S

ENGINEERING CHANGE NOTICE

Page 1 of 21. ECN **660476**Proj.
ECN

2. ECN Category (mark one) Supplemental ☐ Direct Revision ☒ [X] Change ECN ☐ Temporary ☐ Standby ☐ Supersedeure ☐ Cancel/Void ☐	3. Originator's Name, Organization, MSIN, and Telephone No. T. Nuxall, CVDF, R3-86, 372-3739	4. USQ Required? ☒ Yes ☒ No <i>m g/d/ro</i>	5. Date 5/9/00
12a. Modification Work ☐ Yes (fill out Blk. 12b) ☒ No (NA Blks. 12b, 12c, 12d)	12b. Work Package No. N/A	12c. Modification Work Complete N/A Design Authority/Cog. Engineer Signature & Date	12d. Restored to Original Condition (Temp. or Standby ECN only) N/A Design Authority/Cog. Engineer Signature & Date
13a. Description of Change FACILITY - Diesel Generator Addition of Essex Cable, Pass and Seymour Connectors, Receptacles, and Plugs. USQ: CVD-00-0286 gpb 5/11/00			
14a. Justification (mark one) Criteria Change ☐ Design Improvement ☒ [X] Environmental ☐ Facility Deactivation ☐ As-Found ☐ Facilitate Const ☐ Const. Error/Omission ☐ Design Error/Omission ☐			
14b. Justification Details Addition of requirements. The design verification method for SS/SC components is by independent review in accordance with EN-6-027-01. Documentation of this review is accomplished by the independent reviewer approval signature on page 2 of this ECN.			
15. Distribution (include name, MSIN, and no. of copies) See distribution sheet.			

RELEASE STAMP

DATE: 5/11/00

STA: A

HANFORD
RELEASE

ID: 2

MAY 17 2000

ENGINEERING CHANGE NOTICE				Page 2 of 2		1. ECN (use no. from pg. 1) 660476																																																																				
16. Design Verification Required [X] Yes [] No		17. Cost Impact NA ENGINEERING Additional [] \$ Savings [] \$ CONSTRUCTION Additional [] \$ Savings [] \$			18. Schedule Impact (days) NA Improvement [] Delay []																																																																					
19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.																																																																										
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indicate that the signing organization has been notified of other affected documents listed below.																																																																										
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ADDITIONAL																																																																										

Diesel Generator Control Panel - Wiring, Terminals

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

Fluor Hanford
P.O. Box 1000
Richland, Washington

SNF-6263
Revision 1

ECN 660476

Diesel Generator Control Panel - Wiring, Terminals

C Van Katwijk
FH

Date Published
May 2000

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

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Fluor Hanford
P.O. Box 1000
Richland, Washington

5/17/00
Release Approval Date

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Total Pages: 14

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Page 1

Diesel Generator Control panel - wiring, terminals

5-11-00

Commercial Grade Item Upgrade Dedication Form

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ECN No. N/A

CGI No. CGI-SNF-D-20-1-C1-066

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Title: **Diesel Generator Control Panel - Wiring, terminals**

Section 1 Part Information

Item No.: N/A

Manufacturer: N/A

Supplier: N/A

Mfg. Part/Model No.: N/A

Supplier's P/N: N/A

Part Description: N/A

End Use Description: N/A

Section 2a Component Information

Equipment No.: **Diesel Generator Control Panel Components: Wiring and cable, Terminals**

Specification No.: **W-441-C1, W-379 SNF/CSB spec for Diesel Generator**

Manufacturer: **Therm-O-Link Inc., Panduit Corp., Essex, Pass & Seymour**

Past P.O. No.: N/A

Procurement and/or Model No.: **Wiring and cable: SIS-12-65-T; Essex: 411431; Connectors/Receptacles/Plugs: L515-C, 4716-SS, & 5266-X**

Equipment Supplier (if different from manufacturer): N/A

Equip. Supplier's Part No.: N/A

Component Description: **Diesel Generator Control Panel - electrical distribution materials**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)? ☐ YES (go to #2 below) ☒ NO (go to procedure step 6.3.2, proceed to dedicate Item)
If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate w/ project CGI Interface Engineer or BTR): ☐ YES (go to #2 below, dedicate Item) ☒ NO (dedicate Item)

2. List of Candidate qualified suppliers or ISO 9000 suppliers: N/A

1. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): N/A

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

☐ YES (the Item is not commercial grade) ☒ NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

☐ NO (the item is not commercial grade) ☒ YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

☐ NO (the item is not commercial grade) ☒ YES (continue)

☒ All three criteria have been satisfied. The Item meets the definition of commercial grade.

Section 2d Reason for Dedication

The above Commercial Grade (CG) described Item is being Dedicated for use in the application cited for the following reason(s):

	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
X	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

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Title: **Diesel Generator Control Panel - Wiring, terminals**

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **Provide power supply to instruments and signal channels from safety related instruments in the control panel that provides and maintains standby electrical power to the Cold Vacuum Drying Facility.**

B. Part/Component Functional Mode:

Safety Function #1:	☐	Active	☒	Passive
Safety Function #2:	☐	Active	☐	Passive
Safety Function #3:	☐	Active	☐	Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive - Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable): **N/A**

1.

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Fracture, material fatigue, insulation breakdown or loose connection leads to wiring short/open circuit and loss of signal channel.**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:

Yes ☐
No ☒

Environmental Condition A

If yes: Environmental Qualification Requirements

Limiting Environmental Conditions:

Required Safety Functions:

Qualification Period:

Natural Phenomena Hazard (NPH) Design Required:

Yes ☒
No ☐

HNF-PRO-97, Rev. 0, W-441-C1

If yes: NPH Design Requirements

Performance Category: **PC-2**

NPH Design Req'ts.:

Required Safety Functions: **Seismic 3/1 Protection for adjacent SS SSCs - Containment**

Section 5 Component Functional Classification

Safety Class (SC)

General Service

☒

Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **NEC**

Safety Analysis Report (SAR): **HNF- 3553, Rev. 0a, Annex B**

Drawings: **H-1-83978, Sht. 2, O/M Manual (Nutherm DWG. 59723)**

Vendor Manual/Manufacturer/Supplier Information: **Catalog Cut Sheets – Therm-O-Link Inc. Panduit Corp., Essex, Pass & Seymour**

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Title: **Diesel Generator Control Panel - Wiring, terminals**

Section 9 Critical Characteristics				
Critical Characteristics	Acceptance Criteria/Tolerances	Acc.Method	ID	Function
Wiring/Cable:				
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	Therm-O-Link, Inc.	1, IN	X	
Model Number, Size	SIS-12-65-T	1, IN	X	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
SIS-12-65-T; Markings, O.D., No. of Strands, material	UL12 ga. SIS 90°C 600V, Nominal 0.162", 65 strand, tinned conductor	1, IN	X	
Essex:				
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer - Flex. Cord.	Essex	1, IN	X	
Model No., Size, Type - Flex. Cord.	411431, 14 AWG, 3 Conductor	1, IN	X	
Receptacle, Connector and Plug:				
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	Pass & Seymour	1, IN	X	
Model No. -Connector	L516-C	1, IN	X	
Model No. -Flange	4716-SS	1, IN	X	
Model No. -Plug	5266-X	1, IN	X	
Rating -Connector	15 Amp, 125 V	1, IN	X	
Rating -Flange	15 Amp, 125 V	1, IN	X	
Rating -Plug	15 Amp, 125 V	1, IN	X	
Configuration - Conn.	3 wire grounded	1, IN	X	
Configuration - Flange	3 wire grounded, Flanged Inlet	1, IN	X	
Configuration - Conn.	2 pole, 3 wire grounded	1, IN	X	
Terminal:				
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	Panduit corp.	1, IN	X	
Model No.	PN10-10R	1, IN	X	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
PN10-10R; Terminal Stud size/ Color code/ Nominal dimensions "A" & "W", rating	10 / Yellow / Nominal 1.08 inch, 0.38inch / 600V, ≥ 90°C	1, IN	X	
All items:				
3. Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Environmental	Note 1			
Seismic Condition A	Note 2			

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Title: Diesel Generator Control Panel - Wiring, terminals

Notes and Legend:

1. These materials are not subject to degradation at 60°F and 40% RH or 75°F and 25% RH and are suitable for Condition A Application.
2. Maintain critical function before and after Seismic event. Seismic certification does not apply to wiring and terminals. Wiring installation has been seismically certified by analysis (Ref. Nutherm Report #7713-SCE submittal W-379-1015))

Rev. 1: Added Essex Cable, Pass & Seymour Connectors, Receptacles, & Plugs.

Acceptance Method:

1. Special Test and Inspection
 - 1, IN for Inspection
 - 1,T for Test
2. Commercial Grade Survey
3. Source Verification
4. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer

[Signature] 5/11/00

QA Engineer:

[Signature] 5-11-00

Design Authority:

[Signature] 5/10/00

Other:

5/9/00

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Title: **Diesel Generator Control Panel - Wiring, terminals**

WORKSHEET 1

DETERMINATION OF FAILURE MECHANISMS

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.	X	Fracture or material fatigue-loss of signal channel provided by the wiring
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.	X	Deterioration of the insulation resulting in a short and loss of power.
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.	X	An unintentional break of the wire would result in a loss of power.
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	X	An unintentional connection to ground would result in a loss of power.
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.		
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		
Section 2 Additional Failure Modes Applicable to the Component Under Evaluation			
1. Structural Failure that affects neighboring SS or SC SSCs.			

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Title: **Diesel Generator Control Panel - Wiring, terminals**

Checklist 1 – Acceptance Method 1 – Special Test/Inspection Verification

SECTION 1			
Item Description: Diesel Generator Control Panel System #: 20-6		Equip #: DG Cntl. Pnl. Components: Wiring and cable, Terminal, Flex. Cord, Receptacle, Connector, & Plug Procurement and/or Model #: SIS-12-65-T, PN10-10R, 411431, L515-C, 4716-SS, 5266-X	
Manufacturer (Address/Phone): Therm-O-Link Inc., Panduit, Essex, Pass & Seymour		Supplier (Address/Phone):	
SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.			
Insp	Test	Post-Test	
X			1. Manufacturer
X			2. Model Number
X			3. Markings, O.D., No. of strands, material
X			4. Terminal Stud size/ Color code/ Nominal dimensions "A" & "W" / rating
X			5. Rating
X			6. Configuration
SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)			
Wiring/Cable:			
Characteristic: Manufacturer - SIS Acceptance Criteria: Therm-O-Link Inc.			Sample Size*: 100%
Receipt Inspection Plan / Report #:			
Characteristic: Markings, Model Number, Size, No strands, material - SIS Acceptance Criteria: UL, SIS-12-65-T, 90°C 12 ga, 65 strand, tinned conductor			Sample Size*: 100%
Receipt Inspection Plan / Report #:			
Characteristic: Manufacturer - Flexible Cord Acceptance Criteria: Essex			Sample Size*: 100%
Receipt Inspection Plan / Report #:			
Characteristic: Model No., Size, Type - Flex. Cord. Acceptance Criteria: 411431, 14 AWG, 3 Conductor			Sample Size*: 100%
Receipt Inspection Plan / Report #:			
Terminal:			
Characteristic: Manufacturer Acceptance Criteria: Panduit			Sample Size*: 100%
Receipt Inspection Plan / Report #:			
Characteristic: Model Number, Terminal size, Color code, Nominal dimensions "A" & "W", rating Acceptance Criteria: PN10-10R, 10, yellow, 1.08" & 0.38, 600V, ≥ 90°C			Sample Size*: 100%
Receipt Inspection Plan / Report #:			
Receptacle, Connector and Plug:			
Characteristic: Manufacturer Acceptance: Pass & Seymour			Sample Size*: 100%
Receipt Inspection Plan / Report #:			
Characteristic: Model No. - Connector Acceptance Criteria: L516-C			Sample Size*: 100%
Receipt Inspection Plan / Report #:			

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Title: **Diesel Generator Control Panel - Wiring, terminals**

Characteristic: Model No. - Flange Acceptance Criteria: 4716-SS	Receipt Inspection Plan / Report #:	Sample Size*: 100%
Characteristic: Model No. - Plug Acceptance Criteria: 5266-X	Receipt Inspection Plan / Report #:	Sample Size*: 100%
Characteristic: Rating -Connector Acceptance Criteria: 15 Amp, 125 V	Receipt Inspection Plan / Report #:	Sample Size*: 100%
Characteristic: Rating -Flange Acceptance Criteria: 15 Amp, 125 V	Receipt Inspection Plan / Report #:	Sample Size*: 100%
Characteristic: Rating -Plug Acceptance Criteria: 15 Amp, 125 V	Receipt Inspection Plan / Report #:	Sample Size*: 100%
Characteristic: Configuration -Connector Acceptance Criteria: 3 wire grounded	Receipt Inspection Plan / Report #:	Sample Size*: 100%
Characteristic: Configuration -Flange Acceptance Criteria: 3 wire grounded, Flanged Inlet	Receipt Inspection Plan / Report #:	Sample Size*: 100%
Characteristic: Configuration -Plug Acceptance Criteria: 2 pole, 3 wire grounded	Receipt Inspection Plan / Report #:	Sample Size*: 100%

/Manufacturer or Other, Refer to CGI Checklist-2 for Support Information

5/17/00

Commercial Grade Item Upgrade Dedication Form

ECN No. <u>N/A</u>	CGI No. <u>CGI-SNF-D-20-1-C1-066</u>	SNF-6263, Rev. 1
Title: <u>Diesel Generator Control Panel - Wiring, terminals</u>		Page 8 of 11

Section 5 Test / Inspection Summary (Acceptance Method 1)

1. Summary Of Verified Critical Characteristics , Their Verification Methods, and Results

ITEM DESCRIPTION: Wiring and Cable

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check- list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer - SIS	Therm-O-Link, Inc.	X		1, IN							
Model No., Size, Type	SIS-12-65-T, 12 ga. SIS	X		1, IN							
SIS-12-65-T: Markings, O.D., No. of Strands, material	UL, SIS, 12ga, 0.162, 65 strand, tinned conductor, 90°c 600V	X		1, IN							
Manufacturer - Flex. Cord	Essex	X		1, IN							
Model No., Size, Type	411431, 14 AWG, 3 Cond.	X		1, IN							

2. Disposition Of Unverified or Failed Critical Characteristics

Critical Characteristic	Disposition

3. Signature Indicates All Critical Characteristics Verified Satisfactory or Acceptably Dispositioned and Commercial Grade Dedication Is Satisfactory and Complete.

Testing Agency Approval: _____	Date _____	Design Authority: _____	Date _____
Testing Agency QA Engineer: _____	Date _____	QA Engineer: _____	Date _____

Commercial Grade Item Upgrade Dedication Form

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Title: <u>Diesel Generator Control Panel - Wiring, terminals</u>		Page 9 of 11

Section 5 Test / Inspection Summary (Acceptance Method 1)

1. Summary Of Verified Critical Characteristics , Their Verification Methods, and Results

ITEM DESCRIPTION: Receptacle, Connector and Plug:

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check- list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Pass & Seymour	X		1, IN							
Model No. -Connector	L516-C	X		1, IN							
Model No. -Flange	4716-SS	X		1, IN							
Model No. -Plug	5266-X	X		1, IN							
Rating -Connector	15 Amp, 125 V	X		1, IN							
Rating -Flange	15 Amp, 125 V	X		1, IN							
Rating -Plug	15 Amp, 125 V	X		1, IN							
Configuration - Conn.	3 wire grounded	X		1, IN							
Configuration - Flange	3 wire grounded, Flanged Inlet	X		1, IN							
Configuration - Conn.	2 pole, 3 wire grounded	X		1, IN							

2. Disposition Of Unverified or Failed Critical Characteristics

Critical Characteristic	Disposition

3. Signature Indicates All Critical Characteristics Verified Satisfactory or Acceptably Dispositioned and Commercial Grade Dedication Is Satisfactory and Complete.

Testing Agency Approval: _____	Date _____	Design Authority: _____	Date _____
Testing Agency QA Engineer: _____	Date _____	QA Engineer: _____	Date _____

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Title: Diesel Generator Control Panel - Wiring, terminals

Section 5 Test / Inspection Summary (Acceptance Method 1)											
1. Summary Of Verified Critical Characteristics , Their Verification Methods, and Results											
ITEM DESCRIPTION: Terminal											
Critical Characteristics					Verification Results						
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/N	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Panduit	X		1, IN							
Model No.	PN10-10R	X		1, IN							
PN-10-10R; Terminal stud size, Color code, dimensions "A" & "W"	10, yellow, Nominal 1.08 inch, 0.38 inch,	X		1, IN							
2. Disposition Of Unverified or Failed Critical Characteristics											
Critical Characteristic					Disposition						
Verify documentation for terminal rating for 600V ≥ 90°C											
3. Signature Indicates All Critical Characteristics Verified Satisfactory or Acceptably Dispositioned and Commercial Grade Dedication Is Satisfactory and Complete.											
Testing Agency Approval: _____					Design Authority: _____			Date _____			
Testing Agency QA Engineer: _____					QA Engineer: _____			Date _____			

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Title: **Diesel Generator Control Panel - Wiring, terminals****Section 6 Contacts / Phone Numbers**

Title	Name	Phone
Design Authority		
QA		
QC		
Cog - Engineer		
CGI Engineer	Carl van Katwijk	376-9385
Procurement Engineer		
Other		

Section 7 Supporting Documentation for This Checklist

Initial Procurement Documents		For Critical Characteristics
☐	Drawings:	
☐	Manuals (specify type & number):	
☐	Design Calculations	
☐	Installation Instructions	
☐	Operation Instructions	
☐	Calibration Instructions	
☐	Manufacturer's Recommended Spare Parts List	
X	Other: : Catalog Cut Sheets – Therm-O-Link Inc. Panduit Corp., Essex, Pass & Seymour	All
Procurement Documents		
☐	Certificate of Conformance/Compliance	
☐	Seismic Qualification Certificate	
☐	Environmental Qualification Certificate	
☐	Test Report (s):	
☐	Inspection Report (s):	
☐	CMTRs for ASME Pressure Retaining Materials	
☐	Valve Seat Leakage Report	
☐	Weld Records	
☐	Material Traceability Record	
☐	Other:	

5/17/00

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