MAY 31 1995
55 Sta.5

ENGINEERING DATA TRANSMITTAL

1. EDT 160184

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
PFP Design Engineering	PFP Facility Systems Engineering	N/A
5. Proj./Prog./Dept./Div.:	6. Cog. Engr.:	7. Purchase Order No.:
PFP	R. D. Keck	N/A
8. Originator Remarks: N/A		9. Equip./Component No.: RLY-UV1-12A to RLY-UV8-12A, F8X103, F8X105, F8X106, F8X107, F8X205, F8X206, F8X207, F8X211
		10. System/Bldg./Facility: 12/25/99B/234-5Z/PFP
11. Receiver Remarks:		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.:
		14. Required Response Date:

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1.	WHC-SD-CP-CR-036	N/A	0	PFP Supply Fan Motor Starters	SQ	2	1	

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 4. Review 2. Release 5. Post-Review 3. Information 6. Dist. (Receipt Acknow. Required)	1. Approved 4. Reviewed no/comment 2. Approved w/comment 5. Reviewed w/comment 3. Disapproved w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION
(See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature (M) MSIN	(L) Date	(J) Name	(K) Signature (M) MSIN	(L) Date	(G) Reason	(H) Disp.
2	1	Cog. Eng. JD Dick		5/30/95	T4-20	OSTI	L8-07		
2	1	Cog. Eng. RD Keck	RD Keck	5/30/95	T4-20	C.F	L8-04		
2	1	Cog. Mgr. GA Glover		5/30/95	T4-20				
2	2	QA D.R. Grodt		5-30-95	T4-15				
2	1	Safety		5-31-95	T3-01				
		Env.							

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
R. D. Keck 5/31/95 Signature of EDT Originator Date	S. B. Merrick 5/31/95 Authorized Representative for Receiving Organization Date	G. A. Glover Cognizant Manager Date	[] Approved [] Approved w/comments [] Disapproved w/comments

BD-7400-172-2 (04/94) GEF097

BD-7400-172-1 (07/91

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

RELEASE AUTHORIZATION

Document Number:	WHC-SD-CP-CR-036, REV 0
Document Title:	PFP SUPPLY FAN MOTOR STARTERS
Release Date:	5/31/95

This document was reviewed following the procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

Kara M. Broz — May 31, 1995

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

This report has been reproduced from the best available copy. Available in paper copy and microfiche. Printed in the United States of America. Available to the U.S. Department of Energy and its contractors from:

U.S. Department of Energy
Office of Scientific and Technical Information (OSTI)
P.O. Box 62
Oak Ridge, TN 37831
Telephone: (615) 576-8401

Available to the public from: U.S. Department of Commerce
National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
Telephone: (703) 487-4650

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED 85

MASTER

SUPPORTING DOCUMENT

1. Total Pages 12

2. Title	3. Number	4. Rev No.
PFP SUPPLY FAN MOTOR STARTERS	WHC-SD-CP-CR-036	0

5. Key Words	6. Author
PFP, VENTILATION, SEISMIC, MOTOR	Name: R. D. Keck Signature Organization/Charge Code 15510/K6083

7. Abstract

Criteria for installation of solid state, reduced voltage motor starters and isolation contactors for the eight (8) main ventilation supply fans in the 234-5Z Building. The isolation contactors will be interlocked with the seismic fan shutdown system accelerometers to shutdown the supply fans if a seismic event of sufficient magnitude occurs.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

8. RELEASE STAMP

OFFICIAL RELEASE
BY WHC
DATE MAY 31 1995
55 Sta. 5

PFP SUPPLY FAN MOTOR STARTERS

CONTENTS

PFP SUPPLY FAN MOTOR STARTERS

1.0 INTRODUCTION

1.1 Background

The Plutonium Finishing Plant (PFP) is currently stabilizing approximately 25 kilograms of chemically-reactive plutonium sludge. Upon completion of the sludge stabilization, PFP will be maintained in a safe standby condition to await the record of decision (ROD) from the PFP National Environmental Policy Act (NEPA) review, which has been initiated.

It can be reasonably assumed that it will take approximately ten years to initiate and complete terminal cleanout (TCO) activities after the ROD has been made. After completion of TCO activities, the facility will be decommissioned and decontaminated.

Until TCO activities are completed, the 234-5Z ventilation system must continue to operate. An integral element of the ventilation system is the seismic fan shutdown system which shuts down the ventilation supply fans if an earthquake of sufficient magnitude is detected. Operation of the seismic fan shutdown system is required by the PFP FSAR (WHC-SD-CP-SAR-021) and Technical Safety Requirements, WHC-SD-CP-OSR-010.

1.2 Scope

Install solid state, reduced voltage motor starters, power factor correction capacitors and isolation contactors for the eight (8) main ventilation supply fans in the 234-5Z Building. The isolation contactors shall be interlocked with the seismic fan shutdown system accelerometers.

1.3 Site Location

All equipment shall be located in the 234-5Z Building in the 200 West Area. The location of the motor starters in the 234-5Z Building shall be approved by the system 12, 25 and 99B Cognizant Engineers, PFP Operations and PFP Maintenance.

1.4 Project Interfaces

The motor starters must interface to the PFP distributed control system (DCS) for control. The PFP DCS is being installed under Project B-610.

2.0 PROJECT CRITERIA

2.1 Functional Requirement

Motor starters shall be provided for the eight 234-5Z main ventilation supply fan motors.

A safety class 1[1] isolation contactor shall be provided for each of the motor starters. The contactor shall be interlocked with the seismic fan shutdown accelerometers to open the contactor if a seismic event of sufficient magnitude occurs.

2.2 Performance Requirement

Motor starters (softstart) shall be provided for the eight main ventilation supply fan motors. Each starter installation shall include the following:

The motor starter shall have the capability to operate into an open circuit without damage in order to facilitate maintenance and

The motor starter shall be designed to start a 125Hp, NEMA B, electrical motor with a nameplate rating of 440 VAC or 460 VAC, three phase at full load amps and a 1.15 service factor.

Non-latching, isolation contactors shall be supplied for the eight ventilation supply fans. Each isolation contactor installation shall include the following:

The contactor shall be seismically-qualified to remove power from the ventilation supply fan during the seismic event defined in section 5.4. Equivalence of commercial equipment to meet these requirements may be demonstrated using data from reference 1. The contactors shall fail in the safe (open/off) position;

The interface to the safety class portion of the seismic fan shutdown shall be designed to insure that any failure of the control power, electrical conduit, or wiring causes the isolation contactor to be switched to the safe (open/off) position. If required, the existing failure modes and effects analysis (ref. 2) shall be updated.

The ventilation supply fans shall be switched to the safe (off) mode when either accelerometer in corridor 14 detects an earthquake or the manual shutdown switch in the ventilation control room is activated. If additional accelerometer-controlled relays are required, the new relays shall be seismically-qualified to operate during the seismic event defined in section 5.4.

The auxiliary contacts from isolation contactors shall replace contacts from the current supply fan circuit breakers in the outside warning light circuit for the seismic fan shutdown system.

Power factor correction capacitors shall be installed to correct motor power factor to between 0.95 lagging and 1.0 when the motor is operating at full rated load.

The interlocks between the seismic fan shutdown system and the existing switchgear circuits breakers shall be removed.

---

[1]Westinghouse Hanford Company safety class 1 is equivalent to Department of Energy Safety Class Equipment and IEEE class 1E.

2.3 Safety

The Seismic Fan Shutdown System is designated safety class 1. The current supply fan circuit breakers are included in the safety boundary. The system design description is presented in WHC-SD-CP-SDD-004 (ref. 3). The isolation contactors will replace the current circuit breakers in the safety boundary and will be designated safety class 1. Additional accelerometer controlled relays, if required, will be designated safety class 1. All other components will be designated safety class 3.

2.4 Operational Requirements

This task shall strive to minimize downtimes to the 100 and 200 buses during the installation of the motor starters.

No additional operating or maintenance personnel shall be required to support the new modifications or the system as a whole after project completion.

2.5 Maintenance Requirements

The equipment shall be designed to allow maintenance of the motor starter and/or the switchgear circuit breaker feeding the motor starter(s) without taking more than two supply fans out of service.

2.6 General Criteria

The equipment shall be designed and installed to permit easy system component access for maintenance, repair, and in-service inspection.

The electrical equipment must be designed to withstand the environmental conditions of the location in which they are installed. Inside equipment temperature conditions will range between 40°F to 90°F with a clean air environment.

The electrical equipment must be Underwriters Laboratories (UL) listed.

2.7 Mission Requirement

The upgrade to the supply fan motor starters will provide for reliable operation of the supply ventilation until the terminal cleanout of the facility is completed in about 2008.

3.0 PROCESS CRITERIA

The project replaces existing equipment and does not affect any process.

3.1 Instrumentation and Control (non process related)

Local and remote instrumentation and control shall be incorporated in the design.
Remote indication of status, monitoring of motor current and on/off control shall be provided by the PFP DCS. The remote on/off control shall replace

the control for the switchgear circuit breakers currently used to operate the supply fans. Local status indication and hand/off/auto control shall be provided in room 321 for each supply fan.

3.2 Piping and Vessels

There are no piping and vessels associated with this project.

3.3 General Process

This is not applicable to the equipment being modified.

3.4 General Mechanical Processes

This is not applicable to the equipment being modified.

4.0 FACILITY CRITERIA

4.1 Architectural and Civil/Structural

The only architectural and civil/structural modifications required those necessary to install the motor starters.

4.2 Heating, Ventilating, and Air Conditioning

There are no requirements to alter existing HVAC equipment other than replacement of the motor starters and necessary modifications to the electrical feeders.

4.3 Utilities

4.3.1 Steam

There is no requirement to alter the existing steam supply.

4.3.2 Water

There is no requirement to alter existing water supplies.

4.3.3 Sewage

There is no requirement to alter existing sewage utilities.

4.3.4 Electrical

4.3.4.1 General

The existing split of supply fan motor loads between the 100 and 200 buses shall be maintained.

4.3.5 Lighting

The only lighting modifications required are those necessary to allow installation of the motor starters and provide adequate lighting for maintenance of the motor starters.

4.4 Communications Systems

Power Operator page/intercom phone(s) shall be provided adjacent to the motor starters.

4.5 Automatic Data Processing

There is no requirement to alter existing automatic data processing equipment. Section 3.1 on instrumentation and control details interface requirements to the existing PFP DCS system.

4.6 Energy Conservation

General design guidelines for energy conservation in DOE 6430.1A, Sections 0110-12, 1595-10, and 1595-11 shall be applied to this design.

4.7 Maintenance

The additional equipment shall be designed for ease of maintenance. Requirements for specialized maintenance equipment shall be minimized wherever practical and cost effective. Maintenance and operating procedures shall be revised during the readiness review process to reflect the modifications to equipment that have taken place. The procedures revised shall include at least the following; ZSE-99B-001, ZSE-12A-001, and ZSE-12A-002.

5.0 GENERAL REQUIREMENTS

5.1 Safety

5.1.1 Criticality

No criticality potentials exist in this project scope.

5.1.2 Safety analysis

This change to the facility requires changes to the final safety analysis report (FSAR), WHC-SD-CP-SAR-021 (ref. 4) sections 4, 5, and 9, that describes the functional operation of the ventilation and seismic fan shutdown systems. The system design descriptions (ref. 3 and 5), operation safety requirements (ref. 6), and safety equipment list (ref. 7) for the ventilation and seismic fan shutdown system require updating for these changes.

5.1.3 Contamination control

Contamination control may be impacted by this task scope. Electrical feeders for some supply fans are routed through radiologically contaminated areas.

5.1.4 Shielding

No shielding is required by this task.

5.1.5 Industrial safety

Routine construction hazards will be minimized during installation and modification of equipment. These operations shall be conducted in compliance with applicable safety codes and regulations. Specific electrical safety standards shall be strictly followed during installation.

5.1.6 Fire Protection

No revision of existing fire protection system is included in the scope of this project.

5.1.7 Traffic safety

No traffic modifications are envisioned as part of this project.

5.2 Environmental Protection and Compliance

A NEPA Categorical Exclusion has been determined for this project.

5.3 Safeguards and Security

No safeguards and security requirements are included in the scope of this project.

5.4 Natural Forces

The natural forces requirements for safety class 1, isolation contactors and accelerometer-controlled relays shall be based on the acceleration time history for PFP presented in ref. 8. A safety class 3 over 1 analysis shall be completed for this task. Anchorage for other equipment and components shall be per safety class 3 guidelines.

5.5 Design Format

Two way traceability shall be maintained between existing and new drawings, including vendor supplied information (CVI) at all times. All drawings developed by or for WHC shall conform to WHC-CM-6-3, "Drafting Standards Manual". The project shall maintain plant baseline drawings as defined in the essential and support drawing list WHC-SD-CP-TI-125 latest revision (ref. 9).

5.6 Quality Assurance

Quality Assurance (QA) activities for Westinghouse Hanford Company activities shall be done in accordance with approved procedures. QA activities for other contractors involved in the design, procurement, construction, inspection, and testing of the task shall be formulated and executed in accordance with the specific Quality Assurance Plan (QAP). The QAP shall implement quality assurance programmatic requirements based upon DOE Order 5700.6C, "Quality Assurance". The QAP shall provide a format for establishing the scope of the quality related activities, and for establishing specific quality assurance requirements and responsibilities based upon assigned safety classifications.

5.7 Decontamination and Decommissioning

5.7.1 DOE Regulations

If required, specific decontamination and decommissioning design features that can be reflected in the design are listed in DOE 6430.1A, Section 0205, Section 1300-11.2, and the appropriate "additional requirements" sub-sections of section 1300.

5.8 Operating Personnel and Services

This project requires outages of the 100 and 200/300/400 buses of the 234-5Z Building electrical system.

5.9 Testing

An acceptance test procedure (ATP) shall be performed on this project to verify functional requirements are met. An operational test procedure (OTP) shall be performed by the plant under expense funds to verify operational readiness of the installed equipment.

6.0 CODES AND STANDARDS

In general, applicable Occupational Safety and Health Act standards, and the "national consensus" codes and standards as developed by such organizations as the American Society of Mechanical Engineers, and the American National Standards Institute shall be used. The overall governing document for design will be DOE Order 6430.1A. A partial, but not limiting, list of codes and standards for this task is given below:

6.1 American National Standards Institute

ANSI C2, (93), "National Electrical Safety Code (NESC)."

6.2 Instrument Society of America

ISA S5.1, (84), "Instrumentation Symbols and Identification."

6.3 National Fire Protection Association

NFPA-70, (93), "National Electric Code."

6.4 National Electrical Manufacturers Association

NEMA ICS-2, (93), "Industrial Controls and Systems."

6.5 Institute of Electrical and Electronic Engineers (IEEE)

ANSI/IEEE std 323-1984, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations."

ANSI/IEEE std 344-1987, "IEEE Recommended Practices for Seismic Qualifications of Class 1E Equipment for Nuclear Power Generating Stations."

6.6 U.S. Department of Energy

DOE 5700.6C, (91), "Quality Assurance."

DOE 6430.1A, (89), "General Design Criteria."

RLIP 4700.1A, (91), "Project Management System."

RLIP 5480.10, (90), "Industrial Hygiene Program."

6.7 Washington State

WAC 296-46, (93), "Washington Administrative Code for Electrical Inspection."

7.0 REFERENCES

1. Department of Energy Workshop on Walkdown Field Guide and SQUG/EPRI Seismic Evaluation Material, Volume 1 through 7.

2. WHC-SD-C053-RPT-001, Rev. 0, Letter Report, Seismic Shutdown System Failure Mode and Effect Analysis, K. J. Kubinski, Westinghouse Hanford Company, Richland, Washington.

3. WHC-SD-CP-SDD-004, Rev. 1, Definition and Means of Maintaining the Supply Ventilation System Seismic Shutdown Portion of the PFP Safety Envelope, R. L. Martinson, Westinghouse Hanford Company, Richland, Washington.

4. WHC-SD-CP-SAR-021, Rev. 0, May 1995, Plutonium Finishing Plant Safety Analysis Report, Westinghouse Hanford Company, Richland, Washington.

5. WHC-SD-CP-SDD-005, Rev. 1, Definition and Means of Maintaining the Ventilation System Confinement Portion of the PFP Safety Envelope, J. D. Dick, Westinghouse Hanford Company, Richland, Washington.

6. WHC-SD-CP-OSR-010, Rev 0, May 1994, PFP Operational Safety Requirements, Westinghouse Hanford Company, Richland, Washington.

7. WHC-SD-CP-TI-108, Rev. 14, January 26, 1995, Plutonium Finishing Plant Safety Systems and Equipment List, G. G. Bergquist, Westinghouse Hanford Company, Richland, Washington.

8. Blume, 1987, Seismic (SSE) Evaluation for the 234-5Z Building at the Hanford Site, Addendum 2, Rev. 1, URS/John A. Blume and Associates, Engineers, San Francisco, California, December 1987.

9. WHC-SD-CP-TI-125, Rev. 9, March 10, 1994, PFP Essential and Support Drawing List, R. J. Thomas, Westinghouse Hanford Company, Richland, Washington.