Rev. 1 08/29/2016



Minimum Channel Requirements to Maintain Trip Capability:

In order to maintain the capability to trip the recirc pump breakers above 28 percent power on Turbine Stop Valve closure or Turbine Control Valve fast closure, channels in one of the following combinations must be either operable or circuit continuity otherwise maintained..

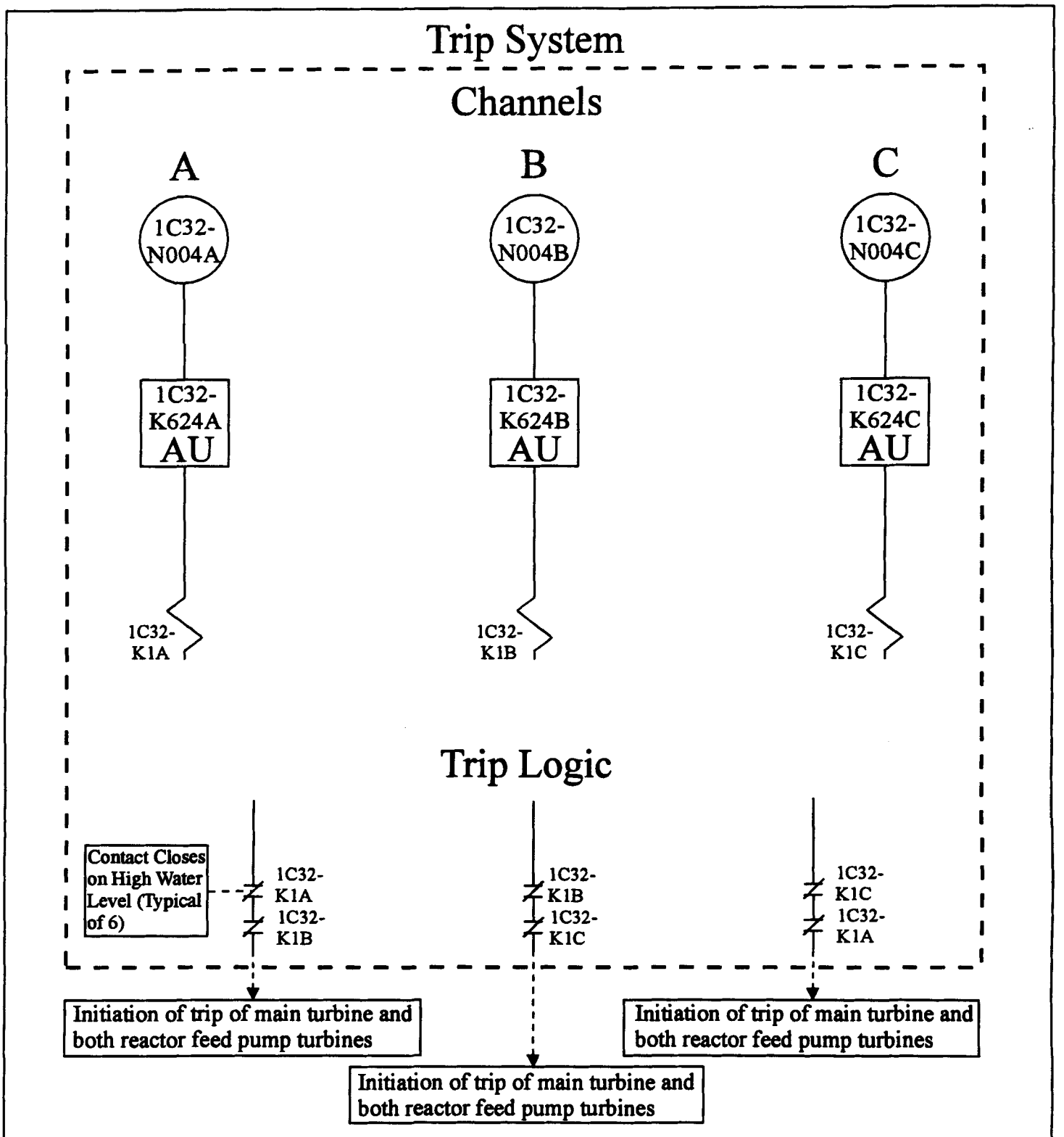
A1 and B1
OR
A2 and B2

Elem. Ref.
H-13444 H-13445
H-17789 H-17790
H-17822

Prepared By:

Reviewed By:

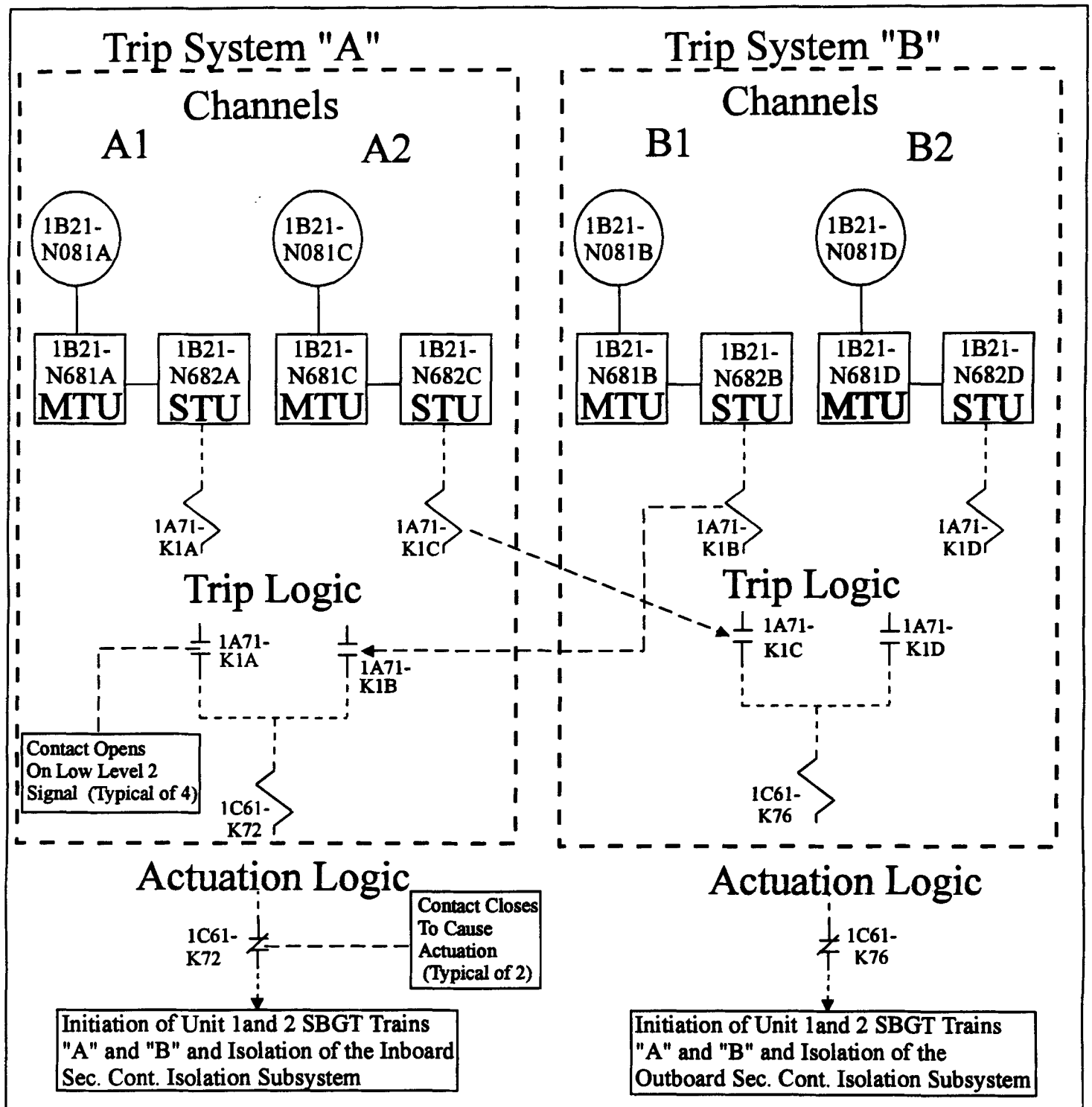
LFD-1-RPT-05
TS SR 3.3.4.1.2 EOC-RPT Instrumentation Bypass Below 28 Percent Power
TRM Rev. 33



Minimum Channel Requirements for System Initiation Capability:

In order to maintain the capability to trip the main turbine and the reactor feed pump turbines on high reactor water level, channels in one of the following combinations must be either operable or maintained in the tripped condition.

Elem. Ref.		LFD-1-RWLH-01
H-17842 H-17845	A and B OR B and C OR A and C	TS 3.3.2.2 Feedwater and Main Turbine Trip High Water Level Instrumentation
Prepared By:		Rev. 0 1/16/95
Reviewed By:		



Minimum Channel Requirements for System Isolation/Initiation Capability:

In order to maintain Secondary Containment isolation capability and SBGT initiation capability on a Reactor Vessel Water Level-Low Low, Lvl. 2 signal, channels in one of the following combinations must be either operable or maintained in the tripped condition.

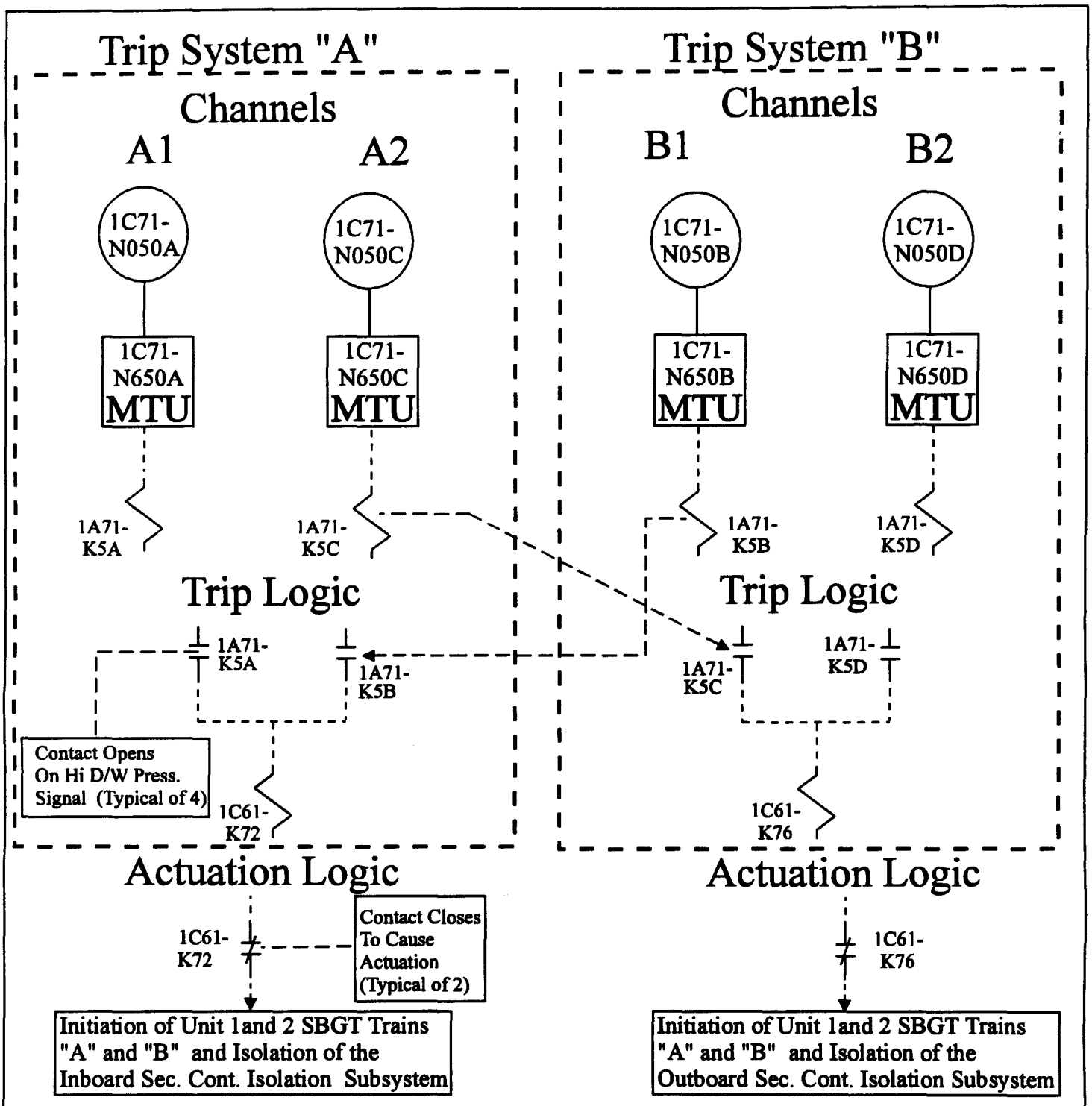
Elem. Ref.		
H-17053	H-17810	H-19815
H-17104	H-17811	H-19818
H-17804	H-19809	H-27761
H-17805	H-19812	H-27767

A1 and B1
OR
A2 and B2

Prepared By: J. R. Bruno

Reviewed:

LFD-1-SCIS-01	
TS 3.3.6.2-1, Item 1 Reactor Vessel Water Level-Low Low, Lvl.2	
Rev. 0	10/19/94



Minimum Channel Requirements for System Isolation/Initiation Capability:

In order to maintain Secondary Containment isolation capability and SBGT initiation capability on a Drywell Pressure - High signal, channels in one of the following combinations must be operable or maintained in the tripped condition.

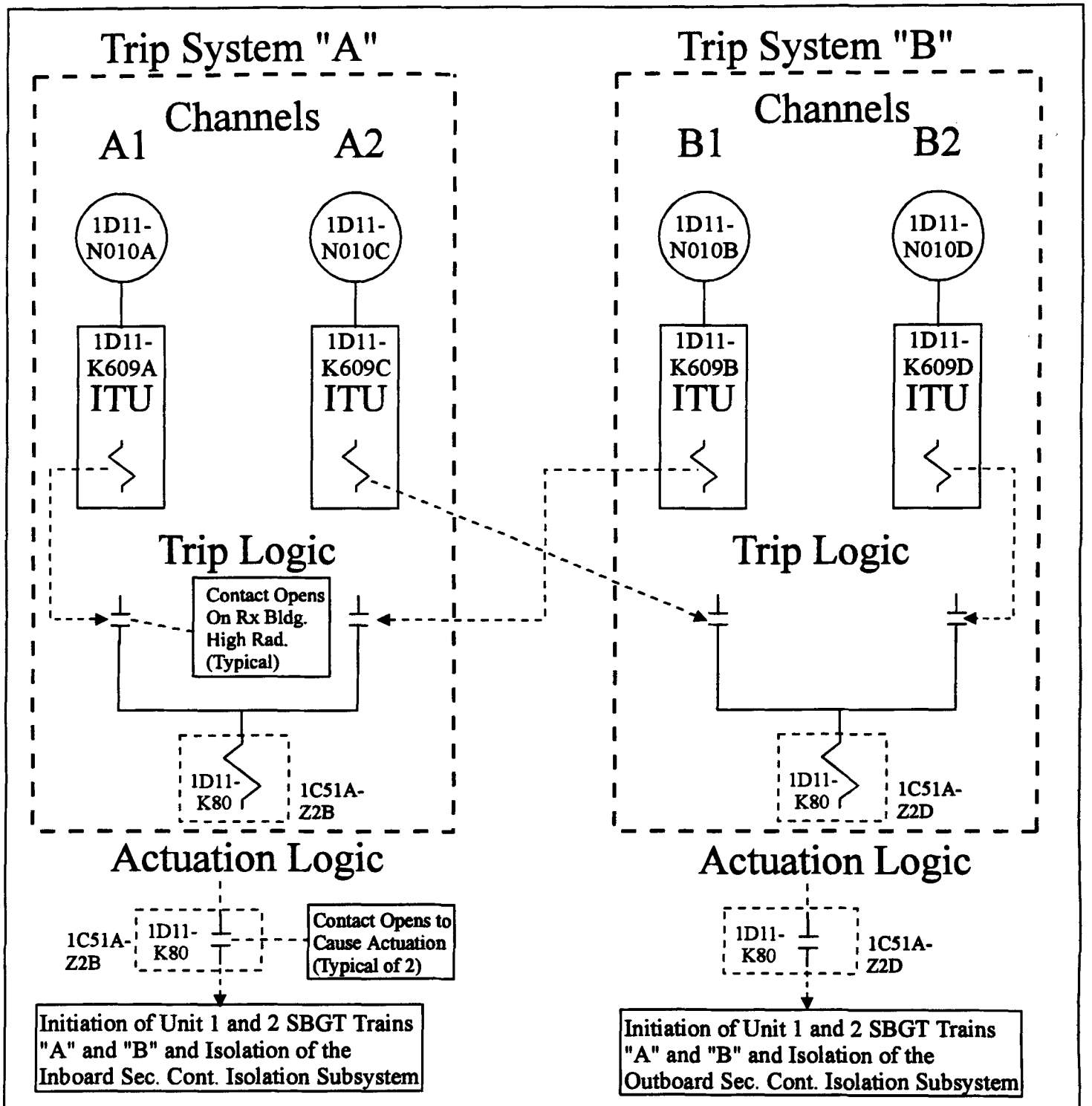
Elem. Ref.			
H-17053	H-17810	H-19809	H-27761
H-17104	H-17811	H-19812	H-27767
H-17804	H-17789	H-19815	
H-17805	H-17790	H-19818	

A1 and B1
OR
A2 and B2

Prepared By: J.R. Brunner

Reviewed:

LFD-1-SCIS-02	
TS 3.3.6.2-1, Item 2 Drywell Pressure - High	
Rev. 0	10/20/94



Minimum Channel Requirements for System Isolation/Initiation Capability:

In order to maintain Secondary Containment isolation capability and SBGT initiation capability on a Reactor Building Exhaust Radiation - High signal, channels in one of the following combinations must be operable or maintained in the tripped condition.

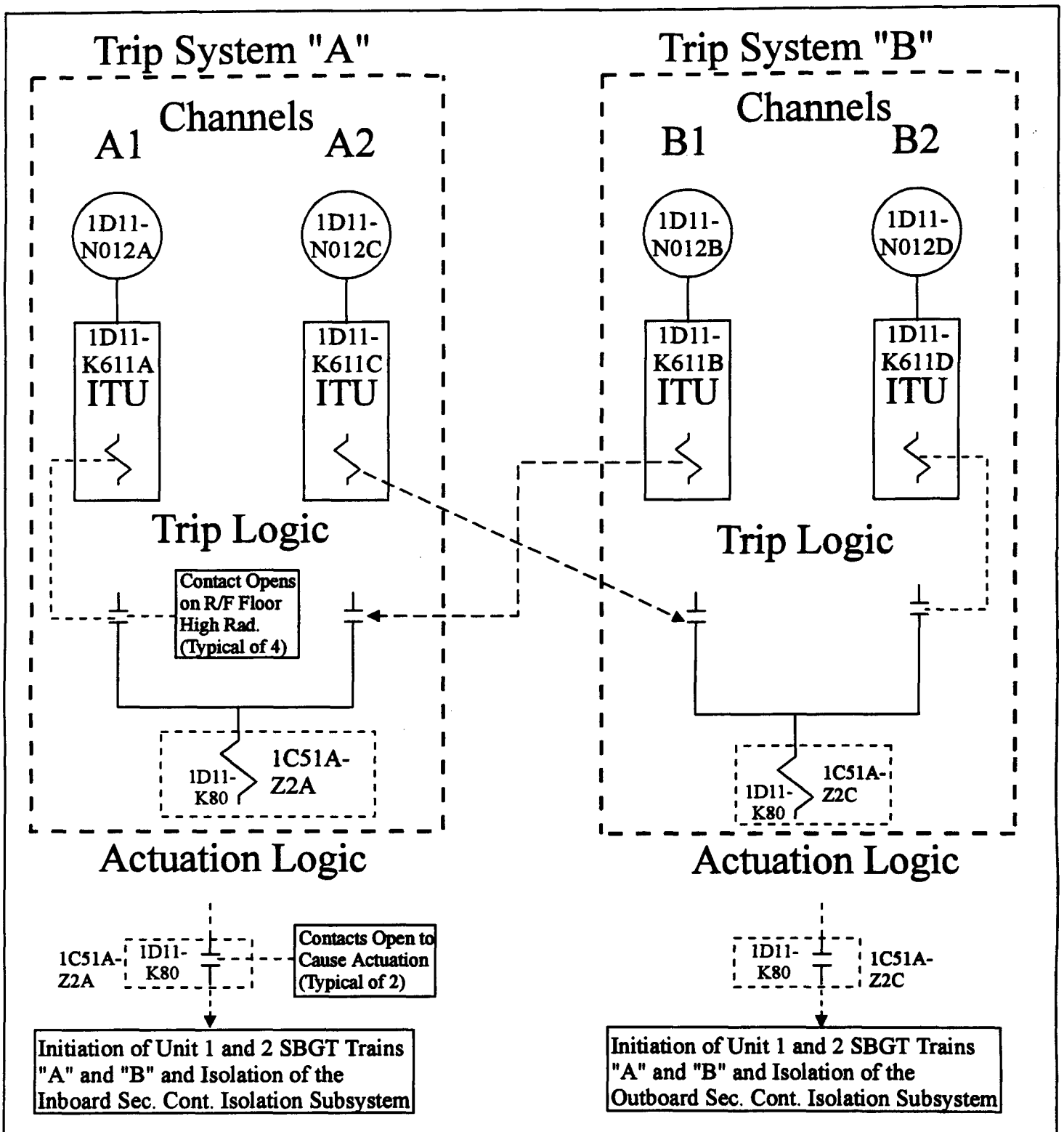
Elem. Ref.		
H-19561	H-17053	H-17805
H-19563	H-17802	H-17104
H-19564	H-17803	H-27761
H-19566	H-17804	H-27767

A1 and B1
OR
A2 and B2

Prepared By: S.R. Brunner

Reviewed By:

LFD-1-SCIS-03	
TS 3.3.6.2-1, Item 3 Secondary Containment Isolation, Rx. Building Exhaust Radiation- High	
Rev. 0	10/20/94



Minimum Channel Requirements for System Isolation/Initiation Capability:

In order to maintain Secondary Containment isolation capability and SBGT initiation capability on a Refueling Floor Exhaust Radiation - High signal, channels in one of the following combinations must be operable or maintained in the tripped condition.

Elem. Ref.		
H-19561	H-17802	H-27761
H-19563	H-17803	H-27767
H-19564	H-17804	
H-19566	H-17805	
H-17053	H-17104	

A1 and B1
OR
A2 and B2

Prepared By: J.C. Brown

Rev. 0 10/20/94

LFD-1-SCIS-04

TS 3.3.6.2-1, Item 4
R/F Exhaust Radiation-High

T 12.0 Safety Function Determination Program

1.0 Introduction

This document outlines the Plant Hatch Safety Function Determination Program (SFDP), provides guidance for evaluating the impact of failure to meet multiple Technical Specifications (TS) Limiting Conditions for Operation (LCOs), and gives appropriate actions for a loss of safety function. The SFDP is required by TS Section 5.5.10.

2.0 Loss of Safety Function

2.1 Background

LCO 3.0.2 directs that if an LCO is not met, its associated Required Actions shall be performed. LCO 3.0.6 provides exception to LCO 3.0.2 for a supported system, structure, or component (SSC) by allowing only the support SSC LCO Actions to be performed if the supported SSC is inoperable solely because its support SSC is inoperable.

If a support SSC is inoperable and a loss of safety function does not exist, the Required Actions for the support SSC address the Condition, and the supported SSC Required Actions do not have to be performed. This recognizes that the plant may no longer satisfy single failure criteria and that all of the supported SSC may not meet the definition of OPERABILITY. Appropriate compensation is made by performance of the support system Required Actions.

2.2 Use of LCO 3.0.6

Upon determination that a TS required support SSC is inoperable, the decision may be made to use LCO 3.0.6 for the supported SSCs. A loss of safety function determination shall be performed using the flow chart shown in **Attachment 1** as a guide. **Attachment 2** provides examples of appropriate determinations. The allowances given by LCO 3.0.6 can be taken only if **no loss of safety function exists**.

2.3 Actions for a Loss of Safety Function

If a loss of safety function is determined to exist by this program, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered. These may be the Required Actions specified for the loss of safety function or LCO 3.0.3.

2.4 SSC OPERABILITY

OPERABILITY determinations precede entry into the SFDP and thus, are not a direct part of the SFDP. OPERABILITY of an SSC is determined using the definition given in TS 1.1, along with the guidance of SR 3.0.1. When equipment that is not addressed in TS is degraded or nonconforming, the impact on TS SSC OPERABILITY shall also be assessed.

3.0 Guidance for Safety Function Determination

TS 5.5.10 states that a loss of safety function exists when, assuming no concurrent single failure, a safety function assumed in the accident analyses cannot be performed. For the purpose of this program a "**graduated**" **approach** may be taken for determining the "safety function" of the supported SSC. This approach, detailed below, is graduated from most to least conservative. Even if the least conservative method is used, the requirements of TS 5.5.10 will be met. In determining whether a loss of safety function has occurred, **at least one** of these methods **must be used.**

- Method 1: Redundant Train[(a)]

  For this method, the safety function is assumed to be the system function. Confirm the OPERABILITY of the corresponding redundant supported SSC(s).

  If one or more of the redundant SSCs are found to be inoperable, a loss of safety function may exist. The appropriate actions for a loss of function **may** be taken or alternatively, one of the following methods may be used.

- Method 2: LCO Function

  In certain cases, multiple systems with diverse individual functions are specified under one LCO statement; i.e., in one TS. For these, the safety function may be considered to be broader than the individual system function--it is the TS LCO function, not the system function.

  An example of this is the TS for "ECCS Operating," in which four different systems are included. In this case, the function as stated in the Bases, "... to cool the core during a LOCA," may be the safety function to be considered in the SFDP.

  If a loss of LCO function is determined to exist, the appropriate actions for a loss of safety function **may** be taken. Alternatively, the following method may be used.

[(a)] The term "train" may be interchanged with "subsystem" or "division."

- Method 3: Safety Analysis

  In this approach, the function of the SSC in the FSAR accident analyses is considered to be the safety function. If the SSC in question is not credited in the analyses, or if the accident function it performs is intact, then no loss of safety function exists. However, if the function is lost, then the actions for a loss of safety function **must** be taken.

4.0 Additional Requirements and Information

4.1 Non-TS SSCs

A situation may exist where a TS support SSC provides support to an SSC not addressed in TS, which may in turn support a supported SSC addressed in TS. The interrelationships between TS and non-TS support and supported SSCs shall be considered in the loss of safety function determination.

4.2 Subsequent Inoperabilities

While taking the Required Actions of the support SSC as allowed by LCO 3.0.6, the impact of subsequent additional SSC inoperabilities on previous SFDP evaluations shall be considered.

5.0 Extending Supported SCS Completion Times

5.1 Singular Support SSC Inoperability

When entering the supporting SSC Required Actions as allowed by LCO 3.0.6, the Completion Times for the supported SSCs might potentially be extended longer than their allowed Required Action Completion Times if they are shorter than those of the support SSC. If there is no loss of safety function, it is acceptable to extend the Completion Time of the supported SSC an amount equal to but not exceeding the Completion Time of its support SSC.

5.2 Multiple Support SSC Inoperabilities

Once a supported SSC LCO is not met solely based on a support SSC inoperability, subsequent support SSC inoperabilities have additional limitations. This is to ensure that the supported LCO will not be in a situation of not being met for an inappropriate amount of time.

Provided there is no loss of function, the Required Actions of the support SSC Condition(s) continue to apply to each additional failure, with Completion Times based on initial entry into the particular support SSC Condition. However, when a subsequent support SSC is discovered to be inoperable or not within limits, the overall time that the supported SSC LCO is not met shall be limited to the more restrictive of either:

a. The first support SSC Completion Time, plus an additional 24 hours; or

b. The subsequent support SSC Completion Time as measured from discovery of the subsequent inoperability.

To apply this Completion Time extension, two criteria must first be met. The subsequent support SSC inoperability.

a. Must exist concurrently with the first inoperability; and

b. Must remain inoperable or not within limits after the first inoperability is resolved.

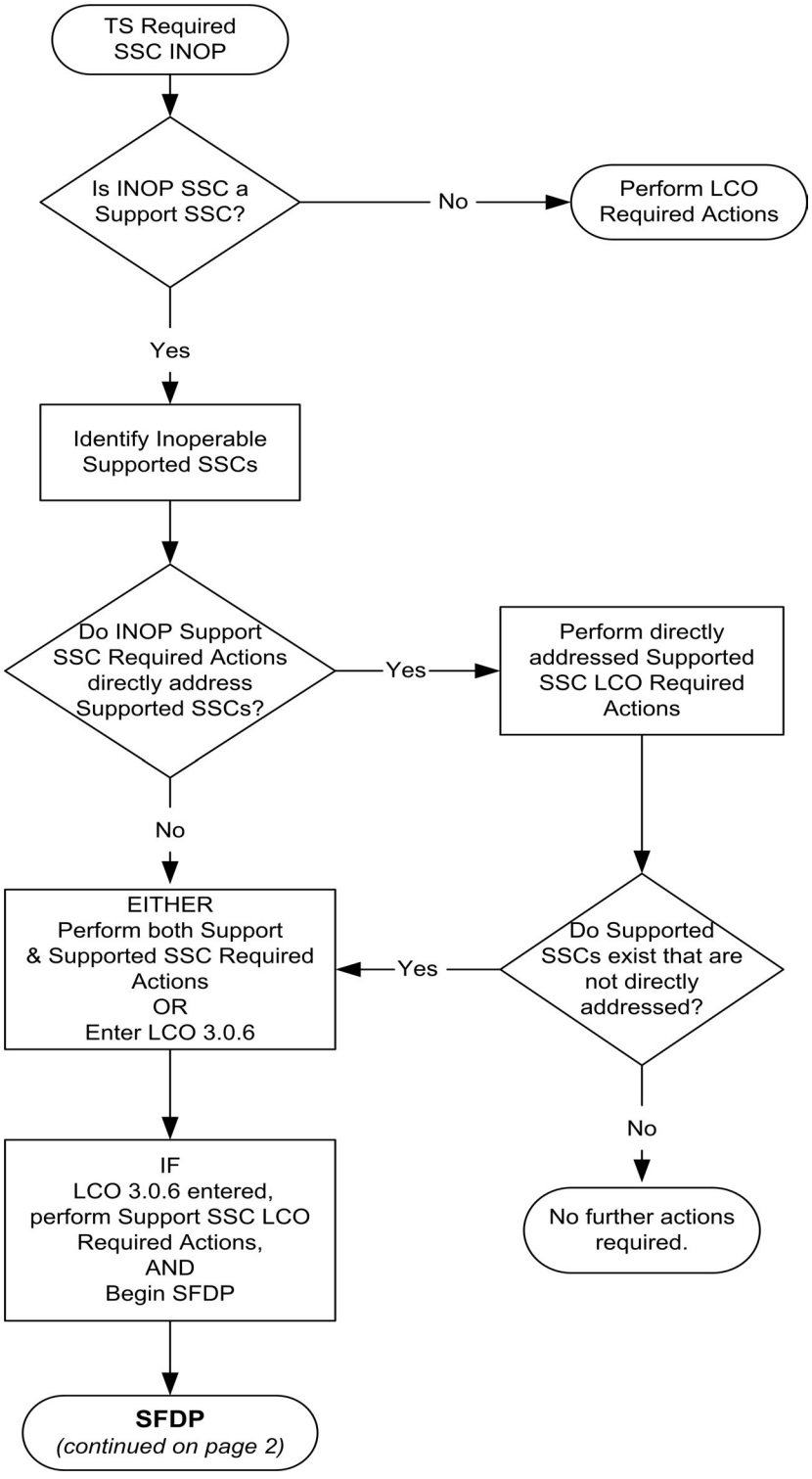
Should this extended Completion Time expire with the subsequent support SSC remaining inoperable or not within limits, the Completion Time for the subsequent support SSC inoperable Condition shall be considered expired. The Required Actions defined for that Condition shall be entered.

Examples regarding Completion Time tracking are included in **Attachment 2**.

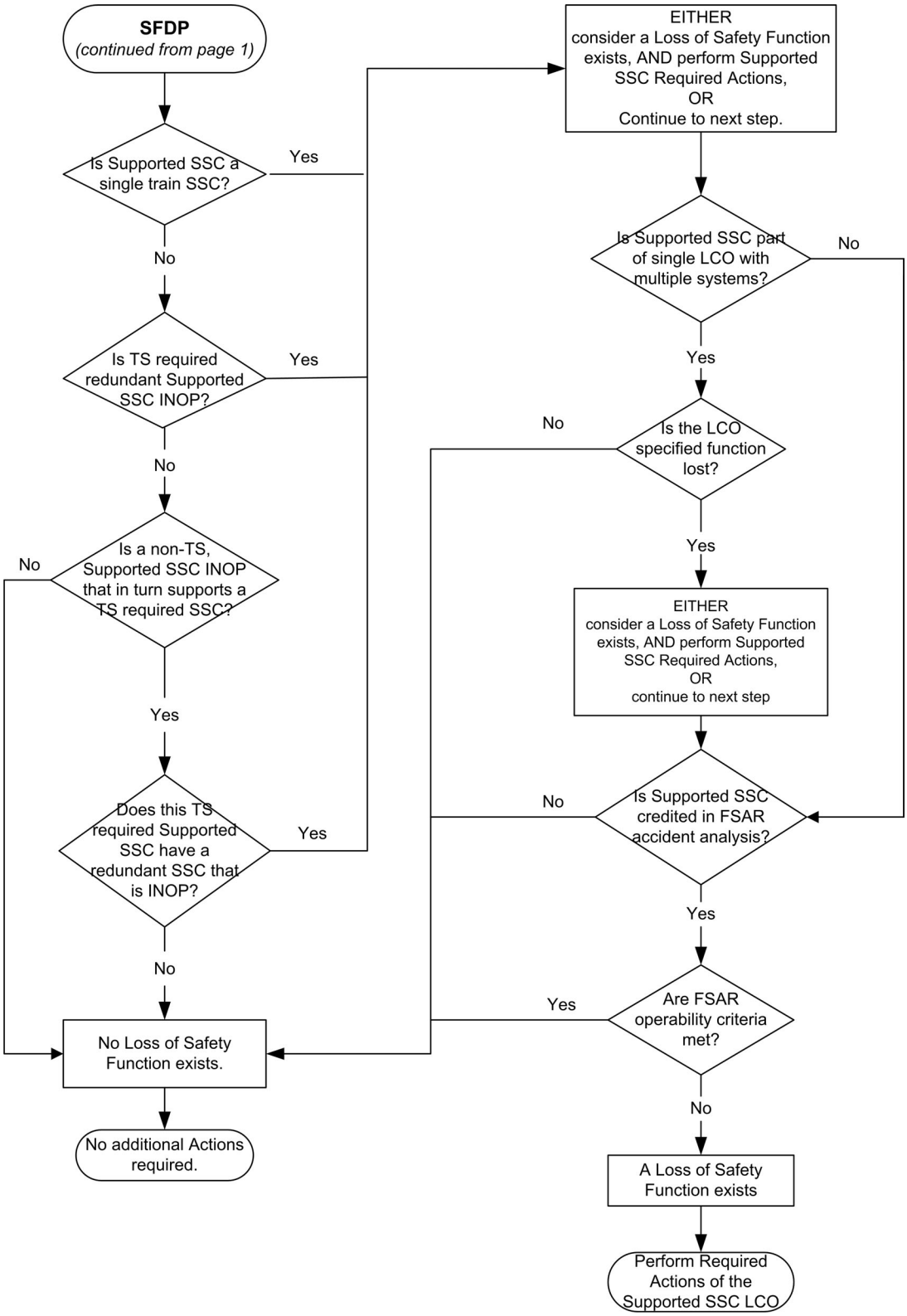
6.0 Conclusions Regarding the Use of LCO 3.0.6

The exception permitted by LCO 3.0.6 is justified as follows. The actions necessary to ensure safe operation of the plant are specified in the support SSC LCO Required Actions and the SFDP requires evaluation of loss of safety function. The SFDP directs that appropriate actions be taken if a loss of safety function exists. This approach eliminates the confusion and inconsistency associated with entry into multiple LCO Conditions and Required Actions.

ATTACHMENT 1 (Sheet 1 of 2)



ATTACHMENT 1 (Sheet 2 of 2)



ATTACHMENT 2

SCENARIO NO. 1: At 0100, with Unit 2 in RUN, the Unit 2 4160V "F" bus (a.k.a. swing bus) is determined to be inoperable. No other TS SSC inoperabilities exist.

The 4160V F bus is a support SSC, addressed by TS LCO 3.8.7. Required Action C requires restoring the bus to OPERABLE status within 8 hours.

The following is the loss of function determination for the supported systems:

- RHR Pumps 2C and 2D: For LCO 3.5.1, because Core Spray, ADS, and HPCI are OPERABLE, no loss of safety function exists.

- RHR Pumps 2C and 2D: For LCO 3.6.2.3, suppression pool cooling is not considered inoperable because only one pump per subsystem is required.

- RHR Pumps 2C and 2D: For LCO 3.6.2.4, suppression pool spray is not considered inoperable because only one pump per subsystem is required.

- RHR Pump 2C: For LCO 3.7.1, because the other subsystem is OPERABLE, no loss of safety function exists.

- PSW Pumps 2C and 2D: For LCO 3.7.2, because PSW can perform its safety function with one pump per subsystem, no loss of safety function exists.

- CRD Pump 2B: This is a non-TS SSC, but it supports control rods, TS LCO 3.1.3. With redundant CRD pumps operable, the safety function of the control rods is not affected.

- Diesel Bldg. MCC 1B (1R24S026): This is part of the 4160V F bus subsystem, addressed by TS 3.8.7. This supports distribution cabinet 1K (1R24S030) and ultimately the DG 1B. The DG 1B is inoperable, and LCO 3.8.1 Condition B required several different actions with Completion Times ranging from 1 hour to 7 days. With redundant DGs OPERABLE, no loss of safety function exists.

Conclusions: No loss of safety function exists. LCO 3.0.6 may be entered with a completion time of 8 hours to restore the inoperable bus to OPERABLE status, beginning at 0100.

SCENARIO NO. 2: At 0500, with Unit 2 in RUN, Reactor Vessel Water Level-Low Low Low (Level 1) channels A, B, and C are determined to be inoperable. This leaves only channel D operable.

This instrumentation supports ECCS by providing initiation for Core Spray, LPCI and ADS; and, also, supports initiation of the DGs and isolation of the PSW Turbine Building valves. Since all these supported functions require at least two channels, entry must be made into the Required Actions for LCO 3.3.5.1.

These Actions directly specify declaring supported features inoperable (due to loss of initiation capability in both Divisions). As stated in LCO 3.0.6, when the support SSC Required Actions provide direction for supported SSCs, the applicable supported SSC Conditions and Required Actions shall be entered. This effectively precludes the use of LCO 3.0.6 in determining the completion time for the supported SSCs.

Conclusions: The LCO 3.3.5.1 Required Actions should be performed, as well as those for all the inoperable supported systems. The SFDP will not be entered, because LCO 3.0.6 cannot be used.

SCENARIO NO. 4-A: At 0100, with Unit 2 in MODE 1, the Unit 2 RHRSW "A" Pump becomes inoperable. The RHRSW crosstie valves are tagged for maintenance. No other TS SSC inoperabilities exist.

The RHRSW system is a support SSC, addressed by TS LCO 3.7.1. Required Action A for one inoperable RHRSW pump is to restore the pump to OPERABLE status within 30 days. The bases for this specification state that an RHRSW subsystem is considered operable when 2 pumps are OPERABLE with an OPERABLE flow path. With the "A" pump inoperable, the "A" subsystem of RHRSW is inoperable.

The following is the loss of function determination for the supported systems:

RHR Suppression Pool Cooling: LCO 3.6.2.3 requires two subsystems to be OPERABLE for suppression pool cooling. The Bases for this LCO state that an RHR suppression pool cooling subsystem is OPERABLE with one RHR pump, the heat exchanger, and associated piping. Therefore, the inoperability of RHRSW subsystem "A" causes suppression pool cooling subsystem "A" to be inoperable. This is Condition A, with a Required Action Completion Time of 7 days. However, because suppression pool cooling subsystem "B" is OPERABLE, no loss of safety function exists. The Completion Time for suppression pool cooling may be extended to 30 days (from the time of discovery of RHRSW pump "A" being inoperable; i.e., 0100).

RHR Suppression Pool Spray: LCO 3.6.2.4 requires 2 subsystems to be OPERABLE for suppression pool spray. The Bases for this LCO state that an RHR suppression pool spray subsystem is OPERABLE with one RHR pump, the heat exchanger, and associated piping. Therefore, the inoperability of RHRSW subsystem "A" causes suppression pool spray subsystem "A" to be inoperable. This is Condition A, with a Required Action Completion Time of 7 days. However,

because subsystem “B” is operable, no loss of safety function exists. The Completion Time for suppression pool spray may be extended to 30 days.

SCENARIO 4-B: At 29 days, 2 hours after the initial inoperability of RHRSW pump ”A,” with the pump remaining inoperable, RHRSW pump “C” is found to be inoperable. At 29 days 6 hours, RHR SW pump “A” is restored to OPERABLE status. RHRSW pump “C” remains inoperable.

With the second RHRSW pump inoperability, Condition C has been entered for LCO 3.7.1. Note that the Completion Time “clock” for Condition A is “still running.” Condition C requires that the RHRSW subsystem be restored to OPERABLE status within 7 days. The two SSCs supported by RHRSW continue to have their “B” subsystems OPERABLE, so no loss of safety function exists.

When the RHRSW pump “A” is restored to OPERABLE status, the LCO 3.7.1 Condition C is exited, but the Condition A clock is “still running” due to the inoperability of RHRSW pump “C”. Under the provisions of Section 1.3 of the Technical Specifications, the Completion Time for RHRSW pump “C” is 31 days from the initial inoperability, i.e., the inoperability of pump “A.” Therefore, the Completion Times for the supported SSCs may also be extended to 31 days measured from the same starting point.

TECHNICAL REQUIREMENTS MANUAL
APPENDIX C
HNP UNITS 1 AND 2
OFFSITE DOSE CALCULATION MANUAL SPECIFICATIONS

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CHAPTER 2

LIQUID EFFLUENTS

2.1 LIMITS OF OPERATION

The following Liquid Effluent Controls implement requirements established by Technical Specifications Section 5.0. Terms printed in all capital letters are defined in Chapter 10.

2.1.1 Liquid Effluent Monitoring Instrumentation Control

In accordance with Technical Specification 5.5.4.a, the radioactive liquid effluent monitoring instrumentation channels shown in Table 2-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits specified in Section 2.1.2 are not exceeded. The alarm/trip setpoints of these channels shall be determined in accordance with Section 2.3.

2.1.1.1 Applicability

As shown in Table 2-1.

2.1.1.2 Actions

With a radioactive liquid effluent monitoring instrumentation channel alarm/trip setpoint less conservative than required by the above control, immediately suspend the release of radioactive liquid effluents monitored by the affected channel, declare the channel inoperable, or change the setpoint to a conservative value.

With less than the minimum number of radioactive liquid effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table 2-1. NOTE: One instrument channel may be inoperable for up to 6 hours to perform required surveillances prior to entering other applicable ACTIONS. Otherwise, restore the inoperable instrumentation to OPERABLE status within 30 days and, if unsuccessful, explain in the next Radioactive Effluent Release Report, per Technical Specification 5.6.3, why this inoperability was not corrected in a timely manner.

Entry into an Operational Mode or other specified CONDITION shall be made if, as a minimum, the requirements of Technical Specifications LCO 3.0.4 are met.

2.1.1.3 Surveillance Requirements

Each radioactive liquid effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION, and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table 2-2.

2.1.1.4 Basis

The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The Alarm/Trip Setpoints for these instruments shall be calculated and adjusted in accordance with the methodology and parameters in Section 2.3 to ensure that the alarm/trip will occur prior to exceeding the limits of Section 2.1.2. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

Table 2-1 Radioactive Liquid Effluent Monitoring Instrumentation

Instrument	OPERABILITY Requirements[a]		
	Minimum Channels OPERABLE	Applicability[b]	ACTION
1. Gross Radioactivity Monitors Providing Automatic Termination of Release			
Liquid Radwaste Effluent Line	1	(1)	100
2. Gross Radioactivity Monitors not Providing Automatic Termination of Release			
Service Water System Effluent Line	1	(2)	101
3. Flowrate Measurement Devices[c]			
a. Liquid Radwaste Effluent Line	1	(1)	102
b. Discharge Canal	1	(1), (2)	102
4. Differential Pressure Measurement Devices			
Service Water System to Closed Cooling Water System	1	At all times	103
5. Groundwater Outfall Instrumentation			
a. Auto Sampler at			
Y22N008A	1	At all times	104
b. Flow Totalizer at Y22N008A	1	At all times	105

a. All requirements in this Table apply to each unit.

b. Applicability of requirements is as follows:
(1) Whenever the radwaste discharge valves are not locked closed.
(2) Whenever the Service Water System pressure is below the Closed Cooling Water System pressure, or ΔP indication is not available.

c. Pump curves may be used to estimate flow; in such cases, ACTION statement 102 is not required.

Table 2-1 (contd) Notation for Table 2-1 - ACTION Statements

ACTION 100 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases may continue provided that prior to initiating a release:

a. At least two independent samples are analyzed in accordance with Section 2.1.2.3, and

b. At least two technically qualified individuals independently verify the discharge line valving and verify the release rate calculations.

Otherwise, suspend release of radioactive effluents via this pathway. If the channel remains inoperable for over 30 days, an explanation of the circumstances must be included in the next Radioactive Effluent Release Report.

ACTION 101 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue, provided that once per shift grab samples are collected and analyzed for gross radioactivity at a MINIMUM DETECTABLE CONCENTRATION no higher than 1×10^{-7} μCi/mL. If the channel remains inoperable for over 30 days, an explanation of the circumstances must be included in the next Radioactive Effluent Release Report.

ACTION 102 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue, provided that the flowrate is estimated at least once per 4 hours during actual releases. If the channel remains inoperable for over 30 days, an explanation of the circumstances must be included in the next Radioactive Effluent Release Report.

ACTION 103 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, assure that the Service Water System effluent monitor is OPERABLE.

ACTION 104 – With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, obtain daily grab samples and composite for weekly tritium, monthly gamma, and quarterly Sr 89/90 analyses.

ACTION 105 – With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, estimate outfall flow rate daily. If the channel remains inoperable for over 30 days, an explanation of the circumstances must be included in the next Radioactive Effluent Release Report.

Table 2-2 Radioactive Liquid Effluent Monitoring Instrumentation Surveillance Requirements

INSTRUMENT	Surveillance Requirements[a]			
	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST
1. Gross Radioactivity Monitors Providing Automatic Termination of Release				
Liquid Radwaste Effluent Line	D[b]	P[e]	R	SA[c]
2. Gross Radioactivity Monitors not Providing Automatic Termination of Release				
Service Water System Effluent Line	D[b]	M	R	SA[f]
3. Flowrate Measurement Devices				
a. Liquid Radwaste Effluent Line	D[b,d]	NA	18 M	SA
b. Discharge Canal	D[b,d]	NA	18 M	SA
4. Differential Pressure Measurement Devices				
Service Water System to Closed Cooling Water System	D	NA	R	NA
5. Groundwater Outfall Instrumentation				
a. Auto Samplers at				
(1) Y22N008A	W[g]	NA	NA	NA
b. Flow Totalizer at Y22N008A	W[g]	NA	NA	NA

a. All requirements in this Table apply to each unit.

b. During releases via this pathway.

c. In addition to the basic functions of a CHANNEL FUNCTIONAL TEST (Section 10.2), the CHANNEL FUNCTIONAL TEST shall also demonstrate that automatic isolation of this pathway and control room alarm annunciation occur if any of the following conditions exists:

(1) Instrument indicates measured levels above the alarm/trip setpoint;
(2) Instrument indicates an isolation on high alarm; or
(3) Instrument controls are not set in operate mode.

d. CHANNEL CHECK shall consist of verifying indication of flow during periods of release. CHANNEL CHECK shall be made at least once daily on any day on which CONTINUOUS, periodic, or BATCH releases are made.

e. The SOURCE CHECK shall consist of verifying that the instrument is reading on scale.

Table 2-2 (contd) Notation for Table 2-2 - Surveillance Requirements

f. In addition to the basic functions of a CHANNEL FUNCTIONAL TEST (Section 10.2), the CHANNEL FUNCTIONAL TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exists:

(1) Instrument indicates measured levels above the alarm setpoint;
(2) Instrument indicates a downscale failure; or
(3) Instrument controls are not set in operate mode.

g. CHANNEL CHECK shall consist of verifying indication of operability at least once weekly during sample collection.

CHAPTER 3

GASEOUS EFFLUENTS

3.1 LIMITS OF OPERATION

The following Limits of Operation implement requirements established by Technical Specifications Section 5.0. Terms printed in all capital letters are defined in Chapter 10.

3.1.1 Gaseous Effluent Monitoring Instrumentation Control

In accordance with Technical Specification 5.5.4., the radioactive gaseous effluent monitoring instrumentation channels shown in Table 3-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Section 3.1.2.a are not exceeded. The alarm/trip setpoints of these channels shall be determined in accordance with Section 3.3.

3.1.1.1 Applicability

These limits apply as shown in Table 3-1.

3.1.1.2 Actions

With a radioactive gaseous effluent monitoring instrumentation channel alarm/trip setpoint less conservative than required by the above control, immediately suspend the release of radioactive gaseous effluents monitored by the affected channel, declare the channel inoperable, or restore the setpoint to a value that will ensure that the limits of Section 3.1.2.a are met.

With less than the minimum number of radioactive gaseous effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table 3-1. NOTE: One instrument channel may be inoperable for up to 6 hours to perform required surveillances prior to entering other applicable ACTIONS. Otherwise, restore the inoperable instrumentation to OPERABLE status within 30 days and, if unsuccessful, explain in the next Radioactive Effluent Release Report, per Technical Specification 5.6.3, why this inoperability was not corrected in a timely manner.

Entry into an Operational Mode or other specified CONDITION shall be made if, as a minimum, the requirements of Technical Specifications LCO 3.0.4 are met.

3.1.1.3 Surveillance Requirements

Each radioactive gaseous effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION, and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table 3-2.

3.1.1.4 Basis

The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The Alarm/Trip Setpoints for these instruments shall be calculated and adjusted in accordance with the methodology and parameters in Section 3.3 to ensure that the alarm/trip will occur prior to exceeding the limits of Section 3.1.2.a. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

Table 3-1 Radioactive Gaseous Effluent Monitoring Instrumentation

Instrument	Minimum Channels OPERABLE	Applicability	ACTION
1. Reactor Building Vent Stack Monitoring System (Each Unit)			
a. Noble Gas Activity Monitor[c]	1	(a)	105
b. Iodine Sampler Cartridge	1	(a)	107
c. Particulate Sampler Filter	1	(a)	107
d. Effluent System Flowrate Measurement Device	1	(a)	104
e. Sampler Flowrate Measurement Device	1	(a)	104
2. Recombiner Building Ventilation Monitoring System			
a. Noble Gas Activity Monitor[c]	1	(a)	105
b. Iodine Sampler Cartridge	1	(a)	107
c. Particulate Sampler Filter	1	(a)	107
d. Effluent System Flowrate Measurement Device	1	(a)	104
e. Sampler Flowrate Monitor	1	(a)	104
3. Main Stack Monitoring System			
a. Noble Gas Activity Monitor[c]	1	(a)	105
b. Iodine Sampler Cartridge	1	(a)	107
c. Particulate Sampler Filter	1	(a)	107
d. Effluent System Flowrate Measurement Device	1	(a)	104
e. Sampler Flowrate Measurement Device	1	(a)	104
4. Condenser Offgas Pretreatment Monitor (Each Unit)			
a. Noble Gas Activity Monitor	1	(b)	108

a. During radioactive releases via this pathway.

b. During operation of the main condenser air ejector.

c. Monitor must be capable of responding to a MINIMUM DETECTABLE CONCENTRATION of 1×10^{-4} μCi/mL.

Table 3-1 (contd) Notation for Table 3-1.

ACTION 104 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided the flowrate is estimated at least once per 4 hours. If the number of channels OPERABLE remains less than required by the minimum channels OPERABLE requirement for over 30 days, an explanation of the circumstances shall be included in the next Radioactive Effluent Release Report.

ACTION 105 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided grab samples are taken daily and these samples are analyzed for gross activity within 24 hours. With the number of main stack monitoring system channels OPERABLE less than required by the minimum channels OPERABLE requirement, immediately suspend drywell purge. If the number of channels OPERABLE remains less than required by the minimum channels OPERABLE requirement for over 30 days, an explanation of the circumstances shall be included in the next Radioactive Effluent Release Report.

ACTION 107 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue, provided samples are continuously collected with auxiliary equipment for periods on the order of 7 days and analyzed within 48 hours after the end of the sampling period. If the number of channels OPERABLE remains less than required by the minimum channels OPERABLE requirement for over 30 days, an explanation of the circumstances shall be included in the next Radioactive Effluent Release Report.

ACTION 108 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided:

a. The offgas treatment system is not bypassed; and

b. The offgas post-treatment monitor (D11-K615) or the main stack monitor (D11-K600) is OPERABLE; and

c. Perform Technical Specification SR 3.7.6.1 every 4 hours.

Otherwise, enter Condition "A" of Technical Specification LCO 3.7.6.

If the number of channels OPERABLE remains less than required by the minimum channels OPERABLE requirement for over 30 days, an explanation of the circumstances shall be included in the next Radioactive Effluent Release Report.

Table 3-2 Radioactive Gaseous Effluent Monitoring Instrumentation Surveillance Requirements

INSTRUMENT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST
1. Reactor Building Vent Stack Monitoring System (Each Unit)				
a. Noble Gas Activity Monitor	D[a]	M	R	SA[c]
b. Iodine Sampler Cartridge	W[a,d]	NA	NA	NA
c. Particulate Sampler Filter	W[a,d]	NA	NA	NA
d. Effluent System Flowrate Measuring Device	D[a]	NA	R	SA
e. Sampler Flowrate Measuring Device	D[a]	NA	R	SA
2. Recombiner Building Ventilation Monitoring System				
a. Noble Gas Activity Monitor	D[a]	M	R	SA[c]
b. Iodine Sampler Cartridge	W[a,d]	NA	NA	NA
c. Particulate Sampler Filter	W[a,d]	NA	NA	NA
d. Effluent System Flowrate Measuring Device	D[a]	NA	R	SA
e. Sampler Flowrate Measuring Device	D[a]	NA	R	SA
3. Main Stack Monitoring System				
a. Noble Gas Activity Monitor	D[a]	M	R	SA[c]
b. Iodine Sampler Cartridge	W[a,d]	NA	NA	NA
c. Particulate Sampler Filter	W[a,d]	NA	NA	NA
d. Effluent Flowrate Monitor	D[a]	NA	R	SA
e. Sampler Flowrate Monitor	D[a]	NA	R	SA
4. Condenser Offgas Pretreatment Monitor (Each Unit)				
a. Noble Gas Activity Monitor	D[b]	M	R	SA[c]

a. Requirement applies during releases via this pathway.

b. Requirement applies during operation of the main condenser air ejector.

c. In addition to the basic functions of a CHANNEL FUNCTIONAL TEST (Section 10.2), the CHANNEL FUNCTIONAL TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exists:
   (1) Instrument indicates measured levels above the alarm/trip setpoint.
   (2) Circuit failure occurs.
   (3) Instrument indicates a downscale failure.

d. The CHANNEL CHECK shall consist of verifying sampler flow and the presence of the collection device (i.e., particulate filter or charcoal cartridge, etc.) at the weekly changeout.

3.1.2 Gaseous Effluent Dose Rate Control

In accordance with Technical Specifications 5.5.4.c and 5.5.4.g, the licensee shall conduct operations so that the dose rates due to radioactive materials released in gaseous effluents from the site to areas at and beyond the SITE BOUNDARY (see Figure 10-1) are limited as follows:

a. For noble gases: Less than or equal to a dose rate of 500 mrem/y to the total body and less than or equal to a dose rate of 3000 mrem/y to the skin, and

b. For Iodine-131, Iodine-133, tritium, and for all radionuclides in particulate form with half-lives greater than 8 days: Less than or equal to a dose rate of 1500 mrem/y to any organ.

3.1.2.1 Applicability

This limit applies at all times.

3.1.2.2 Actions

With a dose rate due to radioactive material released in gaseous effluents exceeding the limit stated in Section 3.1.2, immediately decrease the release rate to within the stated limit.

Entry into an Operational Mode or other specified CONDITION shall be made if, as a minimum, the requirements of Technical Specifications LCO 3.0.4 are met.

3.1.2.3 Surveillance Requirements

The dose rates due to radioactive materials in areas at or beyond the SITE BOUNDARY due to releases of gaseous effluents shall be determined to be within the above limits, in accordance with the methods and procedures in Section 3.4.1, by obtaining representative samples and performing analyses in accordance with the sampling and analysis program specified in Table 3-3.

3.1.2.4 Basis

This control is provided to ensure that gaseous effluent dose rates will be maintained within the limits that historically have provided reasonable assurance that radioactive material discharged in gaseous effluents will not result in a dose to a MEMBER OF THE PUBLIC in an UNRESTRICTED AREA, either within or outside the SITE BOUNDARY, exceeding the limits specified in Appendix I of 10 CFR Part 50, while allowing operational flexibility for effluent releases. For MEMBERS OF THE PUBLIC who may at times be within the SITE BOUNDARY, the occupancy of the MEMBER OF THE PUBLIC will be sufficiently low to compensate for any increase in the atmospheric diffusion factor above that for the SITE BOUNDARY.

The dose rate limit for Iodine-131, Iodine-133, tritium, and radionuclides in particulate form with half-lives greater than 8 days specifically applies to dose rates to a child via the inhalation pathway.

This control applies to the release of gaseous effluents from all reactors at the site.

Table 3-3 Radioactive Gaseous Waste Sampling and Analysis Program

Gaseous Release Type	Sampling and Analysis Requirements[a]			
	Sampling FREQUENCY	Minimum Analysis FREQUENCY	Type of Activity Analysis	MINIMUM DETECTABLE CONCENTRATION (MDC) (μCi/mL)
Environmental Release Points 1. Main Stack 2. Reactor Building Vent (Each Unit) 3. Recombiner Building Vent[b]	M[c] Grab Sample	M[c]	PRINCIPAL GAMMA EMITTERS H-3	1 E-4 1 E-6
	CONTINUOUS[e]	W[d] Charcoal or Silver Zeolite Sample	I-131 I-133	1 E-12 1 E-10
	CONTINUOUS[e]	W[d] Particulate Sample	PRINCIPAL GAMMA EMITTERS	1 E-11
	CONTINUOUS[e]	M COMPOSITE Particulate Sample	Gross Alpha	1 E-11
	CONTINUOUS[e]	Q COMPOSITE Particulate Sample	Sr-89, Sr-90	1 E-11

a. Terms printed in all capital letters are defined in Chapter 10. When unusual circumstances result in a MINIMUM DETECTABLE CONCENTRATION higher than required, the reasons shall be documented in the next Radioactive Effluent Release Report.

b. The Recombiner Building Vent serves Unit 1. Sample analysis results and associated source terms must be assigned to Unit 1 for the purpose of release accountability and dose calculations.

c. Sampling and analyses for PRINCIPAL GAMMA EMITTERS shall also be performed following shutdown, startup, or a THERMAL POWER change exceeding 15% of the RATED THERMAL POWER within a one-hour period. The more frequent sampling and analysis requirement applies only if analysis shows that the DOSE EQUIVALENT I-131 concentration in the primary coolant and the Main Stack Noble Gas Activity Monitor reading have both increased by a factor of 3.

Table 3-3 (contd) Notation for Table 3-3

d. Sampling shall be performed weekly, and analyses completed within 48 hours of changing (or after removal from sampler). Sampling shall also be performed once per 24 hours for 7 days following each shutdown, startup, or a THERMAL POWER change exceeding 15% of the RATED THERMAL POWER within a one-hour period, with analyses completed within 48 hours of changing. When samples collected for 24 hours are analyzed, the corresponding MINIMUM DETECTABLE CONCENTRATIONs may be increased by a factor of 10. The more frequent sampling and analysis requirement applies only if analysis shows that the DOSE EQUIVALENT I-131 concentration in the primary coolant and the Main Stack Noble Gas Activity Monitor reading have both increased by a factor of 3.

e. The ratio of the sample flowrate to the sampled stream flowrate shall be known for the time period covered by each dose or dose rate calculation made in accordance with controls specified in Sections 3.1.2, 3.1.3, and 3.1.4.

CHAPTER 10

DEFINITIONS OF EFFLUENT CONTROL TERMS

The terms defined in this chapter are used in the presentation of the above chapters. These terms are shown in all capital letters to indicate that they are specifically defined.

10.1 TERMS SPECIFIC TO THE ODCM

The following terms are used in the ODCM, but are not found in the Technical Specifications:

BATCH RELEASE

A BATCH RELEASE is the discharge of wastes of a discrete volume. Prior to sampling for analyses, each liquid batch shall be isolated and then thoroughly mixed by a method described in the ODCM to assure representative sampling.

COMPOSITE SAMPLE

A COMPOSITE SAMPLE is one which contains material from multiple waste releases, in which the quantity of sample is proportional to the quantity of waste discharged, and in which the method of sampling employed results in a specimen that is representative of the wastes released. Prior to analyses, all liquid samples that are to be aliquotted for a COMPOSITE SAMPLE shall be mixed thoroughly, in order for the COMPOSITE SAMPLE to be representative of the effluent release.

When assessing the consequences of a waste release at the pre-release or post-release stage, the most recent available COMPOSITE SAMPLE results for the applicable release pathway may be used.

CONTINUOUS RELEASE

A CONTINUOUS RELEASE is the discharge of wastes of a non-discrete volume, e.g., from a volume within a system that has an input flow during the continuous release.

FREQUENCY NOTATION

The FREQUENCY NOTATION specified for the performance of surveillance requirements shall correspond to the intervals defined below, with a maximum allowable extension not to exceed 25% of the surveillance interval.

NOTATION	FREQUENCY
S (Once per shift)	At least once per 12 hours.
D (Daily)	At least once per 24 hours.
W (Weekly)	At least once per 7 days.
M (Monthly)	At least once per 31 days.
Q (Quarterly)	At least once per 92 days.
SA (Semi-annually)	At least once per 184 days.
18M	At least once per 18 months.
R (Refueling)	At least once per 24 months.
S/U (Startup)	Prior to each reactor startup.
NA	Not Applicable.
P (Prior)	Completed prior to each release.

GASEOUS RADWASTE TREATMENT SYSTEM

The GASEOUS RADWASTE TREATMENT SYSTEM is the offgas holdup system designed and installed to reduce radioactive gaseous effluents by collecting primary coolant system offgases from the primary system and providing for delay or holdup for the purpose of reducing the total radioactivity prior to release to the environment.

LIQUID RADWASTE TREATMENT SYSTEM

A LIQUID RADWASTE TREATMENT SYSTEM is any system designed and installed to reduce radioactive materials in liquid effluents by systematic collection, retention, and processing through filtration, evaporation, separation and/or ion exchange treatment. This system consists of at least one collection tank, one evaporator or demineralizer system, one post-treatment tank and associated components providing for treatment flow and functional control.

MAJOR CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS

For the purposes of the ODCM, MAJOR CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS include the following changes to such systems:

(1) Major changes in process equipment, components, structures, or effluent monitoring instrumentation as described in the Final Safety Analysis Report (FSAR) or as evaluated in the Nuclear Regulatory Commission staff's Safety Evaluation Report (SER) (e.g., deletion of evaporators and installation of demineralizer);

(2) Changes in the design of radwaste treatment systems that could significantly increase quantities of effluents released from those previously considered in the FSAR and SER;

(3) Changes in system design which may invalidate the accident analysis as described in the SER (e.g., changes in tank capacity that would alter the curies released); or

(4) Changes in system design that could potentially result in a significant increase in occupational exposure of operating personnel (e.g., use of temporary equipment without adequate shielding provisions).

MEMBER(S) OF THE PUBLIC[1]

A MEMBER OF THE PUBLIC shall be an individual in a *controlled* area or an UNRESTRICTED AREA. However, an individual is not a MEMBER OF THE PUBLIC during any period in which the individual receives an *occupational dose*. This category may include persons who use portions of the site for recreational, occupational, or other purposes not associated with the plant.

MILK ANIMAL

A MILK ANIMAL is a cow or goat that is producing milk for human consumption.

[1] The italicized terms in this definition, which are not otherwise used in this ODCM, shall have the definitions assigned to them by 10 CFR 20.1003.

MINIMUM DETECTABLE CONCENTRATION

The MINIMUM DETECTABLE CONCENTRATION (MDC) is defined, for purposes of the controls in this ODCM, as the smallest concentration of radioactive material in a sample that will yield a net count above system background and that will be detected with 95-percent probability, with only 5-percent probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system, which may include radiochemical separation, the MDC for a given radionuclide is determined as follows (Reference 17):

$$MDC = \frac{\frac{2.71}{t_s} + 3.29\sqrt{R_b\left(\frac{1}{t_s} + \frac{1}{t_b}\right)}}{E \cdot V \cdot 2.22\,x10^6 \cdot Y \cdot e^{-\lambda \Delta t}} \qquad \textbf{(10.1)}$$

where:

MDC = the a priori MINIMUM DETECTABLE CONCENTRATION (µCi per unit mass or volume).

R_b = the background counting rate, or the counting rate of a blank sample, as appropriate (counts per minute).

t_s = the length of the sample counting period (minutes).

t_b = the length of the background counting period (minutes).

E = the counting efficiency (counts per disintegration)

V = the sample size (units of mass or volume).

2.22×10^6 = the number of disintegrations per minute per µCi.

Y = the fractional radiochemical yield, when applicable.

λ = the radioactive decay constant for the given radionuclide (h^{-1}). Values of λ used in effluent calculations should be based on decay data from a recognized and current source, such as Reference 26.

Δt = for effluent samples, the elapsed time between the midpoint of sample collection and the time of counting (h); for environmental samples, the elapsed time between the end of sample collection and the time of counting (h).

Typical values of E, V, Y, and Δt should be used in the calculation. It should be recognized that the MDC is defined as an *a priori* (before the fact) limit representing the capability of a measurement system, and not as an *a posteriori* (after the fact) limit for a particular measurement.

PRINCIPAL GAMMA EMITTERS

The PRINCIPAL GAMMA EMITTERS for which the MINIMUM DETECTABLE CONCENTRATION (MDC) limit applies include exclusively the following radionuclides:

For liquid radioactive effluents: Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, and Ce-141. Ce-144 shall also be measured, but with an MDC of 5×10^{-6} μCi/mL.

For gaseous radioactive effluents: In noble gas releases, Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135, Xe-138; and in particulate releases, Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141, and Ce-144.

For environmental media: The gamma emitters specifically listed in Table 4-3.

These lists do not mean that only these nuclides are to be considered. Other gamma peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Radioactive Effluent Release Report, the Annual Radiological Environmental Operating Report, or other applicable report(s).

OPERATIONAL CONDITION

An OPERATIONAL CONDITION shall be any one inclusive combination of Mode Switch position and average reactor coolant temperature, as defined in Table 1.1-1 of the Technical Specifications.

REACTOR MODE

The REACTOR MODE is established by the Mode Switch position. The four Mode Switch positions are REFUEL, SHUTDOWN, START & HOT STANDBY, and RUN. (See Technical Specifications Table 1.1-1 for definitions of these MODES.)

SITE BOUNDARY

The SITE BOUNDARY shall be that line beyond which the land is not owned, leased or otherwise controlled by Georia Power Company as shown in Figure 10-1.

SOURCE CHECK

A SOURCE CHECK shall be the qualitative assessment of channel response when the channel sensor is exposed to a source of increased radioactivity.

UNRESTRICTED AREA

The UNRESTRICTED AREA shall be any area access to which is neither limited nor controlled by the licensee, or any area within the SITE BOUNDARY used for residential quarters or for industrial, commercial, institutional, and/or recreational purposes.

10.2 TERMS DEFINED IN THE TECHNICAL SPECIFICATIONS

The following terms are defined in the Technical Specifications, Section 1.1. Because they are used throughout the Limits of Operation sections of the ODCM, they are presented here for convenience. In the event of discrepancies between the definitions below and those in the Technical Specifications, the Technical Specification definitions shall take precedence.

ACTIONS

ACTIONS shall be that part of a Specification that prescribes Required Actions to be taken under designated Conditions within specified Completion Times.

CHANNEL CALIBRATION

A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output, such that it responds within the necessary range and accuracy to known values of the parameter that the channel monitors. The CHANNEL CALIBRATION shall encompass the entire channel, including the required sensor, alarm, display, and trip functions, and shall include the CHANNEL FUNCTIONAL TEST. Calibration of instrument channels with resistance temperature detector (RTD) or thermocouple sensors may consist of an inplace qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel. The CHANNEL CALIBRATION may be performed by any means of any series of sequential, overlapping, or total channel steps so that the entire channel is calibrated.

CHANNEL CHECK

A CHANNEL CHECK shall be the qualitative assessment, by observation, of channel behavior during operation. This determination shall include, where possible, comparison of the channel indication and status to other indications or status derived from independent instrument channels measuring the same parameter.

CHANNEL FUNCTIONAL TEST

A CHANNEL FUNCTIONAL TEST shall be the injection of a simulated or actual signal into the channel as close to the sensor as practicable to verify OPERABILITY, including required alarm, interlock, display, and trip functions, and channel failure trips. The CHANNEL FUNCTIONAL TEST may be performed by means of any series of sequential, overlapping, or total channel steps so that the entire channel is tested.

DOSE EQUIVALENT I-131

DOSE EQUIVALENT I-131 shall be that concentration of I-131 EQUIVALENT (microcuries/gram) that alone would produce the same Committted I-131 Effective Dose Equivalent as the quantity and isotopic mixture of I-131, I-132, I-133, I-134, and I-135 actually present. The dose conversion factors used for this calculation shall be those listed in Federal Guidance Report (FGR) 11, “Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion,” 1988.

OPERABLE (or OPERABILITY)

A system, subsystem, division, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling or seal water, lubrication or other auxiliary equipment that are required for the system, subsystem, division, component or device to perform its specified safety

function(s) are also capable of performing their related support function(s).

RATED THERMAL POWER

RATED THERMAL POWER shall be a total reactor core heat transfer rate to the reactor coolant of 2804 MWt.

THERMAL POWER

THERMAL POWER shall be the total reactor core heat transfer rate to the reactor coolant.

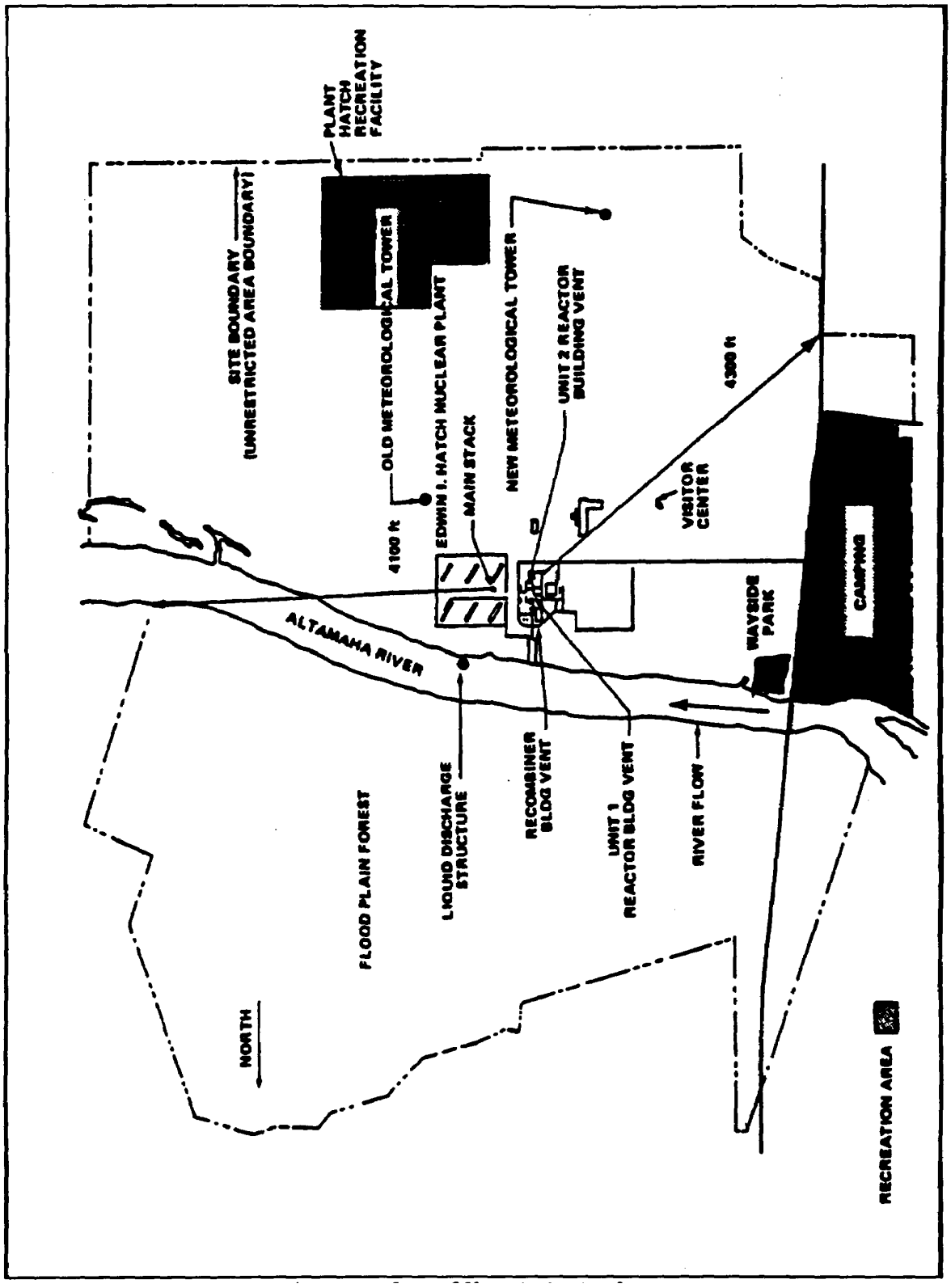

Figure 10-1 Site Map for Effluent Controls