AUG 20 1996
Sta. 4 58

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 617999

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Characterization Project Operations (75100)	Characterization Equipment Design (75230)	N/A
5. Proj./Prog./Dept./Div.:	6. Cog. Engr.:	7. Purchase Order No.:
Core Sampling / FGWL Tanks	R. R. Bafus	N/A

8. Originator Remarks:

ETN-96-003
This report documents the completion of the formal design review for the RMCS (Rotary Mode Core Sampling) Flammable Gas Detector Interlock. This hydrogen/flammable gas interlock, a proposed addition to the RMCS system portable exhauster, is intended to support core sampling operations in waste tanks requiring flammable gas controls.

9. Equip./Component No.: N/A

10. System/Bldg./Facility: 200 General

11. Receiver Remarks:

12. Major Assm. Dwg. No.: N/A

13. Permit/Permit Application No.: N/A

14. Required Response Date: 7/31/96

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 Desig-nator	(G) Reason for Trans-mittal	(H) Origi-nator Dispo-sition	(I) Receiv-er Dispo-sition
1	WHC-SD-WM-DRR-051	ALL	0	FINAL DESIGN REVIEW REPORT for the RMCS FLAMMABLE GAS DETECTOR INTERLOCK	SQ	1	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	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
1	1	Cog.Eng: RR BAFUS			S7-12	DD TATE		8/13/96	B6-37	1	1
1	1	Cog. Mgr: DW HAMILTON			S7-12	GF VARGO JR		8/9/96	H5-09	1	1
1	1	QA: ML MCELROY		8/9/96	S7-07	GA BARNES		8/8/96	H5-09	1	1
1	1	Safety: OM JAKA		8/9/96	R3-08	JA HARVEY		8/7/96	S7-07	1	1
1	1	Env: KS TOLLEFSON		8/7/96	S7-07	JS LEE	FOR JS LEE	8/9/96	S7-03	1	1
1	1	Design Engr: JD ROBINSON		8/9/96	S7-12	RE MERRIMAN		8/9/96	E6-27	1	1
1	1	Design Auth: RJ BLANCHARD		8/9/96	S7-12	NJ MILLIKEN		8/8/96	A3-37	1	1

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
JE CORBETT (Originator)	JG BURTON	DW HAMILTON	[ ] Approved [ ] Approved w/comments [ ] Disapproved w/comments
Signature of EDT Originator — Date: 8/9/96	Authorized Representative for Receiving Organization — Date: 8/19/96	Cognizant Manager — Date: 8/7/96	

BD-7400-172-1

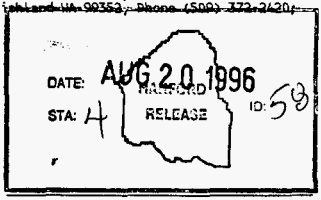
FINAL DESIGN REVIEW REPORT for the RMCS FLAMMABLE GAS DETECTOR INTERLOCK

J. E. Corbett
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: 617999 UC: 2030
Org Code: W75230 Charge Code: N4HBB
B&R Code: 35EW31207 Total Pages: 37

Key Words: Exhauster, Flammable Gas Detector, FGD, Hydrogen Interlock, Core Sampling, Flammable Gas Watch List, Rotary Mode Core Sampling, RMCS, Core Sample Truck, Preliminary Design Review, 100% Design Review, Design Review Report

Abstract: This report documents the completion of the formal design review for the RMCS (Rotary Mode Core Sampling) flammable gas detector interlock. This hydrogen/flammable gas interlock, a proposed addition to the RMCS system portable exhauster, is intended to support core sampling operations in waste tanks requiring flammable gas controls. The objective of this review was to approve new drawings at the 100% design completion state. The conclusion reached by the review committee was that the design was acceptable and efforts should continue toward fabrication and delivery.



Release Approval 8/20/96
Release Stamp Date

Approved for Public Release

FINAL DESIGN REVIEW REPORT

for the

RMCS FLAMMABLE GAS DETECTOR INTERLOCK

Issued by:

J. E. Corbett, Senior Engineer

Tank Waste Remediation System
Characterization Project

July 1996

TABLE OF CONTENTS

ACRONYMS

ATP	acceptance test procedure
CED	Characterization Equipment Design
CFR	Code of Federal Regulations
CPO	Characterization Project Operations
DRR	design review report
ECN	engineering change order
EP	Engineering Practices
FDC	functional design criteria
FGD	flammable gas detector
FGWL	flammable gas watch list
HEPA	high efficiency particulate air (filter)
OTP	operability test procedure
ppm	parts per million
RCR	review comment record
RMCS	rotary mode core sampling
SMC	Sierra Monitor Corporation
WHC	Westinghouse Hanford Company

RMCS Flammable Gas Detector Interlock, Final Design Review

1.0 SCOPE

This report documents the completion of the formal design review for the RMCS (Rotary Mode Core Sampling) Flammable Gas Detector Interlock. During the preliminary design stage of this equipment, the detection capability was limited to hydrogen, and was therefore referred to as the Hydrogen Interlock. Because the interlock was initially associated only with the RMCS exhauster, it is also referred to as the Exhauster Interlock or the Flammable Gas Tank Exhauster Interlock. The approved safety assessment (WHC-SD-WM-SAD-035) refers to this equipment as the flammable gas detector (FGD) or the flammable gas detection system. For the purposes of clarity and brevity, this report will hereafter refer to the system as the "FGD interlock."

The FGD interlock design review included preliminary and final review of new drawings, considered to be at the 100% design completion state. These drawings are listed in section 6.0. This document and the formal design review are in support of design modifications to the core sampling systems used by Characterization Project Operations (CPO). These modifications, including the addition of the FGD Interlock, are required to expand the scope of core sampling to include Flammable Gas Watchlist (FGWL) tanks, as well as any other tanks with flammable gas controls. The objective of this review was to provide a formal design verification consisting of a systematic overall review and evaluation of the FGD Interlock. Design verification is performed to insure equipment function, personnel safety, and compliance with WHC-CM-6-1, *Standard Engineering Practices*, section 2.2.4, and the quality assurance requirements of 10 CFR 830.120. Acceptance of the design is required prior to operational use on any waste tanks requiring flammable gas controls. RMCS exhauster and core sample truck modifications are evaluated in separate design reviews and are not part of this report.

2.0 BACKGROUND

The Rotary Mode Core Sampling (RMCS) systems were designed for initial deployment to FeCN tanks, with later modifications intended to allow for deployment to Flammable Gas Watch List (FGWL) tanks. These modifications include the addition of flammable gas detection and automatic shutdown features, using equipment designed for use in flammable atmospheres. A functional design criteria (WHC-SD-WM-FDC-045) was used to establish the basis criteria for the FGD Interlock.

3.0 SUMMARY

The design review committee was selected in accordance with EP 4.1 and is documented in Section 11.0 of this report. A preliminary design review was performed at the 50% level. This portion of the formal design review was completed on January 4th, 1996, and is documented in WHC-SD-WM-DRR-050.

The kickoff meeting for the 100% level design review was held on January 10th, 1996. This meeting served as the first of two final design review briefings. Updated design information, including the draft software design description (WHC-SD-WM-CSSD-019) and the design drawings, was provided at this briefing. The second final design review briefing was held on February 28th, where the new spool piece design, incorporating combustible gas detection, was described. Meeting minutes for these briefings are attachments to Section 11.0 of this report.

The final design review close-out meeting was delayed in order to accommodated changes made to the SA, WHC-SD-WM-SAD-035, *A Safety Assessment of Rotary Mode Core Sampling in Flammable Gas Single Shell Tanks*, and to complete key development testing. The meeting was held on June 6th. Of the four review comment records (RCR's) submitted for the final design review, three were closed out prior to the meeting, and the last one was closed out immediately after the meeting. For a complete listing of RCR's, see section 9.0 of this report. A listing of open items can be found in section 10.0. The design drawings were essentially complete. Incorporation of redlines and drawing check will be accomplished prior to release. A final drawing review will be performed by the design review committee, and is listed as an open action item in Section 10.0 of this report. Meeting minutes for the close-out meetings, and the completed design review checklist, are attachments to Section 11.0 of this report.

After the completion of the close-out meetings, the conclusion reached by the review committee was that the design of the FGD Interlock was acceptable and efforts should continue toward fabrication and delivery.

4.0 DESIGN DESCRIPTION

The FGD Interlock consists of four primary components: a spool piece with gas sensors to obtain gas samples from the exhaust stream; two identical, separate, electronic packages mounted on wheeled carts; and a power distribution skid with redundant shut-off contractors. The system is powered by the same source as the exhauster, through the RMCS electrical power distribution trailer. The flexible duct from the waste tank is attached to the spool piece which is bolted directed to the exhauster heater. The ventilation stream passes through the spool piece and into the exhauster. Attached to the spool piece are two separate flammable gas sensors; a Whittaker hydrogen detector cell and a Sierra Monitor Corporation (SMC) combustible gas detector.

The purpose of the gas sensors on the spool piece is to provide safety shutdown signals for both flammability and toxic hazards during core sampling operations. Upon detection of out-of-tolerance conditions, the interlock will alarm and initiate a shutdown of the RMCS drill rig.

The Whittaker Cell, an electrochemical cell with a membrane placed between the sample gas and the active element, is very selective for hydrogen and responds directly to the partial pressure of hydrogen on the other side of the membrane. Significant experience with Whittaker has shown them to be stable and reliable in the tank farm environment.

The SMC combustible gas sensor uses a catalyst to "burn" the gas and detects the resulting heat release. To increase sensitivity and decrease drift, the heat detection is done by comparing the temperature of a reference (uncatalyzed bead) to that of a signal (catalyzed) bead. The beads are imbedded in a sintered metal housing which prevents the combustion energy from igniting a flammable mixture. It has the advantage of responding to both ammonia and hydrogen. The SMC detector has not been used extensively in the tank farm environment.

Sample flow to each instrument is provided by a pressure differential within the spool piece--no sample pumps are used. Signals from the flammable gas instruments are processed by redundant programmable logic controllers. If flammable gas concentrations exceed 5000 ppm, the rate of change in flammable gas concentrations greater than 100 ppm/sec for 10 seconds, or the tank pressure increased more than two inches water gage in six minutes, the exhauster will remain operational and the truck will be shut down. The exhauster internal shutdown alarms (low and high flow, and HEPA filter differential pressure) are unaffected by the FGD Interlock.

If FGD Interlock power is lost, or tank pressure falls to less than -3 inches water gauge, electric power to the exhauster is terminated. Exhauster shutdown will automatically result in core sampling drill truck shutdown via the existing connection.

Further details and controls are described in the SA.

5.0 DEVELOPMENT CONTROL

The drawing configuration control methodology for the design and fabrication of the FGD Interlock is described in the JD Robinson memo attached to section 11.0 of this report. The configuration control method chosen follows the requirements of EP-2.4, *Development Control Requirements* as contained in WHC-CM-6-1, Standard Engineering Practices. In response to an action item assigned during the design review briefing, the engineering task plan, WHC-SD-WM-ETP-165, was changed to include the configuration management requirements.

6.0 LISTING OF REVIEW MATERIALS

The following new drawings were reviewed and approved for fabrication, per the above development control requirements, as part of the formal design review:

DRAWING #	TITLE
DWG-100519	FLAMMABLE GAS TANK EXHAUSTER INTERLOCK ELEM DIAGRAM (2205)
DWG-100520	FLAMMABLE GAS TANK EXHAUSTER INTERLOCK ELEM DIAGRAM (2206)
DWG-100521	FLAMMABLE GAS TANK EXHAUSTER INTERLOCK CART'S 2205 / 2206 ASSY'S
DWG-100522	FLAMMABLE GAS TANK EXH. CABLE ARRANGMENT AND ASSEMBLIES
DWG-100523	SAMPLER SPOOL INSTALLATION
DWG-100524	SAMPLER SPOOL ASSEMBLY
DWG-100530	FLAMMABLE GAS TANK EXHAUSTER INTERLOCK PWR DISTRIBUTION DIAG
DWG-100531	INTERCONNECTION DIAGRAM EXHAUSTER CART 2205
DWG-100532	INTERCONNECTION DIAGRAM EXHAUSTER CART 2206

7.0 SA COMPLIANCE MATRIX

The table on the following page was used as a tool for determining which safety requirements from the SA (WHC-SD-WM-SAD-035) are design criteria for the design modifications being made to RMCS equipment. Each credited design safety feature listed in the SA is shown on the left side of the table. The corresponding implementing document(s), shown on the right side of the table, is generally the ECN or new drawing which incorporates the safety feature into the RMCS design for flammable gas tanks. In many cases, where the implementing document is shown as "existing," the design feature was incorporated in the existing design for the RMCS system, and no modification was required. The FGD Interlock is listed as item #45, and is incorporated into the RMCS system by the installation drawing H-14-100523. The remaining items in the table apply to components of the RMCS system, and are not applicable to this design review.

SAFETY ASSESSMENT COMPLIANCE MATRIX

#	CHAPTER 6 - SAFETY FEATURES	IMPLEMENTING DOCUMENT
1	Material compatibility (On-site)	ECN 631116, 631126, H-2-690142, memo 75230-96-001, rev. 2
2	Spark-resistant tools (NA)	Administrative Control (Procedure)
3	Grounding and bonding (NA)	ECN 626742 and approved grounding procedure
4	Radiological controls (NA)	Existing - Exhauster housing <100mR on contact
5	Riser sleeve (Off-site)	ECN 628706 (H-2-690128, H-2-690131)
6	Drill string spray washer (NA)	Existing
7	Frisbee/DS interface lubricant (NA)	Existing
8	Pneumatic foot clamp (Off-site)	In work
9	Drill bit configuration & mat'l (Off-site)	Existing - certified by USBM testing
10	Drill centering spike (NA)	Existing
11	Chevron seal between drill bit & sampler (NA)	Existing
12	Core sampler and drill string components (Off-site)	# TBD
13	Sniffing ports (NA)	Existing (H-2-826513)
14	Change-out assembly (NA)	Existing
15	Cable spray washer (NA)	Existing
16	Purge flow limitation (Off-site)	Existing
17	Original speed limitation (Off-site)	Existing
18	Downforce limitation (Off-site)	Existing
19	Drill string penetration rate (Off-site)	ECN 626740
20	Hydraulic bottom detector (Off-site)	Existing
21	Walkdown function (Off-site)	Existing
22	Hydrostatic head (NA)	Existing
23	Truck position (Off-site)	Existing
24	Stabilizing jacks (NA)	Existing
25	Quill rod adapter (Off-site)	ECN 631126
26	Grapple hoist assembly (Off-site)	ECN 628712, 626742
27	Grapple (sample actuator) (Off-site)	Existing
28	Grapple insertion (NA)	Existing
29	Grapple hoist cable tension (NA)	Existing
30	Shielded receiver assembly (Off-site)	ECN 626742, 628707, 628713
31	SR tube (NA)	Existing
32	SR view port (NA)	Existing
33	SR hoist cable tension (NA)	Existing
34	Remote latch unit (Off-site)	H-2-690142, ECN 628708, 628711, 628714, 628715
35	RLU insertion (NA)	Existing
36	RLU position indicator (NA)	Existing
37	Exhauster Operation (Off-site)	ECN 632390
38	Exhauster intrinsic safety (Off-site)	ECN 628744
39	Exhauster PLC	ECN 632390
40	Exhauster duct (Off-site)	ECN 628744
41	Exhauster heater (Off-site)	H-14-100739
42	Exhauster fan and motor assembly (Off-site)	ECN 628744
43	Inlet breather stack (Off-site)	H-14-100742
44	Tank pressure detection (Off-site)	Existing, and H-14-100521
45	Flammable gas detector (Off-site)	H-14-100523
46	X-ray containment (NA)	VI File, Internal memo 75230-96-006
47	DS nitrogen purge supply (Off-site)	Existing
48	Nitrogen hydrostatic head supply (NA)	Existing
49	Riser sleeve nitrogen purge supply (NA)	H-2-690128, ECN 628706, ECN 626741
50	Unique connections (NA)	H-2-690128, ECN 630017
51	Truck PLC (Off-site)	ECN 623775
52	Audible and visual annunciation (NA)	ECN 623775
53	Shutdown interlock (Off-site)	Existing

8.0 DESIGN REVIEW CHECKLIST

Formal design reviews, as described in WHC-CM-6-1, Standard Engineering Practices, are required to use a design review checklist that has been customized for the review. The checklist developed by the design review committee for this review is listed as an attachment to section 11.0 of this report. The checklist was satisfactorily completed, and all open items from the checklist are discussed in section 10.0 of this report.

9.0 REVIEW COMMENT RECORDS

The following table is a listing of all RCR's received during the design review. All RCR's were dispositioned and signed off as closed. A copy of each dispositioned RCR is included as an attachment to Section 11.0 of this report.

RCR STATUS 6/6/96 (COB)

Final Design Review, FGD Interlock

REVIEWER/DATE/NUMBER	RESP. ENGINEER	RCR STATUS
Krugsrud/0122/1	George Vargo	Closed 4/24/96
Merriman/0130/1	George Vargo	Closed 6/6/96
Martell/0312/1	Jim Robinson	Closed 3/12/96
Krugsrud/0312/1	Jim Robinson	Closed 4/24/96

10.0 CONCLUSIONS AND OPEN ITEMS

With the approval of this report, the formal design review for the FGD Interlock is completed. The following open items were noted during the design review. These items are scheduled to be completed as part of the normal course of business and are not action items for the design review committee. Therefore, these items are NOT considered to be "open action items" as described in WHC-CM-6-1, EP-4.1, paragraph 2.3.3.2, "Documentation of Action Item Completion."

OPEN ITEM: ATP/OTP testing to demonstrate requirements/operability

OPEN ITEM: operation and maintenance procedures revised to reflect modifications

The following action items were noted during the design review. These "open action items" will be closed in accordance with the requirements described in WHC-CM-6-1, EP-4.1

ACTION ITEM: Release of design drawings (listed in section 6.0); assigned to CED.

The conclusion reached by the design review committee is that the design of the FGD Interlock is acceptable. There are no further action items for the review committee.

11.0 DOCUMENTATION

The following items are provided as attachments to this report:

1. Listing of design review committee members
2. Design Review Checklist
3. Copies of RCR's
4. Meeting Minutes (includes JD Robinson memo of 1/15/96)

Review copies of all drawings provided to committee members for final review are available in the design review file. All released documentation referenced in the report will be available using the controlled document number located in the text where the document is cited.

ATTACHMENT 1

Design Review Committee Members

NOTE:
This attachment established the review committee during the prliminary design review. Changes made during the final review are documented in the meeting minutes (Attachment 4).

Westinghouse Hanford Company — Internal Memo

From: Characterization Equipment Design — 75230-95-030
Phone: 373-1248 S7-12
Date: October 2, 1995
Subject: CHARACTERIZATION PROGRAM-- FORMAL DESIGN REVIEW BRIEFING FOR THE HYDROGEN INTERLOCK, ROTARY MODE CORE SAMPLING SYSTEM PORTABLE EXHAUSTER

To: Distribution

cc:

G. A. Barnes	H5-09	M. L. McElroy	S7-07
R. J. Blanchard	S7-12	R. E. Merriman	E6-27
L. E. Borneman	R1-52	N. J. Milliken	H4-65
J. E. Corbett	S7-12	R. E. Raymond	S7-12
D. W. Hamilton	S7-12	J. D. Robinson	S7-12
J. A. Harvey	S7-07	J. S. Schofield	S7-12
M. E. Huda	S7-07	E. K. Straalsund	L6-37
L. S. Krogsrud	R3-08	G. F. Vargo Jr	H5-09
J. S. Lee	S7-08	E. J. Waldo	S7-12
		RJB: File LB	

A design review briefing meeting for the Hydrogen Interlock - Rotary Mode Core Sampling System Portable Exhauster will be held on October 4, 1995 (Wednesday), starting at 1:00 p.m. at the 2750E building, room A229. This meeting will initiate the formal design review for the Hydrogen Interlock 50% design review state. The Design Review Committee will receive a design review package, Review Comment Record forms (RCR), and the review checklist to record their comments prior to the subsequent design review meeting. The RCR forms either hard copy or electronic mail forms are to be returned, with comment, to John Corbett or Jim Robinson by October 12, 1995, for compilation and resolution prior to the design review meeting.

The design review meeting is to be held October 17, 1995, at 2750E, room A229. At this meeting each reviewers comments will be discussed to determine if they have been resolved to the reviewer's satisfaction and/or if additional action is required.

The purpose of this review is to determine the technical adequacy of the design based on the Functional Design Requirements document, WHC-SD-WM-FDC-045, Revision 0.

The Design Review Committee members and their primary areas of responsibility are listed below. The chairman was selected by the Characterization Equipment Design Manager, D. W. Hamilton. The committee members were selected by the manager Characterization Equipment Design and approved by the chairman.

Distribution
Page 2
October 2, 1995

75230-95-030

DESIGN REVIEW COMMITTEE

R. J. (Roy) Blanchard	Design Review Chairman
J. E. (John) Corbett	Design Review Secretary
G. A. (Geoff) Barnes	Mechanical Engineering
L. E. (Lucinda) Bornemann	Environmental Engineering
J. A. (Jerry) Harvey	Industrial Safety
M. E. (Huda) Huda (ALTERNATE)	Industrial Safety
L. S. (Steve) Krogsrud	Nuclear Engineering
J. S. (Jim) Lee	Characterization Operations/Facilities
M. L. (Mike) McElroy	Quality Assurance
R. E. (Ray) Merriman	Electrical Engineering
N. J. (Nancy) Milliken	Safety Analysis
J. D. (Jim) Robinson	Cognizant Design Engineer
E. K. (Eric) Straalsund	Electrical Instrumentation
G. F. (George) Vargo Jr.	Cognizant Electrical Design Engineer
E. J. (Eric) Waldo	Interfacing System/Customer Rep. Design

R. J. Blanchard, Senior Principal Engineer
Design Review Chairman
Characterization Equipment Design

Concurrence: D. W. Hamilton, Manager
Characterization Equipment Design

tla

ATTACHMENT 2

Design Review Checklist

FORMAL DESIGN REVIEW CHECKLIST
RMCS Hydrogen Interlock Exhauster

Document(s) Reviewed: Drawings #100519-100524 and 100530-100532
Software Design Description (1/8/96 Draft)
WHC-SD-WM-DRR-050

Item	Review Consideration	Yes	No	NA	Remarks
1	Have assumptions necessary to perform the design task been adequately described and are they reasonable? Where necessary, have assumptions been identified for reverification when the design task has been completed?	X			
2	Have the appropriate Quality Assurance requirements been specified?	X			
3	Were sources of information identified?	X			
4	Does the design meet the established requirements or design criteria?	X			Will be demonstrated in ATP
5	Does the design meet established requirements for associated system physical and functional interfaces?	X			
6	Have the interface requirements with site construction drawings been clearly specified and are they achievable?	X			
7	Are there any interface problems?		X		
8	Has appropriate consideration been given to use of standardized parts, materials and processes, and have engineering standards and criteria been specified properly in the design?	X			
9	Does the design represent the simplest design consistent with functional requirements and expected service conditions?	X			
10	Can the equipment be readily assembled/disassembled as designed?	X			
11	Does the design minimize overall cost to the extent practicable?	X			
12	Has the cost estimate been verified by an independent reviewer?			X	Not required
13	Are the specified materials compatible with each other and the environmental conditions to which the material will be exposed?	X			
14	Are the applicable codes, standards and requirements, including revisions, properly identified and are their design requirements provided for?	X			
15	Have modifications to commercial grade items and any associated verification operations or tests been appropriately documented?	X			
16	Have qualified and certified parts been specified?	X			
17	Have available data on similar designs been used?			X	No similar designs used

18	Does the design meet functional requirements? a. Stresses are within design limits? b. Derating is used? c. Steady-state and transient conditions? d. Have actual and "worst case" condition stresses been considered rather than nominal average stresses?	X			
19	Will the design meet the following environmental conditions? a. Temperature (steady-state and transient) b. Flow (steady-state and transient) including induced vibration c. Pressure (steady-state and transient) d. Seismic/natural phenomena e. Nuclear radiation	X			NOTE: performance demonstrated in ATP-HEIF-0001 (there are no seismic requirements)
20	Is the design producible by conventional means?	X			
21	Do manufacturing, processing, and fabrication procedures minimize stress corrosion and fatigue?	X			
22	Are the specified construction materials resistant to the following as applicable: a. Moisture b. Oxygen c. Acids d. Salts e. Radiation	X			
23	Do the clearances and tolerances take into account the effects of age and wear?	X			
24	Are mechanical tolerances within the limits of normal shop practice?	X			
25	Are assembly clearances adequate?	X			
26	Have allowable leakages been specified?		X		None critical to design
27	Have non-corrosive materials been used where required?	X			
28	Does the design avoid any materials unproven for use in the anticipated environment?	X			
29	Can the assembly be stored for extended periods of time without degrading effects?	X			
30	Has the design appropriately considered maintenance, operation and reliability, including maintenance procedures and techniques, unique maintenance requirements and frequencies?	X			

31	Are coatings (or finishes) compatible with the expected environment? With expected usage?	X			
32	Are surface finish requirements the least stringent possible?	X			
33	Are required tolerances, fabrication techniques, processes, etc., consistent with standard practices?	-	-	-	OPEN, pending drawing approval for release
34	Can the design and its parts be easily inspected for conformance to engineering specifications?	X			
35	Has adequate accessibility been provided for in-service inspection?	X			
36	Does the design meet all established safety requirements?	X			
37	Has an acceptable level of radiation exposure been defined?			X	
38	Have personnel radiation protection requirements been considered and identified?	X			
39	Have nuclear criticality safety considerations been incorporated?			X	
40	Have necessary features been provided to maintain personnel radiation exposure as low as reasonably achievable?	X			
41	Can the hardware be adequately disposed of after use if it is radiologically or chemically contaminated?	X			
42	Have requirements for storing the equipment item been defined?		X		Equipment is designed for outdoor use, storage requirements to be defined by CED during procedure development
43	Have adequate acceptance criteria been specified and are the verification methods stated appropriately?	X			Ref. ATP-HEIF-0001
44	N/A				
45	Have welding, bolting, joining methods been adequately specified?	X			
46	N/A				
47	Have NDE methods been applied correctly?	X			NDE not required
48	Will a separate Acceptance Test Spec/Procedure be required? - If yes, identify responsible organization(s) for preparation and issue (TBD if unknown)	X			ATP prepared by Merrick, approved by CED
49	Have human factors engineering and operability been considered?	X			
50	Is an Operation and Maintenance Manual required? If so, have requirements been clearly identified?	X			Provided by vendor
51	Are current operating documents (procedures, specifications, etc.) applicable to the design or are changes necessary?		X		To be provided by CFE

52	Does the design use engineered safety and operational protections to avoid an excessive risk-taking dependence on administrative infallibility?	X			
53	Are reliability requirements specified? If so, does the reliability analysis of the design meet the specified reliability requirements?	X			Ref. SA and Merrick report #MLC-003
54	Have all credible non-standard conditions been properly considered?	X			Ref. SA
55	Is the equipment, system, or facility operable?		X		Equipment will not be fully operational until OTP
56	Is the equipment design adequate to implement the proposed maintenance philosophy?		X		Maintenance philosophy to be addressed during development of maintenance procedures
57	If any development work is needed, has it been funded or performed?	X			
58	Has drawing traceability been provided?	X			
59	Has the need for safety analysis of this design been determined by Safety?	X			
60	Is the equipment, system, or facility covered by an existing Safety Analysis Report? If not, complete the safety analysis in time to incorporate findings of the analyzed in the design.	X			
61	Does the design match the intended (and possible abnormal) methods of operation of the system or facility?	X			
62	N/A				
63	Is a single point failure analysis required?	X			
64	Are all indication lights and electrical control considered fail-safe?	X			
65	Do the design media, format, content, reproducibility, and quality comply with all applicable requirements (including Hanford Plant Standards and referenced codes and standards)? Are the drawings structured to meet the needs of users after project completion?	-	-	-	OPEN, pending drawing approval for release
66	Have availability of power requirements for the project been verified?	X			
67	Have requirements for providing as-built drawings been specified?	X			
68	Is the design in compliance with applicable regulatory requirements and/or WHC regulatory commitments?	X			
69	Are design tolerances appropriate and applied in a cost-effective manner and are standard materials and material sizes used where practicable?	X			
70	Is all computer software and data properly identified and controlled?	X			

ATTACHMENT 3

Copies of RCR's

REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
January 22, 1996	29-96
3. Project No.	4. Page
	1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Flammable Gas Tank Exhauster Interlock / DWG-100519 and 520	Tank Farms	L.S. Krogsrud	TWRS / NSS	2751 / 372-2302

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

24 April 96 — Date
L S Krogsrud — Reviewer/Point of Contact

Author/Originator

11. CLOSED

24 April 96 — Date
L S Krogsrud — Reviewer/Point of Contact

Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1.	On sheet 2 of 3 there is a problem with the wires which run from F6 to A6. The top of the right-most wire says 120v, and at the bottom the same wire says 24v. Also when going from zone A7 to F3, three wires suddenly become four. Recommend following these wires on all 3 sheets to make sure they start and stop at the right places and that they are labeled correctly.		Accept	C
2	On page 7 (section 4.2.1) Flammable Gas Tank Exhauster Interlock Software Design Description, it refers to contact TK1. I couldn't find TK1 on the drawings.		Accept	C

REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
01-30-96	3 (100%)
3. Project No.	**4. Page**
HYDROGEN INTERLOCK	1 of 6

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
DWG's 100519-100532	CORE SAMPLING/FGWL TANKS	R. E. MERRIMAN	ELECTRICAL ENGINEERING	1200 JADWIN/372-0514

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

G.F. Vargo Jr
Reviewer/Point of Contact

2-8-96
Date

R.E. Merriman
Author/Originator

11. CLOSED

G.F. Vargo Jr
Reviewer/Point of Contact

2-8-96
Date

R.E. Merriman
Author/Originator

REM 4/6/96

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
	Dwg - 100519 SH1			
1	ZN F-7, Change 240 VAC to 120/240 VAC.		Changed to 120/240	
2	ZN E-7, 2-Pole Disc. SW shown as 3-Pole on Dwg H-14-100531 SH 3?		Shown as 3P	
3	ZN D-6, A/C has two sources of power. No term. for compressor?		Field to hardwire across compressor	
4	ZN D-6, Cabinet heater has "internal" thermostat, not shown.		Will show thermostat in primary (thermostatically controlled)	
5	ZN C-7, Relay contact K2 5-7 should be 6-7.		Contact 5 changed to 6	
6	ZN B-7, CB-5 should be CB-6.		CB-5 changed to CB-6	
7	ZN F-4, Pwr CND-1, 4 recpt. not shown for clarity.		4 recpt's not shown for clarity	
8	ZN E-F-4, Relay contacts ladder rung not ref. correct, 30 & 31.		ZN E-F 4, 31 changed to 30, 31	
9	ZN E-4, Switch terminals not numbered, VTP-HS-2225 and others.		Switch contacts will be numbered	
10	ZN A-D-4, Meter shields not connected properly.		Shields will float at meters, terminated at other end	
11	ZN A-D-4, Signals need to be referenced is sheet #3.		Sheet 3 will be referenced in ZN A-D-4	

REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
01-30-96	3 (100%)
3. Project No.	**4. Page**
HYDROGEN INTERLOCK	2 of 6

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
12	ZN C-3, Signal wires reversed 2101, 2102 & 2401, 2402, Ref. 100531 SH 1.		Z101 & Z102 also 2401 and 2402 will be reversed.	
13	ZN B-4, At FU6 label wire 2801 (Ref. 100531, SH 1) not 2601.		FU6 should go to 2801, not 2601	
	SHEET 2			
14	ZN B-F-4, Remove wire "+24VDC".		Wire +24VDC removed	
15	ZN F-8, Extend at FU7 wire 3101 to Sheet 3. Device PLC (Slot 9) Term 1 change at Dwg. H-14-100531.		Wire 3101 extended to sheet 3	
16	ZN C-3, change "spare" to "space" output #20 & #21.		Outputs 20 & 21 are spare	
	SHEET 3			
17	ZN F-3 & D-3, clear text at module Term 11.		Term 11 clarified	
18	ZN B-3, Does VTP-PS-2205 need a power ground?		Ground added	
19	ZN A-3, Wires 9801 and 9802 Ref. J8A connector and Dwg. to go to H-14-100531, Sh. 3, ZN E6.		Connector J8A referenced w/dwg # and sh #	
	DWG-100520 SH 1-3			
20	Same comments as 1-19 above.		Same resolution for dwg 100520	
			Sheets 1-3 as for dwg 100519	
	DWG-100521 SH 1			
21	ZN E-2, Item No. 19 & 20 Rad 1 3/4, does not match Det 19 & 20 on Sheet 12.		Item 19 & 20 are rad 1/3/4, sheet 12 will change	
22	Sht 2, ZN D-6, Item 161, should be "output" module.		Changed to "output"	
23	Sht 4, Add note that Cart I is 2205 & II is 2206, all Dwgs where Cart I and II are shown.		Note will be added	

REVIEW COMMENT RECORD (RCR)	1. Date 01-30-96	2. Review No. 3 (100%)
	3. Project No. HYDROGEN INTERLOCK	4. Page 3 of 6

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
24	Sht 5, ZN B-4, Item 12, show as "Ref" for second call out, all dwgs.		Added ref to item 12 on all dwgs	
25	Sht 11, ZN F-7, Item 35 should it be 36?		ZN F-7 change to item 36	
26	Sht 12, Det 19 & 20 See comment #21.		Matl is 1 3/4 item 19 dia is 1.33, item 20 dia is as follows - 1.25, 1.33 and 1.50	
27	Sht 12, Det 17, Dim 3.92 has extra arrow on top.		Remove arrow	
28	Sht 15, Add ID for T.B. 1, 2 & 3, like K's & CB's.		Yes, added idents	
29	Sht 15, ZN D-6, to the right of Item 159 add "SPARE."		No, not on hardware dwg	
30	Sht 16, ZN F-7, name plate C add "DS4", D add "DS1."		Add DS4, not on DS1 its spare	
31	Sht 16, ZN B-8, where are AG-AL & AS name plates shown.		AG on sh 1 on item 50, AH on Sht 3 on item 88 AJ on sht 2 on item 89 AK near item 90, AL near item 125 on sht. 3, AS near item 59 on sht. 15	
32	Sht 16, Add titles to three units on right side of Dwg.		Correct, titles will be added	
	DWG H-14-100522			
33	Sht 1, ZN E-7, change Exhauster "motor" to "Power".		Correct, power	
34	Sht 1, ZN D-E-5, Ref. Cart I is 2205 & II is 2206.		Cart 1 is 2205 and cart 2 is 2206 change ID	
	DWG H-14-100523			
35	Sht 1, Item 19; show STAHL is UL labeled, not clear from manufacturer data. Was it labeled when received?		Item 19 is UL approved	
36	Sht 2, ZN B-7, Plugs P7B & P13B wiring does not match jumper cable or source, see 100531 Sht 3.		Wiring will be changed to match 100531 sht. 3 output from J7A and J13A	

REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
01-30-96	3 (100%)
3. Project No.	**4. Page**
HYDROGEN INTERLOCK	4 of 6

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
37	Sht 2, ZN B-7, why are system grounds tied together? See Dwg. 100531, SH 1 Note 4, requires independent ground systems.		Shields will be independent dwg will be changed.	
38	Sht 2, ZN B-7, wiring of barriers does not match manufacturing wiring shown with review package.		Agreed, dwg will be changed	
39	Sht 2, ZN B-6, what is device "circle w/+-" label.		Whittaker devices will be identified	
	DWG-H-14-100524 Sht 1			
40	ZN F-1, item 5, change "indicator" to "sensor".		Agree	
	DWG-H-14-100530 Sht 1		Agree	
41	ZN E-7, change VTP-MS-2205 Motor "starter" to "contactor" 2-PL.		Agree	
42	Identify Cart I and II as 2205 & 2206.		Agree	
43	At interconnection plugs, provide ref. dwg.		They are rated NEMA 3R	
44	Item 12, contactor enclosure should be outdoor rated.		Agreed, will recheck and change	
45	Power distribution schedule, amp loads are too high.			
	DWG H-14-100531 Sht 1			
46	ZN F-8, VTP-AC-2205 compressor terminations? Not separate from L1 & L2.		Yes we are hardwiring blower from compressor	
47	ZN A-8, VTP-HTR-2205, internal thermostat.		Agree will show it	
48	Move 5 panel meters to Sht 2 from PNL.		Will separate the two views	
49	Meter VTP-MON-2207, is FU6-P1-1 wire "2801" is it correct?		Correct it is wire 2801	
50	TB1, CB-1 should be 30A not 20A.		Agree 30A	

REVIEW COMMENT RECORD (RCR)	1. Date 01-30-96	2. Review No. 3 (100%)
	3. Project No. HYDROGEN INTERLOCK	4. Page 5 of 6

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
51	TB1, All VTP should have terminal numbers added to device number several locations.		Agree	
52	TB2, Term 7-8 remove one of the jumpers.		Agree	
53	Relay K1, Term 11 can't read PwrCND.		Correct will clean up	
54	Label "Rear" Panel "back" ref 100521 Sht 15.		Agree	
55	VTP-PS-2205, J8A-E&F Ref. Sht #3, ZN D6.		Agree	
56	VTP-HM-2205, Remove line between K5-10 and Term 9.		Agree	
57	Note 5. How small can wire be?		Will add ..shall be 16-18 AWG type ~~MTW~~ MTW	
58	At meters, shield grounds are not shown connected correctly, consistently.		Agree will terminate shield ends	
59	Sht 2, Add note to top on panel "See Sht 1 for Meters."		Agree	
60	Sht 2, Slot 1, Identify connector at bottom J1.		Agree	
61	Sht 2, Slot 10, change label from "spare" to "space."		No, they are spare, not terminated they are not empty	
62	Sht 2, Relay K12, term 1 ref K9-1?		See dwg 100519 sht 2 (jumper)	
63	Sht 2, ZN D-4 remove "wire no. 9501" by FU10.		Agree, should be 8501	
64	Sht 2, TB3. Is ground correct here?		Will delete	
65	Sht 2, Resistor "tolerance", "call out," and should it be connected in series?		Yes in series, will add tolerance	
	SHT 3			
66	ZN E-8, VTP-OS-2207 shown upside down.		Correct, will reverse	
67	ZN C-7, at P1 & J1 redundant to power cable at generator. Is cable type called out?		Will change ident, cable type identified on H14-100522, sht 2.	
68	ZN E-6, At J6A confirm exhauster connections.		Agree, will confirm and document	

REVIEW COMMENT RECORD (RCR)	1. Date 01-30-96	2. Review No. 3 (100%)
	3. Project No. HYDROGEN INTERLOCK	4. Page 6 of 6

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
69	ZN E-5, at J5B, "TB1-5, 120V-G2"(B) should be ground wire from G1 system.		Agree	
70	At J5B under to power skid add "VTP-MS-2205."		Agree	
71	ZN F-4, DS1 is not shown on ELEM Dwg 100519?		Spare ind. light (not shown)	
72	ZN C-3, VTP-HS-2207. Push to test is called "Lamp test" on Sht 1.		Change to lamp test	
73	What is Title (ID) for the two large pnls shown?		Cart interface & cart control	
	DWG H-14-100532 Sht 1-3			
74	Same comments as 46-73 above.		Comments applicable for H-14-100532, shts 1-3, for 46-73	

REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
3/12/96	100%
3. Project No.	**4. Page**
ETN-96-003	1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
See block 13	Characterization RMCS	P. J. Martell	WCS/ES	MO255/373-5417

17. Comment Submittal Approval:

Organization Manager (Optional) _____ Date _____

10. Agreement with indicated comment disposition(s)

P J Martell 3-12-96
Reviewer/~~Point of Contact~~ Date

_____
Author/~~Originator~~

11. CLOSED

P J Martell 3-12-96
Reviewer/~~Point of Contact~~ Date

_____
Author/~~Originator~~

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
	The following documents were reviewed in support of the hydrogen interlock final design review: Software Design Description (1/8/96 draft), Drawing #100519-100524 and 100530-100532 (Rev. 0). No comments/discrepancies exist that would impact environmental approval of the described design.	none	none	closed

REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
3/12/96	100%
3. Project No.	**4. Page**
ETN-96-003	1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
See block 13	Characterization RMCS	L. S. Krogsrud	TWRS Safety	2751E/372-2302

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

24 April 96 — Date
L S Krogsrud — Reviewer/Point of Contact

Author/Originator

11. CLOSED

24 April 96 — Date
L S Krogsrud — Reviewer/Point of Contact

Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
	The following documents were reviewed in support of the hydrogen interlock final design review: Software Design Description (1/8/96 draft), Drawing #100521-100524 and 100530-100532 (Rev. 0). No comments/discrepancies exist that would impact TWRS Safety of the described design.	none	none	closed

ATTACHMENT 4

Meeting Minutes

MEETING MINUTES

Subject: FORMAL DESIGN REVIEW MEETING - HYDROGEN INTERLOCK, KICKOFF

TO: DISTRIBUTION **BUILDING** 2704HV

FROM: R.J. BLANCHARD **CHAIRMAN** R.J. BLANCHARD

Department-Operation-Component	Area	Shift	Date of Meeting	Number Attending
CHARACTERIZATION EQUIPMENT	200E	1	JANUARY 10, 1996	11

ATTENDEESS:

RAY MERRIMAN	ICFKH
M.E.HUDA	WHC SAFETY
G.F. VARGO JR.	WHC - COG ELECTRICAL ENGINEER
ROY BLANCHARD	WHC- DES. REV. CHAIRMAN
JIM ROBINSON	WHC- COG ENGINEER-MECHANICAL
F.A. SCHMORDE	WHC- CPO
ROSS TRUITT	WHC
SAM SMITH	EG&G
WAYNE SHEPARD	ICFKH
BOB WHITE	LANL
BILL MANGRAN	MERRICK

The meeting was called to order by the chairman and the attendance sheet passed around. The purpose of the meeting was explained i.e., Kick-off meeting for the 100% design review of the "RMCST exhauster Interlock, for flammable gas tanks". Jim Robinson and George Vargo reviewed the design package content and answered questions from the attendees.

Review Comment Record (RCR) sheets were requested to be completed by January 17, 1996 (to Jim Robinson) with the design review meeting to be scheduled for January 24, 1996.

Actions agreed to in the meeting:

1. Provide copies of the SOW to Merrick to board members requesting copies. — Jim Robinson

2. Revise ETP to include "Prototype development" have quality and safety review. In addition define ABU requirements. * — Jim Robinson

**********end**********

* NOTE: ETP REV 1 RELEASED 1/29/96 JR

Flammable Gas Interlock
100% Design Review
January 10, 1996

Name	Org	Phone
RAY MCCRIMAN	ICF KH	372-0514
M E. HUDA	WHC	372-2412
G F VARGO JR	WHC	376-5387
ROY BLANCHARD	WHC	373-1248
Jim Robinson	WHC	6-4777
FA SCHMADE	WHC	376-0662
ROSS TRUITT	WHC	376-2590
Sam Smith	PLCs+	373-6977
WAYNE SHEPHERD	ICFKH	373.7602
Bob White	LANL	376-8885
Bill Mongan	Numatec	376-9436

Westinghouse
Hanford Company

Internal
Memo

From: CHARACTERIZATION EQUIPMENT DESIGN 75230-95-002
Phone: 376-4777 S7-12
Date: January 15, 1996
Subject: DEVELOPMENT CONTROL REQUIREMENTS FOR FLAMMABLE GAS INTERLOCK

To: W. J. Mangan H5-09

cc: D. W. Hamilton S7-12
R. J. Blanchard S7-12
M. L. McElroy S7-07
M. E. Huda S7-07
G. F. Vargo H5-09
JDR: File LB

Reference: Hydrogen Interlock 100% Design Review Meeting Minutes.

This memo will formally document the flammable gas interlock drawing configuration control methodology. The interlock is being fabricated at H&N Electric in Pasco, Washington. Merrick Engineering is responsible for fabrication. Use of this methodology will insure interlock design traceability.

In addition to this memo, the engineering task plan, WHC-SD-WM-ETP-165, will be changed to include the configuration management requirements outlined here. At minimum, Characterization ESQ representatives will review the Engineering Change Notice.

The cognizant engineer for the flammable gas interlock is James Robinson. The cognizant electrical engineer is George Vargo.

The configuration control methods described here follow the requirements of EP-2.4, *Development Control Requirements* as contained in WHC-CM-6-1, Standard Engineering Practices.

The flammable gas interlock has facility use potential. For this application the validation process as used in Paragraph 2.1.4 (a) of EP-2.4 is defined as the Operational Test. As-built documentation (drawings) shall be released and incorporate all fabrication changes before turn over of the interlock to Characterization Project Operations (CPO).

H&N Electric will maintain one set of drawings designated as the master set. Each sheet shall be lettered in red ink with the words, "Development Control," then signed and dated by the Merrick representative.

All changes to the drawings shall be made in red ink, then signed and dated by the Merrick representative.

The Merrick representative may make minor modifications to the drawings without immediate verification by WHC cognizant engineers. Minor changes are defined as those that do not change the function of a selected component, alter the logic or sequence of operations of the programmable logic controller (PLC), or change the material specification.

An example of a minor change would be a change in bolt length from 7/8 inch to 3/4 inch, if the bolt grade and material specification remained the same. As an example of a change that could not be made without WHC approval; Merrick could not alter the output value or range of any device used to gather, control, or transmit data.

The Merrick representative will maintain a log of all changes. At minimum, WHC cognizant engineers will review the log once a week. Each WHC cognizant engineer will maintain a complete set of drawings with each change marked in red.

If a drawing becomes illegible due to changes, that drawing shall be replaced with an updated drawing that reflects the changes to that date. The old drawing shall be maintained to provide traceability.

James D. Robinson, Advanced Engineer
Characterization Equipment Design

MEETING MINUTES

SUBJECT: Final Design Review Briefing #2, Hydrogen Interlock, RMCS Exhauster

TO:		BUILDING		
Distribution		N/A		
FROM:		CHAIRMAN		
J. E. Corbett		R. J. Blanchard		
DEPARTMENT-OPERATION-COMPONENT	AREA	SHIFT	DATE OF MEETING	NUMBER ATTENDING
Characterization	200E	Day	2/28/96	See Roster

The meeting was chaired by Roy Blanchard. The list of attendees is recorded on the attached meeting roster.

Jim Robinson presented the meeting topic, which was a description of the redesigned spool piece. The design of the spool piece presented at the 100% design review kick-off incorporated two Whittaker cells for hydrogen gas concentration measurement. During development of the draft SA, LANL expressed a concern that combustible gas sensors should be used in the interlock instead of Whittaker cells, since the Whittaker cells only measure hydrogen. Jim presented design drawings showing the new spool piece, which can accommodate two combustible gas sensors, two Whittaker cells, or one of each. Copies of the drawing will be sent out to committee members not present at the meeting.

A change to the design review committee assignments was announced: Ron Bafus will be reviewing the design for Characterization Field Engineering.

Review comments are requested, in RCR format, to John Corbett by March 6th. Committee members who do not have any comments are requested to submit a "no comment" RCR. There were no action items assigned at this meeting.

HYDROGEN INTERLOCK FORMAL DESIGN REVIEW, Rotary Mode Core Sampling System

MEETING ROSTER

SUBJECT: FINAL DESIGN REVIEW BRIEFING #2

DATE: 02/28/96	CHAIRMAN: RJ Blanchard
LOCATION: 2704HV/G110	PROGRAM: Characterization

NAME	COMPANY	MSIN	PHONE
Roy Blanchard	WHC	S7-12	373-1248
Ross Trevitt	WHC	L6-37	376-2590
Sam Smith	PLC+	L6-37	373-6977
Jim Robinson	WHC	S7-12	6-4777
JOHN CORBETT	WHC	S7-12	7-2001

MEETING MINUTES

SUBJECT: Final Design Review Closeout, Hydrogen Interlock, RMCS

TO:		BUILDING		
Distribution		N/A		
FROM:		CHAIRMAN		
J. E. Corbett		R. J. Blanchard		
DEPARTMENT-OPERATION-COMPONENT	AREA	SHIFT	DATE OF MEETING	NUMBER ATTENDING
Characterization	200E	Day	6/6/96	See Roster

The meeting was chaired by Roy Blanchard. The list of attendees is recorded on the meeting roster. The meeting consisted of the following agenda:

DESIGN STATUS Jim Robinson reported that design and fabrication is complete for all components of the Hydrogen Interlock. Debugging of the first cart is complete, and is progressing satisfactorily for the second cart.

RCR's There were no new Review Comment Records since the previous meeting. The only open RCR was closed by Ray Merriman.

DRAWING STATUS The drawings were completed under development control. Robinson reported that redlines are currently being incorporated. The redlines are due to changes picked up during fabrication and debugging, as well as those due to previous design review comments. Drawing redlines do not represent significant changes to the design, as described in the design review briefings. The drawings will go through WHC checking.

Roy Blanchard proposed that the design review chairman signature for drawing release would act as the approval signature for each design review committee member. This proposal was accepted. After the drawings have gone through check, they will be sent to all committee members. Blanchard will sign after committee members have reviewed and approved the drawings.

SA STATUS Blanchard reported that the Safety Assessment for RMCS in flammable gas tanks was approved. There were no changes that impacted the hydrogen interlock design.

CHECKLIST The design review checklist was reviewed. Dispositions and remarks were made by committee members. Items #33 & #65 will be considered closed, in the affirmative, when the design drawings are approved for release. The completed checklist is attached.

CLOSING REMARKS The design review is complete, with the exception of drawing approval for release. Due to reorganizations/personnel changes, the following review committee assignments were made for the purpose of drawing release approval and design review report approval: Krogsrud is replaced by Omar Jaka, Bornemann/Martell replaced by Kathy Tollefson, and Straalsund replaced by the designated representative from Characterization Monitoring Development. Distribution of drawings for release approval is expected within two to three weeks. No further meetings are anticipated.

MEETING ROSTER

SUBJECT: HYDROGEN INTERLOCK FINAL DESIGN REVIEW CLOSEOUT
Rotary Mode Core Sampling System Portable Exhauster

DATE: 6/6/96 | CHAIRMAN: RJ Blanchard

LOCATION: 2704HV/G133 | PROGRAM: Characterization

NAME	COMPANY	MSIN	PHONE
Michael L. McElroy	WHC	S7-07	3-5588
James D. Robinson	WHC	S7-12	6-4777
Ray E. Merriman	ICF KH	E6-27	2-0514
Frederick A Schmoroe	WHC	S7-05	6-0662
Roy J. Blanchard	WHC	S7-12	3-1248
John Corbett	WHC	S7-12	2-2001