This document was too large to scan as a single document. It has been divided into smaller sections.

Section
1 of 2

Document Information			
Document #	**SNF-5222**	**Revision**	**0**
Title	SNF MCO DESIGN REVIEW COMPLETION REPORT		
Date	**11/30/1999**		
Originator	**GOLDMANN LH**	**Originator Co.**	**FDH**
Recipient		**Recipient Co.**	
References	**EDT-628351**		
Keywords	**REVIEW COMMENT RECORDS, DESIGN VERIFICATION, CANISTER, FUEL BASKETS**		
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Other Information			

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Page 1 of 1

1. EDT 628351

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5. Proj./Prog./Dept./Div.:	**6. Design Authority/ Design Agent/Cog. Engr.:**	**7. Purchase Order No.:**
Multi-Canister Overpack\W-442	L. H. Goldmann	N/A
8. Originator Remarks:		**9. Equip./Component No.:** N/A
For release		**10. System/Bldg./Facility:** N/A
11. Receiver Remarks: **11A. Design Baseline Document?** [ ] Yes [X] No		**12. Major Assm. Dwg. No.:** N/A
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1	SNF-5222		0	Spent Nuclear Fuel Multi-Canister Overpack Design Review Completion Report	Q	1	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	1. Approved	4. Reviewed no/comment
	2. Release	5. Post-Review	2. Approved w/comment	5. Reviewed w/comment
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17. SIGNATURE/DISTRIBUTION
(See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN	(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN
1	1	Design Authority L.H. Goldmann L6-56			
		Design Agent N/A			
1	1	Cog.Eng. K.E. Smith K E Smith 11/29/99 L6-56			
1	1	Cog. Mgr. J.D. Cloud 11/29/99 L6-56			
1	1	QA C.R. Hoover 11/29/99 L6-56			
		Safety N/A			
		Env. N/A			

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
L.H. Goldmann Signature of EDT Originator — Date 11/29/99	Authorized Representative for Receiving Organization — Date	J. D. Cloud Design Authority/ Cognizant Manager — Date 11-29-99	[ ] Approved [ ] Approved w/comments [ ] Disapproved w/comments

BD-7400-172-1

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	SNF Storage Projects	Date 11/29/99
Project Title/Work Order		EDT No. 628351
Multi-Canister Overpack Design Review Completion Report		ECN No. N/A

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
G.D. Bazinet	S8-06		X		
D.M. Chenault	R3-86		X		
J.D. Cloud	L6-56		X		
L.H. Goldmann	L6-56	X			
C.R. Hoover	L6-56		X		
J.J. Irwin	R3-86		X		
B.R. Lorenz	R3-26		X		
D.R. Lucas	R3-11		X		
M.K. Martin	L6-56		X		
W.C. Miller	R3-11		X		
E.S. Ruff	L6-56		X		
K.E. Smith	L6-56	X			
C.E. Swenson	S8-07		X		
P.A. Young	X3-88		X		
SNF Project Files	R3-11	X			
Central Files	B1-07	x			
DOE Reading Room	H2-53	x			

SPENT NUCLEAR FUEL MULTI-CANISTER OVERPACK DESIGN REVIEW COMPLETION REPORT

L.H. Goldmann
Fluor Daniel Hanford, Inc.
Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

EDT/ECN: 628351 **UC:** 510
Org Code: 2G100 **Charge Code:** 105532 / AA30 ja HMF50041
B&R Code: EW7040000 **Total Pages:** 575

Key Words: Multi-Canister Overpack, design review, review comment records design verification, spent nuclear fuel, canister, fuel baskets

Abstract: This document summarizes the design reviews performed on the Multi-Canister Overpack and includes multiple appendices containing the Review Comment Record forms for each design review.

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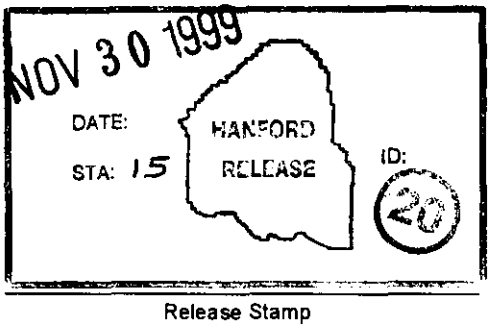

Janis Arnold 11-30-99
Release Approval Date

Release Stamp

Approved For Public Release

DESIGN REVIEW COMPLETION REPORT MULTI-CANISTER OVERPACK (MCO)

November 1999

Prepared by COGEMA Engineering Corporation
For Fluor Daniel Hanford

B.A. Christensen

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1.0 PURPOSE

The purpose of this Design Review Completion Report is to summarize the design review activities conducted by the Hanford site contractor (Westinghouse/Kaiser/DE & S Hanford, Fluor Daniel Hanford) during the design of the Multi-Canister Overpack (MCO), and to compile the review comments and other pertinent documentation into a single referenceable document. This document does not include design verification performed by the Design Agent, Parsons Infrastructure and Technology Group, Inc.

2.0 SCOPE

Multiple independent design reviews were held as the MCO design progressed from the Phase I (Conceptual) design through Phase II (Final) design and was subsequently modified for multiple pressure ratings.

The design reviews conducted by the Hanford site contractor on the Spent Nuclear Fuel (SNF) MCO Project included representatives from all interfacing SNF organizations (e.g., subproject Design Authorities, Nuclear Safety, Operations, Environmental, Radiological Protection, Quality assurance, welding engineers, NDE, etc.) and representatives from the US Department of Energy, Richland Operations (DOE-RL) together with their Technical Advisory Group. In addition to these reviewers, an Independent Review Team was established to provide expert review from qualified personnel outside of the SNF organization. These independent reviewers included personnel with ASME Code, materials, and structural engineering experience. At each design review, reviewers were instructed to review the design media for conformance with the requirements in the applicable revision of the MCO Performance Specification (HNF-S-0426). Design features that addressed functional criteria not quantified in the Performance Specification were reviewed by the interfacing subproject design authorities and analysts to determine their acceptability.

Independent Design Reviews were performed on the MCO design in accordance with SNF procedure AP 6-027, which implements the verification requirements of HNF-PRO-1819. Independent design reviews were held at the following design stages:

Phase I – MCO 50% Design – Fall 1995
Phase I – MCO 90% Design -- Winter 1995
Phase II – MCO 60% Design -- Fall 1996
Phase II – MCO 90% Design – Spring 1997
Phase II – MCO 100% Design – Spring 1997
450 psig Design Change -- Winter 1998
450/150 psig Design Change – Winter 1999

Both the Phase I and Phase II design reviews included the fuel baskets which are stacked inside the MCO. The baskets were not modified with the pressure rating changes to the MCO.

Reviewers commented on various aspects of the design, and their comments where recorded on Review Comment Records (RCRs). The Design Agent dispositioned comments pertaining to the design documents while the MCO Project Team provided dispositions for comments pertaining to the design requirements. Dispositioned RCRs were then returned to the reviewers for concurrence and approval signatures.

3.0 DESIGN DESCRIPTION

The MCO provides a radiological containment system for the vertical storage of Single Pass Reactor and N-Reactor spent nuclear fuel currently stored in the K Basins. The MCOs will be placed in vertical storage tubes in the Canister Storage Building (CSB) located in the 200 Area until final disposal facilities are made available.

The MCO Design Report, Design Drawings, and Fabrication Specification are the major design output documents included in the design reviews. The Design Report includes multiple appendices containing structural calculations.

4.0 SUMMARY

Documentation pertaining to each design review, including RCRs, is attached in Appendices A through G. A brief summary of each review follows:

PHASE I – MCO 50% DESIGN (Appendix A)
In October 1995 the Design Agent submitted the Phase I – 50% Design of the Multi-Canister Overpack to the Hanford site contractor for review and comment. Reviewers where instructed to return their comments to the MCO Project Manager and MCO Design Authority. Reviewer comments and dispositions where recorded in the Phase I – 50% Design comments database. Due to the early stage of the design, no reviewer approval signatures were requested.

PHASE I – MCO 90% DESIGN (Appendix B)
In December 1995 the Design Agent submitted the Phase I – 90% Design of the Multi-Canister Overpack. Comments and the subsequent resolutions where recorded in the review comment record. All comments where reviewed, dispositioned, and closed out, with the exception of the comments that were listed in the matrix *Open Comments to be Addressed by Phase II Design* (Appendix B). These comments were left open and were carried forward to the Phase II Design.

PHASE II – MCO 60% DESIGN (Appendix C)
In December 1996 the Design Agent submitted the Phase II – 60% Design of the Multi-Canister Overpack. Comments and the subsequent resolutions where recorded in the review comment record. All comments where reviewed, dispositioned, and closed out.

PHASE II – MCO 90% DESIGN: DESIGN REPORT, DRAFT REV. 0 (Appendix D)
In March 1997 the Design Agent submitted the Phase II – 90% Design of the Multi-Canister Overpack. The reviewers included design authorities from interfacing SNF sub-projects, operations personnel, representatives from nuclear safety and quality assurance, structural and fabrication engineers, welding engineers, and a three-member "independent" design review team comprised of personnel not associated with the SNF project. These independent reviewers had expertise in the areas of ASME Code, materials, and structural engineering. Reviewers where instructed to return their comments to the MCO Project Manager and Design Authority. All comments where reviewed, dispositioned, and closed out.

PHASE II – MCO 100% DESIGN: DESIGN REPORT, REV. 0 (Appendix E)
In May 1997 a review was performed on the Phase II – 100% Design of the Multi-Canister Overpack by one member of the independent design review team. This review was necessary due to additional structural calculations performed after the 90% design package was submitted for review. The reviewer's comments and the subsequent resolutions where recorded in the review comment record. All comments where reviewed, dispositioned, and closed out.

450 PSIG DESIGN CHANGE: DESIGN REPORT, REV. 1 (Appendix F)
In January 1998 DOE-RL requested in increase in the pressure rating of the MCO from 150 psig to 450 psig. A review was performed of the revised design in May 1998. The "independent" review team was utilized again, along with the interfacing personnel within the SNF Project. Comments and the subsequent resolutions where recorded in the review comment record. All comments where reviewed, dispositioned, and closed out.

450/150 PSIG DESIGN CHANGE: DESIGN REPORT, REV. 2 (Appendix G)
In the fall of 1998 DOE-RL questioned the need for a 450 psig rating for the mechanical closure due to cost. The design was revised for a 150 psig pressure rating for the mechanical closure, while maintaining the 450 psig pressure rating with the final cover cap welded in place. In addition to the interfacing personnel within the SNF Project, the independent review team member with structural engineering expertise participated in the review. Comments and the subsequent resolutions where recorded in the review comment record. All comments where reviewed, dispositioned, and closed out, with the exception of two comments which are being tracked to closure in the MCO Project Action Tracking List.

5.0 DOCUMENTATION

Comments and responses were recorded on RCRs for the following stages of the MCO Design:

Phase I – MCO 50% Design (Appendix A)
Phase I – MCO 90% Design (Appendix B)
Phase II – MCO 60% Design (Appendix C)

Phase II – MCO 90% Design (Appendix D)
Phase II – MCO 100% Design (Appendix E)
450 psig Design Change (Appendix F)
450/150 Design Change (Appendix G)

These RCRs are attached as Appendices to this report.

6.0 CONCLUSION

At each major step in the MCO design process, Independent Design Reviews were performed with qualified personnel to ensure the design complied with the MCO Performance Specification and was acceptable to the SNF subprojects which interface with the MCO. Design review comments were documented, dispositioned, and closed out as evidenced by the review comment records included in Appendices A through G.

APPENDIX A
Phase I
MCO 50% Design

ENGINEERING DATA TRANSMITTAL

Page 1 of _____

1. EDT № 612976

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) MCO Project	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: Spent Nuclear Fuel Project	6. Cog. Engr.: Tom Yount	7. Purchase Order No.: N/A
8. Originator Remarks: Please review the attached documents and drawings in accordance with the reviewer matrix and return comments electronically to Kimball Smith no later than COB October 19, 1995.		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: SNF Project
11. Receiver Remarks:		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: October 19, 1995

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		N/A	Draft	MCO Phase 1 50% Design Media (see attached matrix)	N/A	4		

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 2. Release 3. Information	4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment	4. Reviewed no/comment 5. Reviewed 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.
4		Cog.Eng. Thomas L. Yount	R3-85	Bruce Carlisle	X3-71	4	
4		Cog. Mgr. William D. Gallo	R3-85	Denise Clements ✓	G2-02	4	
4		QA John I. Diehl	X3-80	Dick Cowan	R3-86	4	
4	✓	Safety John T. Vistica	X3-80	Kent Daschke	R3-85	4	
4		Chris Thompson	R3-85	Greg Field	G2-02	4	
4	✓	Larry D. Blackburn,	H5-53	Jim Frederickson	R3-86	4	
4	✓	Terry Bradley		Jack Garvin	R3-85	4	
4		Louis Goldmann	R3-86	John Irwin	H0-33	4	
4	✓	Andy Kee	R3-86	Wesley Nelson ✓	L6-36	4	
4		Mike Mahaffey	R3-85	Bill Mills	X3-79	4	
4	✓	Curtis Miska	R3-86	Mike Palm ✓	H5-70	4	
4	✓	Ed Ruff	H5-70	Jose Rivera • T Ghig	R3-85	4	
4	✓	Kerry Schierman	S7-41	Dean Smith	H4-68	4	
4		Kim Smith	G3-15	Craig Swenson ✓	S8-07	4	
4		MCO Project File					

18.	19.	20.	21. DOE APPROVAL (if required)
KE Smith for 10/16/95 Tom Yount Signature of EDT Originator Date	N/A Draft for Review Authorized Representative for Receiving Organization Date	N/A - Draft for Review Cognizant Manager Date	Ctrl. No. [] Approved [] Approved w/comments [] Disapproved w/comments

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

QT Series Teflon

BD-7400-172-1

MCO Phase 1 50% Design Review

The MCO Phase 1 50% design media will be ready for review on 10/17/95. A listing of the review documents and a preliminary review schedule are outlined below.

REVIEW DOCUMENTS

1. Valve Study
2. Draw Tube Study
3. Welding Study
4. Design Requirements Document
5. MCO Procurement Specification
6. Conceptual Drawings
7. MCO Performance Specification (by WHC)

PROPOSED REVIEW SCHEDULE

10/16/95 COB	Design Packages ready for transmittal to reviewers
10/17/95 am	Reviewers receive design packages. Reviewers will receive only the design media pertaining to their area of responsibility/expertise (see attached matrix)
10/19/95 COB	Written review comments (WP file is OK) submitted electronically to Kimball Smith. Given the accelerated schedule we're trying to meet, it is imperative that comments are returned by this date.
10/20/95 COB	Comments are sorted/combined and transmitted to Design Agent for disposition
10/23/95	Design Agent begins dispositioning/incorporating comments into the design and identifies those comments requiring further discussion before resolution can be made. Meetings are scheduled as necessary throughout the week to resolve those comments.
10/27/95	Design Agent returns dispositioned comments to Projects and forwarded to individual reviewers for information. Since the design is only at 50%, formal sign-off of comments will not be performed.

Please focus your review on ensuring the design is in compliance with the MCO performance specification, ASME Code, and other applicable standards and look at big picture items (material selection, constructability, operability, etc,) rather than design details at this stage. Identify any general areas of exception and where additional work may be required. If you have time, comments in other areas are welcome.

A copy of the latest revision of the MCO performance specification is included in the review packages. While reviewing the design documents against this

specification, please be aware that the Design Agent has yet to incorporate the latest revision (which is presently being released) into the MCO design. Identifying discrepancies between the specification and the design documents will assist the Design Agent in making changes to ensure compliance. Any comments you may have against the performance specification can be directed to J. Rivera or T. Ghigleri. (Per T. Ghigleri, TL Yount and JI Diehl have reviewed this revision, but were not available for signature for this distribution).

MCO PHASE 1 50% DESIGN REVIEW MATRIX

REVIEWER\PROPOSED AREA OF REVIEW	VALVE STUDY	DRAW TUBE STUDY	WELDING STUDY	DESIGN REQUIREMENTS	PROCUREMENT SPEC.	DRAWINGS
Larry Blackburn\ASME Code				X	X	X
Terry Bradley\TAG	X	X	X	X	X	X
Bruce Carlisle\FRS				X		X
Denise Clements\Trans.				X		X
Dick Cowan\Engineering	X	X	X	X	X	X
Kent Daschke\Reg. Compl.				X	X	X
John Diehl\QA	X	X	X	X	X	X
Greg Field\Trans.				X		X
Jim Fredrickson\Engr.	X	X	X	X	X	X
Bill Gallo\Proj.				X	X	X
Jack Garvin\Reg. Compl.				X	X	X
Lou Goldmann\Engr.	X	X	X	X	X	X
John Irwin\Drying	X			X		X
Andy Kee\Cask				X		X
Wes Nelson\NDE			X		X	X
Mike Mahaffey\CSB				X		X
Bill Mills\FRS				X		X
Curt Miska\Conditioning	X			X		X
Mike Palm\Welding			X			X
Ed Ruff\Testing	X	X	X	X	X	X
Jose Rivera\Engr.				X	X	X
Kerry Schierman\DOE	X	X	X	X	X	X
Dean Smith\Safety	X	X	X	X	X	X
Kim Smith\Projects	X	X	X	X	X	X
Craig Swenson\CSB				X	X	X
Chris Thompson\Operations	X	X	X	X	X	X
John Vistica\Safety	X	X	X	X	X	X
Tom Yount\Projects	X	X	X	X	X	X

If you would like copies of the design documents beyond what is assigned in this matrix, please contact Kim Smith at 376-0273 (leave message).

MULTI-CANISTER OVERPACK

DRAWING NUMBER	TITLE	SHEET NUMBER
SK-X-XXXXX-X	MCO SHELL ASSEMBLY	1 OF 8
SK-X-XXXXX-X	MCO SHIELD PLUG	2 OF 8
SK-X-XXXXX-X	MCO DESIGN PLUG ASSEMBLY & B/M	3 OF 8
SK-X-XXXXX-X	MCO SHIELD PLUG ASSEMBLY & DETAILS	4 OF 8
SK-X-XXXXX-X	ASSEMBLY & DETAILS BOTTOM CONDITIONING CHAMBER	5 OF 8
SK-X-XXXXX-X	HARDWARE AND DETAIL 3" CONDITIONING CHAMBER	6 OF 8
SK-X-XXXXX-X	ASSSEMBLY MCO HARDWARE LONG DRAW TUBE	7 OF 8
SK-X-XXXXX-X	MCO SNF REPACK BASKETS MK IA, MK IV, SPR	8 OF 8

PARSONS ENGINEERING SCIENCE, INC.

1955 Jadwin Avenue, Suite 410 • Richland, Washington 99352 • (509) 946-0415 • Fax: (509) 946-8811

MCO-1695

December 1, 1995

xc: MCO File
3.5.3

Mr. Paul Spiel
ICF Kaiser
P.O. Box 888 (B4-70)
Richland, WA 99352

Subject: Task KH-8009-5; Comments to 50% MCO Design Package, Revision 1

Dear Mr. Spiel:

On October 16, 1995, Parsons submitted the 50% Design of the Multi-Canister Overpack to WHC for review and comment. Attached is a copy of the comments to that design transmittal and the Parsons/Westinghouse response to each comment.

If you have any questions, please contact me at 943-0909.

Sincerely,

R Bastar

R. Bastar
Project Manager

RB/be

cc: L. Goldmann w/attachment
C. Kudla w/attachment
N. Krohn w/attachment
K. Smith w/attachment
File: KH-8009-5; 4.4

REVISION 1
COMMENT DATABASE
MCO DESIGN
50% DRAFT

COMMENT NUMBER	SECTION, PAGE, PARAGRAPH	REVIEWER LAST NAME, FI	COMMENT	RESPONSE	RESPONDENT COMPANY
1		Thompson, C 1	How does the blind flange get vented prior to removal? There appears to be the potential for pressure build up behind the flange.	The blind flange would not require to be vented. Primary seal is by the quick connector. Blind flange serves as a "back-up" and also prevents damage to the quick connector, as well as prevents contaminated water from entering the quick connector "pocket".	Parsons
2		Thompson, C 2	How are the blind flanges operationally tested to verify that they meet the leakage criteria?	Primary seal mechanism is the quick connector. However, blind flange could be operationally leak tested by a portable vacuum box. In addition, the quick connector will be leak tested by a helium leak test prior to having the blind flange installed.	Parsons
3		Thompson, C 3	Can the flanges be replaced with a threaded plug and meet the sealing criteria? Will this result in a galling problem with the stainless steel plug? Which is faster to install - a four-bolt flange or a threaded plug?	Blind flanges could be replaced by a threaded plug. However, the threaded plug is not an ASME Code acceptable means of achieving sealing unless a seal weld is utilized to seal the threads. The blind flanges were recommended, since they provide a mechanical means of achieving access to the quick connectors. A threaded plug would require destructive means to break the seal weld to obtain access. Galling could be a problem, unless a stainless material such as NITRONIX were selected for the plug. The threaded plug would be quicker to install. However, it is very feasible to install the bolted flange connection with "tools" to reduce exposure.	Parsons

4		Thompson, C 4	How is the weld surface to be protected during the loading of MCO baskets into the MCO?	The weld area is chamfered in the vertical plain in the direction of the center of the MCO. It actually provides a "funneling mechanism" to guide the MCO baskets into the MCO shell. In addition a "stanchion" pipe could be placed inside of the MCO center pipe so that it protrudes above the top of the MCO. The stanchion pipe would serve as a guide to center the MCO baskets and prevent impact with the weld area. In addition, an oversize funnel shaped pipe could also be "fit" to the inside of the MCO so that it rests on the weld area to guide the baskets and protect the weld area.	Parsons
5		Thompson, C 5	The NDE section addresses the inspection of the weld surfaces prior to lowering into the pit - this inspection should be completed before the MCO/cask arrives at the basin - a second limited inspection to verify no damage occurred in the process before it is lowered into the pit.	It is the intent of the fabrication specification to require inspection of all critical components and parameters (i.e., fit) before the MCO components leave the fabricators facilities. Additional, post-receipt inspections would be prudent at the K-Basin, prior to utilization of the MCO components.	Parsons
6		Thompson, C 6	The lid/top of the MCO Design shown in the drawings appears to have a lip or bowl type arrangement. How will this be dewatered as it comes out of the pit? How will the grapple feature be decontaminated/dewatered?	The MCO shield plug could be protected in a number of ways from contamination. They are as follows: a. Entire top surface of the shield plug would be coated with a strippable protective coating. It would be removed after the top of the MCO was dewatered. b. Dewatering would take place by utilization of a wet vacuum system, mops, squeegee, etc.	Parsons

7		Miska, C 1	Decontamination The MCO as currently proposed and shown on the conceptual drawings does not allow decontamination or surveying of surfaces on the top head of the MCO. Use of an MCO Design that effectively prohibits decontamination is clearly unusable in view of the following facts: 1) the canister storage building is being designed to receive, handle and store clean MCO's, and does not have any significant decontamination provision, 2) the MCO will be placed in a contaminated basin for loading, 3) the MCO draw tubes do not include requested provisions for internal filtration to limit carry-out of fuel particulates, and 4) quick disconnects are proposed which will tend to spread contamination when they are connected or disconnected from a pressurized (e.g., backfilled) MCO. This MCO Design concept, that effectively prohibits decontamination, can likely be linked to a change in the decontamination provision section of the MCO performance specification. The original MCO performance specification required that "...There shall be no blind or hidden corners or joints in areas potentially exposed to contamination that can not be readily accessed by hand held spray devices." This requirement has been changed to read "Blind or hidden corners or joints in areas potentially exposed to contamination that cannot be readily accessed by hand spray devices shall be minimized."	Refer to C. Thompson comment response No. 6. Also the following applies: a. MCO is not intended to be decontaminated at the CSB (unless required as a result of processing activities, damage or leakage while in storage). Decontamination activities would take place at the K-Basin prior to shipment to the CSB. b. MCO is "protected" from contamination in the K-Basin by a "bag" device. (Bag device is shown and discussed in both the MCO Trade Study and the MCO Cask Specification documents.). c. Internal filtration for the MCO draw tubes is not a requirement of the Draft Revision 0 Performance Specification. However, it will be included in 90% Design. d. It is anticipated that the MCO will only be pressurized following the welding of the shield plug (and at a low pressure of approximately 5 psig). The potential amount of contaminated materials is on the order of scc's with standard quick connections. Parsons is also investigating the use of quick connectors manufactured by Breakaway Technology which provide a leak-proof seal when connections are made or broken. Draft Revision 0 Performance Specification does not specifically require that contamination be prevented. However, Parsons recognizes the need to minimize the potential or potential spread of contamination and is designing the MCO with prevention in mind. In addition, the 50% MCO Design presented by Parsons has a relatively smooth top head with minimal crevices or components which would require decontamination. The alternative to the "hidden and protected" quick connectors is valves with their associated fittings. Significant effort would be required to decontaminate the valves and fittings.	Parsons

8		Miska, C 2	Pressure relief MCO Shell assembly drawings do not reflect the installation of a pressure relief device. I assume that this is a detail that will be added when available. This pressure relief device needs to be piped directly to the MCO not attached to the (valved) draw tube. The MCO Design studies summary of results with recommended MCO configuration on page 10 indicates that quick connections can easily accommodate pressure relief should this be added at a later date. This is unacceptable in that this is a mechanism for disabling the pressure relief device if a self sealing quick connection is used.	Draft Revision 0 Performance Specification does not specifically require Parsons to design the pressure relief mechanism. Section 3.2.1.6 of the Specification only requires Parsons to provide "penetration and connection". Specific details have not been provided in the Specification. This will be addressed in the 90% Design. It is true that a quick connector is a self-sealing device. However, when an item is attached to the quick connector, it is required by design that the quick connector be open. Only by removal of the item (i.e., pressure relief device) can the quick connector be closed. The pressure relief device could not be disabled.	Parsons
9		Miska, C 3	Integral draw tube The draw tube studies on page A-12 rejects an integral draw tube as not feasible. The concern for damage to the draw tube that would only be apparent when draining of the MCO is attempted is legitimate. However, equally of concern is how a multi piece draw tube design can be sealed to ensure that the exact scenario that is being avoided is not created via a leak at the connection of the draw tube with the MCO top head. It is not clear to me that the risk of damage to a one piece draw tube is significantly greater that the risk of a leak of a multi piece draw tube.	The integral draw tube was rejected due to the significant impact that it would have on both design requirements and potential dose. The MCO would be required to be analyzed to accommodate baskets that are now notched. The fuel payload would be significantly reduced because of the notch. Criticality control structures other than the center pipe would have to be addressed. The bottom plate of the MCO would have to be tapered and inclined towards one side to ensure that liquids accumulate at the draw tube location. All of the baskets would require a "notch" to accommodate the integral draw tubes. This would result in additional exposure that would require alignment and indexing of the basket "notch" with the integral draw tubes. The result of the aforementioned items is significant with respect to design, MCO payload, criticality, and exposure. The draw tube recommendation is that it would be integral to the shield plug, but not integral to the MCO shell.	Parsons

10		Miska, C 4	Use of self-sealing connectors Consideration of use of self sealing connectors should consider the leakage potential and rate of the device while connection is being attempted. My experience with hydraulic systems etc. indicates that while these connectors can seal when fully connected or fully disconnected (provided they are kept clean, dirt or fuel particulates on the sealing surface will cause failure to obtain a seal) they will leak when they are connected and disconnected. When considering use of a self-sealing connector to replace the function of a valve this leakage potential is critical and must be evaluated. By looking at the text and valve evaluation table C-4 it is not apparent that this leak potential was even considered. The leak criteria during this make break sequence should be the same as the stem leakage rate allowed for a ball, globe or gate valve during processing (i.e., 10 E-4 SCC/sec). On page 8 of the MCO Design studies it is indicated that the quick connection and blind flange combination meet the vast majority of design objectives and criteria. Please discuss all criteria and objectives that are not met and evaluate implication of criteria not met, because the blind flange may not be used throughout the MCO life cycle are the criteria met without the use of the blind flange.	Please refer to comment response No. 13. In addition, the use of valves and fittings would result in significant exposure due to the requirement to perform decontamination activities on these items prior to welding of the MCO shield plug. In addition, the Draft Revision 0 Performance Specification does not specifically state that connections must be made or broken without any leakage or the ability to control leakage. The only leakage rates are those provided when the MCO is under going process or storage operations. The quick connection and blind flange combination are an "either/or" situation. They are not both required, but some distinct benefits do result if they are both utilized. Refer to comment response Nos. 1, 2 & 3.	Parsons

11		Miska, C 5	Use of blind flange What is the purpose of the blind flange, does it do more than provide a mechanism to seal the MCO for transport? Will use of this connection be required by code etc. during drying, conditioning, and staging at the CSB if so what use is the other connector? Will this type of closure be adequate for long term storage? At what frequency would this type of connection need to be serviced (retorqued or regasketed) in the long term storage environment? It should be noted that a distinct advantage of the blind flange closure is that it would allow periodic sampling of the MCO contents if this were required to demonstrate safe storage criteria have been met. Note regulatory input is needed to establish if periodic MCO gas contents monitoring is required.	The blind flange provides 10^{-7} leakage per the Performance Specification during transport and for final CSB storage. Two connectors are required per the Performance Specification. For long term storage, Blind Flanges may be welded over the quick disconnect recesses in the head to provide a 10^{-7} leakage. This would be required during long term storage. Noted.	Parsons
12		Miska, C 6	Impact of valve selection on need for additional penetrations. Provision for instrumentation pass through into MCO interior. I need the design of the MCO valves and draw tubes to be done in such a way that they can be easily modified for use as instrumentation pass through penetration. The provision for this instrumentation penetration would likely require a one piece draw tube, and a plug or ball valve closure. If the existing penetrations cannot be used for instrumentation, an additional penetration for instrumentation will be required.	Draft Revision 0 Performance Specification does not require any instrumentation connections or penetrations, nor the provisions to accommodate the same. WHC is developing the requirements. Results of the prototype testing will determine the needs for instrumentation access.	Parsons/WHC

13		Miska, C 7	Provision for filtration. The provision for filtration of the draw tubes in the MCO needs to be designed. Page A-6 indicates that each draw tube may have a debris screen, filter, or combination screen and filter. This filtration is required to reduce the carry out of small fuel particulates. My input into the MCO Performance Specification was that filtration should have a 100% particulate removal efficiency to 3 microns, and should consider use of high pressure (50 PSI proposed) screened bypass to allow MCO processing if the filtration system plugs. This filtration is required to allow a cost effective drying and conditioning system design. Note it may only be necessary to provide this filtration provision on the long draw tube.	WHC is working this issue and will be further addressed in the 90% Design. This has been discussed with Curt Miska. Curt is concerned about fine oxides of SNF being swept up and out of the MCO during conditioning processing of the MCO and contents. Moving these source term particles out of the MCO will create source terms in the pipes and other equipment for later dose to the operators. The current plan is for two passages in the shield plug. One large bore, 1" or so, that is short and connects to the top of the MCO interior for the vacuum drying the MCO interior and also connected to the pressure relief device. Another bore to move the bulk water up from the bottom and out of the MCO. Putting a filter to the short dip tube is unacceptable because it may block or inhibit the function of the pressure relief device. Hooking a filter to the long dip tube may preclude bulk water removal if the filter plugs up. A possible bypass device, to allow rapid water removal, will require a large Delta P to keep the bypass open during water removal, if the bypass device by design is needed to reset to the filter path after the Delta P is eliminated. Otherwise the device stays in the bypass mode once bypass is achieved. A switchable diverter valve, possibly actuated by a pressure pulse, could possibly be built into the MCO to activate an inline filter, but its operational reliability would have to be very high. Lou Goldmann is presently reluctant to take this path. We are left with the possibility of putting a third passage way in the shield plug to connect with a full time micron type filter inside the MCO to serve the purposes of hot vacuum conditioning. The cost and viability of putting	WHC

				a third passage has to be weighed against the benefit of not having particulates in the receiving section of the hot condition equipment up to its own filters.	
14		Miska, C 8	Time allowed for design review. The short turn around on the design review package (3 days) with no formal design review meetings limits the quality of the review that is possible. This will result in that some comments will be transmitted after the 50% Design review (like at the 90% Design review) when the impact of design changes on cost and schedule is more severe.	In order to meet the overall project schedule and support timely fuel retrieval, the Phase 1 Desgin Schedule permitted just five days for review and comment turnover. Since many of the design interfaces are ongoing and not yet determined, we felt a protracted review cycle would not be productive given the level of detail submitted in the 50% package. The purpose of this review was to get feedback on the major design points, while the 90% review can focus on the details. A design review meeting was held to discuss the decontamination, connection type, and pressure relief issues.	WHC
15	Section 2.1, 1st paragraph, page 2	Ghigleri, T 1	The proper term for cold vacuum drying is "vacuum drying." Revision 0 of the Performance Specification also includes this error. It will be corrected in Revision 1.	Terminology is in accordance with Draft Revision 0 Performance Specification. Will comply.	Parsons/WHC
16	Section 2.1, 1st paragraph, page 2	Ghigleri, T 2	Staging at the CSB is not temporary storage. Delete this word.	Terminology is in accordance with Draft Revision 0 Performance Specification. Will comply.	Parsons/WHC
17	Section 2.1, 1st paragraph, page 2	Ghigleri, T 3	The proper term for final conditioning is "hot vacuum conditioning." A global search should be performed on the document to correct this term. Revision 0 of the Performance Specification also includes this error. It will be corrected in Revision 1.	Terminology is in accordance with Draft Revision 0 Performance Specification. Will comply.	Parsons/WHC
18	Section 2.1, 3rd bullet, pages 2 and 3	Ghigleri, T 4	The first two lines of this bullet ("The containment of fuel elements...") repeat the second bullet. One of these should be deleted.	Typographical error, will be corrected.	Parsons
19	Section 2.1, 4th bullet, page 3	Ghigleri, T 5	Section 3.1.1 of the Performance Specification states that constraining maintains a critically safe array, not confining.	"Confining" will be changed to "constraining".	Parsons

20	Section 2.2, 3rd paragraph, page 3	Ghigleri, T 6	Welding is mentioned in this paragraph. My understanding is that welding has not yet been chosen as the means to seal the MCO. If this is true, welding should not be mentioned here.	Welding has been recommended as the means to achieve closure of the MCO shell and MCO shield plug. Please refer to the Trade Study found in Appendix B, titled, "Multi-Canister Overpack (MCO) Shield Plug/MCO Joining" for additional information.	Parsons
21	Section 3.2, page 5	Ghigleri, T 7	Although vacuum drying occurs at the K Basins, it is a separate process with unique design parameters. I recommend adding it as a separate design phase.	Terminology is in accordance with Draft Revision 0 Performance Specification. Noted.	Parsons
22	Section 3.2, 2nd paragraph, page 5	Ghigleri, T 8	The proper term for cold vacuum drying is "vacuum drying." Revision 0 of the Performance Specification also includes this error. It will be corrected in Revision 1.	Terminology is in accordance with Draft Revision 0 Performance Specification. Will comply.	Parsons/WHC
23	Section 3.3, 1st paragraph, page 6	Ghigleri, T 9	This section conflicts with Section 2.1, which mentions confining and containing, but not constraining.	Refer to comment response No. 19.	Parsons
24	Table 1	Ghigleri, T 10	If vacuum drying is added as a separate design phase, a column must be added for it on this table. See Comment #7.	Terminology is in accordance with Draft Revision 0 Performance Specification. Noted.	Parsons/WHC
25	Table 1, Design Pressure Internal, page 8	Ghigleri, T 11	The design pressure specified in the Performance Specification applies to all design phases, not just transportation. P.S. 3.3.1.1 should be 3.3.3.1.	Comment is not valid. Believe that comment wording should be for "external" not "internal" pressure. In addition the only mention of design external pressure is in the Cask Specification. Draft Revision 0 Performance Specification does not mention an external design pressure. Stated section of 3.3.1.1 is correct for Draft Revision 0 Performance Specification. Will evaluate further for 90% Design.	Parsons

26	Table 1, Design Temperature Normal, page 8	Ghigleri, T 12	The design temperature specified in the Performance Specification applies to all design phases, not just hot-vacuum conditioning. P.S. 3.3.1.1 should be 3.3.3.1	Comment is not valid. Table provides the temperatures during the various phases of the MCO operations. In addition, Draft Revision 0 Performance Specification does not mention an operating temperature, but only provides a design temperature. However, as stated in the Table, Parsons has been verbally provided with a design temperature and a maximum design temperature. Parsons is pointing out in the Table, that the design temperature is 375 and the operating is 350. Stated section of 3.3.1.1 is correct for Draft Revision 0 Performance Specification. Will evaluate further for 90% Design.	Parsons
27	Table 1, Leakage, page 8	Ghigleri, T 13	The Performance Specification specifies leakage rates for all design phases. P.S. 3.2.1.4 should be 3.2.1.3.	Draft Revision 0 Performance Specification provides one leakage value of 1×10^{-7} scc/sec. The value is impossible to measure (unless entire MCO is placed in a vacuum chamber) or be met under the conditions specified in Draft Revision 0 Performance Specification. Table points out that there are different leakage rates and that they can occur during different phases of MCO activities. Stated section of 3.2.1.4 is correct for Draft Revision 0 Performance Specification. Will evaluate further for 90% Design.	WHC
28	Table 1, Weight, page 8	Ghigleri, T 14	The Performance Specification specifies MCO weight for all design phases in Sections 3.2.2.1 and 3.2.2.2.	Draft Revision 0 Performance Specification provides a weight of "TBD". The Cask Specification was the only available document that provided a MCO weight. Table points out that there are different weights and that they can occur during different phases of MCO activities. Will evaluate further for 90% Design.	Parsons
29	Table 1, Seismic, page 9	Ghigleri, T 15	The Performance Specification specifies seismic criteria for an earthquake at the CSB in Section 3.3.2.2	Draft Revision 0 Performance Specification provides a seismic acceleration of "TBD". The FFTF seismic acceleration value criterion was verbally provided by WHC. Table points out the available information and the source of the information. Will evaluate further for 90% Design.	Parsons/WHC

30	Table 1, Dose Requirement, page 10	Ghigleri, T 16	P.S. 3.2.1.5 should be 3.2.1.4.	Draft Revision 0 Performance Specification provides a dose rate of 10 mR/hr. The stated dose criterion of 30 mR/hr was verbally provided by WHC. Table points out the available information and the source of the information. Stated section of 3.2.1.5 is correct for Draft Revision 0 Performance Specification.	Parsons/WHC
31	Table 1, Diameter, page 10	Ghigleri, T 17	The Performance Specification specifies that the 24 in. outside diameter is nominal.	Draft Revision 0 Performance Specification provides a diameter of 24" OD. The word "nominal" is not used. The Table points out the available information and the source of the information.	Parsons/WHC
32	Table 1, Length, page 10	Ghigleri, T 18	The Performance Specification specifies MCO length for all design phases in Section 3.2.2.3.	Draft Revision 0 Performance Specification provides a length of "TBD". The Cask Specification was the only available document that provided a MCO length. In addition, there is a conflict between the MCO Revision 0 Performance Specification and the Cask Specification documents with respect to MCO length. Will evaluate further for 90% Design.	Parsons/WHC
33	Table 1, MCO Drop, page 11	Ghigleri, T 19	The Performance Specification specifies the design basis drop for all design phases in Section 3.3.2.2.	Draft Revision 0 Performance Specification does not address the issue of MCO drop under any circumstances. The CSB Specification was the only available document that provided a MCO drop criterion. Will evaluate further for 90% Design.	Parsons/WHC
34	Table 2, Temperature Cycles, page 13	Ghigleri, T 20	The value in this row is inconsistent with Section 3.3.3.1 of the Performance Specification. Table 3.2.4 of the Performance Specification does not specify temperature cycles.	Comment is not valid. Table 3.2.4 of the Draft Revision 0 Performance Specification is the only portion of the specification that remotely mentions temperature cycles. Will evaluate further for 90% Design.	Parsons/WHC

35	Table 2, Corrosion Requirements, page 13	Ghigleri, T 21	The Performance Specification specifies corrosion requirements in Section 3.3.6.	Comment is not valid. Draft Revision 0 Performance Specification does not address the issue of MCO corrosion with respect to ASME Section III requirements (i.e., Owner is to provide a yearly corrosion rate (i.e., mils/yr, inches/yr, etc.) to the Engineer). The SAIC document was the only available document and which was provided by WHC that addressed the issue of MCO corrosion. Section 3.3.6 of Revision 0 Performance Specification still does not provide a corrosion allowance or rate as defined by ASME Section III. Will evaluate further for 90% Design.	Parsons/WHC
36	Table 2, Connections for..., Page 13	Ghigleri, T 22	The processes that the connections accommodate (draining, drying, conditioning, monitoring, venting) are inconsistent with Section 3.2.1.5 of the Performance Specification.	Comment is invalid. Wording and proposed MCO Design is in accordance with Draft Revision 0 Performance Specification requirements.	Parsons/WHC
37	Table 2, Fuel Fragment and Particle Sizes, page 14	Ghigleri, T 23	The value of .25 in. is inconsistent with Section 3.2.1.8 of the Performance Specification. The 2 mm filter is meant to retain fuel fragments greater than that size inside the MCO; it is not a gas filter. Section 3.2.1.2 should be 3.2.1.8.	Comment is invalid. Wording and proposed MCO Design is in accordance with Draft Revision 0 Performance Specification requirements and verbal/written communication received from WHC. Will evaluate further for 90% Design.	Parsons/WHC
38	Table 2, PSARP-Safety Classification, page 14	Ghigleri, T 24	The information in this row is inconsistent with Section 3.3.2.1 of the Performance Specification. Section 3.2.6.1 should be 3.3.2.1.	Comment is not valid. Draft Revision 0 Performance Specification does not specifically assign Safety Classifications to the MCO and MCO components. The Revision 0 Performance Specification also does not specifically assign Safety Classifications to the MCO and MCO components. Stated section of 3.2.6.1 is correct for Draft Revision 0 Performance Specification.	Parsons/WHC
39	Table 2, Weldment design/fabrication requirements, page 14	Ghigleri, T 25	The information in this row is inconsistent with Section 3.3.5 of the Performance Specification. Section 3.2.3 should be 3.3.5.	Comment is not valid. Draft Revision 0 Performance Specification does not specifically address weldment design/fabrication requirements for the MCO and MCO components. Revision 0 Performance Specification requires NQA-1 to be utilized. Stated section of 3.2.3 is correct for Draft Revision 0 Performance Specification.	Parsons/WHC

40	Table 2, Criticality Requirements, page 15	Ghigleri, T 26	The information in this row is inconsistent with Section 3.3.2.4 of the Performance Specification. Section 3.2.6.4 should be 3.3.2.4.	Comment is not valid. Draft Revision 0 Performance Specification does not specifically address criticality requirements for the MCO. WHC must provide this information. Revision 0 Performance Specification also does not provide specific criticality requirements. Stated section of 3.2.6.4 is correct for Draft Revision 0 Performance Specification.	Parsons/WHC
41	Fabrication Specification, General Comment	Ghigleri, T 27	In a number of instances, this specification incorrectly refers to a "transport cask: as a "transfer cask." The glossary in the Performance Specification gives the definitions for "transfer" and "transport."	Wording will be corrected. Performance Specification glossary was not available at the time that the Fabrication Specification was developed.	Parsons
42	Fabrication Specification, General Comment	Ghigleri, T 28	This specification requires adherence to ASME Section III in a number of areas. Section 3.3.3 of the Performance Specification requires only Safety Class 1 items to meet the requirements of ASME Section III. This point is not made clear in this specification.	Draft Revision 0 Performance Specification and Revision 0 Performance Specification do not provide the specific classification of any of the MCO components with respect to Safety Classification. WHC must provide this information. The Fabrication Specification was written assuming that all components would be Safety Class 1. Will evaluate further for 90% Design.	Parsons/WHC
43	Section 1.0, 1st paragraph, page 1	Ghigleri, T 29	If Sub Section NB is a requirement, the use of "i.e." is inappropriate. It should be deleted.	The comment is invalid. ASME Boiler and Pressure Vessel Code for Class 1 vessels is Sub Section NB. Draft Revision 0 Performance Specification and Revision 0 Performance Specification do not provide the specific Sub Sections of ASME Section III for the fabrication of any of the MCO components. WHC must provide this information. The Fabrication Specification was written assuming that all components would be ASME Section III, Sub Section NB.	Parsons/WHC
44	Section 1.1, 1st paragraph, page 1	Ghigleri, T 30	The MCO is not designed to store sludge; the fuel reracking process will remove all sludge. Delete reference to sludge.	Comment is invalid. Draft Revision 0 Performance Specification and Revision 0 Performance Specification both state that MCO will confine "fuel assemblies, or fuel fragments and particles". Fragments and particles can be considered to be sludge.	Parsons

45	Section 1.2, bullet "A", page 1	Ghigleri, T 31	The tolerances on the outer dimensions of the MCO must be maintained to also ensure the MCO can be inserted in any transfer casks (see General comment above for transfer vs. transport) and the CSB storage tube.	Draft Revision 0 Performance Specification and Revision 0 Performance Specification do not provide this dimensional tolerance.	Parsons/WHC
46	Section 1.2, bullet "B", page 2	Ghigleri, T 32	Welding is mentioned in this paragraph. My understanding is that welding has not yet been chosen as the means to seal the MCO. IF this is true, welding should not be mentioned here.	Refer to comment response No. 20.	Parsons/WHC
47	Section 1.2, bullet "D," page 2	Ghigleri, T 33	Crane capacity requirements apply to the CSB (and possibly other locations) as well as the K Basin.	Draft Revision 0 Performance Specification and Revision 0 Performance Specification do not mention CSB crane requirements. Only a CSB fuel transfer system is addressed, and without any specific requirements.	Parsons/WHC
48	Section 2.2, bullet "B," page 3	Ghigleri, T 34	Automated welding equipment and vacuum drying processing system are not part of the cask system.	Comment is not valid. Section 2.2 of the Fabrication Specification states, "The following items related to the MCO system are <u>not</u> included and will be furnished by Others." Welding equipment and vacuum drying system are <u>not</u> included. Refer to bullet "B".	Parsons
49	Section 3.2, 1st paragraph, page 3	Ghigleri, T 35	ASME is listed twice with two different definitions.	Second ASME should read as, "ASME Code".	Parsons

50	Section 4.1	Ghigleri, T 36	Several of these documents are not compliance documents in the Performance Specification. These documents are: - ASME Section II - ASME Section V - 10 CFR 21 - ANSI N45.2.1 - ANSI N45.2.2 - ANSI Y14.5M-82 - SNT-TC-1A - ASTM A20/A20M - ASTM A370 - ASTM A380 - ASTM A480 - ASTM A484 - ASTM A887-89 - ASTM E338 - AWS A2.4 - 79 - Regulatory Guide 1.31 In order to maintain traceability of requirements, the basis for the inclusion of these documents in this specification must be established.	It is true that the listed documents are not part of the Performance Specification. However, the listed documents are required to fabricate, inspect, and test the MCO, including the qualification of weld procedures, welders, material testing, etc. These listed documents (and potentially others) should be added to the Performance Specification to support the design, fabrication and testing of the MCO. In many cases the listed documents are listed as direct references in the stated Performance Specification referenced documents. (i.e., ASME Section III, Sub Section NB directs the use of ASME Section II for material requirements.).	Parsons/WHC
51	Section 4.1, pages 4 and 5	Ghigleri, T 37	Dates are not given for several of these documents. Since different revisions of the same document may include different requirements, date or revision numbers must be given for all compliance documents.	Comment is invalid. Section 4.0 of the Fabrication Specification states, "Unless otherwise noted, the document with addenda, amendments, and revisions in effect on the date of the purchase order will apply. Later editions may be used if mutually consented to in writing between the Seller and the Buyer." This is common practice for commercial nuclear spent fuel activities and has been accepted by the USNRC.	Parsons/WHC
52	Section 4.4, pages 5 and 6	Ghigleri, T 38	It is unclear to me whether these documents are compliant on the seller or are for information only. The difference between this section and Section 4.1 is unclear to me.	Section 4.4 of the Fabrication Specification states, "The following reference documents shall apply to the Work:".	Parsons

53	Section 5.0, 1st paragraph, page 6	Ghigleri, T 39	The maximum total weight of the MCO is specified in Sections 3.2.2.1 and 3.2.2.2 of the Performance Specification.	Comment is invalid. Draft Revision 0 Performance Specification provided a weight of "TBD" and Revision 0 Performance Specification provided a weight for the MCO which cannot be met. The current estimated weight for the MCO, dependent upon the number of baskets, exceeds the stated Revision 0 Performance Specification weight by 50% to 80%. WHC must resolve. Will evaluate for 90% Design.	Parsons/WHC
54	Section 5.1, 1st paragraph, page 6	Ghigleri, T 40	The MCO must also interface with the CSB storage tubes.	Comment is invalid. Draft Revision 0 Performance Specification and Revision 0 Performance Specification do not provide specific dimensional interface requirements. Will evaluate for 90% Design.	Parsons/WHC
55	Section 5.2, 1st paragraph, page 6	Ghigleri, T 41	In the fourth sentence, the phrase "specific exterior surfaces of the MCO" appear to be in error. I believe "exterior" should be "interior."	Comment is invalid. Once fuel is placed in the MCO, there is no reason to decontaminate the interior of the MCO.	Parsons
56	Section 6.2, 1st paragraph, page 7	Ghigleri, T 42	I believe that "important-to-safety" is an NRC term which the SNF project is not using. The Safety Classes defined in WHC-CM-4-46 and referenced in Section 3.3.2.1 of the Performance Specification are being used instead of "important-to-safety."	It is true that "important-to-safety" is an USNRC term. However, Draft Revision 0 Performance Specification made reference to NQA-1 and Revision 0 Performance Specification makes reference to 10 CFR Part 71, Appendix H for QA requirements. Neither one of these documents utilize the terminology found in WHC-CM-4-46, but utilize NRC terminology. Also refer to comment response No. 16 & 217.	Parsons/WHC
57	Section 6.2.1, 1st paragraph, page 7	Ghigleri, T 43	The value for the lowest service temperature in this paragraph is inconsistent with table 3.2.4 of the Performiance Specification, which gives the low end of the Hanford Site temperature range as -27°F.	Draft Revision 0 Performance Specification provides a temperature of -20°C. "F" should be changed to "C".	Parsons

58	Section 6.2.1, bullet "C," page 8	Ghigleri, T 44	The Performance Specification specifies the 1992 version of ASME Section III. It does not allow welding materials to be purchased in accordance with the year and addenda of the ASME Code effective at the time the material purchase order is placed. The Performance Specification may need to be changed to allow for this.	Comment is invalid. Draft Revision 0 Performance Specification specified 1989 for the Code year. In addition it is prudent to design to a specific Code year and relevant addenda. However, finding welding materials for that same year may be difficult, if not impossible. For appropriate wording refer to comment response Nos. 24, 25 & 26. Also refer to Section 3.0 of the Project Design Criteria.	Parsons/WHC
59	Section 6.3.1, 1st paragraph, page 9	Ghigleri, T 45	I know very little about welding, but I don't think "enchanted" is the right word to describe nondestructive examination requirements.	Word should be "enhanced". Correction will be made.	Parsons
60	Section 7.2.1, 1st paragraph, page 17	Ghigleri, T 46	The maximum acceptable leakage rate specified in this paragraph is inconsistent with Section 3.2.1.3 of the Performance Specification.	Performance Specification leakage requirements are nearly impossible to measure without considerable expense and time. Stated leakage rate in the Fabrication Specification is reasonable, can be measured with conventional equipment, requires no special provisions, and most importantly, the specified leakage rate has been accepted by the USNRC. Letter was provided to T. Yount explaining differences in leakage rates and acceptance by the USNRC. This wil be evaluated further for 90% Design.	Parsons/WHC

61	Section 7.2.2, 1st paragraph, page 18	Ghigleri, T 47	Meeting the intent of ANSI N14.5 is *inconsistent* with Section 3.3.3.3 of the Performance Specification, which states that leakage rate testing shall be conducted in accordance with ANSI N14.5.	ANSI N14.5 is not a requirement of Draft Revision 0 Performance Specification. It was included in the Fabrication Specification since it is utilized as an appropriate reference for commercial nuclear spent fuel storage applications. All requirements of N14.5 cannot be met, just as all requirements of ASME Section III, and the relevant *Sub Sections cannot be met for the* design, fabrication, inspection and testing of the MCO. The USNRC recognizes that all requirements cannot be met, and therefore the "intent" of the applicable codes and standards are met. The USNRC does require that *those specific areas of codes and standards which cannot* be met, shall be documented accordingly for review by the USNRC. This is standard commercial nuclear practice which has been accepted by the USNRC. DOE position on this matter is unknown. Also refer to Section 5.0 of the Project Design Criteria.	Parsons/WHC
62	Section 7.3.1, 1st paragraph, page 18	Ghigleri, T 48	The use of the phrase "it is recommended" is not proper for a specification. Furthermore, the phrase is inconsistent with Section 7.3, which states that the tests are mandatory.	Comment is not valid. The term "it is recommended' is being taken out of context. *It is the intent of this specific* section to perform functional dimensional and clearance tests of the MCO and related components with respect to dimensional clearances. The use of a "fuel assembly basket insertion gauge" is a recommendation and not a *requirement. The Seller could meet the requirements of* the section by measurement or other means.	Parsons
63	Section 7.3.5, 2nd paragraph, page 19	Ghigleri, T 49	Section 3.2.2.1 of the Performance Specification gives the maximum weight of the empty MCO as 3,264 lb.	*Will be evaluated further for 90% Design.*	Parsons
64	Section 9.0, page 21	Ghigleri, T 50	Since the Performance Specification is for design only, it requires compliance only with 10 CFR 71 for QA. However, since this specification is for fabrication, NCA-4000 may also apply.	Comment is not valid. Refer to comment response Nos. *43 & 56.*	WHC

65	Section 9.1, 1st paragraph, page 21	Ghigleri, T 51	I believe that "important-to-safety" is an NRC term which the SNF project is not using. The Safety Classes defined in WHC-CM-4-46 and referenced in Section 3.3.2.1 of the Performance Specification are being used instead of "important-to-safety."	Comment is not valid. Refer to comment response No. 56.	Parsons
66	Section 9.1.1, 1st paragraph, page 21	Ghigleri, T 52	NQA-1 was removed from the Performance Specification as a compliance document. It may not belong in this specification either.	Comment is not valid. Draft Revision 0 Performance Specification required compliance to the requirements of NQA-1. Refer to comment response No. 39 and comment response No. 56.	Parsons/WHC
67	MCO Conceptual Drawings, Sheets 1 and 2, "Bill of Materials"	Ghigleri, T 53	Section 3.3.3 of the Performance Specification states that ASME Section III (and therefore Sub Section NB) is applicable only for Safety Class 1 items. If any item in this bill of materials is not Safety Class 1, Sub Section NB does not apply to that item.	Comment is not valid. Refer to comment response Nos. 38 & 43.	Parsons/WHC
68	GTAW	Palm, M 1	The following comments were developed from review of page B-12, the drawings and the fabrication spec. This process would be the slowest process in terms of deposition rate of filler metal, but by far the cleanest in terms of RT or UT quality welds. So the question that arises is, is it better to go slower, making a better weld and assuring that less time is required for repair, or faster with more repairs. My opinion would be you do anything to assure that the least number of repairs is required. The reason I say this is because as soon as you go from welding to repairing you go from remote to hands on, and in this situation it's a major difference in time and exposure.	No response may be required here.	WHC

69	GMAW	Palm, M 2	This process is used throughout industry for every conceivable application. I can't believe that the procedure couldn't be developed to produce a weld that would give acceptable porosity limits. Like stated, a dual head application can be used to make the deposition rate very competitive. Once again the minimum defect process to minimize repairs is more desirable than a deposition rate.	No response may be required here.	WHC
70	FCAW	Palm, M 3	This process would compare very closely to GMAW, as far as equipment design and process capabilities. The problem that exists with this process is cleaning the slag off the weld joint area after each pass to assure that the following weld pass doesn't have slag entrapment. The other major concern is the accumulation of this slag, which I guess would be contaminated, down in the pit.	No response may be required here.	WHC

71	SAW	Palm, M 4	The first comment is that you have welding horizontal and flat mixed up. The SAW process is normally applicable to the flat position, not the horizontal. If you were welding the deck of a ship you should be welding in the flat position, and to weld the sides of the ship would be horizontal. Since ALARA was mentioned, this process will produce by far the most waste product because of the amount of slag produced on each pass. The disposal of this slag, especially if it is contaminated, makes this a major problem. This slag will need to be removed from the weld joint area after every pass, to assure a clean following bead. This process will give the highest rate of deposition, but unless the procedure produces high quality welds, the high deposition rate is of little value. One other concern is the visibility of the weld joint in relation to the electrode. The weld joint is filled with flux before striking the arc, which requires electrode alignment before the flux is applied. This is not a complicated step when did manually but when done remotely, causes more concern.	Noted.	Parsons/WHC
72	Drawing 3 of 3, Weld Joints and Symbols, Detail 1	Palm, M 5	The weld joint symbol calls out a full penetration weld but the drawing itself does not show it. In fact it is hard to figure out what the drawing is showing.	Noted. Will clarify in 90% Design.	Parsons
73	Drawing 3 of 3, Weld Joints and Symbols, Detail 2	Palm, M 6	This weld joint calls out for a full penetration weld for which it could never be. To be a full pene weld it would have to penetrate the full thickness of the base metal. If it is not intended that the weld be full pene then an amount of needed wall thickness needs to show up as part of the weld symbol.	Noted. Will address in 90% Design.	Parsons

74	Drawing 3 of 3, Weld Joints and Symbols, Note 3	Palm, M 7	Longitudinal butt weld? Are you making one?	This weld is preliminary and will be further developed for 90% Design.	Parsons
75	Fab Spec, paragraph 6.5.2	Palm, M 8	Review of WPQs (welder qualifications) is also necessary.	Noted. Will address in 90% Design.	Parsons
76	Project Design Criteria, Section 5.0	Clements, D 1	Exceptions to ASME Code III Requirements, states that exceptions to ASME Section III Sub Section NB will be taken in the following areas: Weld Geometry, Non Destructive Examination, Leak Testing, and Code Stamping. The only exception should be for Code Stamping. The other requirements should still be used to ensure that the MCO welds are properly radiographed and inspected and to ensure that containment requirements are met.	Comment is not valid. Exceptions as stated in Section 5.0 of the Project Design Criteria will be taken for weld geometry, non-destructive examination, leak testing, and code stamping. It is not possible to design, fabricate, inspect and test a MCO to the full requirements of ASME Section III without incurring considerable time and expense. The commercial nuclear industry and its governing organization, the USNRC, recognize that the ASME Code cannot be met in its entirety with respect to spent nuclear fuel storage vessels. Therefore, the industry takes exceptions to the ASME Code, and the USNRC grants approval of the exceptions. The MCO will meet the intent of the ASME Code for the design, fabrication, inspection, and testing requirements. It will not meet the ASME Code in its entirety. Finally, there has never been a cask or canister that has met the requirements of the ASME Code. However, all current designs meet the intent of the ASME Code.	Parsons/WHC
77	Table 1	Clements, D 2	MCO Design Criteria, in the Design Basis Accidents-Transportation section, should refer to the accident conditions listed in WHC-SD-PDC-030, Packaging Design Criteria for the MCO Cask. Those accident conditions will be applied to the entire packaging system (MCO within the cask), but exposure of the entire system to the 800°C fire for not less than 20 minutes may have some effect of the MCO design.	The next revision to the Performance Specification will include specific reference to the packaging system fire (800 °C). However, there is no impact to the MCO Design as the Cask Specification indicates that for this fire event, the MCO temperature must not exceed 122 °C. The MCO has a design temperature of 375 °C, so this bounds the cask fire event.	WHC

78	Fabrication Specification, Section 1.2, 3rd paragraph	Clements, D 3	Description of the MCO states that the shield plug may be cast iron, carbon steel, or stainless steel, or a combination thereof. If a combination of materials is used, no corrosion or galvanic reaction with other MCO or cask materials is acceptable.	Comment is noted, and will be addressed in the final design.	Parsons
79	Section 6.1, General Requirements	Clements, D 4	General Requirements, states that MCO welding, inspection and examination shall comply with ASME Boiler and Pressure Vessel Code Section III, Sub Section NB. However, Section 5.0 of the Project Design Criteria states that exceptions to the Code requirements will be taken in the areas of weld geometry, non destructive examination, and leak testing. These two documents appear to conflict.	Comment is not valid. There is no conflict. The words "as noted" appear in the referenced section. There meaning is extremely important. In other words, the ASME Code will be met to the greatest possible intent. However, there are exceptions, and they are "as noted" on the MCO Design Drawings and within the Fabrication Specification.	Parsons
80	Section 6.5.5, 3rd paragraph	Clements, D 5	The following statement should be added to the end of the paragraph, Non-Destructive Examination: "NDE personnel qualifications should be submitted to the buyer for approval."	Comment is noted. Seller's QA program will require NDE personnel training records and qualifications per Table 11-1. The need to submit the NDE personnel qualification records for approval to the Buyer is not required for the commercial nuclear industry. Will comply.	Parsons/WHC
81	Section 7.2.1	Clements, D 6	Leak Test for MCO Shell Assembly states that the inner bottom cover to MCO cylinder shell shall be helium leak tested with a maximum acceptable leakage of $1x10^{-5}$ scc/sec. Section 3.2.1.3 of the Performance Specification for the Spent Nuclear Fuel Multi-Canister Overpack states that the maximum total leak rate of the MCO containment boundary shall be $1x10^{-7}$ scc/sec. The fabrication specification does not appear to meet the performance requirement.	This will be addressed for 90% Design. The 10^{-7} or less leakage rate is needed for the MCO during shipping in the cask. Less demanding requirements may ultimately be utilized in other areas but the 10^{-7} requirement is in for shipping so the MCO has to be that good as a minimum.	Parsons

82	Drawings	Clements, D 7	Neither of the welds identified on sheet 3 will meet ASME Code. Section 6.1 of the Fabrication Specification states that all welds shall comply with the ASME Code Section III, Sub Section NB. In addition, the inner bottom cover to MCO cylinder weld identified in Detail #1 cannot be radiographed, while note 3 states that weld will have 100% radiographic examination.	Comment is not valid. Refer to comment response No. 79, and comment response No. 39. 90% Design will show details.	Parsons
83	Drawings	Vistica, J 1	From a general standpoint it looks good. No significant comments for this stage. There are some things missing (which may be planned later) that I will just mention. Safety Class 1 features: Details of the center spacer and baskets were not apparent. I'll assume you are tying down the shell design first.	Noted.	WHC
84		Vistica, J 2	MCO tests: I did not see any drop test of a fully loaded MCO.	Will be addressed for 90% Design.	WHC
85	Fabrication Specification	Swenson, C 1	There should be a requirement for drop tests with metal or pipe of equivalent weight and size of fuel loaded in the MCO baskets to a prototype MCO. Drop tests should be 2-feet (plus 2"?) To an unyielding surface. If that is planned for an advance prototype separate from this production spec-great. However, don't rely on calculations.	The Fabrication Specification is for fabrication of the MCO. Any drop tests required will be performed by WHC after other prototype testing is complete.	WHC
86	Project Design Criteria, Table 2	Swenson, C 2	Criticality Value is Ke=.95 for NRC equivalency.	Noted.	WHC
87	Project Design Criteria, Table 2	Swenson, C 3	Seismic load will be based on a storage tube response spectra to the .35g ground motion to the CSB structure. This probably won't be .25g.	Noted.	WHC

88	Fabrication Specification, Section 7.0	Swenson, C 4	No pressure tests required to check welds or is that same as "leak-tests"?	Pressure test is usually a "proof test" (i.e., over-pressure test at 110% to 150% of design pressure). It is usually not done for a canister, such as the MCO. In stead a low pressure (i.e., 5-10 psig) "leak-test" utilizing a trace gas, such as helium is utilized to identify and locate leaks.	Parsons
89	Project Design Criteria, page 3, Section 3.3, 3rd paragraph, last sentence	Blackburn, L 1	Explain how the shield plug maintains the integrity of the MCO.	Several designs of the MCO shield plug are possible. One of the concepts is a one piece shield plug where the functions of pressure boundary, shielding, and structure are combined into one thick piece. Integrity in this case probably refers to the containment of the SNF inside the MCO by the shield plug.	Parsons
90	page 4, Section 3.0, first paragraph page 7, Section 5.0, first paragraph	Blackburn, L 2	Explain whether the terms "other pertinent sections" and "other applicable sections" are to include provisions of Sub Section NCA requiring Certificates of Authorization and use of an Authorized Inspection Agency.	"Other pertinent sections" and "other applicable sections" both refer to the same issue, that is, ASME Sections II, IX, XI, etc. where they are applicable (i.e., ASME Section III, Sub Section NB refers to ASME Section II for material matters.). Authorized Inspection Agency is not required for this project.	Parsons
91	Fabrication Specification, page 1, Section 1.0, second sentence	Blackburn, L 3	Change "Class I" (capital I) to "Class 1" (numeral one).	Comment is noted and will be addressed. Commercial nuclear industry interchanges "1, 2 & 3" with "I, II, and III". Will comply.	Parsons
92	page 5, Section 4.1	Blackburn, L 4	Either the number or the title of ASTM A370 is in error. The title of ASTM A338 should be "...High-Strength Sheet Materials". Standards ASTM A20, ASTM A484, and ASTM A887 do not appear to be used in the text and should therefore be omitted.	Comment is noted and will be addressed. ASTMs were for carbon and borated materials which are not used for this project. Draft Revision 0 Performance Specification originally made mention of the use of borated materials for criticality control. Will be evaluated further for 90% Design.	Parsons

93	page 6, Section 6.1, first paragraph	Blackburn, L 5	In the first sentence, change "Class I" to "Class 1". The specific components that are subject to Sub Section NF or Sub Section NG is not clearly identified here or in later sections of the document and this omission results in confusion. Why are steel baskets that are required to meet Sub Section NF also required to meet impact testing and inspection (shouldn't this be "examination") requirements of Sub Section (should be Article) NG-2000 when Article NF-2000 contains impact testing and examination requirements?	We are using NUREG/CR-3854 (UCRL-53544) Fabrication Criteria for shipping Containers which was prepared by Lawrence Livermore National Laboratory for the Nuclear Regulatory Commission as a guide line for the selection of appropriate codes and standards applicable to the MCO. There will be areas of the MCO, due to its nature and multiple interfaces with transportation and process, which will be unable to follow this guide exactly, so there will be an exception report that will discuss our position and rationale on why we believe our path is adequate and equivalent. This guide has a summary Table 1.1 of the requirements for our payload as follows: Containment — Section III, Subsection NB Criticality — Section III, Subsection NG Other Safety — Section VIII, Division 1 or Section III, Subsection NF We are trying to get this job done for onsite shipments and storage by using analytical techniques to model accidents and drops without any qualification drop tests of the MCO or transportation cask.	Parsons/WHC
94	page 7, Section 6.2, first paragraph	Blackburn, L 6	The term "equivalent to" implies that the substitution does not meet all the requirements, while the term "in compliance with" implies that all requirements are met, therefore these terms should not be connected by "and". Which one is really intended?	Both are correct. Terminology has been utilized in the commercial nuclear industry for spent fuel storage components for more than 10 years without confusion or problems. in addition, all material related items are required to be submitted to the Buyer for approval. Exceptions will be explained in the Exceptions Report.	Parsons

95	page 7, Section 6.2.1, first paragraph	Blackburn, L 7	Explain where SA-516 Gr. (should be Grade) 70 materials will be used. NG-2310 only imposes impact testing as a requirement when the Design Specification states impact testing is required. What document is to serve as the Design Specification and will it require impact testing? Even if impact testing is required by the Design Specification, NG-2311 identifies materials that are exempt from impact testing. NG-2331 applies only for material thicknesses not exceeding 2". NG-2332 applies to material thicknesses exceeding 2" and the requirements are different from those of NG-2331. Extension of NG-2331 to greater thicknesses than 2" should be viewed as a deviation from Code requirements and be so documented.	Originally, it was thought that baskets and/or MCO components may be made of carbon steel (i.e., SA-516, Grade 70). Since, the time when the Fabrication Specification was written, the use of carbon steel is no longer being considered. The Design Specification (i.e., the Performance Specification) is a WHC document. reference to ASME Code requirements other than Section III, Sub Section NB is not addressed. Wording in Fabrication Specification is based upon commercial nuclear industry practices and has been found to be acceptable by client utilities and the USNRC. The Fabrication Specification was "offered" as a document for comments. Specific DOE and/or WHC requirements other than Sub Section NB have not been documented nor transmitted to Parsons. Finally, the Fabrication Specification as stated was written based upon commercial nuclear industry practices for spent fuel components, since the Owner (i.e., DOE and/or WHC) did not provide a Design Specification in accordance with the requirements of ASME Section III, Sub Section NCA.	Parsons/WHC
96	page 8, Section 6.2.1, B, first sentence	Blackburn, L 8	Add Sub Article NB-2500 in addition to Sub Article (should be Sub Article) NB-4130.	Comment is noted. Comment provides additional requirements not stipulated by Draft Revision 0 Performance Specification. Refer to comment response No. 95. Will be evaluated further for 90% Design.	Parsons/WHC
97	page 8, Section 6.2.1, B, last sentence	Blackburn, L 9	The sentence conflicts with NB-2122 which states "Special requirements stipulated in this Article shall apply in lieu of the requirements of the material specification whenever the special requirements conflict with the material specification requirements." If there is no conflict in requirements, then both sets of requirements should apply.	Comment is noted and agree with comment. Will be clarified in 90% Design.	Parsons/WHC

98	Page 8, Section 6.2.1, C	Blackburn, L 10	In the first sentence, NB-2400 should apply only to those portions of the MCO that are containment boundary. See Comment 3 with regard to the second sentence.	Subsection NB applies only to containment and criticality control.	Parsons/WHC
99	Page 9, Section 6.3.2	Blackburn, L 11	In the first sentence, change "lien" to lieu". NB-4212 does not address rolling to final form, direction of mill rolling, or accurately cutting to size prior to welding. Third sentence, are not NF-4200/NG-4200 applicable?	Typographical mistake will be corrected as noted. This will be further evaluated for 90% Design.	Parsons
100	Page 11, Section 6.5	Blackburn, L 12	To avoid a conflict between the second and third paragraphs, change the second paragraph to "All welding of Code items..."	Will comply.	Parsons
101	Page 13, Section 6.5.3, E	Blackburn, L 13	Given that the Drawings indicate material is 304L and give that the intended conditioning operation will exceed 350 °F, this limit seems too restrictive.	Comment not valid. Note that the requirement in the Fabrication Specification is in the "Preheat and Interpass Temperature" Section and only applies to that operation.	Parsons
102	Page 17, Section 7.2.1, first paragraph	Blackburn, L 14	The test pressure does not meet the Section NB requirement of 1.2 times the design pressure. The acceptable leak rate does not meet the requirement of the Performance Specification of 1 E-7 std cc/sec.	A leak test at 10^{-7} scc/sec will be recommended in place of the test pressure of 1.2 times the design pressure and will be documented in the exceptions report.	Parsons/WHC
103	Page 18, Section 7.2.2, first paragraph	Blackburn, L 15	The test pressure does not meet the Section NB requirement of 1.2 times design pressure.	A leak test at 10^{-7} scc/sec will be recommended in place of the test pressure of 12 times the design pressure and will be documented in the exceptions report.	Parsons/WHC
104	Page 21, Section 9.1.1	Blackburn, L 16	Change "ASME Section II" to "ASME Section III".	Typographical mistake will be corrected as noted.	Parsons
105	Page 22, Section 9.1.2	Blackburn, L 17	In item 1, change "ASME Section II Certificate of Authorization" to "ASME Section III Quality System Certification (Materials)". Why are items 1 and 2 included here since they constitute category "A" materials?	Comment is noted. This will be corrected for 90% Design.	Parsons

106	Conceptual Drawings MCO Shell Assembly, Sheet 3 of 3	Blackburn, L 18	The representation of welds is confusing. Modify (see comments from Mike Palm, weld engineer) so that conformance or non-conformance to Code requirements can be more readily assessed.	Comment is noted. Refer to comment response No. 82 & 95. This will be evaluated further for 90% Design.	Parsons/WHC
107		Blackburn, L 19	An "illegitimate" comment: The Performance Specification appears to require Sub Section NB of the ASME Code, and the Parsons' submittal meets this requirement. However, NRC has licensed systems for dry storage of commercial fuel that are based on Sub Section NC. Since the requirements of Sub Section NC are less restrictive, some cost savings should be available.	The more stringent NB comes from a NUREG related to the transportation package.	WHC
108	Project Design Criteria, Section 1.2, first sentence	Kee, A 1	Is the PDC intended to supersede the MCO performance spec. WHC-S-0426?	The PDC is intended to document the specific design requirements gleaned from the Performance Specification, the Functions and Requirements document, and the applicable codes and standards. It acts as a check document to ensure the designer is interpreting the "soft" requirements in those documents the way they were intended. It will also serve to identify areas where the design must take exception to ASME Section III, Sub Section NB requirements due to other constraints imposed by the Performance Specification.	WHC
109	PDC, Section 3.2	Kee, A 2	For the transportation phase, need to include reference to WHC-S-0396, Cask and Transportation System Specification	Comment is not valid. Draft Revision 0 Performance Specification and Revision 0 Performance Specification do not mention document WHC-S-0396. Will incorporate in 90% Design.	Parsons/WHC
110	PDC, Section 3.3	Kee, A 3	Note that deformation of the MCO is limited by the relatively stiff and unyielding cask during operations involving the cask.	The baskets are not confinement baskets, as the tops are open. The baskets are not counted on for any other purpose other than holding the fuel for loading, cold vacuum drying and hot conditioning process needs. As the design is shaping up, the baskets are not needed for criticality control.	WHC

111	PDC, Section 4.0, first paragraph	Kee, A 4	What does "...mandates continuous quality improvement..." mean?	QA Programs in general are a mechanism of mandating, implementing, and achieving continuous quality improvement.	Parsons
112	PDC, Section 4.0, 2nd paragraph	Kee, A 5	Since this is an onsite activity, no NRC involvement is required. Remove reference to NRC approval of QA.	Will comply.	Parsons/WHC
113	PDC, Section 5.0	Kee, A 6	Why was Sub Section NB selected?	NB was selected based on NUREG/CR-3854 "Fabrication Criteria for Shipping Containers". This guide is being used for the MCO in the most stringent area, the transportation of the SNF. Not all portions of NB will be met and these exceptions will be explained and justified in the "Exceptions Report" being prepared by Parsons.	Parsons/WHC
114	Table 1, MCO envelope, length	Kee, A 7	WHC-S-0396, Figure 15, SK-1-80096, establishes the maximum MCO length is 13'4".	Noted. Will address in 90% Design.	Parsons/WHC
115	Table 1, Vent/Pressure Relief	Kee, A 8	Under Transportation, add after Sealed "per leaktight definition of ANSI N14.5 (i.e. integrated leakage rate $<1x10^{-7}$ std cc/sec air."	Comment is noted and will be addressed in the table.	Parsons/WHC
116	Table 1, DBA, Transportation	Kee, A 9	Fire conditions are defined in Section 4.3.5 of WHC-S-0396, Rev. 1.	Noted.	Parsons/WHC
117	ICD-MCO-020	Kee, A 10	Need to adjust length per comment #7 above. Need to verify that the straightness of 0.125" per 10' can be economically achieved.	Will comply.	Parsons/WHC
118	ICD-MCO-030	Kee, A 11	The grapple concept for the basket does not work with the fixed center pipe design.	Grapple design will work with all proposed designs, including the recommended center pipe design. Grapple design will be included in 90% Design.	Parsons

119	Shell Assembly Drawing	Kee, A 12	a) Is the grapple pocket covered during handling operations under water? If not, how is it drained/decontaminated? b) The installation/removal of the 8 flange cover bolts presents a dose concern. Can this be remote handled? c) Is the flange cover a leak testable seal?	a. Refer to comment response No. 6. b. Refer to comment response No. 3. c. Refer to comment response No. 2, 3 & 10.	Parsons
120	Shell Assembly Weld Detail and Notes	Kee, A 13	a) Note 4: Please explain what is meant by "Code of Construction." b) Detail 1/S-1 should show full penetration weld. c) Detail 2/S-1 calls out PT root and cover. Will additional volumetric inspections be performed? UT or RT?	a. "Code of Construction" is a common commercial nuclear industry term that refers to the specific ASME Code section, Sub Section, addenda, and year. b. Comment is noted. Design is preliminary and shows concepts. c. Volumetric inspections are not required. Refer to comment response Nos. 76, 79 & 82.	Parsons
121	Project Design Criteria, Table 1, page 11	Bradley, T 1	Under Vent/Pressure Relief and CSB-Staging, the installation of a 2' - 3' extension beyond the MCO length is discussed. How does it work? What does it look like?	Extension of 2' to 3' beyond the MCO length may be required for process valves and fittings, pressure relief devices, venting device, HEPA filter, etc. Parsons is pointing out the fact that to accommodate these items may require a significant increase in overall MCO length. In addition, these items would have to be protected for MCO DBA drops and normal handling. Draft Revision 0 Performance Specification only requires "penetrations and connections". The actual requirements for the aforementioned items has never been specifically defined.	Parsons/WHC

122	Valve Study, Appendix C	Bradley, T 2	The proposed use of quick connectors is much preferred to valves on the MCOs. Table C-5 on page C-13 lists manufacturers and ratings of several different types, but it's not clear which one(s) is intended for use. Ensure one is available for the temperature and leakage rate during the conditioning process and a leakage rate after conditioning sufficient to demonstrate a positive helium backfill. Control of contamination during the "burp" that occurs when the quick disconnector is connected to an MCO under pressure (eg. Upon receipt at the CSB for staging) should be addressed.	Please refer to comment response No. 7.	Parsons
123	Fabrication Specification, Section 6.0, Manufacturing Requirement	Ruff, E 1	a) Consider adding another Sub Section entitled "6.7 Component Marking". b) In this new section, stipulate that each of the major pressure boundary components (i.e. shield plug, bottom end closure, and shell) be permanently marked with a unique serial number. c) Require the fabricator to maintain a material record system which enables the source material for each serialized component to be traced to the metallic material supplier heat and lot number. (Question: Is this the intent of Section 11.3 D - "Certified Material test reports with actual chemical and physical properties for each heat number for all material (i.e. piece traceability shall be provided).")	Comment is noted. ASME Code requires material record system for material supplier heat and lot number. Also refer to Sections 6.2.1, 8.0, 9.3.1, 10.2.1, 10.2.2, 10.2.3, and 11.3 of the Fabrication Specification.	Parsons
124	Shell Assembly Drawing Sheet 3 of 3	Ruff, E 2	On Note 2, it is stated that a serial number shall be applied to each DSC. Please define the term DSC.	This is a typographical error. "DSC" should be "MCO".	Parsons

125		Schierman, K 1	The specification does not include a vacuum capability spec., hence this carries over into the Parsons' proposal. In order to match the cold vacuum drying specification Section 3.3.3.1 (pg. 18) of the MCO, specification should show 0.1 torr vacuum. In Parsons' proposal see areas 3.1.3.1 of Appendix A (pg. A-11), 4.0 of Appendix B (pg. B-11) for example. This needs to be resolved ASAP as vacuum is an important design characteristic.	Draft Revision 0 Performance Specification does not address vacuum value. Revision 0 Performance Specification also does not address issue of vacuum. This will be addressed in 90% Design. A requirement for full vacuum on the interior of the MCO with a concurrent external pressure of 10 PSI on the MCO is established. This makes an allowable external net pressure on the MCO of 25 PSI during Cold Vacuum Drying processing. The MCO also has a need for full vacuum on the interior during the Hot Conditioning cycle up to 375 °C limit, so a 15 PSI limit will be added also for conditioning processing. These values will be added to and/or clarified in the specification for the MCO.	WHC
126	Section 2.3, page 10	Schierman, K 2	Says external valves and fittings do not have to be addressed as part of the overall MCO length. Section 3.2.2.3 (pg.12) of the MCO specification says they should be included.	Will comply.	WHC
127	Section 3.3.3.1, page 18	Schierman, K 3	Uses a design temperature of 350 °C while the Parsons' presentation uses 375 °C (3.1.1.9 of Appendix A, for example).	Noted. 375 °C is correct.	WHC
128	Section 3.2.3.1, page 13	Schierman, K 4	Says items needed to maintain subcriticality must last 75 years. The internal basket which maintains configuration should apply to this criterion. Section 3.1.1.12 of Appendix A (pg. A-5) of the Parsons' presentation says basket integrity is not required for the life of the MCO.	This will be addressed for 90% Design. However, it is not a requirement.	WHC

129		Carlisle, B I	The seismic acceptance criteria that no breach of the pressure boundary does not consider the secondary requirement of fuel configuration control. I understand that the center pipe will keep the fuel in a sub-critical array with no credit for the basket integrity. Will the center pipe maintain its configuration during a seismic event for all orientations and during all phases of the loading (various numbers of baskets or partial load states)?	The center pipe will remain intact per the requirements of the Performance Specification. The center pipe is needed for MCO criticality control for the higher enriched fuel under conservative accident conditions. In the MCO, the center pipe creates an occlusion void where optimally rubble-ized fuel is prevented from occupying the void space, thereby reducing the Keff for the configuration. The current plan is for the basket partitions and some other parts to be expendable during an MCO accident and not needed for criticality control. We may use and take credit for a central structural tube, captured by the occlusion pipe in the closed MCO, of a basket in the criticality calculations. The current plan, as explained by Parsons to me, is that the center occlusion pipe will be fixed to the bottom of MCO prior to the beginning of loading of baskets of fuel. After the loading is complete, the shield plug is then put in place. This action captures the upper end of the occlusion pipe inside the MCO before the MCO is removed from the load out pit. The shield plug will be secured into the MCO and cask before the MCO/cask assembly is removed from the basin load out pit. It is our intention to have the occlusion pipe maintained in a safe position inside the MCO at the basin during a seismic event or when fuel loading operations are under way. Analyses to support safety will have to be completed to back up the Safety Analysis Report for the K Basin Facilities.	WHC

130		Carlisle, B 2	Will the lack of seismic qualification of the baskets allow unsafe configuration while the fuel is in a que or in transit across the basin to the que?	If the fuel baskets are shown to be seismically inadequate for handling in the open water of the basin and for queuing storage service then the need for an in basin basket handling shell to support the fueled basket may become apparent. A handling shell would then be used for all handling steps of loaded baskets except the final placement of the loaded basket into the MCO. In this case, the final placement path of fuel into the MCO from the loading queue would probably be as short as possible and probably not pass above other substantial quantities of fuel in the basin. The details of the handling of the fueled baskets in the basin have not been worked out yet.	WHC
131		Carlisle, B 3	Will the basket preclude movement of fuel fragments that become dislodged from brittle whole elements? If movement is not precluded what measures will be taken to prevent these fragments from becoming lodged between a basket and the MCO shell? If no precautions are taken what is the consequences of: Localized hoop stress on the MCO shell as a result of thermal cycling during conditioning or reorientation of the cask. Removal or insertion of the basket; I note that we take credit for always revering the unloading process.	Particles of fuel that fall off the bulk fuel will either stay in the basket, fall through, or lodge in the mesh of the basket. The plan for the baskets now is for the baskets to be made up of wire construction with spaces between the wires approximately one quarter inch. The radial gap between the basket and the wall of the MCO is nominally one quarter to three eights of an inch. A particle that gets through the wire would likely stick out one eighth of an inch before it fell off the basket. A fuel particle lodging between the basket and interior wall of the MCO is possible but not likely to cause a deleterious stress riser on or significant damage to the MCO shell. The basket will be somewhat flexible compared to the wall of the MCO, and nay interfaces that may exist will be taken up by the basket. Removal of loaded baskets from the MCO is possible, but we do not have a normal sequence need for the unloading of the MCO. If the fill height of the MCO is too high after the last basket is loaded, then this upset condition may require the down loading of the MCO to determine the cause. The Plan for the MCO is to load, ship, cold vacuum dry, hot condition, and store the MCO in a vertical orientation.	WHC

132		Carlisle, B 4	As the basket is designed by the MCO Sub-project, the safety analysis of a loaded basket drop, within the fuel containing basin, should be added to the design basis accident list.	The comment is noted and will be included to the Performance Specification possible accident scenarios. Also, please see the response to #130.	WHC
133		Carlisle, B 5	Will the design of the fuel basket also meet DOE-RL-92-36 Hoist and Rigging Manual?	Yes, the Hoisting and Rigging manual will be included in the MCO Performance Specification and will be used for the design of the baskets.	WHC
134		Carlisle, B 6	The provided interface control drawings have several inter-subproject issues or interfaces identified in notes. There are no associated interface numbers associated with these assumptions or notes. Will each of these be identified (uniquely) on a scope sheet and the unique number identified on the ICD drawing for traceability?	The use of interface control discipline for the SNF project involves the use of Process Flow Diagrams (PFD) that show the Interface Control Numbers on the PFD and where the interface is in relation to the process steps. These numbers are then used on the scope sheets, to reference these locations from the PFDs for traceability, and describe the interface with words. The use of interface control drawings is optional on the project.	WHC
135		Carlisle, B 7	From the moment the MCO is loaded with fuel there is the potential for a runaway fuel reaction. After the shield plug is installed and before the water is drained from the MCO the only relief path is the two small diameter draw tubes. Are these tubes and associated connectors sized to limit the peak pressure pulse when they must eject either water, gas or both?	The MCO shield plug will be equipped with a pressure relief device, presumably a rupture disk, to relieve internal pressure from the MCO. This passage line through the MCO shield plug is expected to be 1" in diameter and vent from the top of the MCO and will not go through the quick connectors. Currently this line is marginal in size and until a more adequate accident scenario is developed, the size of the passage will remain 1". When the needed mass transfer rates for accident mitigation are determined then the passage sizing may be changed from the 1" size. The other passage leading to the lower dip is also available for accident mitigation by the removal of water from the interior of the MCO at the base.	WHC

136		Carlisle, B 8	Why is a rapid fuel oxidation reaction not a Design Basis Accident for the MCO design?	I understand that rapid oxidation of the MCO is not credible for the following reasons: The loaded MCO is always handled in a cask from the basins to handling inside the Canister Storage Building (CSB). So a puncture of the MCO while in the cask is not credible. The top of the MCO is a very thick shield plug, of which a puncture is not credible. At the CSB the MCO is handled in a MCO handling machine and the maximum credible drop to concrete is 2 feet with no slap down. So a penetration of the MCO is not credible while being handled at the CSB. The MCO is always held vertical with no possibility of a side penetration while the MCO is loaded into and unloaded from the CSB storage tubes. The storage tubes will be equipped with impact limiters and another impact limiter will be placed above the lower MCO for the upper MCO to rest on. Some modeling has been done on the MCO with a single 1" hole in the MCO and the hypothesized resulting burn has been found acceptable.	WHC

137		Carlisle, B 9	What is the basis of a 30 mr/hr dose rate limit in the specification for the shield plug (*including streaming around the plug*)? As this exceeds 0.5 mrem and it is a new external source created in this project within a continuous occupancy area, records of a radiological engineering evaluation must be available to show that this has been optimized as required by 10CFR835.	The basis for the 30 millirem per hour is a 8" thick shield plug which matches the wall of the cask. Due to the *passage ways int he shield plug the thickness was* increased to 10" to allow for the material removal from the passages. Every inch of steel in shield plug thickness is an approximate factor of 3" attenuation. The 30 millirem per hour is an average contact rate for an extremity such as hands to make and break the quick disconnects on the top of the MCO. The specification is being modified to include the requirement that no area will have a dose rate higher than 100 millirem per hour 2" away from the surface of the shield plug. This rate is not intended for whole body exposure. This axially pointing gap, so called as streaming around the shield plug, is on the order of one sixteenth of an inch wide by 10" deep and goes around the circumference of the MCO and is oriented parallel to the MCO axis. The aspect ratio is high, approximately 160, and the fact that no appreciable source term will be loacated in view of this aperture gap and the gap is covered with approximately one half inch thick of stainless steel means that very little additional dose above the baseline dose rate of the shield plug will be emitted from this path.	WHC
138		Carlisle, B 10	There is no independent radiological engineer identified on the design review committee. *Though this is not mandatory to comply with* 10CFR835, a justification for not providing this in the review must be in the project records.	A radiological engineering evaluation will be prepared during the testing phase of the MCO prior to the Phase II MCO Design is initiated.	WHC

139	MCO Studies, Page 6, second bullet	Goldmann, L 1	The center pipe in the MCO is needed for only the long dip tube. It is advantageous for the short dip tube to be at the side near the cylindrical wall of the MCO. In the case of a blocked central tube then we have the option to empty out the MCO water by laying down the MCO to remove the water through the short tube.	Comment noted. Short dip tube location will be further evaluated as design progresses.	Parsons
140	Page 6, sixth bullet	Goldmann, L 2	Any sludge that is shipped in the MCO is incidental and left over from the cleaning operation in the Fuel Removal System.	Noted.	Parsons
141	Page 8, first bullet	Goldmann, L 3	The Keff of 0.95 is for the most active fuel with optimum fuel spacing and reflection and with the interior of the MCO dry. We are endeavoring to create a basis for equivalency to cover flooding inside the MCO by using less conservative assumption yet remain realistic for the accident scenarios on site.	Noted.	Parsons
142	Page 8, Section 2.3, fourth bullet	Goldmann, L 4	It is possible that the pressure relief device may need to be active during the whole life of the MCO so provisions should be made for the pressure relief device to be plumbed up permanently to the upper dip tube with no valves between it and the interior of the MCO. There may be a need to put a cover over the device to achieve leak tightness in the future.	Will be evaluated for 90% Design.	Parsons
143	Page A-2, Section 2.0, second paragraph	Goldmann, L 5	The center tube area, when utilized, is an exclusion volume where no fuel is allowed to enter. The center tube will therefore have to be solid or have ends that will preclude fuel from entering the volumetric void inside the center tube during accidents, normal handling etc. The gap around the dip tube also has to be factored into the preclusion scheme.	Comment as noted.	Parsons

144	Page A-7, Section 3.1.2.1.2	Goldmann, L 6	Same comment as above.	Comment as noted.	Parsons
145	Page A-8, Section 3.1.2.4, second paragraph	Goldmann, L 7	The draw tubes have to be reliably attached to the shield plug and be appropriate for the process needs. Consideration should be given for shipping the components separately then assembling them prior to insertion in the loaded MCO.	Will be addressed for 90% Design.	Parsons
146	Figure 4	Goldmann, L 8	The streaming of gamma out through the center of the shielding will have to be looked at an angle just missing the supplemental axial shield block, if this sketch is drawn in proportion.	This will be evaluated for 90% Design.	Parsons
147	Figures General	Goldmann, L 9	Any bores in the shield plug pointing toward fuel in the MCO will have to be evaluated for streaming.	Noted.	Parsons
148	Page C-2, Section 2.0, second paragraph	Goldmann, L 10	It is possible to build the valve into the shield plug using the shield plug material as the valve body. For example a tapered plug valve could be installed into the shield plug body with a quarter turn to open and close. This may be good enough to get by until the seal cover is put over the port after processing.	Noted.	Parsons
149	Page C-2, Section 3.0 and on	Goldmann, L 11	The discussion should include debris lodging in the valve after processing is complete. Let us say a small metal fuel particle is swept up the dip tube and lodges in a ball valve and damages the seats. What next?	Performance Specification requires screens to preclude this from happening.	Parsons
150	Page C-4, bottom of page	Goldmann, L 12	The 375 °C is the maximum allowed for the heating system. The MCO cylindrical shell will probably see this temperature. The shield plug will have a lesser chance of this temperature being achieved.	Noted.	Parsons

151	Page C-15, Section 3.6.1	Goldmann, L 13	The threaded plug could seal on an internal or external face. Either would not use the threads for the seal. An example of an internal seal would be similar to a slave cylinder bleed port on an automobile. An example of an external is a seal under the head of a bolt. In either case backing off the plug would relieve the pressure and keep the plug safely in the threaded hole.	Noted.	Parsons
152	Page C-20, Section 3.6.3.1, last paragraph	Goldmann, L 14	Just one opinion, but I don't believe that the connectors have to be made to section NB unless the processes (drying and conditioning) need that level of quality.	Noted.	Parsons
153	Fabrication Specification	Goldmann, L 15	What is with the propriety information notice? That is as far as I got, and I did not review for this reason.	Will delete this Notice.	Parsons
154	Drawings, Shell Assembly Option A, page 1 of 3	Goldmann, L 16	On the top view they should put the HEPA and Pressure Relief Device in the picture. Also, the top dip tube should be moved to the cylindrical wall of the MCO.	Noted. Will address for 90% Design.	Parsons
155	Shell Assembly, sheet 3 of 3	Goldmann, L 17	Detail 1 shows a corner weld. This weld has to be full penetration and the weld also has to be volumetrically inspected at the factory. The proportions don't seem to match the sketch on sheet 2.	Noted. Will address for 90% Design.	Parsons
156	Drawings	Goldmann, L 18	Earlier we had talked with Parsons and discussed the need of two 3 inch chambers inside the MCO to support the drying and conditioning process. One at the top, below the Shield Plug, and the other at the bottom, between the fuel and the sloped floor. Not it seems that this requirement may be going away at the bottom. The top is still needed to support welding of the shield plug.	Noted. Will evaluate for 90% Design.	Parsons

157	Drawings	Goldmann, L 19	160 inches long is our target length for the MCO.	Comment as noted. Will comply.	Parsons
158	Project Design Criteria, Page 6, last paragraph	Goldmann, L 20	We will not be licensing this work with the NRC nor will we need approval of the NRC for this work.	Noted.	Parsons
159	Table 1, Page 8	Goldmann, L 21	At K Basin, external pressure is 0 to 25 PSI on the MCO. John Irwin may have already given you a value. If mine is different, use John's. CSB staging will also use a low flow HEPA on the MCO to vent the inside of the MCO into the CSB storage tube.	20 PSIG is used for the external pressure per the Cask Specification.	Parsons
160	Table 1, Page 9	Goldmann, L 22	Lifting of the MCO for transportation in the cask. The grapple will not be used at this time. Seismic for the MCO is now 0.35 G as far as I know. May eventually be higher and not a concern.	Noted.	Parsons
161	Table 1, Page 10	Goldmann, L 23	Length of 160 inches (13' 4") is our target for the MCO.	Noted. Will be shown in 90% Design.	Parsons
162	Table 1, Page 11	Goldmann, L 24	Vent Pressure Relief at CSB staging, we would like the pressure relief built into the shield plug and have the option to have it activated at all times. On the MCO drop line, through the CSB while in the cask the limit is 100 Gs. Change the note on the bottom of the page to read to an unyielding "concrete" surface, which is what we will have in CSB.	Will be evaluated for 90% Design.	Parsons
163	Drawing Shell Assembly, Option A	Mills, W 1	The drawing does not indicate a landing for item 2 in item 1. Item 5 will not provide the proper alignment features.	Landing is the center pipe, item No. 5. Disagree with comment that center pipe will not provide proper alignment features. Please clarify the basis for the comment. MCO shell and shield plug are required to bit dry "fit" by the Seller as part of the Fabrication Specification.	Parsons

164	ICD-MCO-020	Mills, W 2	The tolerances indicated on ICD-MCO-020 when stacked up are within 0.125 of interference with the cask. This is if everything is ideal. Temperatures, manufacturing lost tolerances, and other variables make the overall fitup far too tight. This type of tolerance may be acceptable if only one or two MCOs were to be manufactured and they would fit in only one cask which had exact as built dimensions.	Fitup will be tight. However, Performance Specification drives these tight balances.	Parsons
165	ICD-MCO-030	Mills, W 3	Drawing ICD-MCO-030 indicates in cartoon fashion a grapple for the shield plug and one for the tier basket. The design should use the same grapple for both items. Simplistic concepts that are interchangeable will be a must to meet high production rates.	It is impossible to utilize the same grapple for both the shield plug and the basket. This is due to the design constraints and requirements that are placed by WHC on each item.	Parsons
166	ICD-MCO-040	Mills, W 4	Indicates in a cartoon fashion the female grapple connection. The female grapple will require leadin chambers and removal of all sharp edges.	Comment is noted. Chamfers are not required, but can be added as an option.	Parsons
167		Mills, W 5	The design of the shield plug does not lend itself to good decon capabilities. Contaminated water will be trapped in many areas that cannot be wiped, swiped or otherwise surveyed to meet release requirements. (Note: Miska's comments)	Comment is not valid. Proposed design provides the "smoothest" possible design with the least amount of crud traps. Refer to comment response Nos. 6 & 7. Trade offs drove the design to this configuration.	Parsons

168	ICD-MCO-050	Mills, W 6	The flange design is simple but may have some hidden flaws. First the threaded holes will be subject to galling and will require special fasteners made of Nitronic 60 (trade name) or equal. Chrome flash on the fastener threads is only good for one time use. Second, if the flanges are seen as backup to the pressure boundary seals then positive locks such as lock wire will be required. The seals will be required to withstand time and radiation exposure. (Note: The rad number should be low on daily bases, but more than 75 years will be moderately high.)	Studs could be utilized which would eliminate the galling problem. There are a number of materials available that would preclude the potential for galling. It is envisioned that there would be three closings and two openings of the blind flange connections. ASME Section III, Sub Section NB does not require lock wires, or other means of "positive locks" for bolted connections of any type or configuration related to this specific application. There are numerous gasket materials available that can withstand time and radiation exposure. Will evaluate further for 90% Design. Will evaluate further for 90% Design.	Parsons/WHC
169	ICD-MCO-050	Mills, W 7	The quick disconnects??? shown in the drawing have several drawbacks. The temperature extremes that the connections will see limits availability and reliability. Make before break connections will have residual contamination of internal exposed surfaces which cannot be adequately decontaminated. The wells in which the connectors are located will be contaminated on disconnection. If HEPA filtration such as NucFil carbon units were installed on the MCO side of the connections, contamination would be controlled. However, fluid and vacuum flow rates would be drastically reduced. The use of vacuum piping equipment is recommended for the design, temperatures, seals and handling of hardware in Special Worker Protection clothing is more practical.	Temperature extremes are not a problem. A number of vendors have been located that can meet the pressure and temperature requirements. Decontamination is problem with any make or break connection, including valves. However, quick connectors provide a "self-sealing" capability that valves do not. It is therefore expected that resultant contamination will be minimized. There is an excellent track record of quick connection use by the commercial nuclear industry for spent nuclear fuel applications. The wells in which the quick connectors are located can be easily protected against contamination by utilization of a sealing device, a protective funnel, strippable coatings, among many other possibilities.	Parsons/WHC
170	ICD-MCO-050	Mills, W 8	The small gap in the weld zone between the shield plug and the MCO is a contamination trap. During welding airborne contamination will be an issue. The gap also will retain surface tension and pore structure fluids. These fluids will create potential porosity in the route weld.	Please refer to the welding Trade Study which addresses this specific and related issues.	Parsons

171	Shell Assembly Drawing, Option A	Mills, W 9	The 6 inch pipe item 5 interfaces with the tier baskets, which if not clearanced and shaped correctly will inhibit the insertion of the tube/shield plug assembly. What schedule is the 6-inch pipe? Straightness, ovality and diameters as compared to tier basket stackups are not identified.	Please refer to the Fabrication Specification which addresses tolerances and "dry fit" of the MCO components prior to shipment by the Seller. Also please refer to comment response No. 4, 5 & 163.	Parsons/WHC
172	Shell Assembly Drawing, Option A	Mills, W 10	Details of item 4 to shield plug will be crucial to accomplish a workable unit. Mechanical support of the inner tube to prevent loading and failure at the junction of pipe to shield plug is required.	Loading of draw tube is not conceivable.	Parsons
173	Shell Assembly Drawing, Note 1	Mills, W 11	All surfaces finished to 250 or better and plate finishes to A-480 #1. The machined surfaces on the exposed side of the shield plug must have surface finishes of 32 RMS or better to provide a deconable surface, 250 is far too rough. This should also apply to the exposed surface of the outer top of the MCO shell and weld.	32 RMS is very costly. Refer to comment response No. 6. This will be addressed for 90% Design.	Parsons/WHC
174	Shell Assembly Drawing, Note 3	Mills, W 12	Discusses longitudinal butt welds. Does this indicate that the MCO shell will be rolled, welded and machined? If so, the total machining effort will require stress relieving and sophisticated tooling and measurements.	Comment is noted. MCO shell may be made from ERW pipe, seamless pipe, or rolled plate. Final decision has not been made. Longitudinal welds may be required depending on the fabrication selection. Commercial nuclear industry has experienced no difficulties in this area.	Parsons
175		Mills, W 13	It assumed that the shield plug to MCO shell weld will not be radiographically examined. If so this should be defined in notes MCO Shell Assembly Drawing and the method of NDT called out.	MCO Shell Assembly drawing in Detail 2 indicates that closure weld only receives a PT examination.	Parsons

176	ICD-MCO-010	Mills, W 14	The tier basket design appears to have pin to socket interfaces for stacking purposes. Without special location indicators it will be very difficult to align these interfaces with loaded baskets in the fuel pools. Special considerations must be incorporated in this concept. "Time is dose". Pick and place remote handling equipment will become much more sophisticated to accomplish this if the concept is required.	Comment is not valid. ICD drawings are conceptual interface drawings. They do not show specific details. In addition, the specific drawing and detail discussed in the comment is based on a WHC drawing which required the pin and socket interface. The basket requirements have not been fixed, and accordingly the design is on-going. However, criticality structure control requirements, the ability to remove the baskets in tact, the requirement to maintain structural and criticality geometry may require special considerations for the basket design which will result in very sophisticated handling equipment, and increased dose due to alignment and indexing issues.	Parsons/WHC
177	General	Mills, W 15	If only a few MCOs were required, say less than 20, the design may meet muster. However, production runs of MCOs that must fit several casks using the tolerances as shown will be cost prohibitive. Not only will manufacturing be an issue, but the examination and validation of MCOs at the CSB and K Basin will become time and cost prohibitive. As delivered inspections, gaging for fitups prior to insertion of the MCO into the cask and gaging of tier baskets to MCOs will require special tooling, facilities and trained QA personnel. Fabrication of material to tolerances as defined on the drawings is not cost effective and does not meet high production rate requirements.	Design Requirements are driving the tight tolerances.	Parsons
178	Performance Specification	Mills, W 16	The Performance Specification is not crisp and directed toward specific functions and well-defined requirements. Several performance requirements are listed that define special features in design and fabrication. The requirement drivers should be identified.	Agree. The Performance Specification is undergoing revision and language will be tightened up.	WHC

179		Mills, W 17	The physical definition section of WHC-S-0426 has several enabling assumptions (it appears this is the case). Should these not be in an appendix or background area of performance specification?	Agree. See disposition to comment 178.	WHC
180	Section 3.3.2.2 of WHC-S-0426	Mills, W 18	Design basis accidents earthquake. With a full or partial load of fuel and the shield plug not welded in place the MCO cannot meet DBA. Does this mean the K Basin facilities will be required to meet this requirement?	The reference case for the MCO is to have the MCO in the load out pit during loading and until the shield plug is welded to the shell of the MCO. A study is underway to decide where the shield plug will be welded to the shell. If the MCO shield plug is welded out of the load out pit then the shield plug will be restrained to the MCO and cask to keep the assembly together during movements out of the load out pit. The Design Basis Accident (DBA) earthquake described in the specification is for the CSB. Anyway, the K Basins Facility Safety Analysis Report will have to address the DBA earthquake when the fueled MCO either open or with a shield plug placed but unwelded is in the shell and the entire cask/MCO assembly is in the basin load out pit. The open MCO inside the cask will likely be suspended by the crane in the load out pit during loading and placement of the shield plug. K Basin facilities will certainly have to support the overall basis to maintain safety of the MCO. As to which portions will fall to the K Basins facilities is unknown at this time.	WHC
181		Nelson, 1	Shield plug to MCO shell weld joint design is unacceptable for the volumetric inspection (RT, UT) and leak test required.	Comment is not valid. Closure weld will not meet ASME Section III requirements. Weld will not require volumetric inspection (i.e., UT, RT). Closure weld is acceptable for leak testing. See exceptions report included in PDR.	Parsons
182		Nelson, 2	The ultrasonic and leak test will be performed by remote inspection due to the radiation exposure.	Comment is not valid. UT is not required. PT is required. Remote performance of leak test will be difficult without sophisticated equipment.	Parsons

183		Nelson, 3	Since the MCO shell to bottom plate weld joint design limits you to ultrasonic inspection, the weld will need to be ground flush with the base metal.	Comment is noted. However, final weld joint configuration will be modified. Manufacturer will decide which volumetric examination is best suited for the weld.	Parsons
184		Nelson, 4	From an NDE standpoint, the plug and bottom weld design originally discussed at Parsons Engineering would be the best design.	Comment is noted. However, structural design requirements will dictate actual weld configuration. NDE requirements regardless of final weld configuration will consist of PT and leak test. Volumetric inspection is not required, nor is it feasible to design the MCO to accommodate volumetric inspection without significant cost and complexity. See exceptions report included in PDR.	Parsons
185	Fabrication Specification, Section 1.2	Nelson, 5	The shield plug may be cast iron, carbon steel, or stainless steel, or a combination thereof. The above allows for a dissimilar weld joint. Is this the best way to proceed? Cast Iron: porous material with a coarse grain structure. These conditions are not favorable for the penetrant and ultrasonic inspections required.	Comment is noted. Shield plug final design will be based upon structural requirements, process connection requirements, and shielding requirements. Other factors will also be considered, but are of lesser importance. Details will be shown in final design.	Parsons
186	Section 6.5.5	Nelson, 6	All references to the standard technique requirements should be removed from each section. A. General (Change to): The Seller shall submit a copy of their (or sub contractor's) NDE written practice, NDE personnel certification and training records and NDE procedures to the Buyer for approval by WHC NDE Level III prior to start of work.	Will include specific requirement for NDE personnel qualification records to be submitted for approval. Additional requirements listed, beyond those included in the referenced code sections, will be reviewed for applicability and duplication.	Parsons/WHC

187	Section 6.5.5	Nelson, 7	B. Radiography (RT) 1. A demonstration radiograph shall be submitted to the Buyer for review by WHC NDE Level III prior to the start of work. 2. Film cassettes shall be loaded with two pieces of film and two films from the same exposure for each view shot shall be submitted to the Buyer for WHC Level III NDE review. 3. A radiographic test report is required for each weld radiograph and all repair welds. As a minimum, the following information is required: identification of part, material type, thickness range, weld examined, effective focal spot size, isotope or maximum x-ray voltage used, curies or milliamperes, minimum source to film distance, single or double wall exposure, single or double wall viewing, film type and manufacturer, number of films per cassette, penetrameter used and essential hole, shim type and thickness, procedure used, results of exam, date of exam, radiographer's name and level, name and NDE level of radiographer interpreting film.	B.1 Requirement for a demonstration radiograph wil be included. B.2 Comment is noted. However, it is more appropriate for the Seller's NDE procedures, and not the Fabrication Specification. The Seller is required to submit NDE procedures in accordance with Table 11-1 for review and comment. Refer to comment response No. 95. B.3 Will comply.	Parsons/WHC
188		Nelson, 8	C. Liquid Penetrant (PT) A written report of each examination shall be prepared. At a minimum, the written report shall include: Identification of part, penetrant materials used, weld number and/or area, examiners name and NDE level, date of exam, and results of exam.	Refer to comment disposition 187, B.2. Details of PT reports will be addressed via the vendor's NDE procedure submittal.	Parsons/WHC

189		Nelson, 9	D. Ultrasonic (UT) ASME III, Article NB-5000 references ASME V, Article 5 for ultrasonic inspection. Make paragraph T-590 through T-593 required and include a copy of the linearity check for the UT equipment.	ASME Section V, Article 4 will be changed to Article 5. The requirement for linearity check on the the UT equipment iwll be addressed in the vendor's procedure submittal similiar to comment 188.	Parsons/WHC
190		Nelson, 10	E. Leak Testing The leak test method referenced is not a quantitative exam, and therefore can't provide the acceptance standard. The leak rate referenced ($1.0x10^{-5}$ scc/sec) is different than the leak rate in the Performance Specification EDT 607656 ($1.0x10^{-7}$ scc/sec).	The referenced test method ASTM E499 can determine, via calibration of the gas sensing equipment, whether the leak rate (should be 10^{-7} scc/sec) is met. If you have a more applicable method to reference, please provide it to us. 10^{-7} scc/sec will be reflected in the Fabrication Specification.	Parsons/WHC

191	MCO Studies, Appendix B, Section 2.0	Smith, D 1	The study refers to the advantage of a temporary seal to allow weld closure at a separate station instead of over the loadout pit. The study does not address the potential for welding of the MCO in the loadout pit (underwater) and does not address the safety considerations for dropping the MCO prior to having a welded closure.	It is not feasible to weld the MCO underwater for a number of reasons. Some being cost, time, difficulty, increased exposure, etc. In addition, Draft Revision 0 Performance Specification never addressed the possibility of welding the MCO underwater. Therefore, underwater welding was never investigated. Furthermore, the commercial nuclear industry has rejected the idea of underwater welding of spent fuel containers because of the stated reasons. Dropping of the MCO prior to have the welded closure is not a major concern, if the temporary seal is securely in place. The idea of the temporary seal is the direct result of the standard practice employed within the commercial nuclear industry for spent fuel containers. The idea is based on more than 10 years of history and experience. The commercial nuclear industry utilizes a bolted, temporary cover on the transfer cask to hold the storage canister (containing between 24 PWR and 52 BWR fuel elements) and shield plug in place while the entire package is lifted out of the spent fuel pool, and transferred to a decontamination and welding area. The entire package weighs between 125 and 150 tons. The commercial nuclear industry (i.e., utilities) and the governing body (i.e., USNRC) have analyzed and accepted this practice.	Parsons/WHC
192	Appendix C	Smith, D 2	The alternatives do not address the potential for spread of contamination or ease of decontamination. This should be a consideration in the evaluation and selection of the preferred alternative.	The issue of contamination has never been addressed by WHC in Draft Revision 0 Performance Specification. However, even though specific requirements have not been provided in the specification, Parsons did address the issue by utilizing the leakage criterion that was provided. In all cases the selection process used to make a recommendation took into account the leakage criterion and the potential for contamination spread. Furthermore, it should be pointed out that specific and definitive conditioning process connection interfaces are still not known. Parsons' study was performed based on available information and requirements.	Parsons/WHC

193	Appendix C	Smith, D 3	The study includes leak rate requirements but does not address the testing requirements or the repair/recovery in the event the system fails the leak test. There should be a leak test after the MCO is filled and welded.	The comment is noted. Weld repair will be done in another area, if possible, to reduce dose. Weld repair is not part of this design activity. Weld repair is discussed in the MCO integrated test plan. A leak test is planned, but not guaranteed, after the MCO is welded closed.	Parsons/WHC
194	Appendix A and C	Smith, D 4	The studies do not address the potential for failure of the connector/valve assembly during accidents. It is important to minimize the potential for an air intrusion into the MCO and to minimize the in leakage rate in the event of a breach of the MCO.	The specific section addressed is a study. WHC has not provided the specific DBAs in the Draft Revision 0 Performance Specification. Therefore, Parsons' has not been able to perform any type of DBA analysis. In addition, there is currently no requirement to minimize air intrusion into the MCO during a breach, failure or accident.	Parsons/WHC
195	Project Design Criteria, Table 1	Smith, D 5	The leakage is specified as 1E-04scc/sec and 1E-07scc/sec. The leakage rate should be specified based on a differential pressure (the specified leakage rate is easy to achieve if there is not pressure differential). Note that this is based on the leakage rate as specified in the Performance Specification.	The issue of differential pressure requirements for the leakage rate has never been addressed by WHC in Draft Revision 0 Performance Specification.	Parsons/WHC
196	Fabrication Specification	Smith, D 6	Section 7.2.1 specifies a leak rate of 1E-05 scc/sec. This is not consistent with the leak rate of 1E-07 scc/sec in the PDC. As noted above, the leak rate should be in terms of a differential pressure.	The leakage rate requirement is currently set at $1x10^{-7}$ the $^{-5}$ is incorrect. The Fabrication Specification text will be changed. The leakage rate determination is normally made at approximately 1 atmosphere of differential pressure. The 1 atmosphere of differential will be added to the Performance Specification.	Parsons/WHC
197	Fabrication Specification	Smith, D 7	Section 7.2.2 does not include a vacuum test for the MCO. It would seem that a vacuum test should be performed to verify the leak rate under vacuum.	Refer to section 7.2 of the Fabrication Specification which addresses a leak test of the entire MCO shell assembly utilizing helium.	Parsons

198	Performance Specification, Section 2.1	Timmins, D 1	Government documents, identifies 10CFR71 as the applicable source for QA requirements. 10CFR820 sets forth the procedures that govern the conduct of persons involved in DOE nuclear activities and to achieve compliance with the DOE nuclear safety requirements. Under Section 820, Definitions, "Contractor" is defined as nay person under contract (or its subcontractors or suppliers) with the DOE with the responsibility to perform activities or to supply services or products that are subject to DOE nuclear safety requirements. Further, §820.20(b), Purpose and scope, states: DOE may assess civil penalties against any person subject to the provisions of this part who entered into an agreement of indemnification under 42USC2210 (d) (or any subcontractor or supplier thereto), ..., on the basis of a violation of : 1) any DOE nuclear safety requirement set forth in the CFRs; 2) any Compliance Order issued pursuant to subpart C of this part; or 3) any program, plan or other provision required to implement any requirement or order identified in paragraphs (b) (1) or (b) (2) or this section. Moreover, §830.4 (c), General rule, states: when a section of this Part expressly requires a plan, program, or implementation plan, the provisions of any such plan, program, or implementation plan, as approved by DOE, shall be the basis used to determine compliance with the relevant nuclear safety requirements in the section. Based on the above and the fact that WHC has a DOE approved implementation plan (WHC-SP-1131, WHC Quality Assurance Program and Implementation Plan) for 830.120, it is my current belief that 10CFR830.120, in the	All of the comments require WHC action. Parsons has no action until WHC resolves the comments, or provides additional information and/or clarification.	WHC

			§830.120, it is my current belief that 10CFR830.120, in the form of WHC-SP-1131, applies to subcontractors and suppliers performing activities related to DOE nuclear safety requirements. 10CFR71, Subpart H, Quality Assurance, more than likely covers the requirements of 830.120 and WHC-SP-1131. If a comparison has been performed and documented by the SNFP that demonstrates 10CFR71, Subpart H, covers 830.120, I have no comment. If such a comparison has not been performed and documented, then I believe the project may be in noncompliance with the requirements of Part 820 and 830.120.		

199	Sections 2.1 and 2.2, Fabrication Specification 4.0, and Project Design Criteria, Section 3.0	Timmins, D 2	Sections 2.1, Government documents, and 2.2, Non-government documents, reference specific dates for 10CFR71 (1994), 10CFR835 (1993), ANSI/ANS 57.9 (1992), and ASME Section III (1992). In addition, the amplifying information for ASME Section III only references Sub Section NB. The Fabrication Specification under 4.0, Specifying Documents, states: "Unless otherwise noted, the document with addenda, amendments, and revisions in effect on the date of the purchase order will apply." In addition, it specifies 1995 editions for ASME Section III, Sub Sections NB, NF and NG, the latter Sub Sections being associated with plate and shell supports, and the basket assembly, respectively. The Project Design Criteria document under 3.0, Design Requirements, states: "The latest editions of codes, standards, and specifications referred to in this document will be followed." The Performance Specification needs to be reconciled with the Fabrication Specification and Project Design Criteria document.	The Performance Specification will keep the specific dates for the design code of record, however language will be added to state that later editions may be used if mutually consented to in writing between the Design Agent and the Buyer. Using the latest editions of the code is purdent and consistent with commercial design and fabrication practices. However, prior to awarding a fabrication contract, the applicable revisions of these codes will be identified and compared with the revisions used for design to address any disconnects. The Performance Specification, Revision 0 was issued at the same time as the 50% Design. The Design was developed in accordance with the Draft Performance Specification.	WHC

200	Paragraph 3.1.2, Physical Definition, page 7	Timmins, D 3	States: Some of these baskets may be safety class and some may not, depending if configuration control is needed for criticality safety. By having some baskets as safety class and some not, unless the two types of baskets are easily and without question identifiable, there will be administrative control problems. It must be recognized that the potential to mix up the baskets cannot challenge the position that inadvertent criticality is not credible. If the cost differential is small, recommend all be safety class. Should use consistent WHC terminology throughout the document; currently mixed with "safety class" from DOE 6430.1A and "safety class 1" which is based on the WHC safety classification system. (Refer to 3.2.1.7 also.)	All of the comments require WHC action. Parsons has no action until WHC resolves the comments, or provides additional information and/or clarification.	WHC
201	Paragraph 3.2.1.1	Timmins, D 4	SNF confinement addresses three types of baskets to hold N Reactor and SPR fuel elements, but there is no mention of how fuel fragments will be accommodated. Should a fourth basket for fuel fragments be discussed?	The concept on loading fuel fragments was to place them in perforated containers that would be located inside the rerack basket. A rerack basket would hold about five such cylindrical containers. If the general rerack basket design does not include dividers between fuel elements, then these baskets can be used for the fuel fragments, given a container is selected. The guidance letter referenced above directed Parsons to hold off on the fuel fragment basket design until more detail was available.	WHC
202	Paragraph 3.3.1.1, MCO fuel inventory, Table 3.3.1.1	Timmins, D 5	This includes a column titled "Average MCO (based on 390 MCOs)." It is not clear what this column represents or how or when it is to be used.	This column represents the total fuel inventory at the basins divided by 390. The use of this column is optional by the reader. The readers can perform their own calculations if needed. The intention here is to describe an average MCO's content of fuel.	WHC

203	Paragraph 3.3.2.1, Safety classification	Timmins, D 6	States: "Safety Class 1 items of the MCO are expected to be the MCO shell, containment seals and portions of the shield plug, other containment components, and possibly some of the rerack baskets." Restraint items plus other mechanisms may be used to maintain a subcritical geometry; recommend the following type of language be included for clarity: "any items used to maintain the fuel in a subcritical geometry."	These words will be added to the next revision of the Performance Specification.	WHC
204	Paragraph 3.3.2.2, Design basis accidents, page 17	Timmins, D 7	This discusses impact limiters between the MCOs. Are there not impact limiters at the bottom of the storage tubes as well? In addition, this paragraph should also address the potential drop of an MCO into a cask for which impact limiters may not be provided. Under the Design basis earthquake (DBE) discussion, it states: "... Safety Class 1 items shall safely withstand a design basis earthquake while at the CSB with a ground acceleration from .20g to .35g." The MCO will need to withstand earthquake damage while in the CSB for a .35g ground acceleration DBE, which when translated to the location of the MCO, and takes into account potential impacts from other items, will likely be a different and perhaps higher acceleration. The acceleration/impacts experienced by the MCO under DBE conditions will need to be reflected in the Performance Specification among other appropriate design-related documents.	Will add words indicating impact limiter at bottom of storage tube. The drop of an MCO into the cask is currently being analyzed with different modes of shock absorbsion, i.e., water, or cushion material. Effects of this drop will be mitigated via the absorbsion rather than the MCO Design. With the shock absorbtion system, impacts to the MCO are bounded by the drop tests for the CSB tubes. The Performance Specification revision will include the .35g requirement "while in storage at the CSB". The seismic analysis must account for the way the MCO is stored in the tubes. However, because the CSB design and storage tube design is not complete, we do not have enough information during Phase 1 design to perform the seismic analysis. This will have to be confirmed during Phase 2 design.	WHC

208	Paragraph 3.3.4, Materials, processes, and parts	Timmins, D 11	This states: "All materials shall be ASME/ASTM certified materials." Particularly for safety class 1 components, this should be clarified as to whether this is the fabricator's certification or if you are requiring a Certified Material Test Report (CMTR).	The applied ASME code sections will determine the level of certification on the materials for the MCO. It is anticipated that items that become WHC Safety Class 1 are pressure boundary items will require Certified Material Test Reports (CMTRs). This list may broaden, however the actual items requiring CMTRs have not been determined.	WHC
209	Paragraph 3.3.6, Corrosion prevention and control	Timmins, D 12	This states: "The materials used in the MCO shall be such that corrosion will not cause an MCO to exceed leakage rates given in Section 3.2.1.3 of this specification when picked up at the end of its 75-year life." The corrosion should also be such that the MCO's structural integrity for a seismic/impact event is maintained and that under any of these type events subcriticality is also maintained.	You are correct in the closing statement of your comment. Words to this effect will be added to the MCO Performance Specification in the corrosion section.	WHC
210	Section 4.0, Quality Assurance	Timmins, D 13	Refer to comment no. 1.	See response to comment 198.	WHC
211	Fabrication Specification	Timmins, D 14	Refer to comment no. 1, the Fabrication Specification refers to 10CFR71, Subpart H as well.	Refer to response to comment 198.	WHC
212	Fabrication Specification	Timmins, D 15	Refer to comment no. 2.	See response to comment 199.	WHC
213	Project Design Criteria	Timmins, D 16	Refer to comment no. 1, the Project Design Criteria document refers to 10CFR71, Subpart H as well.	See response to comment 198.	WHC
214	Project Design Criteria	Timmins, D 17	Refer to comment no. 2.	See related response 199.	WHC

215	Project Design Criteria, Section 2.1, General Design Concept	Timmins, D 18	This repeats the information in the second bullet in the third bullet.	Will clarify in furture revision.	WHC
216	General	Timmins, D 19	Editorial comments are included as markups on the attached copies of the subject documents.	Noted. Comments 198 thru 215 covered most of the document mark-ups.	WHC

217	General	Timmins, D 20	In regards to NRC nuclear safety equivalency and its application to the MCO, at some point the SNFP needs to incorporate the related requirements identified below: Incorporate WHC Procurement Clause E13 (Reporting of Safety Defects and Noncompliance) into safety class 1 procurement specifications to require reporting by suppliers of defects in items or services. (Note: this procurement clause is currently located in Appendix A, Revision 1, to WHC-CM-4-2 and is associated with 10CFR21, *Reporting of Defects and Noncompliance*.) Use NRC Regulatory Guide 1.26, *Quality Group Classifications and Standards for Water, Steam, and Radioactive-Waste Containing Components of Nuclear Power Plants*, to assist in assigning the appropriate code class to ASME Section III components. Review the NRC positions in Regulatory Guides 1.84 and 1.85, *Design and Fabrication Code Case Acceptability ASME Section III, Division 1* and *Materials Code Case Acceptability ASME Section III, Division 1*, respectively, on ASME Section III code cases before using such code cases for safety class 1 applications. Reflect the NRC positions on applicable code cases used in the designs. Where no NRC position is stated in regards to the acceptance of a code case, that code case may be used as approved by the code Committee.	The deisgn authority has responded to these concerns and questions the applicability of several othe referenced guides to the MCO Design. The following responses were provided to similiar issues identified in WHC-SD-SNF-DB-005. Here are the comments to the forth document, Final Draft Multi-Canister Overpack additional NRC requirements, Revision B of WHC-SD-SNF-DB-005. #2 under responsibile discipline (URD) column, page 4: This section puts the need of the protection of the MCO on the MCO. The MCO itself will have a relatively thin shell and will not really afford much protection from NPH such as tornado. The MCO counts on the various facilities and other equipment to do the protecting of the MCO integrity. If the MCO did this job mentioned in this section we would not need the CSB. These requirements hsould be put directly on all the facilities and other equipment along the way that protect the MCO during its lifetime, if not already done. #4 and #5 URD column, page 5: These two sections are related to the utilization of ASME Section III Code. NUREG/CR-3854 is being used as the criteria for the MCO. This NUREG directs us to Sub Section NB for some components and ND, NG and NF for others. Exceptions to Sub Section NB for containment and some other components will be documented in an exception report that will contain the rationale and justification by the Design Agent and then presented to DOE-RL for their approval. Due to the relative complexity o the MCO, as a participating component of many systems during its lifetime, this exception report will be based on established precedent and may possibly delve into and explore new territory. Exceptions may also be written for other Sub Sections also. As stated in the presented table Regulatory Guide 1.26 is for nuclear waste components and may not be	WHC

			Impose the following definition to identify structures, systems and components (SSCs) "important to safety" in accordance with §72.3: "those SSCs that assure there is not a credible breach of the spent nuclear fuel containment/ confinement such that a radioactive release could be postulated to reach the controlled area, defined as 100 meters from the facility release point." Once SSCs "important to safety" have been identified, impose the requirements for safety class 1 SSCs as defined in WHC-CM-4-46, *Safety Analysis Manual*, Section 9.0, *Safety Classification of Structures, Systems, and Components*, Revision 1. Impose a design basis tornado (including translational velocity, rotational velocity and pressure differential) and tornado missile for safety class 1 SSCs, taking into consideration the most recent version of NRC Regulatory Guide 1.76, *Design Basis Tornado for Nuclear Power Plants*, SECY-93-087, *Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor (ALWR) Designs*, and NUREG/CR-4461, *Tornado Climatology of the Contiguous United States* (potential revisions to SRP 3.5.1.4, *Missiles Generated by Natural Phenomena*, Revision 2), in a manner that assures the MCO's integrity is preserved (i.e., satisfies the "important to safety" requirement).	appropriate in our case. I also point out that Division 1 is listed for Section III. I do not have a copy of Regulatory Guide 1.84 or 1.85 handy, so is it possible that Section VIII is being refered to and the "III" call out is a typo (missing the V)? Any way, if it should have been section VIII Division 1, then it is probably inadequate for containment and criticality control purposes in our MCO case due to the curie content of our payload. #10 URD column, page 7: This section calls out usage of a NUREG-0612 for heavy loads. I do not have this one handy either at this time. We are using ANSI N14.6 for the lifting design of the MCO. #13 URD column, page 8: This section should be directly applied to the all locations where the mCO will reside during its lifetime, if not already accomplished. The MCO, which when bare is basically unshielded in regard to photon and neutron radiation emissions and represents quite a source term, depends on the facilities an dother equipment to protect the MCO from damage and also shield the individuals around the MCO from the surce term inside the MCO. Once resolution is obtained on these issues, any necessary changes to the Performance Specification will be made.	

218	Performance Specification, Section 1.0, first paragraph, first sentence	Rivera, J 1	Change "packaging" to read "preparation" [Function 4.1.1.8.3.4 Prepare and Remove SNF]. Delete "cold". Change "final" to read "hot vacuum".	Next Revision will address.	WHC
219	Section 1.0, first paragraph, 4th sentence	Rivera, J 2	Add "subprojects" after "One of these".	Next Revision will address.	WHC
220	Section 1.0, 2nd paragraph, 1st sentence	Rivera, J 3	Change "packaging" to read "preparation" [Function 4.1.1.8.3.4 Prepare and Remove SNF], and add "vacuum drying, transport, staging (short term storage), hot vacuum conditioning, and interim storage" at the end of the sentence.	Next Revision will address.	WHC
221	Section 1.0, 6th bullet	Rivera, J 4	Change "confine, contain, and maintain subcritical the SNF removed from the K Basins" to read "accomplish the mission of the K Basin Spent Nuclear Fuel Path Forward Project."	Next Revision will address.	WHC
222	Section 2.1, CFR	Rivera, J 5	Add 10 CFR 72 Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste.	Next Revision will address.	WHC
223	Section 3.1.1, 1st paragraph, 1st sentence	Rivera, J 6	Change "SNF" to read "fuel". Change "packaging" to read "preparation" [Function 4.1.1.8.3.4 Prepare and Remove SNF]. Delete "cold". Change "final" to read "hot vacuum".	Next Revision will address.	WHC
224	Section 3.1.1., 2nd bullet	Rivera, J 7	Change "packaging" to read "preparation" [Function 4.1.1.8.3.4 Prepare and Remove SNF]. Delete "cold". Change "final" to read "hot vacuum".	Next Revision will address.	WHC
225	Section 3.1.1, 4th bullet	Rivera, J 8	Delete "cold". Change "final" to read "hot vacuum".	Next Revision will address.	WHC

226	Section 3.1.1, 5th bullet	Rivera, J 9	Change "pressure relief and gas venting" to read "pressure relief, gas venting and gas purging".	Next Revision will address.	WHC
227	Section 3.1.1, 6th bullet	Rivera, J 10	Change "when the MCO is contained within a shielded cask that is open" to read "when shining of gamma rays through the sides and bottom of the MCO is limited by the shielding features of the cask, CSB operating deck, or process areas".	Next Revision will address.	WHC
228	Section 3.1.2, 2nd paragraph, 2nd sentence	Rivera, J 11	Change "process SNF" to read "vacuum dry and hot vacuum condition SNF".	Next Revision will address.	WHC
229	Section 3.1.2, 3rd paragraph	Rivera, J 12	Replace with the following: "The MCO shield plug is cylindrical in shape and designed to mate with the open end of the MCO shell. It provides shielding by limiting shine of gamma rays through the top of the MCO. This allows worker access to the MCO shield plug while shine through the sides and bottom of the MCO shell is limited by the shielding features of the cask, CSB operating deck (while the MCO is in the storage tube), or process areas. The MCO shield plug also provides necessary passages, ports and connectors (matching pair) to enable the functions to vacuum dry and hot vacuum condition the SNF, and to maintain the integrity of the MCO. The MCO shield plug is capable of being handled in air and underwater. While underwater, the MCO shield plug is capable of being installed."	Next Revision will address.	WHC

236	Section 3.1.3.2, 2nd paragraph	Rivera, J 19	Add ", vacuum dry" after "K Basin facilities".	Next Revision will address.	WHC
237	Section 3.1.3.3, 1st paragraph, 2nd sentence	Rivera, J 20	Delete ",by welding the MCO shield plug to the MCO shell or by mechanical means," and add ":and to the K Basin Vacuum Dry Module" at the end of the sentence.	Next Revision will address.	WHC
238	Section 3.1.3.6	Rivera, J 21	Change "final fuel conditioning" to read "hot vacuum conditioning" in title and text. Delete "dry and".	Next Revision will address.	WHC
239	Section 3.2	Rivera, J 22	Change "safety requirements" to read "transportability requirements".	Next Revision will address.	WHC
240	Section 3.2.1.3, 2nd paragraph	Rivera, J 23	Change to read "The MCO shall maintain these leakage rates throughout its design life, with the following exceptions:".	Next Revision will address.	WHC
241	Section 3.2.1.3, 2nd bullet	Rivera, J 24	Delete "cold".	Next Revision will address.	WHC
242	Section 3.2.1.3, 4th bullet	Rivera, J 25	Change "drying" to read "condition".	Next Revision will address.	WHC
243	Selection 3.2.1.4	Rivera, J 26	Change "when the MCO is contained within a shielded cask that is open" to read "when shining of gamma rays through the sides and bottom of the MCO is limited by the shielding features of the cask, CSB operating deck, or process areas". Delete "when the MCO is contained within a cask that has the lid open". Change "between the MCO outside diameter and the cask inside diameter" to read "around the MCO shield plug".	Next Revision will address.	WHC

244	Selection 3.2.1.5, 1st bullet	Rivera, J 27	Delete "cold".	Next Revision will address.	WHC
245	Section 3.2.1.5, 4th bullet	Rivera, J 28	Add "purging".	Next Revision will address.	WHC
246	Section 3.2.1.7	Rivera, J 29	Change "staging at the CSB and prior to vacuum drying" to read "prior to vacuum drying and during staging at the CSB".	Next Revision will address.	WHC
247	Section 3.2.1.8	Rivera, J 30	Delete "cold" in two places. Change "final conditioning" to read "hot vacuum conditioning" in two places.	Next Revision will address.	WHC
248	Section 3.2.2.1	Rivera, J 31	Delete "water draining and cold".	Next Revision will address.	WHC
249	Section 3.2.2.2	Rivera, J 32	Delete "water draining and cold". Change "are" to "is".	Next Revision will address.	WHC
250	Section 3.2.3.1	Rivera, J 33	Change "75 years" to read "40 years". Change "seals" to read "features".	Next Revision will address.	WHC
251	Section 3.2.3.5	Rivera, J 34	Change "shielding closure device" to read "shield plug".	Next Revision will address.	WHC
252	Section 3.3.2.2., 2nd bullet	Rivera, J 35	Delete text and TBD; coordinate with K Basins and CSB subprojects.	Next Revision will address.	WHC
253	Section 3.3.3	Rivera, J 36	Add "10 CFR 72 Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste," after "in accordance with".	Next Revision will address.	WHC
254	Section 3.3.4	Rivera, J 37	Change "75 years" to read "40 years".	Next Revision will address.	WHC
255	Section 3.3.7	Rivera, J 38	Change "75 years" to read "40 years".	Next Revision will address.	WHC

256	Section 3.4	Rivera, J 39	"not currently available within the K Basin facilities" to read "needed to interface with the overhead monorail".	Next Revision will address.	WHC
257	Section 4.4	Rivera, J 40	Delete this section.	Next Revision will address.	WHC
258	Project Design Criteria, General	Rivera, J 41	Add detailed descriptions of all MCO interfaces.	Comment is noted. However it is not required, nor are all of the interfaces known, especially the details. The interface documents included as part of the 50% design deliverable provide the requested information that is currently available.	Parsons
259	Section 2.1	Rivera, J 42	Align with Section 3.1.1 of the Performance Specification for the SNF MCO (WHC-S-0426; October 1995). Also, see comments 1.06 through 1.10 in this report.	Will comply.	Parsons
260	Section 2.2	Rivera, J 43	Align with Section 3.1.2 of the Performance Specification for the SNF MCO (WHC-S-0426; October 1995). Also, see comments 1.11 through 1.17 in this report.	Will comply.	Parsons
261	Section 3.0	Rivera, J 44	Show traceability to the requirements documents listed in Section 2.0 of the Performance Specification for the SNF MCO (WHC-S-0426; October 1995).	Requirements compliance will be documented, however, *this is not a project deliverable.* The final design package will include a design criteria compliance matrix to document the design's compliance with specific sections of the standards listed in Section 2.0 of the Performance Specification.	Parsons
262	Section 3.2	Rivera, J 45	Align with Section 3.1.3 and Appendix A of the Performance Specification for the SNF MCO (WHC-S-0426; October 1995). Also, see comments 1.18 through 1.21 in this report.	Will evaluate for 90% Design.	Parsons/WHC
263	Section 3.3	Rivera, J 46	Align with Section 3.2.1 of the Performance Specification for the SNF MCO (WHC-S-0426; October 1995). Also, see comments 1.23 through 1.30 in this report.	Will evaluate for 90% Design.	Parsons/WHC

264	Section 4.0	Rivera, J 47	Align with Section 4.0 of the Performance Specification for the SNF MCO (WHC-S-0426; October 1995). Also, see comment 1.40.	Will evaluate for 90% Design.	Parsons/WHC
265	Table 1	Rivera, J 48	Specify nominal and abnormal (pressure relief) pressures. Specify nominal and maximum temperatures. Fuel capacity shall be in accordance with Table 3.3.1.1 of the Performance Specification for the SNF MCO (WHC-S-0426; October 1995).	Design pressures and temperatures were provided in the guidance letter (see comment response 200) along with a normal operating temperature. The normal operating pressure is undefined at this time. Information regarding abnormal pressures and temperatures will be added to the Performance Specification and the Criteria Document as they are identified. Will comply.	Parsons/WHC
266	Fabrication Specification, Section 1.2	Rivera, J 49	Need to coordinate with the Project Design Criteria.	Not accepted. Description is adequate for fabrication purposes. Will comply for 90% Design.	Parsons/WHC
267	Section 2.1.A	Rivera, J 50	Should require the preparation and submittal of a Quality Assurance Plan.	Fabrication Specification Sections 9.0, 11.0 and Tables 11-1 and 11-2 all address the issue of a Quality Assurance Plan (including implementing procedures) and the submittal requirements.	Parsons/WHC
268	Conceptual Drawings	Rivera, J 51	These drawings show only one port/passage each for the dip tube that extends to nearly the bottom of the MCO shell and for the dip tube that extends a short length below the bottom of the MCO shield plug. The MCO performance specification requires ports/passages for vacuum drying/hot vacuum conditioning (dip tubes), pressure relief, and HEPA filtering. Is the intention here, to use these two ports/passages for vacuum drying/hot vacuum conditioning, pressure relief, and HEPA filtering?	Comment is not valid. Draft Revision 0 of the Performance Specification did not specifically address the number of penetrations. Section 3.2.1.5 of the Revision 0 Performance Specification requires two 1" penetrations. Each penetration can serve more than one function. Will be evaluated further for 90% Design.	Parsons/WHC

269	Drawings	Rivera, J 52	These drawings show the dip tube that extends to nearly the bottom of the MCO shell ending right at the bottom of the MCO shell. This dip tube should be shown ending a short length from the bottom of the MCO shell.	Comment is noted. Drawing is conceptual.	Parsons
270	Drawings	Rivera, J 53	These drawings show the 6" center tube ending right at the bottom of the MCO shell. Is the intention here to show the 6" center tube attached (welded) to the bottom of the MCO shell or just resting on the bottom of the MCO shell?	6" pipe is welded to the bottom of the MCO bottom plate.	Parsons
271	Project Design Criteria, Criticality	Bradley, T 1	Requirements need to be specified. Table 1, page 11 notes criticality DBA has not been defined. Table 2, page 14, PSARP - Safety Classification, states the baskets can be Safety Class 3, which, hopefully, is an accurate statement, but is dependent on the configuration controls dictated by the criticality analysis; page 15 notes the need for basket criticality constraints. I.e., the configuration controls determined by the criticality analysis has major impact on the Safety Class designation and DBAs for the baskets and the center pipe in the MCO.	A criticality accident involving the MCO is very unlikely. We are designing so a criticality is not possible during normal operations and credible accident conditions involving the MCO on site.	WHC

272	Drawings	Bradley, T 2	The shield plug to MCO shield weld detail (Detail 2/S-1) - This protrusion above the top of the shield plug to accomplish the weld detail requires a lot of machining on the shield plug and this protrusion could be a weak point for a postulated cask end drop accident. Is there a way to accomplish the desirable welding attributes and get rid of the protrusion?	Machining is not required, since the MCO shield plug will most likely be a casting, unless the weld detail can be changed. This protrusion will not be a weak point, since it will not be any weaker than the MCO shell thickness (i.e., 0.50"). As a matter of fact it will be stronger, since the cross-sectional thickness will be greater than the shell thickness. Based upon "quick-calculation", combination of MCO pressure and temperature design requirements, along with lifting requirements, indicates a very high moment at the closure weld. The proposed weld geometry is a direct result of the design requirements. Final computer modeling (i.e., Ansys) will provide an enhanced weld geometry, or present possible alternatives.	Parsons
273	Drawings	Bradley, T 3	Per the drawings and study, it is not clear how and when the draw tubes are installed. The study, page A-12, Section 3.1.4.1 states that it's not feasible to construct the draw tubes integral with the shield plug, but does not define how it is done. Per the drawings, the center pipe in the MCO is attached to the MCO shell and not connected to the shield plug until the shield plug is installed. How is it supported during loading of the baskets?	It is proposed that the draw tubes will be installed integral to the MCO shield plug. This conclusion was reached after the Trade Studies were completed based upon a number of conversations and additional comments. The center pipe is welded to the bottom plate of the MCO. 90% Design will address this.	Parsons
274	Performance Specification, Section 2.1	Bradley, T 4	Add 10 CFR Pt. 72	The design of the MCO is compliant in many ways with 10 CFR 71 for shipping the SNF to the CSB. It is thought that 10 CFR 71 is more stringent than part 72, therefore part 72 is not included as a requirement fro the MCO Performance Specification.	WHC
275	Performance Specification, Section 3.2.1.6	Bradley, T 5	The MCO drawings do not show how the stated requirements for pressure relief is accomplished while inside the cask.	Noted.	WHC

276	Concept of Operations, Step 3	Bradley, T 6	Flow of clean water into the cask pit area and the use of flapper doors in the chute between the pool and cask pit does not appear to be a very positive/fool proof way of ensuring the outside of the cask will not be difficult to decontaminate. This concept is likely better than the rubber sock concept for the cask, but will it result in a reasonable decon effort for the cask? As information, attached is information on a steel sock for the cask concept that was developed a few months ago. Has it been further evaluated? Should add discussion of the process of filling the annular space between the MCO and cask with clean water and sealing the space with the inflatable seal.	The concept to keep the exterior of the cask clean and free of smearable contamination during fuel loading is in several parts. The MCO and cask assembly will be covered on the exterior with a bag, metal can, or other barrier prior to immersion in the load out pit. The water in the pit will be continuously flushed with polished water from the water system to clean and remove radionuclides from the pit water during the time the cask is in the load out pit. The water will leave the pit and enter the basin proper through a set of flapper doors. These same flapper doors will serve as the load out pit entrance point for the incoming loaded fuel baskets destined for the MCO. New, non-recycled, water will also be used at the load out pit for final decontamination of the top of the cask and the exposed portions of the MCO shield plug and MCO shell. So the concept is to keep the water away from the exterior of the Cask and keep the water in the load out pit as clean as possible for decontamination reasons. This recycled water also wets the interior of the MCO so we want that water to be as clean as possible also. Large modifications to the basin areas are not planned so this represents a compromise that appears to be acceptable. The cask purchase activity is separate from the MCO activity. Andy Kee should be able to answer your questions related to the cask and refinements beyond the above discussion. The annulus between the Cask and MCO is utilized by John Irwin during Cold Vacuum Drying of the MCO interior and SNF inside. The way this annulus is filled with water is handled by John Irwin.	WHC

277	Concept of Operations, Step 6	Bradley, T 7	How does the water equalization system work? Since some of the water is replaced with an inert gas, it appears the system can be pressurized through the vent and drain ports, but this is prior to the shield plug being welded. May want to consider the use of a siphon tube to establish this air pocket.	The equalization system is a concept at this time and has not been designed. The system could utilize a siphon to move the small amount of water out of the MCO to create the void then be valved off after the water is equalized. An inert gas stream could be used to replace the removed water. Doing the water removal from the top several inches of the MCO without pressurization and/or pumping will reduce the risks and allow for a simple operation.	WHC
278	The Study, Temporary mechanical seal	Bradley, T 8	Use of this temporary seal, discussed on page B-21, to avoid the time to set up and weld in the cask pit is a good idea and should be pursued.	Noted.	WHC

APPENDIX B
Phase I
MCO 90% Design

MCO PHASE 1 90% DESIGN REVIEW MATRIX

REVIEWER\PROPOSED AREA OF REVIEW	VALVE STUDY	DRAW TUBE STUDY	WELDING STUDY	DESIGN REQUIREMENTS	PROCUREMENT SPEC.	DRAWINGS
Larry Blackburn\ASME Code				X	X	X
Terry Bradley\TAG	X	X	X	X	X	X
Bruce Carlisle\FRS				X		X
Bill Dana/CSB				X		X
Dick Cowan\Engineering	X	X	X	X	X	X
Scott Edwards/Trans.				X		X
John Diehl\QA	X	X	X	X	X	X
Jim Fredrickson\Engr.	X	X	X	X	X	X
Bill Gallo\Proj.				X	X	X
Jack Garvin\Reg. Compl.				X	X	X
Lou Goldmann\Engr.	X	X	X	X	X	X
John Irwin\Drying	X			X		X
Andy Kee\Cask				X		X
Wes Nelson\NDE			X		X	X
Mike Mahaffey\CSB				X		X
Bill Mills\FRS				X		X
Curt Miska\Conditioning	X			X		X
Mike Palm\Welding			X			X
Ed Ruff\Testing	X	X	X	X	X	X
Jose Rivera\Engr.				X	X	X
Charlie Loftis\DOE	X	X	X	X	X	X
Dean Smith\Safety	X	X	X	X	X	X
Kim Smith\Projects	X	X	X	X	X	X
Craig Swenson\CSB				X	X	X
Chris Thompson\Operations	X	X	X	X	X	X
John Vistica\Safety	X	X	X	X	X	X
Tom Yount\Projects	X	X	X	X	X	X

If you would like copies of the design documents beyond what is assigned in this matrix, please contact Kim Smith at 376-0273 (leave message).

MCO 90% PHASE 1 DESIGN REVIEW

OPEN COMMENTS TO BE ADDRESSED BY PHASE 2 DESIGN

The following comments were received during the 90% design review and dispositions provided have indicated a need to revisit the issues raised before or during Phase 2 design. These comments have been extracted from the 90% review comment database and listed here to ensure they get addressed before completing final design.

REVIEWER	NO.	COMMENT	DISPOSITION
T. Bradley	1	Performance Specification: Section 2.1, Add 10CFR Pt. 72. Design requirements for interim storage are provided in Pt. 72, not Pt. 71. Need to reference the Spent Fuel Proj. Regulatory Reqmnts. Document.	10 CFR 71 is being used for the quality assurance requirement because they are more stringent that the requirements in 10 CFR 72. Please see section 4.3 of the performance specification. (L. Goldmann)
	10	Fabrication Specification Section 7.3.1, Figure 7-1, Note 2 - The intent to construct the gauges to strict tolerances to verify clearances is clear, but these tight tolerances should also be specified.	Tolerances are shown on design drawings. Note: T. Bradley would like to see the tolerances specified for these gauges.
	13	Fabrication tolerances - Using the performance and fabrication specifications for the baskets, MCOs, casks, MHM, and CSB storage tubes and with consideration of mill tolerances, fabrication tolerances, thermal differences (e.g., hot MCO in a cold cask), and any dimensional changes anticipated as a result of the conditioning process, the worst case and credible tolerance stackups needs to be developed for each operational step, such that the limiting scenarios can be defined. This evaluation will ensure against hangups during operations and ensure that standard manufacturing processes can be used to meet the required tolerances (i.e., special processes will significantly increase cost).	Thanks for the comment. The MCO is the only system with drawings at this time. As drawings are developed for other interfacing systems they will have to compare their drawings to the ones for the MCO to prevent your proposed situations. (L. Goldmann)
S. Edwards	2	Basically, if the decision is made to go to 10-5 or 10-4 on the MCO, then all of the places you have the word containment should be changed to confinement. Also, I notice a couple of places (Section 6.0, First sentence) that have confine and contain in the same sentence. Take the contain out. You only want to say either confine or contain because if you contain, you automatically confine (contain 10-7, confine 10-4).	The leaktight requirement will remain for Phase 1 design. The requirement will be revisited and a determination made whether 10-7 scc/sec is required, prior to Phase 2 design. (K. Smith)

L. Ulbricht	5	Table 3, Weight: How can the design requirement for MCO weight be ignored at 90% Design?	There are few options in the MCO design that can reduce the weight, other than increase the allowable dose at the top of the shield plug (reduce shield plug thickness) or reduce the fuel loading. Both of these have undesirable consequences. Discussions with the cask design authority have indicated there may be some room to reduce the cask weight to make up the shortfall or qualify the K-Basin crane for a slightly higher load. It was decided that the MCO would proceed with meeting the perf. spec. requirements of dose and fuel loading and an evaluation would be made once the final MCO weight was determined. (K. Smith)
	7	Section 11.9, *Pressure/Proof Test: The argument in this* section attempts to show that the helium leak test will meet the intent of the Code requirement for a pressure test. This is not a valid argument. The pressure test is a structural proof test of the vessel's ability to *withstand the design pressure. The leakage examination* referred to in NB-6223 and NB-6224 is a visual examination for gross leakage (seeping, dripping, etc.). The helium leak test is "very sensitive" and is used to verify that the vessel is "leak tight," but it does not verify the *structural integrity of the vessel. With the exception of* the last 3 paragraphs, this entire section (pages 29 - 32) should be deleted or rewritten to remove this argument.	*The MCO fabricator will not be required to perform a pressure* test of the MCO, as it will not be a complete assembly (shield plug not attached) when shipped to WHC. The exception was added to the requirements because it does not seem likely that "safety" would allow a pressure test of 1.2 x 150 psig of the *MCO with fuel in it.* WHC will finalize the test requirements during the prototype test phase.
	14	Section 11.3, J: This requires that a complete set of as-built drawings of the completed MCO be prepared by the manufacturer. This will require approximately 400 as-built drawing packages. Delete the requirement for as-built drawings and require as-built documentation instead.	What is the difference between as-built drawings and as-built *documentation? As built documentation package will include* drawings, radiographs, material certifications, etc. WHC to provide direction on this issue at a later date.
T. Ghigleri	40	Table 3, Drop Acceptance Requirements, page 16. Revision 0A of the Performance Specification does not mention service level D.	*ASME Code requires that a Service Level for the designed* vessel be specified. WHC has not specified a Service Level. Parsons has utilized Service Level D, which is consistent with commercial nuclear industry practice.
L. Goldmann	1	Page 6, Section 4.1, we would like to use the same baskets for fuel, if possible, to hold a scrap holders in the same MCO with full element baskets. This means the scrap holders would come in two different heights and only one scrap holder would be loaded per MCO, probably as the last and only basket into the MCO. *The current plan is that an* MCO would not have scrap holders at several levels inside the MCO.	*This will be addressed in Phase II Design.*
	9	Page 31, First bullet, the word judged is used. Comment, a helium leak test trading for a hydrostatic test may be hard to defend.	Comment is noted, and discussions are taking place on resolving this issue. *This will be resolved for Phase II* Design.

	19	Sheet 2, You may want to put two relief grooves on the face of the shield plug leading away from the pocket to the edge of the plug to allow for gas flow passage, if an impact limiter were above the lower under relief MCO. Are the 150 # blind flanges OK for the 375° C?	Comment is noted. This will be evaluated further in Phase II Design. 150# blind flanges are adequate for 150 psig at 375 °C.
	21	Sheet 4, Once the quick disconnects (QD) dimensions are known, how about adding more metal around the Qds (therefore closing in on them) and narrowing the gaps to lower the dose out the top?	Comment is noted, and can be incorporated in Phase 2 of the MCO design.
A. Hosler	6	Also concerning the safety class designation for the HEPA filter, by WHC-SD-SNF-DB-005, Multi-Canister Overpack Additional NRC Requirements, implementation of NRC nuclear safety equivalency requires assurance that there is not a credible breach of the spent nuclear fuel containment/confinement such that a radioactive release could be postulated to reach the controlled area boundary, defined as 100 meters from the facility release point. Items required to provide this assurance are to be defined as "important to safety" and Safety Class 1 as defined in WHC-CM-4-46, Safety Analysis Manual, Section 9.0, Safety Classification of Structures, Systems, and Components. In the MCO HEPA filter is needed to limit the controlled area boundary dose as discussed above, then it will need to be designated Safety Class 1.	Recent meetings to resolve design issues have identified the need, as pointed out in this comment, to determine the safety function of the HEPA. Since this HEPA will be active during staging at the CSB, the CSB SAR authors have been tasked with making this determination. Pending their analysis, the safety class designation of the HEPA filter will be finalized. (K. Smith/J. Wiborg)
	9	Section 6.1 requires the Seller to implement the requirements of 10CFR21 and pass these requirements on to the subcontractors. Part 21 applies to firms and organizations building or owning NRC-licensed facilities or conducting NRC-licensed activities. As such, Part 21 does not apply to the MCO design or fabrication. WHC-SD-SNF-DB-005, Multi-Canister Overpack Additional NRC Requirements, state the following: "Incorporate Westinghouse Hanford Company, (WHC) Procurement Clause E13 (Reporting of Safety Defects and Noncompliance) into safety class 1 procurement specifications for the MCO to require reporting by suppliers of defects in items and services, (Note; this procurement clause is located in Appendix A, Revision 1, to WHC-CM-4-2, Quality Assurance Manual.)"	It is my understanding that the requirement will remain. Clause E-13 no longer exists as of 1/1/96 It is also my understanding that a new procurement clause is being written for this application. I have not yet confirmed this. (J. Diehl) This issue can be finalized before fabrication. Propose that the document remain as written now, with further discussion with WHC QA (Dennis Smith) required before Phase II design. We understand the reviewer is not in agreement with the inclusion of Part 21 requirements. (K. Smith)

	15	Table 3; for the MCO envelope diameter and length fields, reference should be made to the July 17, 1995 DOE letter (95-SFD-113) that states that the MCO be dimensionally compatible with the MPC such that for future transport and ultimate disposal in the National Repository, the MCOs could be placed inside MPCs.	We have made the national MPC system program aware of the size of our MCO and no indications were given that the size was unacceptable. I have asked for a copy of the referenced letters several times and nobody can find it. Does the letter have the usual boilerplate phrases to do the coordination with MPC system organizations without WHC incurring additional cost or causing scheduling delays? Anyway, it has been drawn to my attention that the work on the National MPC system being performed by TRW and Westinghouse Government and Environmental Services Company is being canceled with no funding after April 1996. Are there any further remarks, comments or other information available in reference to the "MPC System" for the entire nation on where to go for this possible coordination and compatibility assurance activity? (L. Goldmann)
M. Kaviani	1	It should be noted that the top of the MCO cask, as well as the top of the MCO, will be contaminated by basin water while they are in the load out pit. This is probably unavoidable. However, other than specifying the materials (smooth steel) and minimizing crevices, no design features are identified which would assist in decontamination. One suggested feature is to look carefully for possible design modifications to the connectors on the shield plug. If they can be made as smooth as possible, or covered with a strippable latex, it may be possible to reduce decontamination time. Another suggested feature is to ask Parsons to develop a remote, or semi-remote, decontamination tool for the MCO. This could be included with the design planning of the MCO itself, so that the decon tool and the MCO are compatible with each other. What this suggests is the possibility of designing a "lid washing machine" which specifically designed for this purpose. These suggestions apply to the cask, as well as the MCO, but the engineering for the cask will obviously be different than the engineering for the MCO shield plug.	Refer to comments #6 and #7 of the 50% Design Review. Parsons has suggested covering the shield plug top with a strippable protective covering. In addition, the flange coverings would be left in place and a plug would be developed integral with the shield plug grapple to prevent water from entering the grapple pocket. These issues will be finalized during testing and Phase II Design.

	7	The following items are noticeably missing from the document: a) description of underwater tools used by operators while the cask/MCO is in the loadout pit; b) dose/shielding estimates and diagrams for the MCO and the cask; c) dose/shielding estimates for shipping purposes; d) design diagrams for the HEPA filtration systems; e) remote decontamination tools/equipment (mentioned above); f) contamination level criteria (i.e., how clean is "clean") - this evaluation depends on the design criteria for the CSB, and KBRC is not prepared to make a recommendation until that information is more clearly defined; g) Kr-85 mitigation methodology - or at least a risk evaluation (HEPA filters are no help with Kr-85); h) environmental effluent evaluations and criteria (loading and shipping); i) design considerations for the possibility that fuel elements, fuel pieces or fuel baskets get "bound up" in the MCO and cannot be aligned as planned.	These are all valid concerns which will require attention in the future. The purpose of the MCO Phase 1 design was to create a usable design for fabrication of prototypes for testing purposes. Grapples for loading baskets into the MCO, lowering the shield plug into the MCO, and lifting loaded MCOs out of the cask into the CSB storage tubes are under development and will be included in the 100% Design Package. However, most of the items listed will be addressed in preparation for the planned testing, and as part of the fuel retrieval effort (operational dose estimates) and cask/transportation activities.
B. Mills	2	(comment 132) The safety analysis for the design basis accident has not been provided in the 90 % review document.	The design basis accidents are listed in section 3.3.2.2 of the Performance Specification. The design basis loaded basket drop is still TBD. The worst accident is probably dropping a full rerack basket of fuel on a loaded queue of reracked fuel, however the handling of a loaded basket over a queue will probably not be allowed. (L. Goldmann)
	3	(COMMENT 135) The supporting basis for the vent piping size is not in the 90% review package	Although requested, Parsons has not been provided with the expected gas generation rate (see Performance Specification) within the MCO. In addition, the Performance Specification limits the size of openings in the MCO to 1" in diameter. The worst case accident is thought to occur in a flooded MCO in the cask and the event happens prior to cold vacuum drying. The design authority for cold vacuum drying system is preparing an accident scenario and it is scheduled to be drafted by March 15, 1996 for review. At that time an assessment will be made as to the adequacy of the relief passage being sized properly. The accident scenario will include the fuel material inventories inside the MCO and the gas flows produced. (L. Goldmann)
	5	(Comment 138) A radiological engineer must be brought in as soon as possible, to wait until phase II is to late for constructive input.	A radiological engineering independent evaluation will be preformed in the next 2 months or so. The evaluation will initially focus on the MCO shield plug quick disconnects, blind flange covers, and the operation and interfaces of them for use and maintenance. Later the evaluation will expand to cover more of the MCO features. (L. Goldmann)
	15	(page 2, B) The K basin 30 ton crane is driving sizing. The real issue is high risk design actions are being made. A complete evaluation of the 30 ton cranes and how they are driving the technical decisions and dose levels should be done.	An evaluation is in process. (D. Chenault)

	27	(page 7, 4.4) Dose number to high for time and number of times work will take place on top of MCO. Does not support SNF total ALARA plan.	See comment response to # 17 above. The 30 mR average contact dose is considered adequate at this time for the shield plug of the MCO. The SNF Project Alara Plan is being written at this time and I will check with the author and discuss the dose rates and our situation with the MCO. (L. Goldmann)
J. Keve/W. Nelson	2 ✓	Section 6.5.5 General comment for the entire Section: All of the general technique references in paragraphs 6.5.5, B.2, C.1 & 2, and D.1 thru 5 should be removed from the fabrication specification. These requirements are adequately addressed in ASME Section V, Articles 2, 5, 6 & 10. The sellers NDE procedures, approved by the buyers NDE Level III, will address these requirements in detail.	Comment is noted. However, many of these statements were added as a result of the 50% design review. Comment will remain open for resolution in Phase 2 design.
	3 ✓	Section 6.5.5 Nondestructive Examination, Subsection A General, third paragraph add to the end of first sentence, ...by a NDE Level III.	WHC internal review process is not relevant to the Fabricator. Comment will remain open for resolution in Phase 2 design.
	4 ✓	Section 6.5.5 Subsection A, General, Add to Section: "The Seller shall submit a copy of their NDE personnel qualification and certification written practice, and NDE personnel qualification and certification records to the Buyer for review by the NDE Level III prior to the start of work. Personnel qualification and certification records required to be submitted are identified in Section 9 of SNT-TC-1A." These items require verification of compliance with SNT-TC-1A by the WHC QA Manual.	The submittals are listed in Tables 11-1 and 11-2. See Section 6.5.5 of the Fabrication Specification. Comment will remain open for resolution in Phase 2 design.
	7 ✓	Section 7.2 Leak Tests, 7.2.1 & 7.2.2, Change the test pressure requirements of 8 to 12 psig, and 10 to 15 psig., respectively, to a test pressure differential of 1 atmosphere (approximately 14.7 psia) for the leak test. This will facilitate a quantitative type of test. Substituting a low pressure leakage test for a proof test is not valid or permitted by ASME Section III.	See response to #6. Comment remains open; refer to attached response from Nelson/Keve.
	8 ✓	Section 7.2.2 Requires a leakage rate acceptance criteria. The use of NB-6300 in conjunction with Article 10 Section V is improper. NB-6300 deals with proof testing, while Article 10 deals with leak testing. These two types of tests are not interchangeable and are designed to accomplish two different objectives.	Section has been revised. Comment remains open; refer to attached response from Nelson/Keve.
	9	Section 11.3 Records, E. Changes paragraph to read: "ALL NDE examinations shall be documented on a written report and signed by the preapproved examiner who is qualified in accordance with SNT-TC-1A."	Section 11.0 and Tables 11-1 and 11-2 provide the specific requirements for NDE document submittal by the Fabricator for the Owner's review. The documentation requirements stated in the Performance Specification have been in use by the commercial nuclear industry for more than 30 years. Additional requirements will add to the cost of the MCO. Comment remains open; refer to attached response from Nelson/Keve.

	13	General comment: The blind flange and quick disconnect on the shield plug penetration is not easily leak tested. Metallic and elastomeric combination O-ring type seals have been used successfully on other fuel storage containers.	Leak test will be in accordance with ANSI N14.5. Portable vacuum boxes and/or a enclosure over individual flanges/connectors and/or the entire MCO shield plug can be utilized to obtain quantifiable leak test results. Metallic and/or elastomeric seals will not meet the extreme MCO design conditions (pressure, temperature, cycles, particles, etc.). Comment remains open; refer to attached response from Nelson/Keve.
	14	Section 4.3 SNF Pressure Containment, The leakage rate of penetrations and connections into the MCO require that all of the interfaces together must have a total leakage rate of 1×10^{-4} scc/sec. However, this requirement is not in the fabrication specification for leakage testing.	See response to comment #6. Comment remains open; refer to attached response from Nelson/Keve.
	15	Section 4.5 Penetrations and Connections, It was defined in Section 4.3 that the MCO containment boundary leakage rate must be less than 1×10^{-7} scc/sec. However, the lid seals for the penetration have not been designed with this level of leak testing in mind.	See response to comment #6. Comment remains open; refer to attached response from Nelson/Keve.
	16	Section 8.3.1 MCO Penetrations and Connections Design, The current design for the lid designs are not easily leak tested. An alternate acceptable design would be the use of a combination metallic - elastomeric type seal. The second bullet should include a leakage rate requirement.	See response to comment #6. Comment remains open; refer to attached response from Nelson/Keve.
C. Loftis	4	Page 8, Section 5.3, Maintainability; What is the preventative maintenance requirements? Be specific.	The two components of the MCO which may have some longer term operating requirements (and hence, maintenance should be considered) are the HEPA filter and pressure relief device. The selection of these devices was geared toward minimizing any maintenance required due to the cost and exposure associated with removing MCOs from the CSB storage tubes. The intent of this Section is to consider maintenance requirements in the equipment selection and select devices which require minimal maintenance. As specific maintenance requirements get defined and finalized during the test phase, the design documents will be updated during Phase 2 design to include these requirements. (K. Smith)
C. Swenson	4	Table 3 (page 19): corrosion conditions - "CSB tube temp and RH listed as TBD". This sounds like an interface issue and CSB/MCO need dates need to be mutually agreed.	Agreed. Design authorities need to document this as an interface issue.
C. Thompson	8	Appendix A Step 7 - This section describes a sequence for lifting the seal plug from the top of the MCO to assist in drying - this is an extremely high risk evolution - what are the streaming doses when this plug is lifted? What are the consequences of an operator error? This should be solved through the design of the seal plug not by having the operator conduct a hazardous operation.	The idea would have been an eighth of an inch additional width at the weld groove. No increase in dose is expected. If the operator took out the plug then the dose rates would be high. Design improvements are expected. (L. Goldmann)

C. Miska	9	No mentioned is made in the 90% drawings for surface treatments to increase emissivity. This should be added. Emissivities of the MCO wall both outer and inner should be maximized via a passivation process. We should strive for emissivities in the range of 0.7 to 0.8. This same concept should be applied to the shipping cask ID and the CSB storage tube ID and OD. The need for surface treatment may be reduced if Helium is used as a fill gas.	Emissivity raising treatments for the interior and exterior surfaces of the MCO 24 inch diameter shell are being considered. When the scoping heat transfer calculations are completed for the completed 90% design of the baskets (the current review and update cycle), then the utilization of "blackening" of the MCO and fuel basket surfaces will be discussed and decided. The emissivity comments related to the Cask and CSB tubes will have to be addressed in another forum. (L. Goldmann)
	10	MCO & Basket Heat Transfer. Based on discussions during the SNFP Thermal Task meeting on 12/7, there is a potential developing for the mechanical design of the dense-pack MCO compromising effective thermal performance. This may well include intact fuel elements. The assumptions being made for the dense-pack thermal analyses rely on some consistency to the packing of the fuel in the MCO. Until recently, it was assumed that some gridwork would be part of the fabricated basket insuring some spacing and regularity to the fuel element distribution. It appears now that there is a move away from this concept. A procedure whereby fuel elements are positioned in an inclining MCO (introducing a potential for lopsided stack with elements leaning on each other) seems to be the direction. Preliminary analyses by Westinghouse thermal analysts indicate a high reliance on radiative heat transfer during vacuum conditions (~50% of the total conductance). Variations in geometry become significant factors since they impact view factors. Eliminating or controlling these variations becomes a priority. There is a real need for the mechanical design team to assess some of the "needs" of the thermal analysis team. The mechanical design team has valid reasons for leaning in the direction that is proposed, weight being one key factor. However, some consideration needs to be given to spacing the fuel elements. This might possibly be some version of the	Your concerns are noted. The will likely be continuing meeting on this subject. As discussed before in the comments and responses above, after this current review and update cycle an evaluation will be made of the baskets and fuel for heat transfer. The design solutions for the baskets and fuel arrangement will be further refined at that time. (L. Goldmann)
	16	Decontamination of the top shield may be a problem with the proposed design. This aspect should be reviewed by an expert in this area.	With respect to potential contamination during upset conditions during drying, conditioning, or handling at the CSB, we propose to evaluate the options available for decontamination in Mike McWethy's MCO contingency study currently underway. Recommendations from this study will be reviewed and incorporated, as necessary, in the facility designs. Any recommendations regarding shield plug modifications will also be reviewed and incorporated during Phase 2 design. (K. Smith)

	20	Placing the rupture disk on a common line with the short draw tube would more than likely prohibit installation of a high efficiency particulate filter in the MCO because it would potentially disable the capability of the rupture disk. It is my position that the MCO design should not prohibit the installation of a high efficiency particulate filter unless a filter study indicates that such a filter is not practical.	The relief device may have to handle a large flow gas from the worst overpressure event inside the MCO. An event that requires the large flow will likely bring up a lot of fine debris to the inlet of the relief device. If a small pore filter were in series with the relief device then it is likely that the filter would blind and restrict the event's flow further and perhaps even lack sufficient capacity to relieve the event. The fact that a filter may be need to keep radioactive debris inside the MCO during normal process, certainly means that much more would be available to the filter during a relief by an overpressure device. The MCO design is not prohibiting the installation of HEPA filters anywhere. The free volume and space inside the MCO is limited. Hot conditioning was earlier conducting a study and directing a designer to develop an internal MCO process HEPA for exclusive use by the Hot conditioning process. If this exclusive use HEPA device is found to be needed by hot conditioning then a fifth interface on the top of the MCO shield plug may be needed. Perhaps a choice will have to be made between (1) assuring the proper function of the pressure relief device and (2) contaminating the hot conditioning plumbing outside the MCO up to its own dedicated process HEPA to trap the particulates. Placing the pressure relief device on the longer axial dip tube also has problems associated with that arrangement. A larger water heel, more line losses during a relief event, and an even greater potential for blockage of the dip tube entrance with fuel fragments and particulates are the main concerns. (L. Goldmann)

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Project Design Requirements for Multi-Canister Overpack, Fabrication Specification for Multi-Canister Overpack, Multi-Canister Overpack Drawings	Spent Nuclear Fuel	L. D. Blackburn	Mechanisms Engineering	ETC-2 2920 GWW, 376-5888

17. Comment Submittal Approval:

10. Agreement with indicated comment disposition(s)

11. CLOSED

Organization Manager (Optional)	Date	Reviewer/Point of Contact	Date	Reviewer/Point of Contact
	1-22-96	L D Blackburn		
		Author/Originator		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
	COMMENTS ON PROJECT DESIGN REQUIREMENTS DOCUMENT			
1	Section 4.0, p. 5, first paragraph, Omit NC from the subsections of ASME code; use of NC is now treated as exception to Subsection NB, not as primary requirement.		Comment is noted and will be incorporated.	
2.	Section 8.5, p. 14, change title to "Weldment Design, Fabrication, and Examination". In first sentence, replace "inspected" with "designed, fabricated, and examined". Change second sentence to "Welding procedure specifications and personnel shall be qualified per the ASME Boiler and Pressure Vessel Code, Section III, which references Section IX." Section IX of the Code does not deal with either inspection or design of welds.		Comment is noted and section will be revised.	

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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
3	General comment. The ASME Boiler and Pressure Vessel Code uses a very specific, well-defined terminology that should be employed in discussing application of the Code. One improper use of terms used frequently in this document is the word "inspect (or inspection)" when the proper Code term is "examine (or examination)".		Comment is noted. Document has been checked to ensure proper use of ASME terms.	
4	Table 3, p. 20, second row, change first column entry to "Weldment design/fabrication/examination requirements". In second column, omit "...inspection and..."; see comment 2.		Comment is noted and will be incorporated.	
5	Section 11.0, p. 26, MCO Design Basis, last paragraph, third sentence, change "inspection" to "examination", change "NB-5000" to "NB-4000", change "NB-6000" to "NB-5000".		Comment is noted and will be incorporated.	

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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
6	Section 11.0, p. 26-29, "Exception Weld Design...". This section gives the impression that NB "requires" a domed head. This impression is incorrect, since flat heads may be acceptable for NB construction. Edit this section to eliminate this impression. A suggestionis to start by eliminating "required" and "ASME" as a qualifier to domed head. I understand a major point of this section was to distinguish between the construction with domed heads versus that with flat heads. The discussion gives the impression that flat heads in themselves are the problem. This should not be so since NB-4000 illustrates acceptable welds for flat heads. Edit this section to more clearly show what the Code permits for weld geometry. In the last paragraph (top p. 29), provide references to specific NRC documents that substantiate the stated NRC position on hydrostatic or pneumatic tests. Also, eliminate the "proof" from "proof/pressure tests" in this paragraph and in several other places in this document. The Code (Subsections NC, ND) uses the term "proof test" to indicate and experimental determination of design pressure, which is not an issue for the MCO.		Comment is noted and section has been revised.	
7	Section 11.0, "Pressure/Proof Test", p. 32, the sentence at the top of the page is inconsistent with the last paragraph in this section. The last paragraph seems more appropriate.		Comment is noted and will be incorporated.	
8	Section 11.0, "Overpressure Protection, p. 35, second bullet, explain how "premature failure of the rupture disk" can be considered "fail-safe" and how such a disk failure results in "contents of spent nuclear fuel are still confined."		Comment is noted and will be incorporated.	
	COMMENTS ON FABRICATION SPECIFICATION DOCUMENT			

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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
9	Section 6.1, p. 7, first sentence, eliminate "inspection" as the Code use of this term means the provisions of NCA-5000. The 50% Design Review comments/response indicated that Authorized Nuclear Inspector (NCA-5000) was not applicable to MCO. Explain why impact testing and examination requirements from NG-2000 are needed to supplement requirements for NF. If austenitic stainless steel is selected as material for NF or NG components, then all reference to impact tests can be omitted from this document.		Comment is noted and will be incorporated.	
10	Comment 3 applies to this document.		Comment is noted and will be incorporated.	
11	Section 6.2.1, p. 8, first sentence, change to include pipe and forging materials, as these are specified on the drawings. In the next to last paragraph, first sentence,Subarticle NB-2500 is also applicable to MCO shell materials. Same paragraph, last sentence conflicts with NB-2122 (see comment 97 of 50% design review).		Comment is noted and will be incorporated.	
12	Section 6.3, p. 10, the sentence does not refer to NG-4000 as would be expected from Section 6.1. This comment is also applicable to many subsequent sections. If NG is really not needed, then it should be eliminated entirely.		Comment is noted. Subsection NG has been eliminated from the document.	
13	Section 6.3.2, p. 10, first sentence, the reference to NB-4212 is not appropriate as it says nothing about "rolled to final form", "in the direction of mill rolling", or "accurately cut to size". (Comment 99 of 50% design review).		Comment is noted and has been incorporated.	
14	Section 6.5, p. 11, first paragraph, second sentence, the terms "fuel guide sleeves and/or oversleeves" have not been defined for the MCO.		Comment is noted. The wording has been deleted, since it is not applicable.	
15	Section 6.5.3, p. 13, E., given the response to comment 101 of 50% design review and paragraph B., eliminate this paragraph.		This section addresses preheat of the material for welding during fabrication. I understand E has been eliminated. LDB 1-22-96	

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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
16	Section 6.5.5, p. 14, General, first paragraph, explain how the Code exceptions identified in the Projects Design Requirements are to included in this document.		Comment is noted. However, nothing stated and in the scope of the Fabrication Specification are affected by the proposed Code exceptions. All welds made by the Fabricator can be volumetrically examined and leak testing can be performed. the Fabricator is not responsible for the closure weld, which is a field weld, therefore the requirement for a hydrostatic pressure test is not within the Fabricator's scope of work.	
17	Section 9.1.2, p. 23, paragraph A., material suppliers/material manufacturers do not receive Certificates of Authorization (see NCA-8000), but receive a Quality System Certificate (Materials).		Comment is noted and has been incorporated.	
	COMMENTS ON DRAWINGS			
18	Radiographic or ultrasonic examinations required by NB are not indicated on the drawings		Comment is noted. Drawings have been revised to indicate examination requirements.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO 90% Design Documents	Spent Nuclear Fuel	Terry Bradley		

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

As noted, Terry L Bradley

1/25/96

Date

Reviewer/Point of Contact

Author/Originator

11. CLOSED

Date

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
	PERFORMANCE SPECIFICATION			
1	Section 2.1, Add 10CFR Pt. 72. Design requirements for interim storage are provided in Pt. 72, not Pt. 71. Need to ref. the Spent Fuel Proj. Req. Reqmts Doc.	True But	10 CFR 71 is being used for the quality assurance requirement because they are more stringent that the requirements in 10 CFR 72. Please see section 4.3 of the performance specification. (L. Goldmann) ✓	
2	Section 3.2.2.4, Post accident limitation of MCO outside diameter appears to be limited to criticality control concerns. Limits should be added to address post drop accident retrieval from postulated drops into the transport cask (drop during pulling up into the MHM at the CSB), drop inside MHM and drop into storage tube. The acceptable diameter for drops into the storage tube and transfer tube could be limited by MHM diameter, as it will have to transfer the dropped MCO to the oversized, as needed, CSB storage tube to await further mitigative action.		The MCO, if dropped into the shipping cask, is supported by the ID of the cask if the drop is severe enough to deform the MCO (greater than two foot drop). The deformation has been shown to be in the form of buckling of the MCO wall and thus the average diameter due to the buckling wave is constrained by the basket and cask and overall will not change to allow for fuel shift. Thus, no criticality problem will arise. The drop into the CSB tube will be limited to a non-deformed stress state by impact limiters in the CSB. (D. Chenault) ✓	Need to make clear that MCO pressure integrity is maintained

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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
3	Section 3.2.3.1, Is design life 40 or 75 years? 75 years was presented in recent issues management group discussions an din the PDR, Section 5.1.		The direction has been clarified and it is 40 years. (L. Goldmann) ✓	
4	Section 3.2.4, Table I, Transportation, Temperature - Recent thermal analysis indicates a fairly rapid heat-up during transport. IF CVD is performed at 50C, the 75C limit leaves little margin; see Jim Wiborg.		This concern has been relayed to the transportation and CVD design authorities for resolution. (K. Smith) ✓	
5	Section 3,3,2,2 Design Basic Drop - Drops of the bare MCO into a transfer cask during unloading at the CSB and during similar handling at the conditioning stations should be addressed. Scc comment on Section 3.4. — can use an impact limiter, similar to the CSB storage tube If the cask will limit deformation of the MCO such that MCO pressure integrity is maintained for the worst case drop, having the MCO stuck in the cask may be OK, provided the fuel is kept below peak clad temps. and the MCO internal environment can be monitored and controlled, for a considerable period needed to provide facilities for mitigative actions. — may be a simple solution if opers. is not complicated		The loaded (or unloaded) MCO straight down drop is governed by yielding (pre-buckling) of the MCO cylinder wall at the base plate junction. This limiting condition is directly affected by the lid thickness (weight) and the cylinder wall thickness. As conceptually designed with a 3/8" wall and 10 inch lid, the yield initiation occurs with a 2 foot drop or 331 G's. If constrained by the cask and baskets (with dimensions for conceptual design), the breach of the MCO occurs at 550 G's. Breach is considered to be when the buckled wall fills the void between the cask and baskets, thus making removal difficult. — with MCO pressure integrity maintained Further analysis of the full drop of the MCO into the cask has shown 1.) A two foot pool of water in the cask bottom would attenuate the drop G's to acceptable levels. 2.) Preliminary analysis still ongoing shows that the hydrostatic piston effect between the cask and MCO will slow the dropped MCO to acceptable levels. It is possible that a small taper at the lower end of the cask may be necessary. (D. Chenault) ✓	

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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
6	Section 3.3.2.4 - The second sentence indicate the 6.625 in diameter void space can be located at "or near" the longitudinal centerline of the MCO. The requirement needs to be more precise and the safety class of the 6.625 inch pipe defined; i.e., Is this requirement applicable to all operations or only when the water moderator is present? How far can the pipe be off-center relative to the centerline of the MCO and relative to the centerline of the 6.625" pipe above or below? Is the intent to have a continuous 6.625" pipe from the shield plug to the bottom of the MCO that must remain intact subsequent to all drop orientations?		The center pipe in the MK1A basket is still being analyzed but the current design basis is less than one inch off center, but the pipe does not need to be continuous. Each section can be offset from the next, but not more than one inch off center to the MCO. Given the potential for reflooding, this requirement has been imposed for all operations. (D. Cowan) (Understand that the criticality work is on-going) ✓	
7	Section 3.4, Clarify the intent of "fail-safe lifting". This is not being interpreted as providing "single failure protected" handling equipment, thus, drops are postulated. See comment on Section 3.2.2.4.		This portion of the specification is being rewritten. (D. Chenault) ✓	
	Project Design Requirements			
8	Section 8.2.2, Next to last bullet - Need to add the requirement from Section 3.3.2.2 of the performance specification that requires the 100g with the MCO inside the cask to be in the "worst case orientation".		Will comply. ✓	

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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
9	Section 8.2.4, See comment on Section 3.3.2.4 of the performance specification. The rerack basket detail does not appear to meet the requirement that the void space "at or near the centerline of the MCO" be maintained for the Mk IA fuel. For example, in the case of a drop of the MCO with the shield plug end down and the MCO at an angle of 45° to the ground, the center tube of the basket would decouple and the top of the tube could rotate relative to the bottom, especially if the basket was not 100% full of intact fuel.		Comment is noted. Performance Specification does not define "...at or near the centerline of the MCO..." The basket design is being modified considerably. WHC is developing the criterion for how much off center is permissible and the revised basket/MCO design will meet this criterion. (K. Smith) (Understand work is on going) ✓	
	Fabrication Specification			
10	Section 7.3.1, Figure 7-1, Note 2 - The intent to construct the gauges to strict tolerances to verify clearances is clear, but these tight tolerances should also be specified.		Tolerances ~~are~~ will be shown on design drawings. Note: Gauges are fabricated to more stringent tolerances than the component they are checking.	
11	Section 7.3.2, The referenced MCO maximum envelope dimensions do not appear to be on the drawings. Gauge dimensions and gauge fabrication tolerances should be specified with consideration of the maximum allowable MCO out-of-round and bow. Figure 11 1 - Tolerances for measurements should be specified and indicate if they are to be nominal (average), maximums, minimums, etc.		ASME/ASTM standards for material (i.e., pipe) provide the tolerances for out-of-round and ovality. Cask specification specifies MCO envelop based on maximum ASME/ASTM tolerances. Make sure these reqmts in the cask spec. are clearly referenced. ✓	
	MCO Drawings			

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12	Sheet 8, Since the weight of the fuel is carried down through the 4 inch diameter basket center pipe and each basket is balanced on the 4" pipe below it, will have significant stress concentrations at these contact points for handling loads (e.g., when crane sits the cask down on the floor, can easily see a 1 g impact load). Need to make sure operational loads will not deform the contact point and cause a hangup. For the IA fuel, it appears this pipe would also need to be designed for accident (e.g. drop) loads to maintain the void for criticality control. Also, from an operational standpoint, since the basket may not be fully loaded, thus, can have more fuel on one side than the other, the basket, supported at its center will rotate and lean against the MCO shell; need to make sure the 1/8" wire does not deform under operational loads and cause a hangup.		Comment is noted. However, once the SNF is in the MCO, the 4" pipe has no requirements, including criticality. The 6" pipe is being checked for criticality. The basket design is being significantly revised, and will use Johnson Well Wire in lieu of 1/8" wire. WHC will provide the restrictions for off center movement of the center pipe. Refer to Bill Mills comment #33. (Understand work is on-going) ✓	
	General Comments			
13	Fabrication tolerances - Using the performance and fabrication specifications for the baskets, MCOs, casks, MHM, and CSB storage tubes and with consideration of mill tolerances, fabrication tolerances, thermal differences (e.g., hot MCO in a cold cask), and any dimensional changes anticipated as a result of the conditioning process, the worst case and credible tolerance stackups needs to be developed for each operational step, such that the limiting scenarios can be defined. This evaluation will ensure against hangups during operations and ensure that standard manufacturing processes can be used to meet the required tolerances (i.e., special processes will significantly increase cost).		Thanks for the comment. The MCO is the only system with drawings at this time. As drawings are developed for other interfacing systems they will have to compare their drawings to the ones for the MCO to prevent your proposed situations. (L. Goldmann) Don't wait too long; should perform a pred. review based on available information, then update as final info. is available. X	

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Project Design Requirements for Multi-Canister Overpack, Fabrication Specification for Multi-Canister Overpack, Multi-Canister Overpack Drawings	Spent Nuclear Fuel	Denise Clements		

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

W S Edwards for MDC
Reviewer/Point of Contact

1/25/96
Date

Author/Originator

11. CLOSED

W S Edwards for MDC
Reviewer/Point of Contact

1/25/96
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
	COMMENTS ON PROJECT DESIGN REQUIREMENTS DOCUMENT			
1	Section 2.1, I suggest deleting the first bullet and combining that into the second bullet.		Comment is noted and will be considered.	
2	Basically, if the decision is made to go to 10-5 or 10-4 on the MCO, then al of the places you have the word containment should be changed to confinement. Also, I notice a couple of places (Section 6.0, First sentence) that have confine and contain in the same sentence. Take the contain out. You only want to say either confine or contain because if you contain, you automatically confine (contain 10-7, confine 10-4).		The leaktight requirement will remain for Phase 1 design. The requirement will be revisited and a determination made whether 10-7 scc/sec is required, prior to Phase 2 design. (K. Smith)	
3	None of these documents should refer to the PDC because it is an onsite document and really shouldn't be given to offsite people.		The PDC has been removed from the Rev. 1 of MCO Performance Specification. (K. Smith)	
4	In Section 4.1, the title should be something else like "SNF Restraint".		Comment is noted.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO 90% Design Documents	Spent Nuclear Fuel	L.E. Ulbricht D.M. Chenault D.W. Scott		373-3775 376-6230 373-4352

7. Comment Submittal Approval:

Organization Manager (Optional) Date

10. Agreement with indicated comment disposition(s)

Larry E. Ulbricht 1/26/96
LE Ulbricht for D.M. Chenault per telecon 1/26/96
LE Ulbricht for D.W. Scott per telecon 1/26/96

Reviewer/Point of Contact Date

Author/Originator

11. CLOSED

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
	Project Design Requirements for MCO			
1	Section 2.4: Add the following two MCO operational phases 7) Transportation to Final Repository 8) Final Disposition in Repository		WHC has received no direction, to date, to design the MCO for final disposition in the repository. Until RL directs the SNF Project to comply with all repository acceptance criteria, we are not including transport or final repository disposition in our documents. Refer to Hosler comment #15. (K. Smith)	
2.	Section 2.4, 5th paragraph: Will the MCO be vented through a HEPA filter during staging or will it be sealed with over-pressure protection (rupture disk)?		The current plan is for the MCO to be vented thru a HEPA filter during staging (before hot conditioning) at the CSB. (K. Smith)	

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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	Section 2.4: Add the following two MCO operational phases 7) Transportation to Final Repository 8) Final Disposition in Repository		WHC has received no direction, to date, to design the MCO for final disposition in the repository. Until RL directs the SNF Project to comply with all repository acceptance criteria, we are not including transport or final repository disposition in our documents. Refer to Hosler comment #15. (K. Smith)	
2.	Section 2.4, 5th paragraph: Will the MCO be vented through a HEPA filter during staging or will it be sealed with over-pressure protection (rupture disk)?		The current plan is for the MCO to be vented thru a HEPA filter during staging (before hot conditioning) at the CSB. (K. Smith)	
3	Section 2.4, 7th paragraph: What are the requirements for final disposition and for transportation to final disposition?		Refer to comment response #1.	
4	Section 4.5: There are 4 penetrations in the shield plug rather than 2 as stated.		"Penetrations" mentioned in the first sentence of 4.5 refer to those that are full depth of the shield plug. There are 4 ports in the top of the plug, however these combine in the top section of the plug to 2 penetrations out the bottom of the plug. (K. Smith)	

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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
5	Table 3, Weight: How can the design requirement for MCO weight be ignored at 90% Design?		There are few options in the MCO design that can reduce the weight, other than increase the allowable dose at the top of the shield plug (reduce shield plug thickness) or reduce the fuel loading. Both of these have undesirable consequences. Discussions with the cask design authority have indicated there may be some room to reduce the cask weight to make up the shortfall or qualify the K-Basin crane for a slightly higher load. It was decided that the MCO would proceed with meeting the perf. spec. requirements of dose and fuel loading and an evaluation would be made once the final MCO weight was determined. (K. Smith)	
6	Section 11.0, MCO Design Basis, 1st paragraph: States that the MCO is constructed of 304 sstl but drawings call for 316 sstl. Drawings should be corrected.		Drawings will be revised to call out 304L SS per Rev. 1 of the Performance Specification. (K. Smith)	

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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
7	Section 11.9, Pressure/Proof Test: The argument in this section attempts to show that the helium leak test will meet the intent of the Code requirement for a pressure test. This is not a valid argument. The pressure test is a structural proof test of the vessel's ability to withstand the design pressure. The leakage examination referred to in NB-6223 and NB-6224 is a visual examination for gross leakage (seeping, dripping, etc.). The helium leak test is "very sensitive" and is used to verify that the vessel is "leak tight," but it does not verify the structural integrity of the vessel. With the exception of the last 3 paragraphs, this entire section (pages 29 - 32) should be deleted or rewritten to remove this argument.		The MCO fabricator will not be required to perform a pressure test of the MCO, as it will not be a complete assembly (shield plug not attached) when shipped to WHC. The exception was added to the requirements because it does not seem likely that "safety" would allow a pressure test of 1.2 x 150 psig of the MCO with fuel in it. WHC will finalize the test requirements during the prototype test phase.	
	Fabrication Specification for MCO			
8	Section 5.2: Rather than unloading the MCO, consider transporting to CVD and decontaminating there.		The fuel will probably not be unloaded from the MCO unless absolutely necessary. Partial decontamination of the annulus is possible at the Cold Vacuum drying facility. This arrangement will have to be negotiated with that project. (L. Goldmann)	
9	Section 6.5.3 E: States that austenitic stainless steel shall not be heated above 350 °F (except welding) unless followed by a full solution heat treatment. Section 2.4, 6th paragraph of design requirements document states that hot conditioning will occur at 375 °C. Will hot processing at 375 °C (707 oF) be detrimental to the MCO?		No. Statement is made to ensure that the Fabricator does not inadvertently heat the MCO in an uncontrolled or detrimental manner without the Buyer's knowledge.	

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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
10	Section 7.3.4.2, Test 4b: How will a wire go/no go gauge be inserted past the lip on the shield plug and between the side of the shield plug and the inside wall of the MCO shell with the shield plug fully assembled in the MCO shell?		Section is being revised to clarify.	
11	Section 7.3.6, Test 6: How does this test differ from Tests 4a and 4b in 7.3.4?		Section is being revised to clarify.	
12	Section 7.3: Add requirements for load testing baskets, and the lifting socket of shield plugs.		Load testing every basket would be costly. The prototype testing phase will perform load tests to qualify the design; examination at the shop after fabrication to ensure baskets were built to print is believed to be sufficient. The lifting socket design will be tested during the prototype test phase. (K. Smith)	

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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
13	Section 10.2.1: Match labeling of shield plug to MCO does not provide the interchangeability as required by the design requirements document.		In order to meet MCO payload requirements, the pre-set 24" MCO diameter, the design parameters, and the required shell thickness, tolerances are extremely tight, but an interference fit does not exist based upon the given tolerances for design, material, and fabrication. This will provide for interchangeability of the components. However, in addition, storage at the CSB of the shells will be extremely important, since "ovaling" of the shells may occur, if they are improperly stored. Improper on-site storage may result in plugs, baskets, and shells, that are not interchangeable.	
14	Section 11.3, J: This requires that a complete set of as-built drawings of the completed MCO be prepared by the manufacturer. This will require approximately 400 as-built drawing packages. Delete the requirement for as-built drawings and require as-built documentation instead.		What is the difference between as-built drawings and as-built documentation? As built documentation package will include drawings, radiographs, material certifications, etc. WHC to provide direction on this issue at a later date.	
15	Table 11.1: Delete item 13, "As-Built Drawings."		See response to #14.	
16	Figure 11.1: Add the following to critical dimension list: 3) Minimum diameter at any section; 4) Straightness. Does the diameter measurement method account for ovality or will the diameter measurements be allowed to be taken with a Pi tape (not accounting for ovality)?		Comment is noted, but not required. ASME/ANSI/ASTM referenced requirement codes provide manufacturer and fabricator requirements and documentation.	

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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
17	Table 11.2: Require submittal of test plans and procedures.		Refer to Section 11.0 and Tables 11-1 and 11-2. Refer to items 2, 4, 6, 7, and 8 of Table 11-1.	
	Drawings			
18	General: Early in the conceptual design of the MCO, 304 sstl was chosen based on acceptable material properties (corrosion resistance, fabricability, strength, etc.) and significant cost savings as compared to 316 sstl. The drawings specify 316 sstl. Is there a valid reason for selecting the higher cost material?		Rev. 1 of the Performance Specification calls for 304L SS, based on Interoffice Memo #57E00-96-003, L. Blackburn to L. Goldmann/K. Smith, dated 12/13/95. (K. Smith)	
19	General: All tolerances should be carefully scrutinized to avoid unnecessary fabrication costs. For example the drawings identify the shell thickness to be 0.500 +/- 0.005, and the inside radius of the MCO bottom to be 0.500 +/- 0.005.		Dimensions shown on drawings will be revised to reflect standard tolerances.	

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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
20	General: The drawings indicate that all welds are to be penetrant tested. There are many welds that should not require this level of inspection (plug welds in shield plug, welds in top conditioning chamber, welds in bottom conditioning chamber, welds in long processing tube assembly, wire to wire welds on baskets). Also, indicate when PT is required (each pass; root and final).		The design code specified by the Performance Specification for the MCO, that is, ASME Section III, Division 1, Subsection NB, specifies both directly and indirectly (i.e., reference to ASME Section V), the NDE requirements. Subsection NB requires NDE of all welds that are pressure retaining, or made to a pressure retaining boundary. The following welds would not require NDE: plug welds in shield plug, any attachment welds to the spacer bars, any welds to the long or short draw tubes. NDE would be required, as previously stated for all pressure retaining welds, including welds that attach to a pressure retaining boundary, such as the spacer bar to bottom assembly forging, the cover plates for the connections (these welds provide containment during interim storage), among others. The drawings have been revised to show the required level of PT. However, the level (i.e., root, passes & cover) of PT specified is based on the code requirements and the experience of the commercial nuclear industry for fuel storage facilities. The commercial nuclear industry utilizes PT for the root, first cover pass, every five passes, and final pass. This level of PT may seem excessive, but is better to find a defect before 50 passes are made. In addition, the	

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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
21	General: Weld requirements, welder qualification requirements, weld inspection requirements, inspector requirements, etc. Also, need to specify other test/inspection requirements such as load tests (basket and MCO lift feature), pressure/proof tests, fit-up tests, and leak tests.		Comment is not valid for the drawings. Please refer to the fabrication specification which addresses many of the tests. Some of the tests such as the proof/pressure test is not performed by the Fabricator, since the final closure weld is made by the Buyer (i.e., WHC). The necessity for any additional tests will be determined after the prototype test phase.	
22	General: Drawings specify ½ inch for MCO shell thickness. This increases weight and cost, and reduces payload envelope. Is there a valid reason for increasing the wall thickness from 3/8" to 1/2"?		The engineering analysis that includes thermal cycling, drop requirements, and temperature and pressure parameters show that 1/2" wall thickness is required. There was no credible basis for the 0.375" shell thickness. The 0.375" thickness was a "blue sky" number that was never substantiated with rigorous engineering analysis. In addition, the ICF-Kaiser analysis that was performed for the MCO was based on "old" design parameters which were considerably less than those currently mandated. In addition, the MCO drop analysis was never performed for a 0.375", but a statement was made that "...considerable distortion can be expected." This by itself, would most likely require a thicker shell to meet the related drop and criticality requirements.	

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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
23	General: The increase of shield plug thickness to 16" adds significant weight and cost. Is the thickness of the shield plug justifiable? It appears that the length could be reduced by minimizing gaps in the process ports and other places.		Thickness of shield plug is required for two reasons, the shielding/dose requirements specified in the Performance Specification, and the structural requirements which are a result of the stress analysis. A separate issue, but not a design requirement, was to protect the connections in the event of a drop. If the connections were not "buried" in the shield plug, an extensive protection system would be required, since they are required by the Performance Specification to be protected in the event of a DBA drop. The shielding/dose requirement is significantly more conservative than that utilized in the commercial nuclear industry, and as such the plug is significantly thicker. Final shielding analysis has confirmed that the plug thickness will be reduced to approximately 12 - 14 inches.	
24	General: What is the purpose of the top and bottom sockets (pipes in center of top and bottom closures)? It appears that these will complicate fabrication and operations without any identifiable purpose.		Top socket protected the socket for the long draw tube and also served to anchor the upper chamber strainer. This is being re-designed based on conditioning requirements. The lower socket serves three functions: 1) it is the lifting interface for the MCO in order to place it in the cask, 2) it serves to center the rerack baskets, and 3) it protects the long draw tube strainer from being crushed or damaged during any movement of the MCO or baskets.	

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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
25	General: Are four process ports really required? A vented MCO will not need over-pressure protection. Can one port be eliminated by installing either a HEPA filter or a rupture disk as the process requires?		This idea has been discussed before and this is how it went. Four is the lowest number so far. The small vent may plug up. Pressure relief should be available at any time during the MCOs life. Removal and replacement of different components may need leak testing after device installation. Also having the devices permanently installed reduces the chances of configuration errors during the lifetime of the MCO. (L. Goldmann)	
26	General: For the multi-bolt port cover design, has radiation exposure been considered? If would appear that a simpler cover attachment would be appropriate from this standpoint. What is the purpose of the covers; are they to provide final closure containment or will they have to be replaced with welded cover plates? Are the covers intended to provide containment? Can they be leak checked as designed? The port design and the blind threaded holes have contamination traps that are outside of the containment boundary. How will contamination spread be controlled? This design does not meet the requirements of 8.6 of the design requirements document.		The ASME Code does not allow threaded connections. also the leakage requirements for storage and transportation dictated the cover design. the blind flanges will be replaced with blanks which will be seal welded prior to interim storage. The design meets the current design requirement to "minimize" contamination. Leak checking can be accommodated per ASTM E499. Contamination spread may be controlled by the application of a strippable coating prior to submerging the MCO in the basin pool.	
27	General: The cask lid to shell weld is positioned lower on the MCO than anticipated for the cask design. This would appear to force a cask design change. Has this been considered?		The impact on the cask design is under review. Initial feedback is that the cask design will permit both the weld and ultrasonic inspection to be made. (D. Chenault/K. Smith)	

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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
28	General: Will quick disconnect port attachments such as those depicted work? Typically, this type is difficult to attach when interior to an opening as shown, and have inherent leakage problems also. How will a leak check be conducted?		Yes, the quick connectors will work for the design conditions specified in the Performance Specification. The quick connectors specified by Parsons are designed and manufactured by Walther and are of a special design incorporating multiple seals and the ability to retain the fluid or gaseous medium within the coupling to meet leakage requirements and the extreme design parameters. The proposed Walther design is based on their patented designs which have been shown both by testing and during actual use to be extremely reliable over many cycles. In addition, Walther plans to implement performance and leak testing of the proposed quick connector design to ensure that Performance Specification requirements are met. The proposed Walther design has been shown to be readily workable in a number of applications, including remote alignment and coupling operations. Walther personnel met with WHC and Parsons personnel in November 1995 to address and discuss many of the issues that have been raised with respect to quick connectors. Actual leak checking of the installed quick connectors will be finalized during the prototype testing phase of the SNF Project. The testing is not part of Parsons' design phase.	

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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
29	General: The basket fit appears to be tighter now than previously concepted, both in diameter and length. Will the fitup still work? Will payload capacity (280 MK-IA, 277 MK-IV) be maintained?		The basis for the statement, that is comparison to the conceptual drawings is not valid with respect to tolerances. the concept design was based on "blue sky" desires that were not based on design, operational, and functional requirements. Current design meets all requirements.	
30	General: As depicted, the basket floors probably will not be of sufficient strength to support the fuel, i.e., center support. Also, with no penetration holes in the floor plate and tighter fit, drying operations may be difficult, and incorporation of holes in floor plate as supported will just make it weaker.		The baskets are being redesigned to accommodate air flow thru the bottom plate and permit center lifting. (K. Smith)	
31	General: How is water displaced as the shield plug is lowered into place? If all ports are closed, water will be forced out across final closure weld joint preparation. If through a port, port will be contaminated and will at best be difficult to decontaminate.		Water is displaced between the shield plug and the shell juncture.	
32	Sheet 1, Notes: What does note 10 apply to?		Notes are being revised.	

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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
33	Sheet 1, Detail 1: Identifies quantities of 5, 6 and 9 for the various baskets. Are 9 SPR fuel baskets sufficient?		There are approximately 1200 SPR elements. Performance Specification originally called for 10 SPR baskets per MCO. Ten baskets can fit in the MCO, but the weight of 10 baskets far exceeds the maximum weight capacity of the MCO. A decision has not been made as to how the SPR fuel will be loaded in the MCOs. Details on SPR loading will follow. Yes, depending on the final basket loading this should be adequate. There is only about 3500 kg of uranium in SPR fuel. (D. Cowan)	
34	Sheet 5, Section H: Consider skip welding item 3 to item 2.		Notes are for general information. Skip welding of item 3 to item 2 would or could result in potential crevice corrosion problems. This issue has already been addressed by WHC welding personnel. In addition, the spacer bars will be bearing the entire weight of the SNF, which is approximately 15,000 lbs. In addition, the weld detail is being revised to indicate welding all around the spacer bar to prevent crevice corrosion problems from occurring.	
35	Sheet 6, Notes: No welds are identified on this sheet.		Notes are for general information.	

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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
36	Sheet 6: What is the purpose of this screen; would a smaller local screen over the short process tube only provide the same function at reduced fabrication cost?		Screen detail is being revised due to new conditioning process requirements.	
37	Sheet 7, Detail L: Why is item 6 field welded to item 5?		If item 6 was not welded to item 5 it would slide along item 5. It is required to be fixed in place at the designated location.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Project Design Requirements for Multi-Canister Overpack, Fabrication Specification for Multi-Canister Overpack, Multi-Canister Overpack Drawings	Spent Nuclear Fuel	William Dana	CSB Technical Integration	

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

* Agreement subject to satisfactory resolution of comment in phase 2 mco design.

W. P. Dana

1-24-96

Date

Reviewer/Point of Contact

Author/Originator

11. CLOSED

Date

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
	COMMENTS ON PROJECT DESIGN REQUIREMENTS DOCUMENT			
1	The CSB project is concerned that MCOs received from HVC may have changed or warped dimensions as the result of HVC which may result in interference fit-ups either in the storage tube or with the MCO grapple tool. Consider stress relieving all portions of the MCOs after initial fabrication to minimize warping. Changes to dimensional tolerances after HVC may otherwise prove to be the fatal flaw of the MCOs.		This issue is not a Performance Specification requirement. Control of the HVC temperature to below the ASME Code allowable yield temperature of 800 °F will preclude the material from warping. ok. WD	

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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
2.	The dimensions of the female slot for the lifting grapple appear to be marginally too small to accommodate large concentrated stresses, especially for times when the MCO may rock to the side, concentrating all weight on only one side of the small 1" holding ledge. Consider increasing depth into the metal of the female slot which would add more metal above to absorb weight induced shear stresses. Consider also increasing the internal diameter of the lifting slot. Failure of this holding slot would result in an MCO drop accident. External lifting lugs may be required.		Grapple design is being revised. Details will be changing. * WD	
3	Design of an expandable mandrel which releases when weight is released is unacceptable, since there may be times when the MCO Handling Machine will mis-position the MCO during handling, potentially releasing the MCO at an undesirable position, resulting in an MCO drop accident.		Design of grapple is being revised. In addition, the design does not provide redundant load paths nor is it fail-safe. It is not a Performance Specification requirement, as it was removed as a requirement. The MCO is designed to withstand a maximum 2' drop. * WD	
4	Section B/S-1 calls item 5 as a blind flange; when in fact this is probably a nameplate.		It is not item 5, but note 5, which indicates that identification of MCO is stamped in this designated area. ok WD	
5	Sheet 4 of 8 Drawing: Detail 1 (top socket-long draw tube) is not clearly identified for location on adjacent shield plug penetration section E/S-2.		Drawing is being revised and will be corrected. ok WD	
6	Provide cross section detail of bottom spacer bar plate shown on sheet 5.		Section D, identifies item 3, which is the spacer plate. This shows the cross section. ok WD	
7	On Sheet 5, it is not clear what detail 5 refers to.		Drawing is being revised to clarify. ok WD	

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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
8	On Sheet 5, Section H, it is not clear what opening the long draw tube bottom socket accesses; i.e., how does this detail support hot vacuum conditioning or cold vacuum conditioning suctioning of liquids off of bottom of MCO? It appears that a dead leg of water would be left, unless holes were somehow drilled to access the bottom of the draw tube.		Please refer to sheet 7, which shows the long draw tube with the integral strainer device. The long draw tube provides the means of removing the water. OK WD	
9	On Sheet 1, Section E should actually be labeled Section E/S-1 as detailed on Sheet 6.		Drawing is being revised to correct. OK WD	
10	Since there is actually no conditioning taking place in the conditioning chamber, it is suggested that the chamber be renamed to "Dry Gas Distributor".		Drawing is being revised. This chamber will be renamed as appropriate. OK WD	
11	Sheet 7: After the liquid has passed through the strainer assembly, it is not clear how the liquid clears the end of the suction pipe. It is assumed that the suction pipe has slots on the lower support in the stainer assembly, around which the liquid may pass to go up the tube. A cross sectional view of Detail 1 on Sheet 7 needs to be shown, to clearly define the tabs shown at the bottom of the 1" suction pipe.		Detail 4, long draw tube, and detail of strainer assembly clearly show an opening at the bottom of the long draw tube where the strained liquid enters the long draw tube. OK WD	
12	Sheet 7: Cross section O should look circular in appearance. It does not look that way.		Section O cross-section is circular as depicted on the drawing. OK WD	
13	During a recent review meeting, it was pointed out that the description of Detail 2 and Detail 3 on Sheet 8 are labeled in reverse. Please fix.		Drawing is being revised and will be corrected. OK WD	

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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
14	The ½" solid base plate design on the MCO baskets do not support the hot vacuum drying process, since this forms a solid barrier where hot gas cannot pass from one basket to the basket above. The basket base plates should be perforated. A cross section should be shown to describe those perforations.		The basket design is being revised and the bottom plate in each basket will contain holes or perforations to support flow through the baskets. OK WD	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Transmittal of 90% Design Drawings, Fabrication Specification, and Project Design Requirements	MCO Subproject	T. T. Ghigleri	SNF Project Systems Engineering and Integration	MO-285/373-5756

17. Comment Submittal Approval:

Organization Manager (Optional) Contact

Date

10. Agreement with indicated comment disposition(s)

1/24/96 Thomas T. Ghigleri

Date Reviewer/Point of Contact

Author/Originator

11. CLOSED

Date Reviewer/Point of

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
	Note to Parsons: Many of my comments note discrepancies between Parsons 90% documents and Revision 0A of the Performance Specification (which was distributed along with the Parsons 90% documents). I realize that Parsons has not seen Revision 0A of the Performance Specification before and could not have made their documents consistent with Revision 0A of the Performance Specification. My comments in this area point out topics which must be discussed to make all the MCO documents consistent.			

Project Design Requirements for Multi-Canister Overpack

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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	General Comment. The correct term is "hot conditioning" rather than "hot-vacuum conditioning" or "final conditioning." Revision 0A of the Performance Specification contains the correct terminology.		Will incorporate "hot conditioning".	
2	General Comment. The correct term is "vacuum drying" rather than "cold-vacuum drying." Revision 0A of the Performance Specification contains the correct terminology. I made this comment to the 50% design package (Parsons #15) and the response was "will comply."		Will revise PDR.	
3	General Comment. In Revision 0A of the Performance Specification, the 75 year life for the MCO has been changed to 40 years.		Will revise PDR.	
4	General Comment. In Revision 0A of the Performance Specification, "unyielding surface" has been changed to "flat reinforced concrete."		Will revise PDR.	
5	General Comment. The words ".20g to" have been deleted from Section 3.3.2.2 of Revision 0A of the Performance Specification.		Will revise PDR.	

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6	Section 1.2, last sentence, page 1. The Project Design Requirements document receives no requirements directly from the MCO Functions and Requirements. The Performance Specification receives requirements from the F&R and passes them on to the Project Design Requirements document. I recommend that reference to the F&R be deleted.		Will comply.	
7	Section 1.2, last sentence, page 1. Note that once the revision of the Performance Specification is given to Parsons as compliance, requirements resulting from technical interface meetings with WHC will no longer be valid. The Performance Specification revision will incorporate these requirements.		Comment is noted.	
8	Section 2.1, 1st paragraph, 2nd sentence, page 1. "Temporary storage" refers to the current storage of SNF at the K Basins, not to staging at the CSB. I made this comment to the 50% design package (Parsons #16) and the response was "will comply."		Will revise PDR.	
9	Section 2.1, 2nd paragraph, fifth bullet, page 2. "And purging" has been added to this bullet in Section 3.1.1 of Revision 0A of the Performance Specification		Will add as a separate bullet in PDR.	
10	Section 2.2, 1st paragraph, 2nd sentence, page 2. This sentence is inconsistent with Section 3.1.2 of Revision 0A of the Performance Specification, which includes incidental equipment.		Will revise PDR.	

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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
11	Section 2.3, 2nd paragraph, page 3. This paragraph makes two references to "Mark IA fuel" and one to "Mark 1A fuel." Since they refer to the same fuel type, one of these is incorrect.		Will revise PDR.	
12	Section 2.4, 3rd paragraph, 1st sentence, page 4. The correct term is "vacuum drying module."		PDR is correct as stated.	
13	Section 3.1, fifth bullet, page 4. The Project Design Requirements document receives no requirements directly from the MCO Functions and Requirements. The Performance Specification receives requirements from the F&R and passes them on to the Project Design Requirements document. I recommend that reference to the F&R be deleted.		Will comply.	
14	Section 3.4, page 5. This section has been deleted from Revision 0A of the Performance Specification.		Will revise PDR.	

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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
15	Section 4.0, 1st sentence, page 5. This sentence is inconsistent with Section 2.0 of Revision 0A of the Performance Specification, which gives specific issue dates for compliance documents. There are two reasons the Performance Specification does this: (1) to ensure all participants know which edition of a document is being used, and (2) to ensure all participants are using the same edition. A new edition of a document may be published while the design is in progress, resulting in later design work being done to a different edition than earlier design work. Generally, documents do not differ significantly enough from edition to edition for this to be a problem. However, it is prudent to make sure. I believe Section 2.0 of Revision 0A of the Performance Specification adequately addresses this issue.		Will revise PDR to be consistent with the Performance Specification, Revision 1.	
16	Section 4.0, 2nd sentence, page 5. This sentence is inconsistent with Section 3.3.3 of Revision 0A of the Performance Specification, which states that only Safety Class 1 items will be designed to meet the intent of ASME Section III. I made this comment to the 50% design package (Parsons #42) and the response was that Parsons was assuming all components would be Safety Class 1. Since Section 8.2.1 of the Project Design Requirements document states that not all components will be Safety Class 1, I resubmit this comment.		Not all of the MCO components will be safety class 1 items. However, all of the MCO designed components will be designed to meet Subsections NB, NC, NF, or NG of ASME Section III.	

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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
17	Section 4.3, 2nd paragraph, pages 6-7. This paragraph (including all bullets) has been deleted from Section 3.2.1.3 of Revision 0A of the Performance Specification.		PDR will be revised accordingly.	
18	Section 4.4, 1st sentence, page 7. This sentence leads me to believe that the MCO shield plug only provides shielding when contained within a shielded, open cask, which is untrue. I recommend the words "when contained within a shielded, open cask" be moved to the end of the sentence to make it more clear.		Comment is noted.	
19	Section 4.5, 1st paragraph, 4th bullet, page 7. "And purging" has been added to this bullet in Section 3.2.1.5 of Revision 0A of the Performance Specification.		Will add bullet to PDR.	
20	Section 6.0, 2nd paragraph, 2nd sentence, Page 9. This sentence refers to the initial drying process which will likely occur at the K Basins rather than the subsequent process which will likely occur at the CSB. I recommend changing "Hot vacuum drying" to "vacuum drying."		Will comply.	
21	Section 8.1.2, 2nd sentence, page 11. This sentence has been deleted from Section 3.3.1.2 of Revision 0A of the Performance Specification.		Will revise PDR.	
22	Section 8.2.2, 2nd paragraph, page 12. The reference to the CSB PSE has been deleted from Section 3.3.2.2 of Revision 0A of the Performance Specification.		Will revise PDR.	

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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
23	Section 8.2.3, page 12. The section has been deleted in Revision 0A of the Performance Specification.		Will revise PDR.	
24	Section 8.3, 1st paragraph, 1st sentence, page 13. The words "to meet the intent of DOE 6430.1A" are inconsistent with Section 3.3.3 of Revision 0A of the Performance Specification, which uses the words "in accordance with."		Comment is noted, but is not valid. Requiring reference documents that do not impose specific, but only general requirements should be eliminated. DOE 6430.1A is such a document.	
25	Section 8.3, 1st paragraph, 1st sentence, page 13. "HPS-SDC-4.1" has been changed to "SDC-4.1" in Section 3.3.3 of Revision 0A of the Performance Specification.		Comment is noted. Requiring reference documents that do not impose specific, but only general requirements should be eliminated.	
26	Section 8.3, 1st paragraph, 1st sentence, page 13. ANSI/ANS 57.9 has been deleted from Section 3.3.3 of Revision 0A of the Performance Specification.		Will revise PDR accordingly.	
27	Section 8.3.1, page 13. These bullets are inconsistent with Section 3.3.3.3 of Revision 0A of the Performance Specification, which includes a bullet which states "Provisions to make or break all connections while continuing to maintain SNF containment, with minimal spread of contamination."		Will revise PDR to incorporate comment.	
28	Section 8.5, 1st sentence, page 14. The words "to the maximum extent possible" are inconsistent with Section 3.3.5 of Revision 0A of the Performance Specification, which does not contain these words.		Comment is noted, but is not valid. Some items cannot be met, or the requirements are so vague that they are indeterminate.	

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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
29	Section 8.6, 2nd sentence, page 14. The words "as much as possible" are inconsistent with Section 3.3.6 of Revision 0A of the Performance Specification, which does not contain these words.		Comment is noted, but is not valid. Some items cannot be met, or the requirements are so vague that they are indeterminate.	
30	Section 9.0, 3rd paragraph, 1st sentence, page 14. The words "to meet the intent of DOE-RL-92-36" are inconsistent with Section 3.4 of Revision 0A of the Performance Specification, which uses the words "in accordance with."		Hoisting/Rigging DOE-RL-92-36 to be deleted from PDR.	
31	Section 10.0, page 14. The second paragraph of this section does not pertain to personnel training. It should be a separate section.		Comment is noted and PDR will be revised.	
32	Table 3, References, page 15. Note that once the revision of the Performance Specification is given to Parsons as compliance, the 10/24 letter, 11/2 meeting, and ROTC will no longer be valid. The Performance Specification revision will incorporate these requirements.		Will issue PDR after issue of Performance Specification.	
33	Table 3, Design Temperature, page 15. The statement "Only applies during hot conditioning" is inconsistent with Revision 0A of the Performance Specification, which does not say this.		PDR will be revised.	
34	Table 3, Leakage, page 15. The statement "Standards do not apply when making/breaking connections" is inconsistent with Revision 0A of the Performance Specification, which does not say this.		Table 3 will be reworded to be consistent with the Perf. Spec., Rev. 1.	

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35	Table 3, Leakage, page 15. "No spread of contamination" has been changed to "minimum" in Section 3.3.3.3 of Revision 0 of the Performance Specification. This should resolve this conflict.		Comment is noted.	
36	Table 3, Weight, page 16. The dry weight of 18,314 is in Section 3.2.2.2 of Revision 0A of the Performance Specification, not Section 3.2.2.1.		Will revise PDR.	
37	Table 3, Lifting, page 16. The words "intent of the code" are inconsistent with Section 3.4 of Revision 0A of the Performance Specification, which uses the words "in accordance with."		This refers to the Hoisting and rigging manual, which has been replaced with ASME B30.20, Below the Hook Lifting Devices. Wording will be revised to indicate compliance with the new code.	
38	Table 3, Mechanical Loads - Seismic, page 16. Seismic acceleration for the Hanford Site has been deleted from Table 3.2.4 of Revision 0A of the Performance Specification.		Will revise PDR as required.	
39	Table 3, Mechanical Loads - Seismic, page 16. Revision 0A of the Performance Specification does not reference the cask specification on any seismic issues.		PDR will reflect Revision 0A of Performance Specification.	
40	Table 3, Drop Acceptance Requirements, page 16. Revision 0A of the Performance Specification does not mention service level D.		ASME Code requires that a Service Level for the designed vessel be specified. WHC has not specified a Service Level. Parsons has utilized Service Level D, which is consistent with commercial nuclear industry practice.	

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41	Table 3, Fuel Basket Capacity, page 17. Section 3.2.1.1 of Revision 0A of the Performance Specification includes the basket for fuel fragments.		This is a Phase II task.	
42	Table 3, Fuel Basket Capacity, page 17. Section 3.1.2 of Revision 0A of the Performance Specification does not state the number of baskets per MCO.		Will revise PDR.	
43	Table 3, DBA-Earthquake, page 19. Seismic acceleration for the Hanford Site has been deleted from Table 3.2.4 of Revision 0A of the Performance Specification.		Will revise PDR.	
44	Table 3, DBA-Earthquake, page 19. Revision 0A of the Performance Specification does not reference the cask specification on any seismic issues.		Will revise PDR as required.	

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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
45	Table 3, Penetrations and Connections, page 19. The processes that the penetrations and connections accommodate (draining, drying, conditioning, monitoring, venting) are inconsistent with Section 3.2.1.5 of Revision 0A of the Performance Specification, which gives the processes as vacuum drying, hot conditioning, pressure relief, and venting and purging. I made this comment to the 50% design package (Parsons #36) and the response was "Wording and proposed MCO Design is in accordance with Draft Revision 0 Performance Specification requirements." This revision of the Fabrication Specification was written when Parsons was working to Revision 0 of the Performance Specification, which contains different wording. Therefore, I resubmit this comment.		Will comply with terminology suggested for PDR.	
46	Table 3, Protective finishes and coatings, page 20. Section 3.3.8 of Revision 0A of the Performance Specification contains some words on finishes and protective coatings.		Will revise PDR as required.	
47	Table 3, Tools and handling equipment currently available, page 20. This statement has been deleted from Section 3.4 of Revision 0A of the Performance Specification.		Will revise PDR as required.	
48	Table 4, Additional governing documents, page 21. ANSI/ANS 57.9 has been deleted from Sections 2.2 and 3.3.3 of Revision 0A of the Performance Specification.		Will revise PDR as required.	

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49	Table 4, Scrap Holders, page 21. Section 3.2.1.1 of Revision 0A of the Performance Specification contains some words on scrap holders.		Noted.	
50	Table 4, Preventive maintenance, page 22. Section 3.2.3.3 of Revision 0A of the Performance Specification states that the MCO shall be designed to minimize preventative maintenance. An exception to ASME Code may no longer be required.		Will revised PDR as required.	
51	Table 4, Radioactive source term, page 23. The worst case for criticality has been deleted from Section 3.3.1.2 of Revision 0A of the Performance Specification.		Will revise PDR as required.	
52	Table 4, Abnormal operations detection, page 23. This section has been deleted from Section 3.3.1.2 of Revision 0A of the Performance Specification.		Will revise PDR as required.	
53	Section 11.0, paragraphs 33-35, pages 33-34. Some of the wording regarding the maintenance of the pressure relief device has been changed in Revision 0A of the Performance Specification. Based on these changes, it may be possible to meet all requirements and not take exception to the ASME Code in this area.		Rupture disk alone does not meet Subsection NB requirements for overpressure protection.	

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54	Section 1.0, 2nd sentence, page 1. "i.e." means "such as." Given this definition, this sentence does not make sense. Recommend replace "i.e." with "for."		Comment is noted and has been incorporated.	
55	Section 1.1, 3rd sentence, page 1. The phrases "K East" and "K West" do not contain dashes.		Will comply.	
56	Section 1.1, last sentence, page 1. Based on the context of this sentence, it appears "debris" refers to fuel fragments. "Debris" has a specific meaning in the SNF Project. It is the non-fuel miscellaneous material in the basins (i.e., empty canisters, dropped tools). I recommend "debris" be changed to "fragments" or "fuel fragments."		Comment is noted and has been incorporated.	
57	Section 1.2, 3rd paragraph, 1st sentence, page 1. The shield plug minimizes dose for processes other than just drying. I recommend "Drying" be changed to "Conditioning."		Change to "hot conditioning".	

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58	Section 4,0, 2nd sentence, page 4. This sentence is inconsistent with Section 2.0 of Revision 0A of the Performance Specification, which gives specific issue dates for compliance documents. I made this comment to the 50% design package (Parsons #51) and the response was "This is common practice for commercial nuclear spent fuel activities and has been accepted by the USNRC." I believe the convention in the Performance Specification is preferable to that used in commercial activities for two reasons: (1) giving specific issue dates ensures all participants know which edition of a document is being used, and (2) giving specific issue dates ensures all participants are using the same edition. A new edition of a document may be published while the design is in progress, resulting in later design work being done to a different edition than earlier design work. Generally, documents do not significantly enough from edition to edition for this to be a problem. However, it is prudent to make sure. I believe Section 2.0 of Revision 0A of the Performance Specification adequately addresses this issue.		Dates will not be provided except for the design code (i.e., ASME), since actual procurement and fabrication activities may take place at a later date.	

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59	Section 4.1, pages 4-5. 20 of the 25 documents listed in this section are not compliance documents in Revision 0A of the Performance Specification. In order to maintain traceability of requirements, the basis for inclusion of these documents in this specification must be established. I made this comment to the 50% design package (Parsons #50) and the response was "The listed documents are required to fabricate, inspect, and test the MCO. These listed documents (and potentially others) should be added to the Performance Specification. In many cases the listed documents are listed as direct references in the stated Performance Specification referenced documents." It is not clear to me that the documents are required to fabricate, inspect, and test the MCO. Before these documents are added to the Performance Specification, Parsons must show for each document that there is a valid need for its addition.		Performance Specification only contains those documents that are required for design. However, Fabrication Specification requires additional documents that are required to procure materials and perform the fabrication. These documents are not to be included in Performance Specification.	

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60	Section 4.1, pages 4-5. The second sentence of this section states that "The codes and standards are applicable to the extent referenced in this fabrication specification and the associated Design Drawings." However, the following codes and standards referenced in this section are not referenced anywhere else in the Fabrication Specification or design drawings: • ASTM A20/A20M • ASME SA-370 • ASME SA-484/SA-484M • ASTM E338 • ASME SA-745/SA-745M • ASTM A-480/A-480M		Comment is noted, and has been incorporated.	
61	Section 4.1.7, page 5. In Section 6.5.5 of the Fabrication Specification, the document is called ASNT-TC-1A. Here, it is called SNT-TC-1A. One of these citations is incorrect.		Comment is noted, and has been incorporated.	
62	Section 4.1.14, page 5. In Section 11.1.2 of the Fabrication Specification, the document is called AWS A2.4-79. Here, it is called AWS A2.4-86. One of these citations is incorrect.		Comment is noted, and has been incorporated.	

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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
63	Section 4.3, page 6. The first sentence of this section states that "The following reference specifications shall apply to the Work to the extent referenced in this Fabrication Specification." However, none of these specifications are referenced anywhere else in the Fabrication Specification.		Comment is noted, and has been incorporated.	
64	Section 4.4, page 6. It is unclear to me whether these documents are compliant on the seller or are for information only. The difference between this section and Section 4.1 is unclear to me. I made this comment to the 50% design package (Parsons #52) and the response was "Section 4.4 of the Fabrication Specification states, 'The following reference documents shall apply to the Work:'" I am not clear on the meaning of "apply to the Work." If it means that the documents are compliant to the extent referenced elsewhere in the Fabrication Specification (since they are both referenced elsewhere), then there is no difference between this section and Section 4.1 and they should be combined. If it means that these documents are compliant in their entirety, then this section should state as such. If it means that the vendor fabricating the MCO must read analyze these documents and find applicable requirements, then this section should state as such.		Comment is noted, and has been incorporated.	

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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
65	Section 5.2, 4th sentence, page 7. The phrase "specific exterior surfaces of the MCO" appears to be in error. I made this comment to the 50% design package (Parsons #55) and the response was "Once fuel is placed in the MCO, there is no reason to decontaminate the interior of the MCO." This is true. However, the third sentence of this paragraph discusses contamination on the inside of the MCO shell. Furthermore, the phrase "all exterior and the specific exterior" does not make sense. I recommend that this paragraph be reviewed.		Comment is noted, and has been incorporated.	
66	Section 6.2.1(C)(1), page 9. ASME SFA-5.4, ASME SFA-5.9, and SFA-5.22 are referenced in this section, but are not included in Section 4.1.		Comment is not valid. The documents are sections of ASME IX.	
67	Section 6.5, page 11. AWS D1.1 is referenced twice in this section, but is not included in Section 4.1.		Comment is noted, and has been incorporated.	
68	Section 6.5.5(A), 2nd paragraph, 1st sentence, page 14. ANSI N45.2.6 is referenced in this sentence, but is not included in Section 4.1.		Comment is noted, and has been incorporated.	
69	Section 7.2.1, 1st paragraph, 1st sentence, page 18. ASTM E499 is referenced in this section, but is not included in Section 4.1.		Comment is noted, and has been incorporated.	

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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
70	Section 7.2.2, 1st paragraph, 1st sentence, page 18. The statement "to meet the intent of ANSI N14.5" is inconsistent with Section 3.3.3.3 of the Performance Specification, which states that leakage rate testing shall be conducted in accordance with ANSI N14.5. I made this comment to the 50% design package (Parsons #61) and the response was "ANSI N14.5 is not a requirement of Draft Revision 0 Performance Specification. All requirements of N14.5 cannot be met, just as all requirements of ASME Section III, and the relevant Sub Sections cannot be met for the design, fabrication, inspection and testing of the MCO." ANSI N14.5 is a requirement of Revision 0 and Revision 0A of the Performance Specification. If this requirement cannot be met, then Parsons must ask WHC to change the Performance Specification. Until the Performance Specification is changed, the Fabrication Specification is inconsistent with the Performance Specification. Therefore, I resubmit this comment.		Comment is noted, but is not valid. Some items cannot be met, or the requirements are so vague that they are indeterminate. ANSI N14.5 does provide any information to the designer (Parsons) with regard to designing the MCO to be leak testable. N14.5 does state how to perform a test and determine that the test and test parameters are valid for the item to be tested. N14.5 is not valid for design of the MCO, but is only applicable for testing of the MCO.	

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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
71	Section 7.3, pages 18-20. Sections 7.3.1 and 7.3.2 state that the tests described in these sections are "recommended." This is not proper language for a specification. Furthermore, these sections are inconsistent with Section 7.3, which states that the tests are mandatory. I made this comment to the 50% design package (Parsons #62) and the response was "The term 'it is recommended' is being taken out of context. It is the intent of this specific section to perform functional dimensional and clearance tests of the MCO and related components with respect to dimensional clearances. The use of a 'fuel assembly basket insertion gauge' is a recommendation and not a requirement. The Seller could meet the requirements of the section by measurement or other means." This response does not address the fact that Sections 7.3.1 and 7.3.2, which state that this tests are not a requirement, conflict with Section 7.3, which states that the tests are a requirement.		The mechanism of performing the test is recommended, not that the specific test is recommended. The test shall be performed as stated in Section 7.3.	

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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
72	Section 9.1.1, 2nd sentence, page 22. The reference to NQA-1 has been deleted from Revision 0A of the Performance Specification. It may not belong in this specification either. I made this comment to the 50% design package (Parsons #66) and the response was "Draft Revision 0 Performance Specification required compliance to the requirements of NQA-1." This revision of the Fabrication Specification was written when Parsons was working to Revision 0 of the Performance Specification, which does not require compliance to the requirements of NQA-1. Therefore, I resubmit this comment.		Comment is not valid. Performance Specification QA requirements are not consistent with the other SNF project documents. The reference to NQA-1 will be removed, however, the NRC has accepted ASME Section III, NCA-3800 as an acceptable alternate to 10 CFR 71, Subpart H. (J. Diehl)	
73	Section 9.1.1, 2nd sentence, page 22. NQA-1 is referenced in this sentence, but is not included in Section 4.1.		Reference will be added to Section 4.1. Refer to response to comment #72.	
74	Section 11.0, pages 26-28. The information in this section is administrative rather than technical in nature. Since a specification contains technical and not administrative requirements, this section does not belong in the Fabrication Specification. It belongs in a Statement of Work to the vendor who is fabricating the MCO. Since this SOW does not yet exist, I recommend at least moving this section to an appendix of the Fabrication Specification.		The information is not administrative, but sets the requirements for Fabricator documentation, submittals, etc.	

Design Drawings

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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
75	Sheets 1, 2, 3, 5, 6, 7, and 8. Each of these sheets reference ASME Y1.1, ANSI/ASME Y14.36, and ANSI/ASME B46.1. None of these documents are included in Section 4.1 of the Fabrication Specification.		Comment is noted, and will be incorporated.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Project Design Requirements for Multi-Canister Overpack, Fabrication Specification for Multi-Canister Overpack, Multi-Canister Overpack Drawings	Spent Nuclear Fuel	Lou Goldmann		

17. Comment Submittal Approval:

10. Agreement with indicated comment disposition(s) LH Goldmann 1/23/96

11. CLOSED

Organization Manager (Optional) Date

Reviewer/Point of Contact

Date

Reviewer/Point of Contact

Author/Originator

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
	COMMENTS ON PROJECT DESIGN REQUIREMENTS DOCUMENT			
1	Page 6, Section 4.1, we would like to use the same baskets for fuel, if possible, to hold a scrap holders in the same MCO with full element baskets. This means the scrap holders would come in two different heights and only one scrap holder would be loaded per MCO, probably as the last and only basket into the MCO. The current plan is that an MCO would not have scrap holders at several levels inside the MCO.		This will be addressed in Phase II Design.	
2.	Page 7, Section 5.5, refer to the processes as Spent Nuclear Fuel (SNF) Vacuum Drying and SNF Hot Conditioning through out your document to avoid confusion with common words.		Comment is noted and will be incorporated.	

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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
3	Page 7, Section 4.6, first sentence, remove the reference to hydrogen as other gases may be present that need to be relieved.		Comment is noted and will be incorporated.	
4	Page 8, Section 4.1, according to Mike Mahaffey, we need to design the MCO for only 40 years of storage in the Canister Storage Building (CSB), so the number should be reduced from 75 to 40 years as the life of the MCO. This change should be made through out the documents of this review. So, please search for 75 and 200 and change accordingly.		Comment is noted and will be incorporated.	
5	Page 13, Section 8.3, I believe the ANSI/ANS 57.9 requirement is being deleted.		Comment is noted and will be incorporated.	
6	Page 18, Second column, top line, the middle phrases, the sentence reads "The device will be replaceable or resealable after functioning." Later in document text (page 33) the word resealable (from the Performance Spec) is used for resealable. The needs for this device are to (1) replace the device as needed because a rupture disk is indicated and (2) make the device inactive as needed during a portion of the life cycle of the MCO. The inactivation is currently thought to be done by installing a blind flange over the device to deactivate the device and remove the blind flange to activate the device.		Comment is noted. Section will be clarified.	
7	Page 26, MCO Design Basis section, second paragraph, Delete the 5 tiers of scrap spent fuel. The plan is to not load an MCO with some scrap in several baskets or tier separators. Currently the plan is to have the last and top basket contain the scrap, if needed.		Will comply.	

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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
8	Page 30, End of section to top of page 31, although the section quoted and referenced does not contain the direction to pressure test the MCO shells or assembly, the design activity includes the determination if it is needed or not. If all the answers were in the performance specification then we would not have to design the MCO. The expectation is that the MCO pressure boundary will meet NB or an exception will be taken.		The MCO pressure boundary is designed to meet ASME Section III Subsection NB requirements.	
9	Page 31, First bullet, the word judged is used. Comment, a helium leak test trading for a hydrostatic test may be hard to defend.		Comment is noted, and discussions are taking place on resolving this issue. This will be resolved for Phase II Design.	
	COMMENTS ON FABRICATION SPECIFICATION DOCUMENT			
10	Page 5, Top Line, not absolutely sure about this one but may want to add an A to SNT to read ASNT.		Comment is noted. SNT is correct.	
11	Page 7, Section 5.2, first sentence, I believe the annulus will be dry during loading, the water will be put in during vacuum drying then dried after cycle is complete. I understand that the vacuum drying station will be able to handle some levels of contamination in the annulus water.		Noted.	
12	Page 17, Section 6.6.1 Cleaning. We should add that no materials be used during fabrication, processing, or cleaning that contain appreciable amounts of halogens.		Comment is noted and will be incorporated.	

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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
13	Page 19, Section 7.3.4.2, The idea of using "go" and "no go" gases with the shield plug in the MCO is a good one, but I can't see how the test will be done at the factory with the MCO plug and shell fit up as there is not room or access (without moving the shield plug) to get the gage in the "gap" between the shell and the plug as the MCO is sealed up on the lower end at that point in time. Also, how would this help us after the parts are received. Shipping may damage or bend something. Much the same comment for Test 6 on page 20.		Comment is noted. Section is being revised to provide clarification.	
14	Page 22, Section 8.0, The shield plug and MCO shell should be given numbers at the beginning, lets say 1 to 500 for shield plugs and 501 to 1000 for the shell assemblies. The sealed MCO would assume the plug number after welding for inventory, accountability, etc. Both numbers would be visible after the closure weld is complete in the cask.		Parsons will add this requirement to the Fabrication Specification.	
15	Page 24, Section 9.2.6, It is likely the WHC QA NCR form and procedure would be used for nonconformances. The QA folks will have comment here.		Noted.	

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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
16	Page 27, Drawing should be done to ANSI Y14.5 (I am not sure of the specification number) that covers mechanical drawings.		Comment is noted and will be incorporated.	
17	Page 28, Line H, I think the last version of N14.5 is 1987.		Comment is noted and will be incorporated.	
	COMMENTS ON DRAWINGS			
18	Sheet 1, Zone E-3, the 0.06 Gap at the root of the weld may be difficult to maintain to tack up the weld. What is the plan here to do this and hold tolerance in the field at the basins? Also, the gap is called out twice--once in the field weld symbol call out once as a dimension in the section view. Is this customary to call out in both places these days?		Comment is noted. Based upon discussions with WHC welding personnel, the joint design is being revised.	
19	Sheet 2, You may want to put two relief grooves on the face of the shield plug leading away from the pocket to the edge of the plug to allow for gas flow passage, if an impact limiter were above the lower under relief MCO. Are the 150 # blind flanges OK for the 375° C?		Comment is noted. This will be evaluated further in Phase II Design. 150# blind flanges are adequate for 150 psig at 375 °C.	

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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
20	Sheet 3, The plug is too thick. Can the passages be re-directed or re-done to minimize dose out the top, thus allowing the plug to go to 10 to 11 inches. A heavier skirt from the shield plug around the axial draw tube may also help the reduction out the lift pocket. The 5 inches of space is needed inside the MCO for circulation among the baskets. Also the MCO weight will go down and the metal may be used elsewhere for needed shielding. Have the dose rate calculations for the shield plug been completed?		Conservative dose rate calculations were performed and resulted in the plug thickness shown. The calculations are in process with some of the conservatism removed. Preliminary results indicate a plug thickness of anywhere from 12 to 14 inches. Thickness of shield plug is required for two reasons, the shielding/dose requirements specified in the Performance Specification, and the structural requirements which are a result of the stress analysis. A separate issue, but not a design requirement, was to protect the connections in the event of a drop. If the connections were not "buried" in the shield plug, an extensive protection system would be required, since they are required by the Performance Specification to be protected in the event of a DBA drop. The shielding/dose requirement (i.e., Performance Specification requirement of 30 mrem/hr vs. 200 mrem/hr for commercial nuclear industry) is significantly more conservative than that utilized in the commercial nuclear industry, and as such the plug is significantly thicker.	
21	Sheet 4, Once the quick disconnects (QD) dimensions are known, how about adding more metal around the Qds (therefore closing in on them) and narrowing the gaps to lower the dose out the top?		Comment is noted, and can be incorporated in Phase 2 of the MCO design.	
22	Sheet 7, I am sure you have the details figured out, but I would like to see a blow up of the view L. Lou Goldmann.		This will be provided.	

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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
23	Sheet 8, How are fines of fuel occluded from the area between the 4 inch pipe and the axial draw tube? A reasonable plan is needed to keep the materials out to prevent the possibility of criticality concerns. Also, the basket bases plates have to support possible ventilation and process needs for the circulation and convective cooling among the tiers.		The center pipe of each basket is beveled and designed to interface with the basket centerpipe above and below it. The baskets are in the redesign phase to allow sufficient circulation through the bottom plate.	
	OPERATIONS and MAINTENANCE REPORT REVISION A			
24	Page 2, Third paragraph, the 5 tiers of scrap should be deleted. It is likely that scrap holders will only be allowed in the top basket in the MCOs.		Will comply.	
25	Page 3, Section 2.3.2, The last part or the last sentence should change to read ", the maximum contact (2 inches) dose will be less than 100 millirem per hour in any area of the shield plug at the top face." or something like this. This means we don't want a contact dose at any area at the face plane of the plug more than 100 mrem/hr.		Will comply.	
26	Page 5, Section 2.3.4, first sentence change hydrogen to built up or something else. Hydrogen is only one of the gases that may build up.		Will comply.	
27	Page 9, Section 3.2, line 6, at fuel elements change to fuel "elements/scrap". Line 7, add water equalization equipment to shield plug. Line 11, add using the water level equalization equipment.		Will comply.	
28	Page 11, Section 3.5, line 2, add or move transport cask to station for MCO removal. Line 3, at reconnect change to reconnect/activate.		Will comply.	

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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
29	Page 13, Section 3.6, line 10. This may not work unless we weld around the bolt heads also. Maybe removal of the blind flange and a disk welded inside the bolt circle would be better? **Section 4.9, line 3, last paragraph, may want to add reflood of the SNF to the steps which may prove to be a delicate operation!**		Comment not incorporated. The port covers are the same diameter as the blind flange, but do not have bolt holes.	
30	Page 16, Comment, I don't agree with the conclusion.		Comment noted.	
31	Page 19, Section 6.3.1, pressure testing in pairs (double length, back to back) is possible then separate and cut each MCO to length after passing the pressure test is possible. Then no special mechanical fixture is needed.		Section 6.3, which pertains to MCO fabrication, has been deleted from the O&M Report.	
32	Page 19, Section 6.3.3, Comment, I disagree with the conclusion. An axially oriented weld is a more critical weld from the pressure standpoint.		Section 6.3, which pertains to MCO fabrication, has been deleted from the O&M Report.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO Ninety Percent Documents	Spent Nuclear Fuel	AG Hosler	SAIC	HO-50/372-7755

17. Comment Submittal Approval:

10. Agreement with indicated comment disposition(s)

11. CLOSED

Organization Manager (Optional) Contact — Date — Reviewer/Point of Contact — Date — Reviewer/Point of Contact

Alan Hosler 1/29/96

Author/Originator — 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
	WHC-S-0426, Revision OA, MCO Performance Specification			

1-29-96 ; 9:27AM ; SAIC RICHLAND- 509 376 3252:# 2/ 2
SENT BY:

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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	Section 2.1 and 4.3. We have previously commented on the need for the MCO Design and fabricator contractors to comply with 10CFR830.120, Quality Assurance Requirements. The performance specification refers to 10CFR71 for quality assurance requirements. Has an analysis been performed that shows the quality assurance requirements of 10CFR71, Subpart H satisfy the requirements of 10CFR830.120?		Yes, there have been comparisons made. Ref.(1) I.M. 38600-95-020 Subject: Comparison of Quality Assurance Program Requirements of 10 CFR 71 Subpart H., 10 CFR 72 Subpart G. , 10 CFR 50 Appendix B.; Ref.(2) 10 CFR 72 Subpart G., 10 CFR 50 Appendix B., 10 CFR 830.120. Comparison of Nuclear Regulatory Commission and Department of Energy Requirements. Ref (1) concluded that all of the NRC CFR's were essentially the same but used for different activities. Ref. (2) conclusion was that 830.120 if invoked may not meet the requirements of the other CFR's due to the fact that it is expressed in generic terms and allows for various approaches to meet its requirements. Ref (3) is a memorandum from the Department of Energy, subject: Commitment to DOE/RW-0333P. Ref (3) states that DOE/RW-0333P will be used as the baseline requirements document for SNF Quality Assurance Programs. Appendix B. of this document state that the QA Program shall meet the requirements of 10 CFR 71, Subpart H. or 10 CFR 72, Subpart G. Therefore if we impose 830.120 we may not meet the NRC and OCRWM requirements. But by imposing 71 or 72 as applicable we will meet the requirements of 830.120. (J. Diehl)	

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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
2.	Section 3.1.1, 3.2.1.1, and 3.3.2.4 state that the fuel is to be physically constrained such that fuel elements and fragments are maintained in a critically safe array. The results of criticality calculations we have seen to date have considered the fuel to be in well-defined array of vertically orientated fuel assemblies. The MCO drawings provided for the ninety percent design review, however, do not show any means for supporting the fuel assemblies. If the fuel assemblies may exist in a random array, then the criticality calculations will need to be redone to show a keff not to exceed 0.95.		The evaluations to date have used both intact elements in the most reactive lattice and scrap which is taken to be optimum moderated, optimum diameter rods. Some cases have been evaluated with less than optimum moderated intact fuel but these will not be used for the CSCR. (D. Cowan)	
3	Also, if the fuel assemblies are not to be constrained, then fuel damage may result during routine shipments and the postulated design basis MCO and MCO/Cask drops. This could lead to generation of additional fuel fragments and particulates at the time of the drop and additional fuel fragments and particulates at the time of the drop and additional fuel damage during subsequent CSB staging. The result of heat transfer calculations presented to date have also been for a well-defined vertical array of fuel assemblies.		There will be fuel fragments generated during handling and shipping whether the fuel is constrained or not. The cooling models are also being made utilizing only radiative and conductive heat transfer thus leaving out the convective heat transfer component. This is being done to see how vulnerable we are to heat transfer with the various baskets that may inhibit the convective heat transfer component. Fragments that are generated inside the MCO will have minimal impact on the conductive and radiative components to heat transfer. (L. Goldmann)	

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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
4	It is not clear if the blind flanges that cover the ports are to be welded after HVC and prior to long term storage. This could be a concern relative to the requirement of Section 3.2.1.3 that the maximum total MCO leakage rate from all leak paths shall be less than 1×10^{-7} scc/sec. Appendix A states that the seal ports are to be welded prior to long term storage. However, it is not clear if "seal ports" refers to the blind flanges. If the flanges are not to be welded (the drawings do not show such welding), then how will maintenance of the leakage limit be ensured when consideration is given to degradation of the seal and relaxation of the bolts?		Comment is noted. The design will provide the flexibility for blind flanges to be replaced by blanks which can be seal welded to satisfy NRC equivalency storage requirements. Drawings are being revised to include a note explaining this. This issue will be carried into Phase 2 design. (K. Smith) Appendix A is used as guidance and information and is changeable. The blind flanges may not be welded shut. The flanges and fasteners, together with the gasket materials are supposed to be good for the 40 year interim storage period. In any event, the required ports will be sealed prior to the MCO going into interim storage. (L. Goldmann)	
5	Sections 3.2.1.7 and 3.3.2.1 state that the MCO HEPA filter is not a safety class item. This only means that it is not Safety Class 1 as the term "safety class item" of DOE Order 6430.1A, General Design Criteria, is considered to be equivalent to Safety Class 1 for WHC. The safety class of the filter should be provided using the terminology of WHC-CM-4-46, Safety Analysis Manual, Section 9.0, Safety Classification of Structures, Systems, and Components.		Accept. Wording will be changed. There has been a great deal of discussion on the purpose of the filter on the MCO. This report assumes it does not have a safety function. It was intended to protect the MCO handling machine and staging tube at the CSB from requiring decontamination but, this may become a safety item. See comment below. (D. Cowan)	

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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
6	Also concerning the safety class designation for the HEPA filter, by WHC-SD-SNF-DB-005, Multi-Canister Overpack Additional NRC Requirements, implementation of NRC nuclear safety equivalency requires assurance that there is not a credible breach of the spent nuclear fuel containment/confinement such that a radioactive release could be postulated to reach the controlled area boundary, defined as 100 meters from the facility release point. Items required to provide this assurance are to be defined as "important to safety" and Safety Class 1 as defined in WHC-CM-4-46, Safety Analysis Manual, Section 9.0, Safety Classification of Structures, Systems, and Components. In the MCO HEPA filter is needed to limit the controlled area boundary dose as discussed above, then it will need to be designated Safety Class 1.		Recent meetings to resolve design issues have identified the need, as pointed out in this comment, to determine the safety function of the HEPA. Since this HEPA will be active during staging at the CSB, the CSB SAR authors have been tasked with making this determination. Pending their analysis, the safety class designation of the HEPA filter will be finalized. (K. Smith/J. Wiborg)	
7	Sections 3.2.3.1 and 3.3.6 state the design life of the MCO is 40 years. Elsewhere (e.g., the Sections 5.1, 8.4, and 11.0 and Table 3 of the Project Design Requirements document) this has been stated as 75 years.		Comment is noted. Design life has been changed to 40 years in all cases.	

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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
8	Section 3.3.2.2 does not address the potential drop of the MCO by the MCO handling machine back into the shipping cask for which the drop will be greater than two feet, the cask will provide no protection, and no impact limiter will be provided.		The loaded (or unloaded) MCO straight down drop is governed by yielding (pre-buckling) of the MCO cylinder wall at the base plate junction. This limiting condition is directly affected by the lid thickness (weight) and the cylinder wall thickness. As conceptually designed with a 3/8" wall and 10 inch lid, the yield initiation occurs with a 2 foot drop or 331 G's. If constrained by the cask and baskets (with dimensions for conceptual design), the breach of the MCO occurs at 550 G's. Breach is considered to be when the buckled wall fills the void between the cask and baskets, thus making removal difficult. Further analysis of the full drop of the MCO into the cask has shown 1.) A two foot pool of water in the cask bottom would attenuate the drop G's to acceptable levels. 2.) Preliminary analysis still ongoing shows that the hydrostatic piston effect between the cask and MCO will slow the dropped MCO to acceptable levels. It is possible that a small taper at the lower end of the cask may be necessary. (D. Chenault)	
	MCO FABRICATION SPECIFICATION, DRAFT REV. B			

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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
9	Section 6.1 requires the Seller to implement the requirements of 10CFR21 and pass these requirements on to the subcontractors. Part 21 applies to firms and organizations building or owning NRC-licensed facilities or conducting NRC-licensed activities. As such, Part 21 does not apply to the MCO design or fabrication. WHC-SD-SNF-DB-005, Multi-Canister Overpack Additional NRC Requirements, state the following: "Incorporate Westinghouse Hanford Company, (WHC) Procurement Clause E13 (Reporting of Safety Defects and Noncompliance) into safety class 1 procurement specifications for the MCO to require reporting by suppliers of defects in items and services, (Note; this procurement clause is located in Appendix A, Revision 1, to WHC-CM-4-2, Quality Assurance Manual.)"		It is my understanding that the requirement will remain. Clause E-13 no longer exists as of 1/1/96 It is also my understanding that a new procurement clause is being written for this application. I have not yet confirmed this. (J. Diehl) This issue can be finalized before fabrication. Propose that the document remain as written now, with further discussion with WHC QA (Dennis Smith) required before Phase II design. We understand the reviewer is not in agreement with the inclusion of Part 21 requirements. (K. Smith)	
10	The above comment on the performance specification regarding the need to address 10CFR830.120, Quality Assurance Requirements, also applies to the Fabrication Specification; for example Sections 4.1.3, 6.2, 9.0, 9.1.1, and 9.1.2.		Same response as comment #1.	
11	The above comment on the performance specification regarding 10CFR21 also applies to the fabrication specification; for example Sections 4.1.2 and 6.1.		Same response as comment #9.	
	PROJECT DESIGN REQUIREMENTS			

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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	The above comment on the performance specification regarding the need to address 10CFR830.120, Quality Assurance Requirements, also applies to the Project Design Requirements document; for example Section 3.3.		Same response as comment #1.	
13	The above comment of the safety classification of the HEPA filter also applies to Section 8.2.1 and Table 3 of the Project Design Requirements document.		Refer to comment response #6.	
14	Section 8.3 should refer to the 1995 Edition of ASME Section III.		Comment is noted and will be incorporated.	
15	Table 3; for the MCO envelope diameter and length fields, reference should be made to the July 17, 1995 DOE letter (95-SFD-113) that states that the MCO be dimensionally compatible with the MPC such that for future transport and ultimate disposal in the National Repository, the MCOs could be placed inside MPCs.		We have made the national MPC system program aware of the size of our MCO and no indications were given that the size was unacceptable. I have asked for a copy of the referenced letters several times and nobody can find it. Does the letter have the usual boilerplate phrases to do the coordination with MPC system organizations without WHC incurring additional cost or causing scheduling delays? Anyway, it has been drawn to my attention that the work on the National MPC system being performed by TRW and Westinghouse Government and Environmental Services Company is being canceled with no funding after April 1996. Are there any further remarks, comments or other information available in reference to the "MPC System" for the entire nation on where to go for this possible coordination and compatibility assurance activity? (L. Goldmann)	

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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
16	Section 11.0 could include a statement that the NRC does not require that the spent fuel container be designed and fabricated to Subsection NB, and, in fact, the NRC has accepted a commitment to Subsection NC.		Thanks for the information. Would you please send the commitment reference to WHC on the NRC's position on using NC for this type of shipment. After receipt of the reference, we will consider the recommendation. Reduction to NC would not help much in the areas of inspection of the MCO final closure weld. It is our understanding that backing off to ND would alleviate the volumetric inspection requirements on the weld somewhat, but at the price of (1) having less stress allowables in the sections and (2) doing more joint analysis work. (L. Goldmann)	
17	In Section 11.0, references to a small minority of the canisters using a bolted design, the majority using a welded design, and 95% of the commercial nuclear industry using the proposed Parson design should be removed. Of the utility-licensed ISFSIs, three use the bolted design (Surry, Fort St. Vrain, and Prairie Island) and four use the welded design (HB Robinson, Oconne, Calvert Cliffs and Palisades).		This section is being revised and the discussion between bolted and welded connections will be removed.	
18	In Section 11.0, a reference should be provided for the NRC's acceptance of the proposed Parsons's closure design.		This section is being revised and reference to NRC's acceptance of the design will be removed.	

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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
19	Section 11.0 states that the NRC has accepted helium leak testing for commercial spent fuel canisters. This was accepted by the NRC because of the existence of three conditions, two of which do not apply to the MCO. They were; 1) the use of double-seal welds for the vessel closure, 2) an expected internal pressure of about 1 psig (discussed at some length in the paragraph that follows), and 3) the effectiveness of helium leak testing and dye penetrant examination. As only the third reason applies to the MCO, the statement should be revised so that it is apparent immediately that the NRC acceptance of helium leak testing is of limited value to the MCO.		This section is being revised and discussion relating to helium leak testing has been removed.	
20	Section 11.0; is there any plan to deviate from the requirements of Subsection NB relative to the performance of fatigue analyses? If so, this should be added to the document.		No. All ASME Section III, Division 1, Subsection NB requirements are met, except for the identified and documented exceptions. Fatigue is based on cyclic operation, which has not been identified in the Performance Specification. Therefore, no analyses are required.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Project Design Requirements: Fabrication Specifications and Drawings for MCO	Spent Nuclear Fuel	M.B. Palm	Mechanisms Engineering	ETC-2 2920 GWW, 376-8126

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

1/25/96
Date

Reviewer/Point of Contact
M B Palm

Author/Originator

11. CLOSED

Date

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
	COMMENTS ON PROJECT DESIGN REQUIREMENTS			
1	No Comments			
	COMMENTS OF FABRICATION SPECIFICATION			
1	In Section 6.2.1, C.1.b Page 9, E308L-15 and E308L-16 was left out. Was that intentional?		E308L-15 and E308L will be incorporated.	
2	In Section 6.5, first and third paragraph, page 11, it gives an option of welding to Section III "or AWS D1.1". From this I am assuming the fuel guide sleeves and oversleeves (I know the basket assemblies are SS) are carbon steel because you would not call out the use of AWS D1.1 if stainless steel was the only steel involved since AWS D1.1 does not address stainless. I suggest this option be omitted.		Will comply.	

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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
3	In Section 6.5, second and third paragraph, page 11, it states to qualify to Section III and Section IX. Omit "and Section IX" because it is redundant. Section III references Section IX when Welding Procedures Specifications and Personnel are to be qualified.		Will comply. However, Performance Specification specifically added reference to Section IX for this exact issue.	
4	In Section 6.5.1, paragraph A, third sentence, page 12, it states electrodes shall be held in holding ovens at 150 °F min, and 300 °F max. That seems extreme, is that manufactures recommendations? I'm more familiar with 180 ±50.		This typical commercial practice used in nuclear industry.	
5	In Section 6.5.2, first paragraph, first sentence, page 12, change "welding procedures" to "Welding Procedure Specifications (WPS)." Second sentence, change each "procedure" to "WPS" shall be prepared... Third sentence, change "Procedures and procedure qualification records" to "WPSs and Procedures Qualification Records (PQRs) shall....		Section will be revised to incorporate the use of WPS and PQR.	
6	In Section 6.5.2, second paragraph, second sentence, page 12, change "Welding Procedure Specification (WPSs) and one copy of Procedure Qualification Records (PQRs)." to "WPSs and corresponding PQRs."		Comment is noted. Section will be revised to incorporate the use of WPS and PQR.	
7	In Section 6.5.3, paragraph E, page 13, Omit complete paragraph.		Will comply.	
	DRAWINGS			
8	All full penetration welds should not have a dimension in the weld symbol. Example: Sheet 1, D7, D6, Sheet 5, A8.		Will comply. Drawings are being revised.	

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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
9	On Sheet 3 and 4, the 3/16 fillet weld all around of the wire mesh filter to the bottom of the shield plug needs to be clarified. Maybe a note in the tail as to what really needs to happen. It cannot be a continuous weld as is stated. And is 3/16" going to be too big for the wire mesh?		The strainer detail is being revised and will be considerably different.	
10	On Sheet 3 and/or 4, a note and possibly a weld symbol should be used to explain that when the blind flanges are removed and the cover plates are set in place of the, the cover plates will be seal welded in place.		Comment is noted. Note and explanation are being added. However, discussion is underway as to leak requirements. Seal welded blanks may not be needed. The final determination of seal welding the blind flanges has not been made.	
11	On Sheet 5, D8 and 8, F4, there are double fillet welds that have the size of the weld on only one side of the weld symbol. Even though it is thought to be understood, each individual symbol requires a size.		Will add size to each symbol.	
12	The 1/4" continuous double fillet weld of the Bottom Assembly Forging Spacer Bar to the Bottom Assembly Forging seems like an awfully large weld. Just an observation. Also on that same part is it necessary to weld all around so that you don't end up with a crevice that becomes a hot spot?		Weld is being revised to weld all around to eliminate possibility of crevices.	
13	Is there a longitudinal weld on the Shell Assembly? It seems like it would be very expensive to use extruded pipe, but maybe because of the need for close tolerance in roundness, it is better to use extruded pipe.		No, there is not a longitudinal weld. However, a drawing is being added to show a longitudinal weld in the event that it is decided to make the MCO from rolled plate that is joined by a longitudinal weld. Per ANSI/ASME/ASTM tolerances are the same for extruded and ERW pipe.	
14	On sheet 7, D7, the two fillet welds have the size of the weld on the wrong side of the symbol. The size of the weld is always on the left side of the symbol.		Will revise accordingly.	

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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
15	On Sheet 8, all the partial penetration weld shave a size next to the symbol. That size is the depth of bevel to be cut. Also needed is the Groove weld size. Therefore on all the partial penetration welds, two dimensions should appear, and the size representing the groove weld size needs to be in parentheses. Example: 1/4 (3/16) This says 1/4" bevel cut of the base metal, and 3/16" effective thickness of the weld.		Rerack baskets are undergoing extensive design revision. Johnson Well Wire will be used for sides and bottom of basket. Weld details are being revised accordingly.	
16	On Sheet 8, the weld of Part 15 to part 7. Part 7, the pipe, is only .237" thick, and you are welding a 1-1/2" thick ring to it with a full penetration weld which means the weld could be around 1" thick, plus a 3/4" fillet on top of that. We will have tremendous hoop shrinkage from this weld on such a small pipe. Is this much weld required?		Rerack baskets are undergoing extensive design revision. Grapple interface detail is being simplified, which will significantly reduce welding requirements.	
17	I have concern about the spot welds of the 1/8" wire to the 1/8" wire for the basket assemblies. A spot weld is where you melt thru the outer member into the inner member for the fusion of the two. That's ok if the wire being melted thru is not under any loads that would cause it to straighten out, or relieve itself, when the wire becomes molten. I guess my question is, was the intention of this weld really to be an official spot weld or just a small fillet or fusion weld of the two wires together?		Comment is noted. However, rerack baskets are undergoing extensive design revision. Johnson Well Sire will be used for sides and bottom of basket. Weld details are being revised accordingly.	

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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
18	A discussion about the closure weld joint: From a welding perspective, we feel the need for a weld joint that is butted together rather than open root. The reason that open root welding will be a problem is that first, when using the open root it would be very difficult to tack weld the shield plug in place because of the weight of the plug and hanging on a crane, plus being in a radiation zone where speed is a driving force. The second issue is when making the root weld, the unwelded gap pulls down or shrinks due to weld stresses, decreasing the gap width and making it increasingly harder to get a good melt thru on that root. A third reason is that open root welds are manual friendly but not remote friendly. Now some thoughts about the weld joint configuration. A "J" groove is being highly considered which would allow butting up shield plug to canister wall during tacking. A second idea is using a consumable insert. Either one of these ideas would allow setting the shield plug down on something solid before and during tack welding. Also, when the root pass is made the two parts are tight against each other preventing any movement during the welding process. All of this to say the present configuration of the closure weld joint will more than likely change.		Comment is noted. Discussions have taken place with stress analysts. Butt weld appears to be acceptable. Original design and suggested butt weld will be per ASME requirements. If a "J" groove is required, **specific direction from Westinghouse is required.** Use of consumable insert is not practical, since it would have to be installed underwater with the shield plug and some how held in place. Any changes to the closure weld joint configuration will have to be re-analyzed if they are significant.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO Ninety Percent Documents	Spent Nuclear Fuel	J. I. Rivera		

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

1/24/96

Date

Reviewer/Point of Contact

Author/Originator

11. CLOSED

Date

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
	PROJECT DESIGN REQUIREMENTS			
1	Page 11, Section 8.2.1 Safety Classification: This section classifies the MCO shell, shield plug, and rerack baskets for Mark IV fuel as SC1 items, other components as SC2, and the HEPA Filter as a non-safety item. Recommend the classification here of the "other components" (rerack baskets for Mark IA and SPR fuel, etc.).		It is straight forward as stated. Generating a list of SC2 items could result in leaving an item off the list and creating confusion. (K. Smith)	
2.	Propose adding "All" before "other components".		Comment is noted and will be incorporated.	
	FABRICATION SPECIFICATION			

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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
3	Page 1, Section 1.0, 2nd sentence: Recommend the change of "The MCO shall..." to read "The MCO Class 1 components shall...", and the deletion of "(i.e., Class 1 Components)". See Tom Ghigleri's comment #54.		The entire MCO, safety related or not is being designed to ASME Section III, Division 1, Subsections NB, NC, NF, and NG. In addition, the MCO components have never been specifically safety-class designated in the Performance Specification.	
4	Page 1, Section 1.2, item "B": Recommend the deletion of "MCO" and "Assemblies".		Fabrication Specification will not incorporate this comment.	
5	Page 1, Section 1.2, 3rd paragraph, 1st sentence: Recommend the change of this sentence to read "The MCO is equipped with a top end shield plug so that when the MCO is contained within a shielded cask, storage tube, or processing module, the radiation dose to the worker is minimized during operations that require the worker to get near or come in contact with the shield plug". See Tom Ghigleri's comment #57.		Comment is noted. However, this is a Fabrication Specification. This issue is of no concern to the Fabricator. The information is provided purely for informational purposes.	
6	Page 4, Section 4.0, 1st sentence: Recommend the change of "...federal laws..." to read "federal, state, and local laws and regulations...".		This is a Fabrication Specification. The Fabricator cannot be responsible for "... state and local laws and regulations..." other than those integral to the requirements of the specification. The Performance Specification does not reference or list any state or local laws.	

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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
7	Page 4, Section 4.1: Recommended the listing of ASME SFA-5.4, ASME SFA-5.9, and ASME SFA-22 (See page 9) ANSI N45 2.6 (See page 14), ASTM E499 (See page 18), and AWS A2.4-86 (See page 27).		ASME-SFAs are part of ASME Section IX. Other references have been added to Section 4.1 of the Fabrication Specification.	
8	Page 6, Section 4.4: Recommend the deletion of this section and listing of ANSI N14.5-1977 in Section 4.1.		Will comply.	
9	Page 7, Section 5.2, 4th sentence: Recommend the deletion of "and the specified exterior". See Tom Ghigleri's comment #65.		Will comply.	
10	Page 24, Sections 9.2.4 and 9.2.5: Recommend these two sections get combined into one section.		Will revise. Section 9.2.4 to be titled, "Access to Facilities for QC".	
	DESIGN DRAWINGS			
11	Sheet 3: Section F "Shield Plug Penetration - Rotated 90° CCW" shows item 10 "4" Blind Flange Ring Joint Gasket". This seems to be a typo. Instead, it should show item 9 "3" Blind Flange Ring Joint Gasket".		Will revise drawing.	
12	Sheet 8: This drawing shows, with the exception of lengths and the 6" diameter pipe provided with the Mark IV baskets, a common design (0.5" thick base plate and 4" diameter pipe) for the rerack baskets. Since the rerack basket for Mark IV fuel is an SC1 item designed for a 40 year life and the three basket types share a common design, is it right to infer that the baskets for Mark IA and SPR fuel (SC2 items) also are designed for a 40 year life?		The entire MCO, safety related or not, is being designed to ASME Section III, Division 1, Subsections NB, NC, NF, and NG. In addition, the MCO components have never been specifically safety-class designated in the Performance Specification other than the statement that MCO components providing fuel containment or criticality control functions are Safety Class 1.	

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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
13	Sheet 8: The 6" diameter (21.85" long) pipe is shorter than the Mark IV fuel element (26.1" long). Since the 6" diameter pipe is provided to maintain fuel in a critically safe array, I would expect this pipe to be the same length as the Mark IV fuel element (26.1" long).		The basket design is being revised.	
14	Sheet 8: The 21.969" diameter x 0.5" thickness base plate specified for the rerack baskets could restrict convective circulation between the top and bottom chambers (through the rerack baskets). Convective circulation is required for vacuum dry and hot vacuum conditioning.		The basket design is in the revision process and will include holes or slots to enhance circulation of gases through the fuel.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
PROJECT DESIGN REQUIREMENTS FOR MCO, NOV. 1995, REV.1	SNFP/MCO/100K	C. LOFTIS, A. FREITAG	AMW/SFD	MO-277/372-3108

17. Comment Submittal Approval:	10. Agreement with indicated comment disposition(s)			11. CLOSED	
KERRY SCHIERMAN	12-13-95	C. LOFTIS	12-13-95	C. LOFTIS	
Organization Manager (Optional)	Date	Reviewer/Point of Contact	Date	Reviewer/Point of Contact	
		Charles B. Loftis	1/26/96	C. LOFTIS	
		Author/Originator		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
	COMMENTS ON PROJECT DESIGN REQUIREMENTS DOCUMENT			

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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	Page 6, Section 4.2 SNF Constraining, "The MCO will physically constrain the fuel elements or fuel fragments in order to achieve and maintain sub criticality." The current drawing of the baskets and discussions do not clearly support this requirement.		The MCO will retain fuel inside the maximum diameter and length MCO at all times. Only the baskets for MKIA (1.25% enriched) will position fuel inside the MCO. These baskets will prevent fuel from occupying the center six inch diameter of the MCO during any credible accident. For the MK 1A fuel, a 6" void space is maintained at the center of the baskets and a maximum of 24" OD of the MCO is maintained. This configuration meets the requirement.	

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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
2.	Page 6, Section 4.3 SNF Pressure Containment - "The maximum total leak rate of the MCO containment boundary proper is 1 x 10^{-7} scc/sec for normal conditions, ..." This leak rate should be reevaluated and compared with current commercial practices of 1 x 10^{-5} scc/sec.		The leak rate described is for storage only and only under specific conditions. The MCO functions as the inner container and primary containment for transportation of SNF as well as storage. The source term material is potentially dispersible and has a Pu content greater than 20 Ci, the requirements of 10 CFR 71.63 apply, mandating a leak rate no greater than 10-6 A2/h. Using ANSI N14.5 and the source term for the MCO, the fabrication verification is calculated to be 10-7 std cm3/s air (leaktight), assembly verification is a minimum 10-3 std cm3/s. Section 6.5.2 industry practice for storage appears to be leaktight for bolted closures initially with the expectation of 10-4 std cm3/s in 20 years due to seal and bolt creep and other factors, for example the Westinghouse MC-10 Cask TSAR. Closure welds (differentiated from fabrication leak testing) for storage alone appear to start life with leak tests of 10-4 std cm3/s and remain at that value for the life of the license, for example the Sierra Nuclear VSC. (M. Monthey)	

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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
3	Page 8, Section 5.1, Design Life, "Incidental equipment has a projected life of 10 years." What equipment are you talking about? Be specific. Does this mean criticality control will be in place for only 10 years?		The use of incidental equipment here is intended to cover the process connections for drying and conditioning. Features to maintain criticality control are Safety Class 1 and will have a 40 year life. The Section will be revised to incorporate this clarification. (K. Smith)	
4	Page 8, Section 5.3, Maintainability; What is the preventative maintenance requirements? Be specific.		The two components of the MCO which may have some longer term operating requirements (and hence, maintenance should be considered) are the HEPA filter and pressure relief device. The selection of these devices was geared toward minimizing any maintenance required due to the cost and exposure associated with removing MCOs from the CSB storage tubes. The intent of this Section is to consider maintenance requirements in the equipment selection and select devices which require minimal maintenance. As specific maintenance requirements get defined and finalized during the test phase, the design documents will be updated during Phase 2 design to include these requirements. (K. Smith)	
5	Page 10, Section 7.0, Transportability; Where will the MCO's be warehoused at the Hanford site?		This issue has not been addressed to date. However, preliminary discussions with Rick Dahlin (Materials Management) indicate there is ample warehouse room at 200E to accommodate the MCO's. (K. Smith)	

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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
6	Page 13, Section 8.2.5, Shielding Requirements; Nothing is said about the sides or bottom of the MCO. Specify bottom and side shielding.		Bottom and side shielding is provided by the cask. There is no requirement to have the MCO shield the source on the bottom or sides. The transport cask and MHM at the CSB does the shielding. (L. Goldmann)	
7	Page 15, References; None of the references indicate approval of the design authority for the MCO.		Approval of design Authority is not a design requirement, therefore, does not belong in this document. These references will not appear in the final documents as all guidance will be located in Rev. 1 to the Perf. Specification. (K. Smith)	
8	Page 15, Table 3; This table should specify the requirement. Example- Design Pressure-External. The table lists 20 psia, per Cask Spec. As the requirement. Which Cask Spec? Number and Rev. and where found in the spec. This example should be used through out Table 3.		Will comply.	
9	Section 2.2, Paragraph 3 - A reference is made to allow worker access for welding the shield plug. It is not clear if there is any intent to perform welding underwater.		No, there is no intention to make the closure weld under water. The water level in the canister will be lowered a certain amount when it is time to make the weld. Words will be added to make this clear. (Mike Palm)	

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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
10	Section 2.2, Paragraph 4 - A reference is made to maintain the subcriticality of the loaded MCO with an earlier reference to 5 or more rerack baskets. The number of baskets may be constrained by the criticality analyses. For Three Mile Island some of the fuel canisters had internal poisons to meet criticality limits.		The amount of fuel in an MCO is too great to control criticality by mass limiting and thus geometry is the controlling feature. The main control is provided by limiting the maximum diameter of the MCO but for the higher enrichment fuel, the baskets will provide additional control via fuel exclusion and neutron poisons. (D. Cowan)	
11	Section 2.4, Paragraph 6 - A reference is made for hot conditioning to a maximum 375 °C. Above 60 °C Austenitic stainless steels may be subject to SCC.		See response to #12. SCC has been observed with SS in contact with an Aqueous solution in areas where stresses around 20,000 PSI exist. The MCO interior will be dry at 375 °C.	

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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	Section 5.1, Last Sentence - There should be some statements provided to indicate what special corrosion testing is envisioned for material selection.		Corrosion tests to demonstrate a 75-year (subsequently changed to 40-year) design life are not intended. Various corrosion issues are addressed in L.D. Blackburn (ICF-KH) Inter-Office Memo to L.H. Goldmann/K.E. Smith, Material Selection for Multi-Canister Overpacks, December 13, 1995. Unknowns regarding corrosion (pitting or stress corrosion cracking) behavior in an MCO are: (a) how much water may be trapped in crevices and survive cold vacuum drying; (b) whether condensation of moisture on the MCO shell can then occur; (c) whether an ongoing evaporation/condensation process can lead to levels of chloride or fluoride that could produce stress corrosion cracking; (whether such a concentrated liquid can exist near weld locations with residual stress); (d) whether the short duration that the MCO is in the range of 60-100 C is long enough to produce through wall cracking. At this time, a meaningful test program to address these issues has not been defined. (L. Blackburn)	

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13	Section 8.1.2 - The description of the source term suggests that both neutron and gamma radiation should be addressed and not just gamma. In commercial casks, the neutron component is often found to be the toughest to design for to accommodate both worker access and skyshine doses.		The shield plug thickness selected by Parsons was based on dose of neutron and gamma. (See MCO Shield Plug Thickness Technical Evaluation, Revision 0, dated December 1995.) The neutron dose for N-Fuel is lower than that from commercial nuclear fuel due to the low burn up but is a significant fraction of the total. (D. Cowan)	
14	Section 8.1.2 - A minimum decay period should be specified for the design basis. Current commercial casks can only accept fuel with 5 to 7 years cooling.		The design basis fuel already exist and is aged to 12/31/97, the projected start of fuel movement. The complete detailed inventory is given in WHC-SD-SNF-IT-009. (D. Cowan)	
15	Section 8.1.2 - Need to confirm that the unirradiated fuel is the worst case. Is this because burnup credit is being assumed in the other case?		N-Reactor fuel loses reactivity with increasing burn up. This is a significant effect but burn up credit is difficult to justify because there is some unirradiated fuel in the basins. Unirradiated fuel is always the bounding case for N-Fuel. (D. Cowan)	
16	Section 8.3 - Change reference to the 1995 Edition of the ASME B&PV Code. This is the current document and should be consistent with other references to ASME B&PV Code Section III.		Will comply.	

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17	Section 8.5 - The phrasing "to the maximum extent possible" will be difficult to interpret. Needs to be more specific.		Ideally, there will be no contamination traps in the MCO. However, other requirements may override designing for this "ideal" condition. Agree, however, there is some question whether the weld joint between the MCO shell and shield plug can be ultrasonically tested. This will not be verified until the weld and examination development work is complete. The wording "to the maximum extent possible" is understood by the WHC MCO subproject to mean that all applicable code tests will be performed unless the physical geometry of the weld or weld/cask interface prohibit such tests. This issue will be resolved during the prototype test phase and test results will determine whether the code can be met. (K. Smith)	
18	Section 8.5, Second Sentence - The intent of this sentence should be to require the welders and welding procedures be qualified to ASME Section IX. Weld inspection is not covered in ASME Section IX.		Will revise section as applicable.	
19	Section 8.5 - Welding procedures used for welding of Austenitic stainless steels should meet NRC Reg. Guide 1.44, "Control of the Use of Sensitized Stainless Steel", requirements.		Yes, the welding procedures will meet NRC Reg. Guide 1.44, "Control of the Use of Sensitized Stainless Steel", which include controls to minimize sensitization of the weld zone when welding. (Mike Palm)	

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20	Section 9.0 - This section does not refer to the overhead crane at the K Basins as being "single failure proof". This is a strict NRC requirement for commercial nuclear plants.		This is not a requirement for K Basins operation. (D. Chenault) K-Basins is an aging facility. The crane shall be used under the requirements of the facility Safety Analysis Report safety envelope in the SNF fuel removal campaign. (A. Kee)	
21	Section 9.0 - A requirement to provide "more than one load path" has been deleted. A statement should be added to perform a heavy loads evaluation.		The requirement for more than one load path has been deleted because analysis of the full drop of the MCO into the cask has shown 1.) A two foot pool of water in the cask bottom would attenuate the drop G's to acceptable levels. 2.) Preliminary analysis still ongoing shows that the hydrostatic piston effect between the cask and MCO will slow the dropped MCO to acceptable levels. It is possible that a small taper at the lower end of the cask may be necessary. Effects of the MCO drop into the cask will be mitigated by design; a heavy loads evaluation is not required. (D. Chenault)	
22	Table 3, Corrosion Requirements - Need to define what corrosion testing program will involve and what test environment is envisioned.		Refer to comment disposition #12.	
23	Table 3, Weldment Design - Revise working "Weld inspection and qualification per ASME IX." to read "Fabrication and inspection of welds to NB-4000 and NB-5000. Qualification of weld procedures and welders per ASME IX.".		Will comply.	

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24	Table 3, Criticality Requirements - A reference is to a "nominal 6.625" void for MK1A fuel. Assuming a unit cell for this case where the undamaged fuel pellet is taken to be the worst case may not be a bounding case. At three Mile Island, Oak Ridge National Laboratory found for damaged fuel, a unit cell based on a hexagonal close pack structure of spheres was optimum since there was not a way to guarantee the original cylindrical geometry of the fuel pellet.		Yes, undamaged fuel is rarely the most reactive. A great deal of work has been done for the low enrichment metallic N-Fuel which has shown that about 1/2 inch rods on a hex lattice is the most reactive. This configuration is used where intact fuel can not be justified. The exact diameter and the rod spacing is a function of the enrichment. The rod in place of the spheres is a result of the physics for low enrichment uranium. (D. Cowan)	
25	Table 3, Criticality Requirements - No explicit limit mentioned for k-effective for these canisters. The standard number is 0.95 which includes benchmarking and design uncertainties. At Three Mile Island valid critical for benchmarking were difficult to obtain. This resulted in adding a 2.5% delta k to all criticality calculations.		Two different k_{eff} limits are in use. For existing systems, 0.98 is used but 0.95 will be used at all new facilities and the loaded MCO. These included the 2σ uncertainties. There are excellent bench marks for N-Fuel. A set of critical experiments were done on both unirradiated and irradiated fuel. (D. Cowan)	
26	Table 4, Material of Construction - Other than the fact that 304L has been used for commercial casks, there is not basis provided for the statement that 304L is an acceptable material. Also, page 39, MCO Design Basis, indicates that 316L is the material of construction.		Based on material recommendation made in Inter-Office Memo from L.D. Blackburn to L.H. Goldmann/K.E. Smith, "Material Selection for Multi-Canister Overpacks", 12/13/95, the WHC Performance Specification for the MCO will be revised to specify 304L SS as the containment boundary material, and Parsons documents will be revised accordingly. Please refer to the above memo for details. (L. Blackburn)	

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27	MCO Design Basis - Fabrication and inspection are to be done in accordance with Articles NB-4000 and NB-5000 and not NB-6000.		Will revise as required.	
28	Exception Weld Design and Inspection/Examination - The first sentence of paragraph 2 which begins with "Both of the ASME "domed" head designs..." and the second sentence of the third indented paragraph which is "No wasted "space" would occur with an ASME "domed" head design." are conflicting statements. Should the second sentence of the third indented paragraph have a "flat" versus "domed" head design?		Will revise sentence.	
29	Exception Weld Design and Inspection/Examination - In the third indented paragraph from the top of the page which starts with "One field weld is Eliminated," it is not clear from the description why 2 field welds are required for a "domed" head.		Domed head would require two welds: one weld for the shield plug, and the second for welding the domed head over the shield plug.	
30	Pressure/Proof Test - In the paragraph which starts with "The leak rate test addressed...", the second to last sentence the work "achieve" should be changed to "demonstrate compliance with" to read correctly.		Will comply.	
	GENERAL COMMENTS			

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31	The authors of the document have "cherry picked" or rather selected specific requirements from the ASME B&PV Code and have tried to use the ASME Section III rules wherever practical and appear to have adequately flagged/substantiated the areas where they have departed from ASME Section III rules. However, this places the burden-of-proof on the Designer of the MCO to ensure that all related requirements are embraced or justified accordingly. As a general rule, the Code requires that all rules of a section and subsection be followed.		Three known "exceptions" to the ASME Code are cited: 1. Pressure relief - rupture disk only 2. Pressure testing 3. Flat head configuration Provided the weld can be classified as a corner weld, ultrasonic testing is an allowable means of volumetric examination. The classification of the weld will be reviewed and finalized prior to Phase 2 design. Should the corner weld classification not be correct, an exception to the code will be required since radiographic examination cannot be performed.	

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32	The document needs to add a section that clearly defines the differences and relationships between DOE Safety Classes and ASME Section III Code Classes. In addition, this new section should also identify the ASME Section III Code Class for each component of the MCO.		We have been using NUREG/CR-3854 as a guide in the application of ASME code sections--with some criticism that the NUREG is too stringent and conservative for on-site shipments. This NUREG lists the areas for the code section applications by function. DOE only has a single safety class with no graduations. WHC has a graded approach to safety class and is described in WHC-CM-4-46. The expected component breakdown into safety class is described in the MCO performance specification WHC-S-0426 in section 3.3.2.1. The value of repeating the listings and information in the presented Project Design Requirements by Parsons may not have much value. A full discussion of the safety aspects of the MCO will be included in the facility SARS and in the Safety Analysis Report for Packaging (SARP) for the fuel shipments from K basins to the CSB. (L. Goldmann)	

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33	In the document Type 304L/316L stainless steel appear to have been selected as the pressure boundary material of choice, but it does not identify or provide the details of whatever corrosion testing is intended to apply to demonstrate adequacy for the 75-year design life. Part of the testing program should evaluate the potential for stress corrosion cracking (SCC) of the stainless steel during hot conditioning at 375 °C. Even though the reported chloride content is "below detectable limits" and the fluorides are 0.248 ppm, the possibility exists for much higher concentrations to exist during the last stages of moisture removal as the dissolved solids concentrate in the liquid.		Refer to comment disposition #12.	
34	The document discusses at great length about why a "domed" head (required by ASME Section III) Subsection NB design rules) is not practicable for the MCO closure and why a "flat" head saves space, but it is not clear why a "flued" head type arrangement would not work. A "flued" head would allow the closure weld to be a butt-type joint and eliminate the internal crevice between the head and MCO shell.		Flued head, such as used for penetrations is nothing more than a domed head with a pipe running through it. There is no difference. The flued head would not eliminate the internal crevice between the head and the shield plug, since the crevice would still exist between the shell and shield plug. In addition, a flued or domed head does not address how the connections get through the top of the flued head to interface with processing, venting, and pressure relief. A flued head arrangement would be considerably more costly, wastes space, and would be very complicated. That is the primary reason as to why the commercial nuclear industry utilizes a flat head for their canisters.	

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35	If it is judged the "flued" head is impractical or unnecessary, the "flat" head approach is workable provided the final closure configuration does not result in a single lap welded joint within the pressure boundary. A "flat" head does, however, limit the amount of weld metal available for minimum leak path design, is less durable than a butt weld would be from a direct impact blow from above, and results in a build-in crevice between the "plug" and the shell.		Please refer to the design drawings. Head is "flat" in appearance, but utilizes a butt weld for closure of the shield plug and shell.	
36	There are several references to the design temperature of the canister but there are no thermal design criteria explicitly identified for the fuel, i.e., what is the maximum kilowatts that would be allowed in any one canister. This drives the internal allowable temperature of the fuel, which also is not specified. It is not clear if the MCO system is to be cooled via natural convection.		The thermal analysis is being handled internally inside WHC and ICF/KH. The performance specification that Parsons is working to is specifically written for them. The maximum possible thermal output (based on the "hottest" key) for a single MCO is 835 watts. The average for all the MCOs is 396 watts. The MCO fuel maximum temperature while stored in the CSB storage tubes is targeted at 400 Degrees F. The MCO is not planned to be actively cooled while in transport or at the CSB in storage. Cooling in the cask will be through the annulus between the MCO and cask. Cooling at the CSB will be between the wall of the MCO and the CSB storage tube. These two cooling modes will utilize radiative, conductive, and convective heat transfer. The current CSB design uses natural convection for cooling the vaults. (L. Goldmann)	

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37	The document provides significant discussion as to how the "intent of complying with Article NB-6000" is achieved. The use of the word "intent" is very strong and is not completely true. First of all, a design pressure of 150 psig is specified with no indicated basis for the elevated pressure provided in the document. Secondly, on page 43 in the Section entitled, "Exception Weld Design and Inspection/Examination," a statement is made that the "flat" plate does not readily accommodate the ASME Section III Subsection NB volumetric weld inspection requirements, but will facilitate surface examination techniques and support leak testing. Finally, a helium leak test at 8 to 12 psig will not subject the pressure boundary including welds to any significant stress that an ASME Code required proof/pressure test for a component with a 150 psig design pressure would. Therefore, without performing the ASME Code required, weld volumetric examination to provide assurance of weld integrity and then not subjecting the weld to an elevated stress that would accompany the ASME Code required pressure test, the statement that "the intent of NB-6000 is being met" cannot be expressed.		Since, a regulatory organization, such as the USNRC is not involved with the MCO project, it is difficult at this time to ascertain the acceptability of the closure weld, or what if any requirements may be imposed with regard to inspection or testing. Normally, the design agency can engage in on-going discussions with the USNRC during the design process to determine in advance the acceptability of the design, prior to actual fabrication. The MCO project does not enjoy this advantage. Since the USNRC is not involved with the MCO Project, nor has a specific regulatory agency for the MCO Project been identified, it is impossible to determine at this time if the closure weld is acceptable. Based upon USNRC previous positions, the MCO closure design is similar to that used by the commercial nuclear industry and evaluated by the USNRC. However, they do or do not provide comments on design, and document the comments (if there are any) in a Safety Evaluation Report (SER) and the accompanying, Certificate of Compliance for an ISFSI. Again, this is not being done as part of the MCO project. The WHC NDE group believes the weld can be ultrasonically inspected. Discussions are underway with the K-Basin safety group to determine the feasibility of post loading pressure testing.	

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37	'continued		The expected internal pressure for a commercial nuclear industry ISFSI is greater than 1 psig, but significantly less than the MCO design pressure of 150 psig. The commercial nuclear industry design is based upon a Safety Analysis, that rightfully concludes that pressure buildup will not occur over the expected design life of the SNF storage canisters. For this specific reason, the commercial nuclear industry treats the storage canisters as tanks (i.e., 0 - 15 psig), rather than pressure vessels (i.e., greater than 15 psig), and accordingly over-pressure protection devices, such as safety relief valves or rupture disks have not been required by design or the USNRC. Finally, based upon discussions with Larry Blackburn, this issue is being re-addressed and re-written to provide clarification of the issue and the USNRC's position. (Parsons) Per discussion with Parsons, reference to meeting the intent of NB-6000 is being removed from the document. (K. Smith)	

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MCO 90% Design Review	MCO	D.A. Smith	SA&NE/Project Safety Engineering	Fed Bldg 220/ 376-5551

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

1/24/96
Date

D.A. Smith
Reviewer/Point of Contact

Author/Originator

11. CLOSED

Date

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	Section 4.3, page 6. The third bullet discusses leak rate during staging. It should be noted that the standards still apply to the MCO containment boundary.		All bullets listed under Section 4.3 will be deleted to align with Section 3.2.1.3 of Revision 1 of the Performance Specification.	
2	Section 5.1, page 8. It is noted that Safety Class 1 items (the MCO shell) has a projected life of 75 years. This is in excess of the draft Performance Specification requirement for a design life of 40 years. Other items including the shield plug and associated penetrations are required to maintain containment and should also be Safety Class 1. It is not likely that the quick connects or the gaskets for the blind flanges can maintain the leak requirements for the design life. The design should evaluate the leak requirements for the design life and determine if welding the blind flanges is required.		Design life has been changed to 40 years in all cases. In addition, blind flanges will be replaced by blanks which will be seal welded prior to interim storage.	

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3	Section 8.2.1, page 11. The performance specification (3.3.2.1) states that components providing fuel containment shall be classified as Safety Class 1. The Project Design Requirements should identify those components which are required to maintain fuel containment during the staging, transportation, processing and storage. This would include the quick connects, the blind flanges and their gaskets, the rupture disk and the HEPA filter housing. The rupture disk has a safety function to provide fuel containment and a safety function to protect the MCO from an overpressure event.		The PDR reflects the Performance Specification wording in this case. For the Mark 1A Fuel Safety Class 1, components are the items at the pressure boundary and structures required to maintain subcriticality. For the Mark IV, the safety class items are those that maintain the pressure boundary.	
4	Table 3. The table needs to be revised for the design life and the safety classification consistent with the above comments.		Table 3 will include the design parameters provided by WHC in the Performance Specification.	
	Drawings			
5	Drawing sheet 2, MCO Shield Plug Assembly. Welding of the blind flanges may be required to assure the leak rate requirements are met for the design life consistent with the response to C. Miska comment 5 previously. It is not apparent that the bolt holes may interfere with welding and NDE of the weld. The bolts or the bolt holes would also require welding to prevent a possible leak path.		Blind flanges will be replaced by blanks which will be seal welded prior to interim storage.	

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6	Drawing sheet 8, MCO SNF Rerack Baskets. The basket design allow the fuel assemblies to rattle around and incur further damage during handling and transportation. The design also does not lead to uniform cooling and drainage passages between the fuel assemblies. An assessment should be made of the provisions required to assure adequate drainage and cooling and to minimize further fuel damage and generation of particulate.		The basket design is being modified significantly and will incorporate a wire grid for the base plate and walls to facilitate drainage and air flow for drying. The conditioning design authorities raised this issue and we're working with them to ensure the basket design meets their requirements. Changes to the design are also intended to address the movement of fuel assemblies during transport. The thought for the open basket was that the fuel would be packed tightly so that movement would not be possible. Smaller diameter dummy rods could be inserted in the basket at the end to ensure that the fuel elements are not free to move about. (K. Smith)	
	Performance Specification			
7	Section 3.3.2.2., page 18. The last bullet under Design Basis Drop states that drops of an MCO into a storage tube without an impact limiter are not credible. I am not aware of any basis for this statement and expect that such a drop may be credible. It is probably more appropriate to refer to this accident as a Beyond-Design Basis Accident.		Good for you. The CSB has taken on the job of seeing that it is not credible. It is my understanding that by a combination of (1) installing impact limiters in all CSB storage tubes before MCOs are shipped to the facility and (2) insuring that the MCO handling machine at the CSB is reliable enough so that a low number of MCOs are dropped. Someone will later have to do the math using the number of picks per year and failure rates to determine if the event (MCO drop into a non impact limiter tube) is credible or not. Call it what you want. I haven't kept up with all the jargon changes that have occurred over the years. (L. Goldmann)	

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8	Section 3.3.2.6, page 19. Recommend that this section be deleted. It is not apparent that can demonstrate the design meets these criteria (especially the instantaneous release of radioactivity).		Agree. Section will be deleted. (K. Smith)	
9	Section 4.3, page 23. The QA requirements should also reference the requirements in WHC-CM-4-46, Section 9.0.		The QA requirements referenced in Section 9 of WHC-CM-4-46 refer back to CM-4-2, which are bounded by 10 CFR 71, subpart H. Specific QA requirements for the MCO components will be settled during the fabrication/vendor submittal phase as WHC QA reviews and must approve all QA plans prior to fabrication. (K. Smith)	

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MCO 90% Design	SNF Project	C.E. Swenson		

17. Comment Submittal Approval:

Organization Manager (Optional) Contact

10. Agreement with indicated comment disposition(s)

1/26/96
Date

Craig Swenson
Reviewer/Point of Contact

Date

Author/Originator

11. CLOSED

Reviewer/Point of

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
1.	PDR, Section 2.3, last paragraph: WHC-SD-SNF-TI-009 will be revised and issued in January 1996. We issued ECN 191382 to CSB Performance Specification (WHC-S-425) to reflect new MCO radionuclide inventories.		The updated information was included in the draft Rev. 1 of the performance specification.	
2.	Section 2.4, second para., last sentence: "Each MCO is subsequently sealed." This doesn't mean the final "seal/structural weld" does it? That happens just before interim storage at the CSB I thought.		No, this is referring to the closure weld between the shield plug and MCO shell. This weld will occur sometime before it leaves vacuum drying. (L. Goldmann)	
3.	Section 4.3, first paragraph: Leakage of 1EE-7 scc/sec is probably not measurable with routine field equipment.		The required leakrate is under review and will be determined prior to Phase 2 design. Cost of performing test will be considered.	
4.	Table 3 (page 19): corrosion conditions - "CSB tube temp and RH listed as TBD". This sounds like an interface issue and CSB/MCO need dates need to be mutually agreed.		Agreed. Design authorities need to document this as an interface issue.	

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5.	Table 3 (page 22): Environmental Conditions - "CSB storage conditions are still required." Another interface issue. What specifically is needed?		Same info as #4 is required. The concern is potential corrosion. Storage conditions at the CSB should be evaluated in the MCO material selection.	
6.	Several technical MCO parameters need to be supplied to Fluor-Daniel to write procurement spec for the MCO Handling Machine (MHM) in the CSB. Bill Dana summarized FDI needs on a table that is attached. Bounding information is needed soon along with target dates for MCO final design information. A joint Parsons/Fluor workgroup with the WHC Design Authorities or representative has been proposed a few times.		I believe Bill is up to speed on when the required information will be available. (K. Smith)	
7.	Section 11.0, Exception Weld Design ..." - Distortion during welding may create stress risers and require stress relief (difficult with fuel in place) unless the additional stress is accounted for in the final design. This is only a detail that's TBD though.		Welding always causes distortion and a certain amount of stress, but in the MCO closure weld configuration it is not significant. (M. Palm)	

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MCO 90% Review	Spent Nuclear Fuel	Chris Thompson		MO285/372-0598

17. Comment Submittal Approval:

_____ _____

Organization Manager (Optional) Contact

10. Agreement with indicated comment disposition(s)

CA Thompson

11/26/96

Date Reviewer/Point of Contact

11. CLOSED

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Date Reviewer/Point of Contact

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Author/Originator 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
	PERFORMANCE SPECIFICATION COMMENTS			
1	3.1.3.3 Rerack baskets need to be independent of the MCO's. They will be handled, stored and loaded into the basin independent of the MCO.		Clarification will be made to reflect this guidance. (T. Ghigleri)	
2	3.1.3.5 This paragraph is weak. The use of 'may transfer' and 'could handle' makes it unclear what the actual interface is. There is nothing that addressed the vent and purging of the MCO's in the CSB.		The CSB interface has become more clear since this revision of the specification was put out. The words "may" and "could" will be deleted. A sentence addressing venting and purging will be added. (T. Ghigleri)	
3	3.1.3.6 Add the same second paragraph as in section 3.1.3.4		The paragraph will be added. (T. Ghigleri)	

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4	3.2.1.4 The last sentence addressed streaming around the shield plug. Why is there streaming around the shield plug? Isn't the source the streaming from the area between the MCO and the cask and this is not included in the 30mr.		The Performance Specification has a flaw. The 30 Millirem per hour average rate is for the MCO shield plug face and does not consider the annulus around the MCO to the Cask inner wall. The spec. will be fixed. (L. Goldmann)	
5	3.2.1.6 Pressure reliefs require periodic testing. This is not addressed in this section.		The intention is to have a device that does need maintenance. The referenced section says this in the second from last sentence. (L. Goldmann)	
6	3.4 This section does not address loading an empty MCO into the cask or the shield plug into the MCO. Where are these tools and handling equipment addressed?		This performance Spec is for the design agent of the MCO. The CSB handling tool for the empty MCO will likely be developed in house. (L. Goldmann)	
7	Appendix A - Throughout this section a clam shell is referred to, there is not a clam shell included in any of the designs I have reviewed. The sequence for loading the MCO into the basin does not reflect the anti-contamination devices currently being considered. Steps 6 & 7 should be combined.		You are correct. The clamshell is nonexistent. The Spec will be changed. (L. Goldmann)	
8	Appendix A Step 7 - This section describes a sequence for lifting the seal plug from the top of the MCO to assist in drying - this is an extremely high risk evolution - what are the streaming doses when this plug is lifted? What are the consequences of an operator error? This should be solved through the design of the seal plug not by having the operator conduct a hazardous operation.		The idea would have been an eighth of an inch additional width at the weld groove. No increase in dose is expected. If the operator took out the plug then the dose rates would be high. Design improvements are expected. (L. Goldmann) TBD PHASE II	

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9	Appendix A Steps 7 & 8 - These sections contain design arguments that are not related to operations but try to justify the weld design and testing. They should be removed and justified elsewhere.		The title to the appendix is being changed to allow for any pertinent information. (L. Goldmann)	
10	Appendix A Step 9 - The MCO cask does not currently have a hatch in the lid.		The process access requirements will be addressed in cask preliminary design. (D. Chenault)	
	FABRICATION SPECIFICATION COMMENTS			
11	Section 5.2 Decontamination - this section addresses removal of the fuel from a contaminated cask. This is an unacceptable risk to the operators and the environment. There is no method provided to remove the fuel nor is there a location that will support this activity. This step as written will cause major delays in the schedule and excessive dose to the operators.		The fuel will only be unloaded from the MCO as a last resort. Please see comment and response # 8 of Doug Chenault. (L. Goldmann)	
12	6.2.1 The first paragraph requires material thickness greater that 2" having a minimum of 40 mils lateral expansion. It is not clear what this is for?		This section will be revised to clarify.	

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13	6.4.1 This section appears to require the test fit of individual baskets to a specific MCO. The performance specification requires that they be interchangeable.		Comment is noted. This section does not require a test fit of the individual baskets to a specific MCO. The section does require that each MCO be checked to ensure that the MCO gauge basket (i.e., the standard) does fit in each of the MCOs. Please refer to section 7.3 for testing requirements. In order to meet MCO payload requirements, the pre-set 24" MCO diameter, the design parameters, and the required shell thickness, tolerances are extremely tight, but an interference fit does not exist based upon the given tolerances for design, material, and fabrication. This will provide for interchangeability of the components. In addition, storage at the CSB of the shells will be extremely important, since "ovaling" of the shells may occur, if they are improperly stored. Improper on-site storage may result in plugs, baskets, and shells, that are not interchangeable.	
14	7.2 Leak Test - This section requires a test with the maximum leakage of $1x10^{-7}$ scc/sec. Who designs the fixture to do this test is not addressed.		This fixture would be designed by the Non Destructive test group located at the 306 building. (L. Goldmann)	
15	7.3.2 Why is this test recommended vice required?		The section has been re-written to clarify.	

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16	7.3.4.1 Test 4a - This test indicated that the MCO and seal plugs are a unit - they are to be interchangeable. The last sentence is not clear in what is intended - test it until it fits?		In order to meet MCO payload requirements, the pre-set 24" MCO diameter, the design parameters, and the required shell thickness, tolerances are extremely tight, but an interference fit does not exist based upon the given tolerances for design, material, and fabrication. All of the plugs and shells will be interchangeable. In addition, storage at the CSB of the shells will be extremely important, since "ovaling" of the shells may occur, if they are improperly stored.	
17	7.3.4.2 Test 4b - This test does not appear to be supported by the drawings - the MCO seal plug should not have a gap that can be measured - if there is there will be excessive streaming and welding operations will be impossible.		This section is being revised and re-written.	
18	7.3.6 Test 6 how is this different from Test 4B?		Comment is noted. This section is being revised and re-written.	

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19	10.2.1 Detailed Requirements - This eliminates the requirement for interchangeable components - the MCO and the shield plugs, and the baskets need to be interchangeable - other wise the ability to store fuel in a storage que in very difficult and adds unnecessary complexity to the operation and will drive dose higher - this is unacceptable.		Comment is noted. However in order to meet MCO payload requirements, the pre-set 24" MCO diameter, the design parameters, and the required shell thickness, tolerances are extremely tight, but an interference fit does not exist based upon the given tolerances for design, material, and fabrication. All MCO pieces are designed for interchangeability. The shell inside diameter will be measured and the test gauge basket will be traversed along the entire length of each MCO shell. Any problems should be found before the MCO shell leaves the fabricator. In addition, storage at the CSB of the shells will be extremely important, since "ovaling" of the shells may occur, if they are improperly stored. Improper on-site storage may result in plugs, baskets, and shells, that are not interchangeable.	
20	2.4 Need to add an additional Phase - storage and installation of MCO's into the shipping cask.		The stages here were taken out of the MCO Performance Specification and is only for general information.	
21	4.5 There has been discussions re - instrumented shield plugs - should it be listed here?		I don't believe so. Curt Miska has requested that 5 MCOs or so be allowed to have sensors installed through the shield plug for confirmation of his hot conditioning process. After his use these would be terminated and sealed. I agree with this approach. (L. Goldmann)	

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22	5.1 What is the incidental equipment with 10 year design life? What is the impact if the MCO is not sealed?		Incidental equipment with a 10 year life include the quick disconnects and HEPA filter. If the MCO is not welded shut after Hot conditioning, the cover flanges would be relied on to provide the leak tightness. They are currently not designed to do so, as the design basis is for welding the MCO shut. (K. Smith)	
23	5.3 What preventive maintenance is envisioned? What will be required - a hot cell; a green house; removal of MCO from the tube?		None is envisioned. Should the HEPA filter or rupture disk need inspecting, a remote camera could be used. If they require fixing or replacing, I imagine this work would be done under an air hood, similar to that required for the venting and purging operation upon receipt at the CSB. (K. Smith)	
24	Table 1 the Ph and conductivity are not correct recommend use the numbers from the SAR.		Information from the OSR regarding maximum allowable pH range will be added to this table. (T. Ghigleri)	
25	8.2.1 Why is the HEPA a non safety class item? Doesn't it prevent release to the environment?		Recent meetings to resolve design issues have identified the need to determine the safety function of the HEPA. Since this HEPA will be active during staging at the CSB, the CSB SAR authors have been tasked with making this determination. Pending their analysis, the safety class designation of the HEPA filter will be finalized. (K. Smith/J. Wiborg)	

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26	8.3.1 All Penetrations...Are they testable? How do we know that they are sealable?		All penetrations and connections are testable per ANSI-N 14.5. Following the processing operation and prior to interim storage, the quick connector openings and the HEPA filter opening are seal welded utilizing blanks for the blind flanges.	
27	9.0 How does the MCO use the K Basin overhead crane? The transport cask is lifted by the K Basin crane not the MCO.		The MCO does not use the crane directly, as it is lifted inside the cask. (D. Chenault)	
28	Exception Weld Design -From the discussion it is not clear if the commercial cask welds are seal welds or structural welds. The MCO weld is clearly structural and must function as the primary strength element of a lifting fixture for spent nuclear fuel. Has the NRC waived the inspection of lifting fixtures for fuel handling equipment? If not its not clear that this argument is valid.		Commercial canister welds serve two functions. They provide sealing and provide structural capability for drop requirements, lifting, and/or pushing. Since, a regulatory organization, such as the USNRC is not involved with the MCO project, it is difficult at this time to ascertain the acceptability of the closure weld, or what if any requirements may be imposed with regard to inspection or testing. Normally, the design agency can have on-going discussions with the USNRC during the design process to determine in advance the acceptability of the design, prior to actual fabrication. the MCO project does not enjoy this advantage. The commercial casks are not lifted by the end plug. The weld detail has been revised and an exception is no longer being taken.	

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Project Design Requirements for Multi-Canister Overpack, Fabrication Specification for Multi-Canister Overpack, Multi-Canister Overpack Drawings	Spent Nuclear Fuel	Curtis Miska John Irwin Hank Reid	Process Eng	376-7103

17. Comment Submittal Approval:

Organization Manager (Optional) Contact

10. Agreement with indicated comment disposition(s)

John J. Irwin 11/25/96

Date Reviewer/Point of Contact

Author/Originator

11. CLOSED

John J Irwin 11/25/96

Date Reviewer/Point of

Author/Originator

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	MCO Basket Design			

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1	There are concerns about a basket design that may not adequately constrain the fuel from damage during handling and transport. While it is true that the fuel has been subjected to more severe shock loads during discharge it is also true that some of this fuel that was previously damaged has corroded and will tend to "fall apart" when mishandled again. It is very likely that corroded fuel is much more subject to damage than the fuel when it was first discharged. This is because the hydrogen produced in corrosion is likely to migrate through small cracks, defects and grain boundaries to sites far away from the apparent area of corrosion. In addition, it seems plausible that there would be a greater probability of element damage under vibration scenarios for loading and transportation with the fuel loosely in contact. This type of handling of the fuel should occur only if there is project wide agreement that no effort should be made to reduce or minimize the increase in reactivity and amount of particulates associated with the fuel as part of the path forward process. In summary, there is a need for a SNF wide consensus that it is ok to mistreat the fuel, creating an unknown amount of particulates and greatly increasing its potential for pyrophoricity, and leave the fuel in this reactive dispersable state prior to implementing the MCO basket design proposed.		We are actively addressing the concerns of all those who interface with the MCO. Creating a basket that constrains and separates every fuel element would most certainly be more difficult to load by the fuel retrieval system. Adding partitions or separators to the baskets would likely decrease the heat transfer, reduce the payloads for the MCOs, and affect gas transport inside the MCOs. Alternative basket designs are being evaluated, in an attempt, to satisfy the many needs of interfacing activities. In the close packed arrays being utilized for the baskets, a few fragments, when generated, will quickly lock up the array so that the back and forth motion of the upright fuel will be self limiting. Another way to put it is that the in the proposed fuel fragmenting process will be self limiting as fragments are made they will bounce around and fall in among the nearby elements. This "falling in" will wedge the nearby elements and surrounding elements to point to point contact someplace in the array. This will thereby limit further fragmenting action in that area of the array. As a further comment, I believe everyone in the SNF project should try to preserve as much of the SNF in a whole form as possible. Lou Goldmann	

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2.	The basket design presented in the 90% design review is inadequate in that it does not provide any provision for gas flow through the elements with the basket having a solid flat plate for a bottom. This is clearly unacceptable for both Cold Vacuum Drying, and Hot Conditioning. Establishing gas flow through and around the elements is critical to the Hot Conditioning process. Since all of the Hot Lab work is being performed with small portions of a single element with flowing gas surrounding the fuel it is critical that the MCO & basket design promote uniform gas flow past the elements, (preventing flow bypass or channeling), (channeling can be prevented by promoting gas mixing between basket layers).		The basket design is being modified to incorporate a wire grid base in lieu of the solid flat plate to permit air flow up thru the basket internals. Additionally, the configuration of the fuel elements within the basket has been changed to allow air flow around all sides of the element. Drying and conditioning engineers have been consulted in the basket redesign and are in concurrence with the changes made. (K. Smith)	
3	Basket base plates must be perforated to enhance draining, mass transport, and natural circulation flows. The placement and diameter of the flow holes should be determined through an iterative process with the mechanical designers and thermal-hydraulic analysts. Any flow holes should be rounded top and bottom to minimize pressure losses.		See response to comment #2.	
4	To increase structural rigidity of the basket base plates, it is recommended that the edge (perimeter) of the base plate be curled downward (to allow draining). This is similar to a "pizza plate" that has a lip to prevent warping.		The suggestion would require a forging, casting, or a special "built-up" section, all of which are expensive. The basket redesign features which permit air flow thru the baseplate will also function to allow draining.	

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5	Natural circulation flows will have a significant effect in redistributing energy throughout the MCO. The fuel assemblies must be uniformly spaced within each tier to allow for convective flows. In addition, each fuel assembly must be positioned above a large enough flow hole(s) to allow for flow through the assembly. Loose stacking of the fuel assemblies like a "cord-of-wood" is not recommended, since the geometry is not fixed and cannot be analyzed and could potentially lead to shifting and mechanical damage due to impacts with other fuel assemblies.		Natural circulation flows are being evaluated as to their importance in the convective cooling arena. When Helium is used as the backfill gas the conductive component to the total heat transfer rate rises substantially. The convective component is low because the increased conductivity of the helium lowers the density differential, which drives the convective mode of heat transfer. If we find we don't need much of a convective component, then the uniformity of the array for heat transfer may not be as important as we think. As to gas flows for conditioning there will always be the generic channels created between three cylindrical fuel elements pushed together. The fuel elements ends will likely set on a perforated or well wire deck to allow gas flow through the channel created by the three elements intersection. It is likely that some fuel elements may actually achieve line to line contact if the clips on the cladding are not in the way. see response to your number 1 for discussion of the fragmenting issue. (L. Goldmann)	

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6	Consideration should be given to aligning the lower and upper tiers (baskets) to promote a "chimney effect" that will enhance the vacuum drying process and natural circulation flows during transportation and interim storage. This consideration should be balanced with the need to prevent flow channeling in the hot conditioning process.		We are not planning on axially orienting the baskets during loading. As a result, I doubt if the fuel will be well collimated end to end in reference to a line parallel to the MCO axis. We can create MCO shell wipers on the baskets to isolate each basket cell to force most of the axial flow to go through the fuel beds and not around the edge of the basket, if needed. (L. Goldmann)	
7	Can we use hollow pins fixed to base plate to help position the fuel assemblies? This concept is similar to the hollow lower base plate pins WEC uses to fix the thimble and instrumentation tubes for PWR fuel assemblies.		This was considered with the loading function in mind and judged to be too difficult to perform under 12+ ft. of water. Also, this design does not lend itself to stacking broken outer or inner elements unless the hollow pins extended nearly full length. This type of basket would be difficult and expensive to fabricate. (K. Smith)	
	MCO Basket Design (Performance Specification/Project Design Requirements)			

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8	The requirement to have good gas flow through and past the elements, and for the MCO design to minimize damage to the fuel, and to transfer heat efficiently has been communicated before. However it still appears that it is not stated succinctly in the performance specification or Project Design Requirements and these documents should be revised to incorporate these requirements.		We can add a phrase indicating the need for gas flow through the fuel in the performance specification. If we do that the we also have to add the needs of 1) loading the baskets with fuel, 2) loading of the fueled baskets in the open MCO, 3) allowing for the drying process 4) allowing for the hot conditioning process 5) allowing for the needs of the staging, venting and interim storage. Instead of all the interfacing requirements being put down in excruciating detail and taking a lot of time doing it, we are depending on close consultation by all the interested parties to develop a consensus and get an adequate design accomplished in time to meet the December 1997 load out date for fuel. All the details for every interface would have to be thoroughly quantified, described, and agreed to before the design is finished. I don't believe that our fast track will allow for that type of documentation. We have allowed for approximately a year after the current review and update cycle is complete for testing to bring out any short comings of the design. (L. Goldmann)	
	MCO Surface Treatment			

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9	No mentioned is made in the 90% drawings for surface treatments to increase emissivity. This should be added. Emissivities of the MCO wall both outer and inner should be maximized via a passivation process. We should strive for emissivities in the range of 0.7 to 0.8. This same concept should be applied to the shipping cask ID and the CSB storage tube ID and OD. The need for surface treatment may be reduced if Helium is used as a fill gas.		Emissivity raising treatments for the interior and exterior surfaces of the MCO 24 inch diameter shell are being considered. When the scoping heat transfer calculations are completed for the completed 90% design of the baskets (the current review and update cycle), then the utilization of "blackening" of the MCO and fuel basket surfaces will be discussed and decided. The emissivity comments related to the Cask and CSB tubes will have to be addressed in another forum. (L. Goldmann)	

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10	MCO & Basket Heat Transfer. Based on discussions during the SNFP Thermal Task meeting on 12/7, there is a potential developing for the mechanical design of the dense-pack MCO compromising effective thermal performance. This may well include intact fuel elements. The assumptions being made for the dense-pack thermal analyses rely on some consistency to the packing of the fuel in the MCO. Until recently, it was assumed that some gridwork would be part of the fabricated basket insuring some spacing and regularity to the fuel element distribution. It appears now that there is a move away from this concept. A procedure whereby fuel elements are positioned in an inclining MCO (introducing a potential for lopsided stack with elements leaning on each other) seems to be the direction. Preliminary analyses by Westinghouse thermal analysts indicate a high reliance on radiative heat transfer during vacuum conditions (~50% of the total conductance). Variations in geometry become significant factors since they impact view factors. Eliminating or controlling these variations becomes a priority. There is a real need for the mechanical design team to assess some of the "needs" of the thermal analysis team. The mechanical design team has valid reasons for leaning in the direction that is proposed, weight being one key factor. However, some consideration needs to be given to spacing the fuel elements. This might possibly be some version of the		Your concerns are noted. The will likely be continuing meeting on this subject. As discussed before in the comments and responses above, after this current review and update cycle an evaluation will be made of the baskets and fuel for heat transfer. The design solutions for the baskets and fuel arrangement will be further refined at that time. (L. Goldmann)	

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	MCO Design Drawings			
11	A top plenum for natural convection is not defined, by the MCO drawing it may be there. A drawing is required that depicts the five or six or twelve baskets inside the MCO with plenum spaces noted.		Sheets 3 and 4 show details of the shield plug. The 3" top chamber required by the Performance Specification is provided by the 3" screened plenum at the bottom of the shield plug. This area was screened to prevent the short draw tube from plugging. Subsequent to issuance of the drawings, input from the drying team indicated that the screen would inhibit natural air flow. The screen will be removed, replaced with a small screen just around the short draw tube, and the 3" top chamber will remain open for air circulation. (K. Smith)	
12	The top shield appears no more effective from a radiation streaming standpoint than the original 8" shield. This is due to the large pockets for the quick disconnects and the process penetrations that turn back on them self. Jay Lan is showing a 400 to 1000 mrem/hr dose rate for the original design, his initial assessment of the proposed design was that there is not improvement. This work indicates that the design would not meet design criteria and may require remote handling.		Please refer to the Parsons' report, "K-Basin MCO Shield Plug Thickness Technical Evaluation", revision 0, December 1995. Report summarizes and provides the basis for the shield plug design. Results of analysis indicate 30 mrem/hr nominal and 100 mrem/hr peak which are the requirements specified in the Performance Specification. Actually, Jay Lan's completed assessment shows the shield plug to be below the 30 mrem/hr nominal average. (K. Smith)	

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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
13	The people from INEL cautioned that special design care should be exercised in the quick disconnects. They experienced some reliability problems (i.e. leakage) at their facilities. I explained to them that we were going to all metal seal design, this will not improve the reliability problem.		Parsons is not aware of the type or brand of quick connectors utilized at INEL. However, the quick connectors specified by Parsons, that is Walther, are of a special design incorporating special seals to meet the leakage requirements and the extreme design parameters. The proposed Walther design is based on their patented designs which have been shown both by testing and during actual use to be extremely reliable over many cycles. In addition, Walther plans to implement performance and leak testing of the proposed quick connector design. Finally, because of the extreme conditions and leakage requirements, Walther has proposed the use of a graphite based seal design, which should avoid many of the problems associated with metallic seals.	
14	The flow pressure drops through the quick disconnects were not provided in the 90% design review package, this should be provided as soon as possible.		Comment is noted. The Performance Specification nor any other document has required nor specified the quick connector flow pressure drop. The Performance Specification only requires a 1" diameter opening. During the meeting with Walther this specific issue was discussed, but a response or requirement was not provided by WHC. Cv is approximately 13 for the 1" coupling.	
15	It appears that the design drawing put the criticality control spacer in the baskets that do not need it and fail to place the criticality control spacer in the higher enriched MK-1A fuel baskets. This needs to be fixed.		Basket drawings are being revised to correct this.	

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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
16	Decontamination of the top shield may be a problem with the proposed design. This aspect should be reviewed by an expert in this area.		With respect to potential contamination during upset conditions during drying, conditioning, or handling at the CSB, we propose to evaluate the options available for decontamination in Mike McWethy's MCO contingency study currently underway. Recommendations from this study will be reviewed and incorporated, as necessary, in the facility designs. Any recommendations regarding shield plug modifications will also be reviewed and incorporated during Phase 2 design. (K. Smith)	
17	The bottom plate alignment feature (see sht. 5) does not appear to be properly sized. If the basket completely engages there will still be a 1/4 inch gap between the basket and the support ribs.		The bottom of the basket is chamfered to mate to the chamfered ring on the bottom of the MCO. In addition, the baskets design is being revised.	
18	The 90% design report did not contain any structural, seismic, thermal, fluid flow, mechanical or shielding calculations. When will these be provided?		Calculations for structural (including seismic) and shielding activities (which are in Parsons' scope of work) will be provided with the final design. Other identified areas, such as thermal, fluid flow, etc., are not part of the Performance Specification requirements, nor has Parsons been tasked to develop these calculations.	

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19	For Conditioning to be possible in the MCO, the MCO design MUST direct gas flow down the long draw tube past, and past the fuel up to the short draw tube (the gas flow must be almost exclusively past the fuel). The design presented appears to allow or promote the gas flow bypassing the fuel by returning up the central space provided for the draw tube, and past the outside of the fuel baskets. This should be evaluated by flow modeling, and this design deficiency must be corrected. Some type of "wiper seal" that would prohibit flow up the central tube, and along the outside of the baskets may be required as a result of detailed flow modeling for conditioning.		The incorporation of a metallic wiper on the inside of the basket central tube to make a flow barrier for the hot conditioning atmospheres seems appropriate. There will certainly be some leakage around the long axial dip tube but the bypassing could be reduced. For the modelling to occur in an efficient way the hot conditioning heating profiles, pressures and flow rates will have to be available. I assume that hot conditioning will provide the analytical results if the MCO proposes a wiper arrangement on the central dip tube at each basket. Then the concept could be tested during the one year test period. (L. Goldmann)	

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20	Placing the rupture disk on a common line with the short draw tube would more than likely prohibit installation of a high efficiency particulate filter in the MCO because it would potentially disable the capability of the rupture disk. It is my position that the MCO design should not prohibit the installation of a high efficiency particulate filter unless a filter study indicates that such a filter is not practical.		The relief device may have to handle a large flow gas from the worst overpressure event inside the MCO. An event that requires the large flow will likely bring up a lot of fine debris to the inlet of the relief device. If a small pore filter were in series with the relief device then it is likely that the filter would blind and restrict the event's flow further and perhaps even lack sufficient capacity to relieve the event. The fact that a filter may be need to keep radioactive debris inside the MCO during normal process, certainly means that much more would be available to the filter during a relief by an overpressure device. The MCO design is not prohibiting the installation of HEPA filters anywhere. The free volume and space inside the MCO is limited. Hot conditioning was earlier conducting a study and directing a designer to develop an internal MCO process HEPA for exclusive use by the Hot conditioning process. If this exclusive use HEPA device is found to be needed by hot conditioning then a fifth interface on the top of the MCO shield plug may be needed. Perhaps a choice will have to be made between (1) assuring the proper function of the pressure relief device and (2) contaminating the hot conditioning plumbing outside the MCO up to its own dedicated process HEPA to trap the particulates. Placing the pressure relief device on the longer axial dip tube also has problems associated with that arrangement. A larger	

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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
20	Continued		water heel, more line losses during a relief event, and an even greater potential for blockage of the dip tube entrance with fuel fragments and particulates are the main concerns. (L. Goldmann)	
21	To preclude inadvertent misconnection of the MCO long and short draw tubes (switching of lines) it is recommended that the design media or design requirements indicate that inadvertent connection to incorrect MCO ports be precluded by engineered features (different size/shape connectors). Also it may be desirable to consider evaluating the line size on the long diptube, it is likely that flow modeling would show that this line size could be decreased.		I agree. If the process systems are planning on having the MCOs pressure relief device active during operations then they will likely want to have the MCO shield plug oriented in a way so that any relief flows will be properly directed and handled by the facility systems and thus not grossly contaminate the facility. Orientation of the MCO shield plug and different size disconnects can solve this concern. If the process systems choose not to activate the pressure relief device then provisions should be made by the process systems to not damage or unknowingly set off the pressure relief device.	
22	Consideration should be given to facilitate visual indication that the MCO has completed Hot Conditioning (allow place for 300 degree melt crayon mark). Similarly consideration should be given to visual indication (verification) that the MCO did not exceed design temperatures (allow place for 375 degree melt crayon mark).		I agree. We can put a space on the MCO shield plug for the tell tales. Perhaps metal alloy melt discs, similar to the ones used on engine blocks, would be better? (L. Goldmann)	
	Project Design Requirements			

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23	Page 15, Leakage Leakage requirements specifically do apply when making/breaking connections in the conditioning station.		Selection of the quick disconnects has centered around minimizing the leakage during making/breaking connections. While the specified couplings minimize the area for trapped gases to escape upon disconnecting, they are not a zero leakage device. The MCO project has not received any quantitative leakage requirements for making/breaking connections. Revision 1 of the Performance Specification states that provisions should be made to make or break connections with minimal spread of contamination. Walther has provided the following with respect to making/breaking connections: "The vertical arrangement of the couplings allows that when you disconnect at first the valves close, housing seal still active, then when screwing further apart the medium which is dropped between the valves is released into the opening of the lower (vertical) adaptor half. Thus, no medium is spilled. On reconnection, the medium will be included in the line again. When installing a protection cap, this medium will be trapped and secured in the chamber in front of the valve." Actual leakage rates for making/breaking connections will be determined during the testing phase, as they are dependent on temperature and pressure inside the MCO. Further discussion with Walther has confirmed that they can meet 10^{-4} cc/sec in the coupled condition. (K. Smith)	

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24	Page 19, Fuel Fragments and Particle Sizes & Page 22, MCO retainment of loose materials... The specified retention of material greater than 2mm is three orders magnitude (a factor of 1000) less than the design criteria requested by conditioning. Please place the Conditioning imposed criteria in this section as well with a note that disposition of this discrepancy is pending a filter evaluation study.		Agree, The study will also have to include the feasibility and other safety issues. Mike Mcwethy should be able to assist in your study on this item. Also see response to Item # 20 this group of comments for further information. (L. Goldmann)	
25	Page 20, Criticality Requirements & Page 23, Radioactive source term (criticality) Note protection of the fuel from fragmentation (basket design) may be required to stay within criticality evaluations. Review and evaluate criticality analyses to determine if limitation of fuel damage after loading is required.		Presently, the criticality analyses have permitted the fuel to break apart during DBA's. For Mark IV fuel, there are no criticality constraints, even taking this very conservative approach. For Mark IA fuel, the void space up the center is required for criticality control. (K. Smith) Heat transfer is also dependant on the array of the fuel. (D. Cowan)	

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26	The MCO design must evaluate stresses resulting from temperature nonuniformity during the heatup and cool down cycles. Maximum allowed thermal gradients should be calculated, and accepted by fuel loading, Vacuum drying, Transport cask, Hot Conditioning, and CSB which will all heat and cool the MCO by design or by default.		The thermal gradient numbers provided for the design are: 300 °C maximum fuel temperature inside MCO 350 °C driver on exterior of the MCO 375 °C absolute temperature limit on drive of MCO exterior 100 °C Delta is maximum expected difference between the shell wall at the fuel and the shield plug mass during heatup.	

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MCO 90% Design Documents	Spent Nuclear Fuel	S. S. Lewis		

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

1/29/96
Date

Reviewer/Point of Contact

Author/Originator

11. CLOSED

Date

Reviewer/Point of Contact

Author/Originator

11/29/99

The RCR was prepared 12/15/95 and the signature was secured sometime later. The signature was mis applied in block (17). It should have gone under block (10). As such the comments are considered to be closed.

Louis H. Goldmann

Louis H. Goldmann

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1	It should be noted that the top of the MCO cask, as well as the top of the MCO, will be contaminated by basin water while they are in the load out pit. This is probably unavoidable. However, other than specifying the materials (smooth steel) and minimizing crevices, no design features are identified which would assist in decontamination. One suggested feature is to look carefully for possible design modifications to the connectors on the shield plug. If they can be made as smooth as possible, or covered with a strippable latex, it may be possible to reduce decontamination time. Another suggested feature is to ask Parsons to develop a remote, or semi-remote, decontamination tool for the MCO. This could be included with the design planning of the MCO itself, so that the decon tool and the MCO are compatible with each other. What this suggests is the possibility of designing a "lid washing machine" which specifically designed for this purpose. These suggestions apply to the cask, as well as the MCO, but the engineering for the cask will obviously be different than the engineering for the MCO shield plug.		Refer to comments #6 and #7 of the 50% Design Review. Parsons has suggested covering the shield plug top with a strippable protective covering. In addition, the flange coverings would be left in place and a plug would be developed integral with the shield plug grapple to prevent water from entering the grapple pocket. These issues will be finalized during testing and Phase II Design.	

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2	Welding the shielding plug is not necessarily the most practical alternative. The design document does not make a convincing argument that all possible means of designing a bolted plug have been explored. Bolting the shielding plug is preferred since it saves personnel exposure for welding and welding inspections. Additionally, the bolting option avoids the radioactive airborne issues associated with welding.		Refer to the MCO Studies, Appendix B, for discussion regarding the tradeoffs between a mechanical seal versus a welded joint. Bolting (external or internal to the MCO) of the shield plug would ultimately decrease the usable area for fuel loading and significantly increase the number of MCO's required. Welding and weld inspection will be performed by an automated process to reduce personnel exposure.	
3	No containment mechanisms are developed for the connecting/disconnecting steps associated with the MCO drying activity. The document identifies that MCO leak rate criteria do not apply to connecting/disconnecting vent lines because there will be "minimal leakage." Even minimal leakage can result in serious airborne problems, and this should be addressed with engineering controls. Please note that this is a Parsons design issue (not K Basins ALARA issue) since the engineering controls will have to be compatible with the MCO Design.		This issue was addressed at the 50% Design Review (see comment #7) and subsequent meetings with the quick disconnect supplier and the WHC conditioning design authorities indicate the couplings are designed to minimize the space where fluid or gas can be trapped and released on connecting/disconnecting. This results in a coupling that has an extremely low leak rate on connecting/disconnecting. The couplings are built with a chamber to collect any spillage, preventing external contamination. It is envisioned the connections for drying and conditioning will be made underneath an air hood, which will be part of the drying and conditioning station designs.	

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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
4	The document states that the "...completed MCO seal is later utilized at the Canister Storage Building (CSB) as a lifting load path..." This strategy may not be wise since a single failure in the seal weld results in a radiological issue, as well as, a rigging/hoisting issue. There do not appear to be justifiable reasons for placing the primary radiological seal at risk with weight loading.		Interfaces with the CSB storage tubes and the transportation cask do not permit the addition of lifting lugs on the MCO sides. Whether the MCO shield plug is welded or bolted to the MCO shell, it is only means available for lifting. The MCO closure weld will be designed to permit an internal pressure of 150 psi to accommodate potential conditions before or after drying. Design of the weld to accommodate this pressure far exceeds the needed strength for lifting.	
5	A better design is needed to ensure that the cask lid hatch is closed prior to any transporting. Leaving it open while transporting the cask to the vacuum drying facility defeats the purpose of having the lid in the first place.		We are performing a study not to determine the best location for the MCO closure weld. If the MCO is not welded in the loadout pit, a temporary closure mechanism is planned to ensure the MCO shield plug will remain in place during transfer to the welding location.	
6	It is unwise to take a great deal of credit for introducing "clean" water into the load out pit while loading fuel. Although this is an admirable practice, the amount of contamination which is avoided may not be as substantial as the document currently implies.		This is a side issue to the MCO Design. Water quality issues are being addressed by others.	

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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
7	The following items are noticeably missing from the document: a) description of underwater tools used by operators while the cask/MCO is in the loadout pit; b) dose/shielding estimates and diagrams for the MCO and the cask; c) dose/shielding estimates for shipping purposes; d) design diagrams for the HEPA filtration systems; e) remote decontamination tools/equipment (mentioned above); f) contamination level criteria (i.e., how clean is "clean") - this evaluation depends on the design criteria for the CSB, and KBRC is not prepared to make a recommendation until that information is more clearly defined; g) Kr-85 mitigation methodology - or at least a risk evaluation (HEPA filters are no help with Kr-85); h) environmental effluent evaluations and criteria (loading and shipping); i) design considerations for the possibility that fuel elements, fuel pieces or fuel baskets get "bound up" in the MCO and cannot be aligned as planned.		These are all valid concerns which will require attention in the future. The purpose of the MCO Phase 1 design was to create a usable design for fabrication of prototypes for testing purposes. Grapples for loading baskets into the MCO, lowering the shield plug into the MCO, and lifting loaded MCOs out of the cask into the CSB storage tubes are under development and will be included in the 100% Design Package. However, most of the items listed will be addressed in preparation for the planned testing, and as part of the fuel retrieval effort (operational dose estimates) and cask/transportation activities.	
8	The brief evaluation of accident consequences is based on DCG's from WHC-CM-7-5 rather than DAC's from 10CFR 835. The 10CFR 835 DACs are more appropriate for evaluating occupational hazards. Also, the accident consequences references DOE 5480.11 and 10CFR 835 for personnel exposure purposes. Although these are valid reference documents, it should be noted that anticipating personnel exposure beyond 2,000 mrem/yr is not acceptable (The document as-is implies a maximum of 5,000 mrem/yr.).		Based on comments received from other reviewers (D. Smith), Section 3.3.2.6 of the Performance Specification will be deleted.	

Eric Shen 01/25/96

Subject: MCO 90% Design Review Comments

1. Comments from Fuel Retrieval System (FRS) design team have been reviewed, most of the comments are acceptable, however some were not fully understood by the design Agent and or his representative. With the exception of clearance issues the comments are acceptable for development of a test unit.

2. The recent development of a draft functional breakdown of the MCO tier baskets by the FRS design team should be addressed in the procurement and testing phase for the MCO.

3. Fuel Retrieval System should reserve the right to have approval signature authority on procurement and testing of the MCO/basket/plug. It is apparent after establishing the draft functions of the baskets that FRS has nearly all of the responsibility of handling the tier baskets. The starting point is receipt into the K basin(s) proper and extends until the MCO is loaded with fuel by FRS. With this in mind all proposed testing of loading and handling of baskets directly influences FRS design, time and motion and ALARA considerations.

Thanks

W. C. Mills

Lead WHC Engineer

FRS Design Team

Eric Shen
1/26/96

CONCURRENCE

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MCO 90% DESIGN		Bill Mills		373-7323

17. Comment Submittal Approval:

Organization Manager (Optional)

Date

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact

Author/Originator

Date

11. CLOSED

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

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1	(comment 130) The response is not sufficient, the K basin monorails are underrated for loaded tier basket as designed. The level of modification required just to handle tier baskets will push the structural envelope. an addition of a handling shell will most probably be prohibitive.		This discussion is outside the intended scope of this review. However, I have discussed the noted current underrating of the monorails for a fuel basket with the Design Authority of the cranes and monorails at K basins. A loaded basket will weigh approximately 2800 pounds. With the hoist and rigging the estimated load will be on the order of 3200 pounds. The central monorails (over pool) are being rated for 2400 pounds now. The paths from the fuel retrieval cleaning and reracking station to the MCO loading queues and on to the MCO loading in the load out pits of each basin will have to be delineated and then the rail line will have to be upgraded or modified for use. As to the handling shell, if the FSAR dictates a handling shell the that is what we use. However, other engineered solutions are available to make sure that the baskets are handled safely above existing fuel in the basin. (L. Goldmann)	
2	(comment 132) The safety analysis for the design basis accident has not been provided in the 90 % review document.		The design basis accidents are listed in section 3.3.2.2 of the Performance Specification. The design basis loaded basket drop is still TBD. The worst accident is probably dropping a full rerack basket of fuel on a loaded queue of reracked fuel, however the handling of a loaded basket over a queue will probably not be allowed. (L. Goldmann)	

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3	(COMMENT 135) The supporting basis for the vent piping size is not in the 90% review package		Although requested, Parsons has not been provided with the expected gas generation rate (see Performance Specification) within the MCO. In addition, the Performance Specification limits the size of openings in the MCO to 1" in diameter. The worst case accident is thought to occur in a flooded MCO in the cask and the event happens prior to cold vacuum drying. The design authority for cold vacuum drying system is preparing an accident scenario and it is scheduled to be drafted by March 15, 1996 for review. At that time an assessment will be made as to the adequacy of the relief passage being sized properly. The accident scenario will include the fuel material inventories inside the MCO and the gas flows produced. (L. Goldmann)	
4	(Comment 137) The 30mr/hr dose rate is too high for the overall ALARA equation, all dose exposure throughout the life of the project is a issue. The number of times and the amount of time required to perform work on the MCO does not warrant numbers as high as 30 mr/hr.		I disagree. The 30 mRem average over the face of the shield plug is not high. This is a suitable intermittent dose for a human extremity to make and break couplings on the MCO and perform other related tasks. The background dose in the K Basins facility is much more relevant as it is a whole body dose. (L. Goldmann)	
5	(Comment 138) A radiological engineer must be brought in as soon as possible, to wait until phase II is to late for constructive input.		A radiological engineering independent evaluation will be preformed in the next 2 months or so. The evaluation will initially focus on the MCO shield plug quick disconnects, blind flange covers, and the operation and interfaces of them for use and maintenance. Later the evaluation will expand to cover more of the MCO features. (L. Goldmann)	

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6	(comment 164) Comment remains the same from the reviewer. The spec is not realistic, for fabrication, cost and or operation. What looks like it is possible but is pushing the envelops is not the way to success on this project. Time constraints do not allow for the level of risk that this requirement is imposing.		Currently the cask ID is 25.19 inches which is a very adequate clearance for the Parsons stated maximum OD projection for the MCO of approximately 24.85 inches. It is likely that both diameters will change in the future, but for now it looks acceptable and is not a conflict. (L. Goldmann)	
7	(comment 165) As the tier basket and MCO lid designs have changed the concept of the same grapple or at least the same design features should be revisited.		The grapple for the MCO is a 10 ton lift and the basket is a ton and a half lift. We are limited on the basket grapple OD by the hole down the center of the basket. The basket lift is also done in water. This basket hole only has to be large enough to accommodate the dip tube. The MCO grapple has to be strong enough for 30 to 50 tons depending how you read the lift manuals. A 30 ton capacity in a nominal 1 inch diameter hole is not common. This MCO lift is a dry lift so some lubricants may be allowed in the MCO grapple. The interface will probably be wire rope with the hoist. A common grapple for both purposes will cost more for the single design and I don't know if the differences in cost will offset the possible savings of building several extras of a more complicated overall style. I don't think that anyone said that the grapple would be the same for the two lifts. (L. Goldmann)	

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8	(comment 166) Strongly disagree with this comment. The MCO must be grappled in the tubes at CSB, a 14 foot dangling grapple will require lead in chambers and possibly more. It appears that consulting with folks who have done this type of work on a daily basis would be a excellent idea.		The grapple design has not been designed yet, so if chamfers are needed then they will be included in the design. Put another way enough information is in not available to decide if chamfers are needed or not. It is likely that some sort of chamfering, lead in, or some other grapple location features will be need prior to the engagement of the grapple with the MCO shield plug. The "how" of this task will be decided at the appropriate time. (L. Goldmann)	
9	(comment 167) The comment still stands, a review by health physics personnel is a must on this concept.		Please see the response to number 5 above (#138 on 50%). This subject will be included in the evaluation. (L. Goldmann)	
10	(comment 173) The 250 surface is a bust for decontamination of an area that requires no smearable for welding and CSB requirements. The cost of a much better surface is minimal when compared to decontamination time and dose on the production line.		Please see the response to number 5 above (#138 on 50%). This subject will be included in the evaluation. (L. Goldmann)	
11	(comment 176) Comment still stands. If design requirements are driving tolerances the requirements should be revised and basis analyzed for cost benefit.		We are currently heading away from concepts that require a fixed or predetermined rotational orientation of the baskets in the MCO. (L. Goldmann)	
12	(comment 178) Revisions and clarification still required.		We are still working towards making everybody's needs and requirements more clear in the MCO performance specification. (L. Goldmann)	

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13	(comment) The K basins cranes ate not DBA qualified, a USQ, screen and safety basis is required for the condition. This could be a show stopper.		The current plan is to have an MCO and fuel retention device attached to the cask. The role of the device is to restrain all fuel structurally in case of a drop, which is more severe than a seismic event and to seal the contents so that no radioactive material or water can escape during the event or transfer to the conditioning process. (D. Chenault)	
	FABRICATION SPECIFICATION			
14	(page 2 A) Multiple levels of go-no-go gaging will be required to prevent an inadvertent interference fit of a stuck basket to MCO or MCO to cask or MCO lid to MCO. The design is driving big ticket items in both fabrication an labor/production costs.		The requirements specified in the Performance Specification drove the tight tolerances. However, the requirements are being revisited by WHC. Thank you for the comment. We will put loaded go/no go gaging in the fabrication specification for the fuel baskets and also include gaging for the interior of MCO fabricated shell with the lower end attached. The Cask MCO interfaces will be addressed with the Design authority of the Cask. (L. Goldmann)	
15	(page 2, B) The K basin 30 ton crane is driving sizing. The real issue is high risk design actions are being made. A complete evaluation of the 30 ton cranes and how they are driving the technical decisions and dose levels should be done.		An evaluation is in process. (D. Chenault)	
16	(page 2, 2.1) C A gage should also be provided to gage the MCO. Sticking a tier basket due to out of tolerance MCO (Which can happen after receipt is not acceptable).		Please see response for Number 14 above in this group of comments. (L. Goldmann)	

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17	(page 6, 5.1) Adequate radiation shielding protection. 30 mr/hr is not acceptable when the total SNF project does is taken into account.		This is a contact dose for a extremity of the body. Workers will not be expected to have their hands in this area very long to make and break connections, do decontamination, etc. The dose rate is expected to decrease as the distance from the shield plug increases. (L. Goldmann)	
18	(page 7, 5.2) Discussion on seal fails or leaks, unloading the MCO is not acceptable as first fall back condition. Seal design must be positive pressure fed with clean H2, any leak or failure will ge in safe configuration.		We agree, the MCO will not be unloaded unless it is absolutely necessary. The Seal is being provided by the cask system for the use of the drying system. Your concerns are noted. (L. Goldmann)	
19	(page 7, 5.2) Add bead or sandblasted.		Comment has been incorporated.	
20	(page 8, 6.2.1) Use photo etch or engrave to minimize contamination traps.		To minimize contamination traps, low stress stamping has been specified. In addition, strippable coatings will be applied over the stamp.	
21	(page 10, 6.3.2) If a rolled shell is used, a verification must be done to assure tolerance will not change when run through heat cycles of 50°F to 750°F and back. The shell may require heat treat or stress reliving.		If a rolled plate is utilized for the MCO shell, it would have to meet the same requirements as those for either seamless or ERW pipe (which is a rolled plate). The MCO shell is specified on the design drawings to be pipe in accordance with ASME SA-312, Type 304L. This ASME material designation is found in Section II of the ASME Code, and provides specific requirements for a number of issues. Control of the HVC temperature to below the ASME Code allowable temperature for the MCO shell material temperature of 800 °F will preclude the material from warping.	
22	(page 18, 7.2.1) The leak rate seems a bit overkill, like a vacuum system spec.		This will be revisited. The fabricator may not be required to perform a leak test.	

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23	(page 19,7.3.4.2 test B) The suggested method is the long way around and can provide false data. Suggest using form set RTV of other polymer type gaging assembly disassembly will not be as likely to upset actual to tolerance indications.		Entire testing section is being revised. Will consider your suggestion.	
24	(page 21) Fuel basket gage must be a multi ring hoop gage to provide realistic go-no-go data, the MCO will require similar gaging. The gage will be required to do pre assembly test of loaded basket prior to underwater loading into MCO.		Will consider and evaluate your suggestion.	
25	(page 25, 10.1.3) Include requirements for unloading and upending the MCO for off loading to prevent damage and or changes to critical dimensions.		Document is a Fabrication Specification and provides details, information and requirements for a fabricator. As such, the Fabrication Specification does not address on-site activities, which are covered by on-site documents and procedures.	
	PROJECT DESIGN REQUIREMENTS DOCUMENT			
26	(page 3, 2.4) More definition required, note MCO remotely installed into CSB storage tubes which requires remotely operated nuclear qualified grapple system.		A specification for the MHM equipment design is currently in process. Contact M. Mahaffey for detail. (D. Chenault)	
27	(page 7, 4.4) Dose number to high for time and number of times work will take place on top of MCO. Does not support SNF total ALARA plan.		See comment response to # 17 above. The 30 mR average contact dose is considered adequate at this time for the shield plug of the MCO. The SNF Project Alara Plan is being written at this time and I will check with the author and discuss the dose rates and our situation with the MCO. (L. Goldmann)	

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28	(page 7,4.5) The MCO is either a pressure vessel of a vented vessel, a single penetration with a NucFil capped with a removable rupture disk assembly would eliminate one port. This would also provide HEPA filtration in the event of a rupture. The rupture disk could be removed if a vented condition is required. The NucFil will also provide a flash arrestor for hydrogen gas (as used on K basin IX waste streams).		The idea of having a HEPA in front of the pressure relief device has been discussed before. Basically we are concerned that a HEPA would possibly blind and thus lack sufficient flow capacity to vent a vigorous water-uranium metal reaction inside the MCO. (L. Goldmann)	
29	(page 8 5.5) What does to the maximum extent mean ????? All components must fit all equipment, baskets to MCO's, MCO's to cask(s), MCO's to CSB tubes.		Requirements are driving tight tolerances, and tight tolerances are driving matching the baskets to the MCO's. The requirements are being relaxed and therefore will revise the statement.	
30	(page 9 table 1) Table does not include hot vacuum drying temp. 350°C.		Comment is noted. However, governing design temperature is 375 °C, as stated.	

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31	(page 12, 4th bullet) Worst case drop is >13 feet when unloading csk into charging machine at CSB and grapple or winch fail.		The loaded (or unloaded) MCO straight down drop is governed by yielding (pre-buckling) of the MCO cylinder wall at the base plate junction. This limiting condition is directly affected by the lid thickness (weight) and the cylinder wall thickness. As conceptually designed with a 3/8" wall and 10 inch lid, the yield initiation occurs with a 2 foot drop or 331 G's. If constrained by the cask and baskets (with dimensions for conceptual design), the breach of the MCO occurs at 550 G's. Breach is considered to be when the buckled wall fills the void between the cask and baskets, thus making removal difficult. Further analysis of the full drop of the MCO into the cask has shown 1.) A two foot pool of water in the cask bottom would attenuate the drop G's to acceptable levels. 2.) Preliminary analysis still ongoing shows that the hydrostatic piston effect between the cask and MCO will slow the dropped MCO to acceptable levels. It is possible that a small taper at the lower end of the cask may be necessary. (D. Chenault)	
32	(page 14, 9.0) Should read the Cask/MCO assembly use crane.		Comment will be incorporated.	

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33	(page 21, table 4, 2nd row) Letter 10/24 and 11/2 meeting baskets were not intact for reverse removal. This is not agreed to by Fuel Retrieval engineering (the Design Agent may have agreed), furthermore if a MCO had to be unloaded and the baskets were not intact it could take weeks to clear the load out pit.		Nobody is asking "Fuel Retrieval engineering" to agree. This is put in to assure that the shield plug is removable and will not "wedge" in the MCO shell because of the shield plugs design features. The reason for the consideration for the baskets not to survive is that we don't want to make the baskets all safety class such that the baskets would have to survive an accident for fuel unloading purposes from the MCO. If an accident required the down loading of the MCO then a selection and planning process would be done, if not already done so, to mitigate the situation. If a load out pit were needed, then I would guess that fuel retrieval operations would stop while the down loading of the MCO was underway. (L. Goldmann)	
34	(page 28, 3) Dye Pen will be dose intensive to inspector. Remote methods can be employed, but leave a lot to be desired to detect defects.		Comment addresses and answers the original comment, that is, "Remote methods can be employed, but leave a lot to be desired to detect defects." Dye penetrate will require "hands-on" inspection in order to provide meaningful results. Determination of dye penetrate requirements will be accomplished during prototype testing.	

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35	(page 31 2nd, 3rd bullets) a low pressure helium leak test does not replace a hydro as stated in later discussion. Calculations in most cases do not validated pressure vessel integrity. Who is going to provide written authority to bypass this requirement?		Discussions are planned with the K-Basin safety representatives to determine the feasibility of hydro testing the loaded MCO, which introduces a significant safety issue. If all safety concerns can be addressed, then the MCO will be pressure tested after loading and welding. If a pressure test is deemed unacceptable from a safety risk assessment, then a position will be developed based on UT examination and weld process control to qualify the weld. (K. Smith)	
	DRAWINGS			
36	(shell assembly) Part 6 requires straightness, this means that threaded attachment to lid and all parts of long tube require special features. Drawings are not clear in this requirement.		ASME/ANSI codes, specifications and documents provide tolerances which were utilized as part of the MCO Design and in the selection of materials. "Special features" are not required.	
37	(shield plug) Grapple socket does not appear to account for grapple that will have to meet 5 to 1 safety factor (i.e. 50 ton lift on extension fingers). More grapple comments on # 39.		The grapple hardware will be designed to meet the appropriate lift criteria. (D. Chenault)	
38	(shield plug) Grapple socket requires lead in for remote alignment in CSB and K basin load out pit.		This grapple pocket is being redesigned based on the grapple selected. (K. Smith)	
39	(shield plug) Do quick disconnect threads meet pressure vessel codes???		Quick disconnect is a "temporary" item. Temporary sealing is provided by a bolted blind flange and permanent sealing is provided by replacing the blind flanges with blanks and seal welding them in place. The bolted flange and seal welded blank are ASME recognized and acceptable means to provide either temporary or permanent sealing.	

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40	(shield plug) Break the edge at taper bottom (lead in to MCO tube) 0.040 over 2.00 zone. Also radius corner on Johnson weld wire assemble for lead in for MCO.		Taper is adequate and is minimized for shielding purposes. Will be evaluated further during prototype testing.	
41	(bottom condition Chamber) As designed part 3, six required, all require special notch cuts for part 4. Suggest 3 pass mill cut of bottom of part 4.		Will evaluate suggestion.	
42	(bottom condition Chamber) Part 5 should be longer and have lead in angle of more like 30 degrees to prevent hang up of tier basket.		Will evaluate suggestion.	
43	(Assembly Long Draw Tube) How are fittings to be tested for leaks after assembly and straightness???		Please refer to the Fabrication Specification which provides the fabricator with the requirements for leak testing of the Long Draw Tube Assembly.	
44	(MCO rerack baskets) As drawn and discussed at 95% review the baskets will act as a piston in a hydraulic cylinder with a limiting orifice. This will create hydroplaning action of the basket to the MCO. With the tight tolerances interference and galling can occur.		Basket design has been extensively re-designed to incorporate the use of Johnson Well Wire. The use of the Johnson Well Wire will allow adequate water flow and eliminate the possibility of a hydraulic piston or a hydroplane effect.	
45	(MCO rerack baskets) Detailed interface discussions are requested between Fuel Retrieval design team and MCO design team to mutually agreed upon concept and develop a signed Interface Control Document. Note: BNFL comments on 90% design below.		Agree. The design authorities for both subprojects will take this action. (K. Smith)	
	FABRICATION SPECIFICATIONS			

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46	(page 7, 5.2) Why does the MCO outer face have to be decontaminated on seal failure. Fuel Unloading (Baskets) is difficult enough without implementing other constraints. Will conditioning not remove the trace contamination?		If the seal is found to be leaking then the cask and loaded MCO would likely be taken to the cold vacuum drying facility, where some decontamination of the MCO will be possible. Unloading of the MCO would only be a last resort. We cannot speak for the drying and conditioning process stations, but it is likely that decontamination may have to be done at these stations from time to time. (L. Goldmann)	
47	(page 8,6.2.1) What does basket material in accordance with NG-2331 having a thickness greater than 2" will have a minimum of 40 Mils lateral expansion		Comment has been addressed. Section has been revised.	
48	(page 10, 6.3.3) Machinery of MCO This will have a great impact on cost, both on fabrication and inspection. May impact on welding also. Looks like all MCO's will be individual items and not interchangeable.		MCO components will be interchangeable based on the design requirements and tolerances provided for fabrication and materials within the ASME Code.	
49	(page 13, 6.5.3 para E) Does the 350 °F tie in with the Hot Vac Conditioning process of 375°C (should the 350°F not be 350°C) Is heat treatment required on all MCO?		The 350 °F is for the shop fabrication of the MCO shells. The 350 C number is for the nominal design of the driving heat for the hot vacuum drying process. The 375 C figure is the absolute maximum allowed for the MCO during the hot conditioning process. (L. Goldmann)	

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50	(page 18, 7.2.2) should the test pressure of 10-15 psiq for process piping not be increased to near bursting disc pressure. Corrections tested to this pressure may leak at pressures nearer the bursting disc rating. This may lead to contamination spread.		Fabricator will not be performing any leak and/or pressure tests with or in the presence of contaminated items or SNF. Therefore, possibility of contamination is not credible. This for the shield plug and attached dip tubes inside the MCO. I don't see a problem here. (L. Goldmann)	
51	(page 18, 7.3.1) To meet the 50 lb resistance force of the basket gauge within the MCO interior implies that the fuel load is evenly spread within the basket. Without segregation this would be virtually impossible to achieve. Off set loading of fuel within the basket load equipment design, not to mention complexity. To ensure basket loading into the MCO can be carried out in a safe and efficient manner. I would recommend 1. Segregated fuel compartments within the MCO. 2. Increase critical clearances between the basket 0/0 and MCO 1/0 3. Ensure that the basket design has no snagging features on the 0/0.		SNF re-rack baskets are undergoing extensive revision, which will incorporate recommendations.	
	PROJECT DESIGN REQUIREMENTS			
52	(page 2, 2.1) Transfer of casks/MCO should be in the vertical mode to maintain furl containment.		The first bullet on Page 2 refers to transport from vacuum drying to the CSB. The MCO will be designed to accommodate transport in either orientation, although it is understood the cask is currently envisioned to be transported vertically. The MCO may be transported elsewhere in the future, and horizontal configuration is likely. (K. Smith)	

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53	(page 3, 2.4) Are all MCO's subject to hot conditioning?		A recommendation coming out of the J. Wiborg "vent/no vent" study was that the SNF Project baseline include hot conditioning of all MCO's. (K. Smith)	
54	(page 4, 2.4) Hot Vac Conditioning (375°C temp as stated previously. See para. 6.5.3 E re: Fabrication Specification.		Comment is noted. However, governing design temperature is 375 °C, as stated. Hot vacuum drying takes place at 350 °C or less.	
55	(page 6, 4.3) Pressure containment. There appears to be paths for contamination spread during making and breaking of various connections. Can these path ways lead to contamination of the MCO? If so why the requirement to unload and decontaminate the MCO on seal failure during basin operations.		A small spillage will occur when the quick disconnects are opened and the coupling halves are separated. This may contaminate the upper surface of the shield plug unless precautions are not taken by operations. Some decontamination may be necessary after the drying and conditioning process are completed and the MCO is disconnected from the process stations. The seal failure is discussed in # 18 and 46 above in this group of comments. (L. Goldmann)	
56	(page 7, para. 4.4) Radiation fields at Cask load out and MCO shield plug welding could and would effect any fuel retrieval process operations if they were being carried out or located in the most efficient operation area. What steps are being carried out by any project to mitigate the effect of the radiation field.		The loaded MCO and cask is being handled as a unit in a vertical orientation. It is my understanding that the Cask is roughly 8 inches thick of stainless steel. The dose would probably be on the order of 30 mRem average at the cask surface. The dose received by a passerby would be dependant on the distance to the cask and the background dose at that particular area of the basin. I would recommend that you contact Andy Kee who is the Design Authority for the Cask System and Rich Creed for information on the dose reduction efforts planned at the basin. (L. Goldmann)	

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57	(page 7, para. 4.6) What id the basis for a bursting disc when the gas generation rates have not been established? Do we need a Bursting Disc?		Establishing the maximum gas generation rate to size the pressure relief is needed and will require data from fuel characterization on peak reaction rates. yes, pressure relieve should be provided to prevent the very unlikely but violent failure due to an unexpected water reaction. (D. Cowan)	
58	(page 9, para. 6.0, sentence after table 1) What does this mean, Cold Vac Drying, Hot Vac Drying or What? Note: Hot Vac Conditioning has been used in previous test.		The correct term here is vacuum drying. The second sentence will exchange "hot vacuum drying" for "hot conditioning". These two changes will be made throughout the documents for consistency. (K. Smith)	
59	(page 11, 8.1.2) Has a criticality analysis been carried out on the basket loading configuration? If no analysis has been carries out to date it may well impact on future loading configurations.		Criticality calculation are based on the available space and the most reactive fuel configuration in the MCO and allow any fuel configuration in the basket. The baskets with criticality control function (MKIA) only provide exclusion of fuel and neutron poisons in the center of the MCO. With the exception of this center area, fuel can be in any position. (D. Cowan)	
60	(page 11, para. 8.2.1) If all items are Safety Class for providing criticality control. What happens to the fuel in the design basis accident case.		Presently, the criticality analyses have permitted the fuel to break apart during DBA's. For Mark IV fuel, there are no criticality constraints, even taking this very conservative approach. For Mark IA fuel, the void space up the center is required for criticality control. (K. Smith)	
61	(page 13, para. 3.2.4) States a 6.625" diameter void space for MK 1A fuel. Drawings indicate 4.50".		Drawing is being revised to reflect the correct fuel designation and accompanying diameter.	

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62	(page 15, table 3) Design temperature -see previous comments. Leakage spread of contamination - see previous notes. MCO Envelope length 160" Max m., should the drawing not reflect this "max m.		Comment is noted. However, governing design temperature is 375 °C, as stated. Hot vacuum conditioning takes place at 350 °C or less. Spread of contamination has been addressed by the design. Drawings currently call out the 160" MCO length.	
63	(page 21, table 4) Accident Recovery How do we remove basket if they do not remain intact? I thought they were a Safety Class item. This would have greater impact on fuel destruction in the accident case.		Removal of re-rack basket following an accident is not included as part of the Performance Specification. As previously stated, there are no requirements or design considerations for removing the re-rack baskets either whole or in part, following an accident. See response to comment #33.	
64	(page 22,) MCO RETAINMENT OF LOOSE MATERIAL Does the 2mm size to particles released during the Vac Conditioning process only.		Yes. These are the only processes which are planned for the MCO.	

From: Nondestructive Examination
Phone: 376-8061 L6-36
Date: January 25, 1996
Subject: NDE REVIEW OF PARSON'S 90% DESIGN REVIEW DISPOSITIONS

To: K. E. Smith R3-85

cc: L. H. Goldmann R3-86
W. H. Nelson L6-36
File JKK LB

Nondestructive Examination (NDE) has reviewed Parson's disposition of the NDE comments for the 90% design review and do not believe the dispositions adequately address the original concerns. The following is a summary of each item and the outstanding issues surrounding some of the original comments:

Item 1 WHC should verify that comment is incorporated.

Item 2 This disposition is not entirely accurate. The 50% review comment #186 stated that all references to standard techniques be removed. Parson's 50% design review disposition said that they would review for applicability and duplication. They also agreed to include a specific requirement for NDE personnel qualification (and I would hope certification) records for approval. WHC needs to also accept the NDE vendor's personnel qualification and certification program which includes their written practice written to ASNT SNT-TC-1A. The 90% review comments are basically the same comments as the 50% review and were written with specific paragraph numbers to recall Parson's attention back to the original concerns. Also refer to 50% comments # 187, 188, and 189.

Item 3 It may not be important or relevant to individual fabricators but it should be important to the overall project as to who is qualified and responsible for NDE reviews. In this case who is the reviewer ICF/KH or WHC (see Definitions 3.1 Buyer)? If ICF/KH does the reviews does WHC reserve the right to overview to assure that the reviews are adequate and fabricators meet all of the NDE specifications before the MCO is built and delivered to resolve problems ahead of time?

Item 4 Agree that the required submittals are identified in Tables 11-1 and 11-2. However, to have a NDE qualification and certification program to ASNT SNT-TC-1A, the NDE vendor is required to have a written practice. WHC must agree that their program meets the needs of this project and are in general compliance with SNT-TC-1A. This document is currently not required by the fabrication specification to be submitted and it should also be approved by WHC. The timing of submittals for the NDE personnelqualification and certification records have not been identified properly as these records along with the vendors written practice needs to be submitted and approved before fabrication by a WHC NDE Level III just like the NDE method procedures.

Item 5 Has been verified for inclusion in specification.

Item 6 ANSI-N14.5 does not have specific procedural requirements. It is a standard that identifies what the appropriate leakage rate is for shipment of radioactive materials under specific conditions. Most NDE vendors who do this kind of work would already have procedures that are in compliance with ASME Section V, Article 10, Appendix V. Suggested wording could be: An integrated containment boundary leak test of 1 X 10-7 atm-cc/sec (ANSI N14.5) shall be performed in accordance with ASME Section V, Article 10, Appendix V.

Item 7 Paragraph 7.2.1. The second sentence should be deleted because the NDE vendor should identify in his procedure the best way to test the item. WHC suspects that the NDE vendor, in order to meet the 1 X 10-7 atm-cc/sec leakage rate, will want to evacuate the interior of the assembly and put a helium hood around the shell assembly for the test. Identifying a test pressure differential of 1 atm is proper but there should be no reference to pressurizing anything because the helium leak detector will create the pressure differential of 1 atm. The NDE vendor should also be made aware when they are testing individual components that the final integrated containment boundary leak test must be less than 1 X 10-7 atm-cc/sec. This means that acceptable individual component tests could add up to a rejectable condition in the final integrated boundary leakage test.

Item 8 Paragraph 7.2.2. The maximur B-~~168~~ 164 e specified. The test pressure

of 10 to 15 psig should be removed unless the acceptance criteria clearly need to specify the test pressure. It is suspected that this requirement was left over from the proof test and does not belong now.

Item 9 These are not additional documents and if someone was in the commercial nuclear business they would have these documents. The NRC audits written NDE reports which must be signed by the "qualified and certified examiner who did the examination" and not an authorized representative or agency as written in the specification in Section 11.3 Records paragraph B.

Item 10 Will accept disposition if item 9 is agreed too.

Item 11 It is Parson's document and how they break it out is their business. However, its seems odd that all other NDE examinations other than leak testing are in the process specification section.

Item 12 Should verify this is done.
Item 13 Disposition doesn't make sense since a metallic o-ring is in their design already. The concerns are if the leakage rate acceptance criteria for the flange is 1 X 10-4 atm-cc/sec or less, a helium leak detector test will most likely be done. Even if a vacuum box test is appropriate the bolts for the flange will have threads and spaces between the end of the bolt and MCO head and this will create a virtual leak path requiring long pump down times. If long pump down times are required and a gross leak across the seal is present one could evacuate the space behind the flange creating an improper test that may not detect the gross leak.

Items
14, 15,
and 16 Must be verified that the comments are adequately addressed. This disposition does not adequately address concerns.

Item 17 Disposition accepted.

Item 18 Provide a technical reason why the current closure weld cannot be volumetrically examined. Does the weld require a volumetric examination? If the weld does not require a volumetric examination the comment is resolved. However, if it does then WHC needs to know why the weld design cannot be volumetric examined so modifications to the weld design can be done. This issue must resolved ASAP.

With this memo, NDE has expanded upon the issues identified during the 50 and 90% design reviews. We are also committed to help resolve these issues in a timely professional manner. It is in the best interest of everyone that the MCO's NDE personnel be qualified and certified to a recognized national system, and that testing procedures be defendable to all stakeholders. If you have questions contact me on 376-8061.

John Keve, NDE Engineer
Nondestructive Examination

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO 90% Design Review	MCO	W.H. Nelson J. K. Keve	Nondestructive Examination	306E/300 Area 376-5403 376-8061

17. Comment Submittal Approval: 10. Agreement with indicated comment disposition(s) 11. CLOSED

Organization Manager (Optional) Date Reviewer/Point of Contact Date Reviewer/Point of Contact

Author/Originator 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
	Fabrication Specification for MCO			
1	Section 4.1 Codes and Standards, 4.1.7 Change the year to 1984 for SNT-TC-1A as required by ASME Section III.		Comment is noted and will be incorporated.	
2	Section 6.5.5 General comment for the entire Section: All of the general technique references in paragraphs 6.5.5, B.2, C.1 & 2, and D.1 thru 5 should be removed from the fabrication specification. These requirements are adequately addressed in ASME Section V, Articles 2, 5, 6 & 10. The sellers NDE procedures, approved by the buyers NDE Level III, will address these requirements in detail.		Comment is noted. However, many of these statements were added as a result of the 50% design review. Comment will remain open for resolution in Phase 2 design.	

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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
3	Section 6.5.5 Nondestructive Examination, Subsection A General, third paragraph add to the end of first sentence, ...by a NDE Level III.		WHC internal review process is not relevant to the Fabricator. Comment will remain open for resolution in Phase 2 design.	
4	Section 6.5.5 Subsection A, General, Add to Section: "The Seller shall submit a copy of their NDE personnel qualification and certification written practice, and NDE personnel qualification and certification records to the Buyer for review by the NDE Level III prior to the start of work. Personnel qualification and certification records required to be submitted are identified in Section 9 of SNT-TC-1A." These items require verification of compliance with SNT-TC-1A by the WHC QA Manual.		The submittals are listed in Tables 11-1 and 11-2. See Section 6.5.5 of the Fabrication Specification. Comment will remain open for resolution in Phase 2 design.	
5	Section 6.5.5 Nondestructive Examination, Subsection B, Radiography (RT), ASME Section III specifies its own penetrameter chart which could be missed by prospective bidders. This requirement should be added to the fabrication specification for information purposes.		Specific wording for ASME Section III penetrameter chart has been added to the Fabrication Specification.	

REVIEW COMMENT RECORD (RCR)	1. Date 12-15-95	2. [illegible]
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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
6	Section 7.2 Leak Tests, 7.2.1, Change the reference ASTM E499 to ASME Section V, Article 10, Appendix V. The ASME code section is more applicable to the required leak testing. The detector probe (sniffer) identified by ASTM E499 is a semi-quantitative examination and according to ASME Section V, Article 10, Paragraph IV-1010, the detector probe shall not be considered quantitative. The specified leakage test is an integrated leak rate for the assembly and not a localized area, thereby eliminating the use of a detector probe. The Project Design Requirement, Section 4.3 requires an integrated containment boundary leak test of 1 x 10^{-7} atmcc/sec.		MCO will be quantitatively leak checked in accordance with ASME Section V, Artricle 10, Appendix V to meet the intenet of ANSI-N14.5. The Fabrication Specification will be revised accordingly.	
7	Section 7.2 Leak Tests, 7.2.1 & 7.2.2, Change the test pressure requirements of 8 to 12 psig, and 10 to 15 psig., respectively, to a test pressure differential of 1 atmosphere (approximately 14.7 psia) for the leak test. This will facilitate a quantitative type of test. Substituting a low pressure leakage test for a proof test is not valid or permitted by ASME Section III.		See response to #6. Comment remains open; refer to attached response from Nelson/Keve.	
8	Section 7.2.2 Requires a leakage rate acceptance criteria. The use of NB-6300 in conjunction with Article 10 Section V is improper. NB-6300 deals with proof testing, while Article 10 deals with leak testing. These two types of tests are not interchangeable and are designed to accomplish two different objectives.		Section has been revised. Comment remains open; refer to attached response from Nelson/Keve.	

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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
9	Section 11.3 Records, E. Changes paragraph to read: "All NDE examinations shall be documented on a written report and signed by the preapproved examiner who is qualified in accordance with SNT-TC-1A."		Section 11.0 and Tables 11-1 and 11-2 provide the specific requirements for NDE document submittal by the Fabricator for the Owner's review. The documentation requirements stated in the Performance Specification have been in use by the commercial nuclear industry for more than 30 years. Additional requirements will add to the cost of the MCO. Comment remains open; refer to attached response from Nelson/Keve.	
10	Section 11.3 Records, I. Remove this paragraph as it is redundant with Sections 7.2 and 11.3 E.		Paragraph will stay as written.	
11	Table 11-1, Item 8, Remove 7.2.1 from this table section and add 7.2 to item 7. Leak testing is a NDE process.		Item 7 is for Process Specifications. Item 8 is for Inspection and Test Procedures.	
	Drawing			
12	General comment: NDE is a part of the AWS A2.4 weld symbols. NDE symbols should be added to the weld symbols and notes as applicable.		Will comply.	
13	General comment: The blind flange and quick disconnect on the shield plug penetration is not easily leak tested. Metallic and elastomeric combination O-ring type seals have been used successfully on other fuel storage containers.		Leak test will be in accordance with ANSI N14.5. Portable vacuum boxes and/or a enclosure over individual flanges/connectors and/or the entire MCO shield plug can be utilized to obtain quantifiable leak test results. Metallic and/or elastomeric seals will not meet the extreme MCO design conditions (pressure, temperature, cycles, particles, etc.). Comment remains open; refer to attached response from Nelson/Keve.	

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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
	Project Design Requirements			
14	Section 4.3 SNF Pressure Containment, The leakage rate of penetrations and connections into the MCO require that all of the interfaces together must have a total leakage rate of 1×10^{-4} scc/sec. However, this requirement is not in the fabrication specification for leakage testing.		See response to comment #6. Comment remains open; refer to attached response from Nelson/Keve.	
15	Section 4.5 Penetrations and Connections, It was defined in Section 4.3 that the MCO containment boundary leakage rate must be less than 1×10^{-7} scc/sec. However, the lid seals for the penetration have not been designed with this level of leak testing in mind.		See response to comment #6. Comment remains open; refer to attached response from Nelson/Keve.	
16	Section 8.3.1 MCO Penetrations and Connections Design, The current design for the lid designs are not easily leak tested. An alternate acceptable design would be the use of a combination metallic - elastomeric type seal. The second bullet should include a leakage rate requirement.		See response to comment #6. Comment remains open; refer to attached response from Nelson/Keve.	
17	General comment: Will the MCO require a leak test done periodically or during the life of the MCO? If so, this should be considered, planned, and designed for.		Once the loaded MCO is hot conditioned and put in interim storage, no further leak testing is planned. (L. Goldmann)	
18	General comment: The current MCO closure weld design is suitable for a volumetric examination in accordance with ASME Section III.		Based on commercial nuclear industry experience, closure weld configuration is not suitable for volumetric examination. In addition, the USNRC has accepted the subject weld configurations without volumetric examination.	

APPENDIX C
Phase II
MCO 60% Design

CORRESPONDENCE DISTRIBUTION COVERSHEET

Author | **Addressee** | **Correspondence No.**

L. H. Goldmann, 373-6371 | Distribution |

Subject: MULTI-CANISTER OVERPACK PHASE 2 DESIGN - 60% DESIGN REVIEW

INTERNAL DISTRIBUTION

Approval	Date	Name	Location	w/att
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Larry Robinson

PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC.
1955 Jadwin Avenue • Richland, Washington 99352 • (509) 946-0415 • Fax: (509) 946-8811

MCO-8-1296

December 10, 1996

Peter Braun
Fluor Daniel Hanford, Inc.
2355 Stevens, MSIN G1-64
Richland, WA 99352

Subject: Phase 2 MCO Design; Design Drawings and Specification for Review

Reference: Task Order KH-8009-8 for Design of the Multi-Canister Overpack

Dear Mr. Braun:

Under cover of this letter is one each copy of the subject documents. The Design Documentation is submitted for review and comment.

In accordance with the approved schedule, please forward all comments to Parsons by December 16, 1996.

If you have any questions, please call me at 946-0415.

Sincerely,

Neil A. Norman
Hanford Operations Manager

RB/dms

Attachment

cc w/attach: Distribution
File: KH-8009-8; 3.3.3

PARSONS

REVIEW COMMENT RECORD (RCR)

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Multi-Canister Overpack (MCO) 60% Design Review	SNFP/CVDF/142K	KJ McCracken	FDNW/Engineering	373-6653

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

2/12/97
Date

KJ McCracken
Reviewer/Point of Contact

Author/Originator

11. CLOSED

2/12/97
Date

KJ McCracken
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
	GENERAL COMMENTS			
1	Refrain from flat horizontal surface as much as possible throughout the MCO.		Will be considered in the final design.	Closed
2	Who is responsible for basket grapple device and basket indexing and alignment device?		The cask/transportation subproject is responsible for the basket grapple device and loading baskets into the MCO. Alignment device is integral to the baskets.	Closed
	Drawing comments			
1	H-2-828043 Refer to general comment # 1. Perhaps a slight angle across the bottom rather than totally flat. The angle must not be such that it will be any lower than the end of the dip tube in the pocket. The basket support (dwg H-2-828056) would also need modification to accommodate the bottom angle. This is not a requirement because current CVD testing has no indication that this modification would significantly decrease water amounts.		This was changed from a slight angle to flat at the request of CVD. Would prefer to keep as is, based on structural modeling done to date.	Closed

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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
2	H-2-828046 Taper the 1" through holes as wide as possible on the filter side. This is to help drain any water that may be splashed into the filter shield plate dome during transport. Based on preliminary testing conducted by Don Squire, the this plate will get wet. I will test the effects of the meniscus formed on this plate to see how it effects the drying process.		Will be included in the final design. KJM Comment: Another way of doing this is to provide slots along the bottom edge of the diving bell.	Closed
3	H-2-828046 If it all possible redesign this "diving bell" to be at least ½" deeper, based on Don Squire's initial testing of the bell.		Based on latest 305 bldg. tests, the existing depth is adequate. KJM Comment: The test did not verify this. The test was conducted on a non-prototypic shield plug and the filter in that case would get wet. Calculations showed, with the new shield plug design, the filter should not get wet. Suggestion: Another video test should be run with an updated shield plug.	Closed
4	H-2-828041 Why does the basket stabilizer have a shoulder on it. It is not necessary. H-2-828053 does not have the shoulder.		The shoulder supports the shield plate.	Closed
5	H-2-828060 sht 2 Why the basket bottom design change for the Mark 1A fuel. This design with the sheet metal webbing seems less robust than the 3" machine bottom plate. If a fuel element was dropped into the basket it could damage the plate such that an element would no longer fit into the basket.		Baseplate design change was necessary to survive horizontal drop and maintain criticality control. Alternate design is forthcoming to eliminate the sheet metal plates.	Closed
6	H-2-828060 sht 1 The sheet metal basket side will act as a radiation shield preventing heat from getting into the fuel (scrap) from the cask. It also holds more water droplets than a perforated sheet. The sheet metal shroud should have hole perforations in it 1/4" minimum.		A solid sheet was requested by the thermal analysts. Also, some concern that small pieces or parts of pieces could slide partially thru holes and snag during loading. KJM Comment: This is still undesirable for the CVD process--but it is a compromise for hot conditioning. Additional KJM comment: After fuel retrieval--there should be no debris in the fuel baskets--Scrap basket may be another consideration.	Closed

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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
7	H-2-828060 sht 3 What are the hole sizes in the bottom plate (provide basket base plate detail) and sheet metal "snowflake" plate. These holes should be larger than 1/4" to reduce water hang up.		Based on further conversations with Design authorities and reviewer, 1/4" holes in baseplate were determined to be acceptable, provided chamfers were included.	Closed
8	H-2-828060 sht 1 general note 13. Remove note. All materials should be stainless steel--pain in a vacuum off gases and also flakes off and adds to the sludge and water retention problems already existing in the MCO.		Will be included in the final design.	Closed
9	H-2-828065 sht 1 see comment # 6		See response to #6.	Closed
10	H-2-828065 sht 2 & 3 Threads tend to increase water retention. Wherever possible seal weld the grapple inserts into the baskets.		Welded inserts will be used.	Closed
11	H-2-828070 sht 1 See comments 6 and 8		See response to #6.	Closed
12	H-2-828070 sht 2 & 3 Where is note 15		Notes will be corrected in final drawings.	Closed
13	H-2-828070 sht 2 If the sheet metal basket spacers are a superior design to the 3" SS bottom on the Mark IV baskets--it might be cheaper to make all baskets to have the sheet metal rather than the machined bottom.		Believe casting the Mark IV baseplates will be less expensive. Mark IV doesn't have the criticality concerns, hence the difference in the basket designs.	Closed
14	H-2-828075 sht 1 See comment 6		See response to #6.	Closed

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO 60% design review	SNFP - MCO	Richard Cowan	Technical Integration	R3-86/376-9682

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

2/12/97 — Date

R L Cowan — Reviewer/Point of Contact

Author/Originator

11. CLOSED

2/12/97 — Date

R L Cowan — 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	MCNP shielding code can pick a poor energy fit for Cs-137 gamma and it can make a difference. Be sure it has a bin at 0.66 MEV as this is almost all the dose.		Will be included in the final analysis.	
	the following comments are for the closure and are generally taken from my note of 5/1/96			
2	Use more, smaller cap screws to preload the seal. This will reduce the torque required to make up the seal, thus lighter tools, and reduce the size and weight of the ring. The current space between bolts is much larger than those used on a 150 PSI flange of the same bolt circle. Use 16 to 20 set screws to preload the seal. Use 16 not 14, no one makes 14 bolt flanges!		The locking ring is not a flange. However, additional design work has indicated between 16 to 18 bolts are necessary. Set screws will be considered for the final design.	
3	Eliminate the heads on the bolts, they have no function. Use set screws and eliminate the cutouts on the lifting flange. Without the heads and using lower loadings on the bolts, make the ring thinner (and the plug thicker) which will decrease the exposure before the ring is installed.		The bolts with heads are part of the original DESH design. The analysis will be performed to permit headless bolts, if possible.	

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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
	Replace the washers on the bottom of the bolts with a single hard ring attached to the shield plug to allow change out of bolts without removing the locking ring.		Preliminary evaluation indicated the single ring will increase the cost of the shield plug. The single ring will be incorporated or eliminated by increasing the number of bolts.	
4	Why are we able to thin the MCO to 3/8 for this closure and not for welded? The final welded requirements are the same for both. (5/1/96) I can not find a reasonable way to increase the wall of the MCO collar above the threads by an eight of an inch. We could reduce the inside diameter of the MCO by another 1/4 inch, we could use very fine threads, or we could thin up the seal face. None of these is really workable. We need to show the 0.38" wall is adequate.	X	The wall thickness will be addressed once load conditions are clarified (number of grapple fingers in contact with ring).	
5	Replace the treads with a breach block (interrupted) type grove. Threading this ring into the MCO may be difficult. Also, use a 400 series SS to avoid galling? I still do not think this would be excessively expensive and a lot easier to assemble.		A breach lock type grove will require greater wall thickness. A meeting was held early on in the final design process and buttress threads were selected as the closure type. The 400 series SS can corrode.	

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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
6	Assembly of the shield plug in the MCO may be more difficult than expected with the proposed internal filter shield plate. The large step (½ inch) may catch the top surface of the MCO, which is shown as very thin (0.060 inches). In addition the bottom of the shield plant may strike the seal surface. Why not increase the diameter of the internal filter shield plate by a little over an inch, seal weld it to the plug, and finish machine the OD with a long taper so there is no way to hang up the plug on the weld prep or sealing surfaces. Currently both are at risk.		The assembly clearances will be addressed in the final design. Step will be minimized.	
7	A significant flat on the top of the threads to reduce the possible damage when the plug hits them. Why not use Acme thread form in place of buttress?		Buttress threads were chosen as the preferred thread by DESH.	
	Basket comments			
8	We have really made a mess of the MK1A basket! I do not think we can load it very easily and the stack height is very close to the top. I know this is a spec. problem not a design problem but we could change the design to improve the loading. I suggest using a thick plate 1 3/4" with shallow pockets (~1") with a half inch hole and wire spacer at the bottom. The loading alignment would be done with a separate "egg crate".		Alternate designs of the MKIA basket are being addressed with DESH.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO 60% Comments	SNFP	C. E. Swenson	DESH/	M0725/600/ 376-0288

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

1/29/97
Date

Reviewer/Point of Contact

Author/Originator

11. CLOSED

1/09/97
Date

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	My only concern is that the MCO will fit into the MHM and that the grapple will interfere. At our MHM meeting with FWENC/GEC/Ederer last week, they will design the grapple for 6 fingers, but each finger will be designed as though only 3 act due to possible misalignment. MCO Project needs to perform an alalysis and provide feedback on the minimum bearing area allowed that will keep the MCO rim deformation below the allowable limits.		The lifting ring will not meet ANSI N14.6 with only three fingers acting. To meet the specification the bearing area of all 6 fingers as designed must be applied to the lifting ring. GEC will grind grapple lift fingers to .005" co-planar.	
2	Lou indicated that the post-conditioning MCO seal lid will alter the overall height of the MCO due to the threads. Hopefully, GEC can adjust hoist travel limits with the grapple plunger to accomodate this.		Agree - Note: Grapple concept presented @ MHM 80% Review Mtg (1/22/97) GEC Dwg 3620523	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
FABRICATION SPECIFICATION FOR MCO REV.A H-2-828042 REV.A	MULTI-CANISTER OVERPACK	W.H. NELSON	DYNCORP NONDESTRUCTIVE EXAMINATION	306E/300 AREA 376-5403

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

1-22-97
Date

W H Nelson
Reviewer/Point of Contact

Author/Originator

11. CLOSED

Date

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	Previous MCO comments submitted by NDE. No resolution has been given to previous comments.		Meeting to be held to address appropriate NDE comments.	
2	All boundary welds require a volumetric examination of final weld. The changes made on drawing H-2-828042 Rev. A to the final closure weld (canister cover to canister collar weld) prevent this required inspection. Current design the shield plug and locking ring block access for radiography inspection of final closure weld. Ultrasonic examination could be accomplished if additional scanning area is added adjacent to final closure weld. The amount of additional material area required will depend on the final base material thickness.		The weld configuration shown on the prototypic drawings was not amenable to UT inspection. Accomodating the additional scanning area would require a complete redesign of the lifting ring and collar and may not, in the end, prove possible. DESH decision to take exception to the UT inspection and rely on liquid penetrant testing of root and final pass, per commerical practice of SNF canisters. Comment: A full penetration welded joint in categories A, B and part of C require both a volumetric and a surface examination. A partial penetration welded joint may require surface inspection a 50% and final. WHN	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO, Phase II, 60% Design Review	SNF-MCO/W-442 212H	ES Ruff	Mechanisms Engrg. (MCO Fabrication)	376-1943 H5-70 TCPC 431

17. Comment Submittal Approval:

Organization Manager (Optional) Date

10. Agreement with indicated comment disposition(s)

ES Ruff 01/14/97

Reviewer/Point of Contact Date

Author/Originator

11. CLOSED

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
1	Fab Spec. 3.1.A.: Define DE&S as Duke Engineering and Services. Flour should be spelled Fluor.		Will be corrected in final design.	
2	Fab Spec. 4.3: For the 90% design, be sure to include specific component drawing numbers, catalog pages, part numbers, etc...		Will be added in final version.	
3	Fab Spec. 6.1, para 2: Refer the reader to Table 9-1 for a summary of nuclear saftety related classifications for the components.		Will be addressed as appropriate in final version.	
4	Intentionally left blank (every comment form needs one of these...)		Left blank.	
5	Fab Spec. 7.2.1, Leak Test: The fab spec says that "The leak test shall include the mechanical seals." This would require compression of the mechanical seal, resulting (I believe) in some permanent deformation of the seal. If true (check with Stan Crow), this would adversely impact the ability of the mechanical seal to firmly seat when the shield plug is installed in the loadout pit.		Recommend using new mechanical seals for leak testing the first several MCOs. Later tests can use a hard elastomer seal.	

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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
6	Comment 5, cont.: I think the mechanical seal should be "fresh and unused" when first compressed in the loadout pit. An alternate means to inspect or test the shield plug sealing surface (without crushing the expensive mechanical seal) needs to be discussed/devised. Perhaps a leak rate correlation between a hard elastomer "factory test seal" and the actual mechanical seal could be developed for acceptance purposes.			
7	Fab Spec. 7.2.1: I believe the transportation group now says that the acceptable leak criteria can be relaxed to $1x10^{-4}$ std. cm^3/sec.		The correct criteria need to be addressed in the Performance Specification.	
8	Fab Spec. 7.3.5: I think it unecessary to weigh each MCO and shield plug. (See if DESH would be willing to waive this requirement.) In lieu of weighing all MCO's, perhaps only the first articles of production could be weighed - to serve as a check on design calculations. Follow-on production of MCO components to dimensioned tolerances would ensure acceptable weight uniformity.		Weights may become critical at the load-out pit considering the combined cask/MCO weight and the crane limits. Until requirements can be finalized with Operations, prefer to leave the weighing in the spec.	
9	Fab Spec. 7.3: General Comment - Give a name or title to each test - i.e. "Shield Plug Fitup Test", or "Outside Diameter Test", etc, etc...		Will be addressed in final version.	

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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
10	Fab Spec. 7.5: Calibration of basket gages before and after each test is excessive. Have the gages measured and certified, and leave it at that. Stipulate that basket gages need to be re-checked only if they are dropped, bent, or otherwise damaged during the course of testing/handling. Same philosophy holds true for pressure gages used in pressure testing. As long as the gage is in "current calibration" - generally good for 1 year, there is no need to recalibrate before and after each test.		Will be addressed in final version depending of project's acceptable level of risk. Possible consideration would be a periodic dimensional check.	
11	Fab Spec 8.0.Part Tagging: Section A. Rather than use the DOE-XXX-YYY MCO designation, just stipulate they use the Purchase Order Number (maybe this is what you meant ?). Section B: Include Vendor or Fabricator Name. Section c: Include Drawing Revision Number.		Part tagging will be revised in the final version depending of project requirements.	
12	Fab Spec. 9.2.6, Should the last sentence be revised to read: " The proposed Nonconformance disposition shall include a technical justification provided by the Seller" ?		Will be addressed in final version.	
13	Fab Spec. 9.3.1: Should this be revised to read " A signature by the person who is responsible for the Seller's quality assurance function" ?		"A certificate signed by ..." may clarify.	

REVIEW COMMENT RECORD (RCR)

1. Date	2. Rev. ...
9/16/96	ES RUFF
3. Project No.	4. Page
W-442, SNF MCO	4 of 5

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
14	Fab Spec. 11.1.1: Add the requirement: "The Seller shall also submit one complete set of full-sized reproducible mylars of the final approved shop drawings. If, at a later date, approved revisions are made to the shop drawings, the Seller shall also submit full-sized reproducible mylars of any subsequently approved revisions."		Will be added in the final version.	
15	Fab Spec. 11.3: Whenever signatures are called for, stipulate: "signature and legibly typed or printed full name of the authorized representative..." This is intended to preclude the old "illegible-signature-we-don't-know-who-signed-off-on-it" dodge.		Will be added in the final version.	
16	Fab Spec. Table 11-2: Consider eliminating the requirement for Item 10, Weight Certificates.		See response to #8.	
17	General Comment: The spec is cogent, logical, and cohesive. My Kudos to the author for a good work-in-progress...		Thanks.	
18	Drawing H-2-828060, Sheet 3, Zone F-3: If possible (if stress analysis allows) make the trapezoidal bar flat on all sides. This would save some cost. The outer side currently illustrated will require either custom extrusion or a lot of radius milling to manufacture.		The final design for fabricability is being reviewed.	

REVIEW COMMENT RECORD (RCR)

1. Date	2. Revie
9/16/96	ES RUFF
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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
19	General Comment on Mark IA basket design: I realize that the current basket design is being driven by g-loads calculated for drop scenarios. However, those phenomenal loads have resulted in the following undesireable operating features: 1. Need for angular orientation/indexing of baskets when installing. 2. Need for sheet metal "egg crates" which may snag fuel as it is being loaded. 3. Need for trapezoidal support posts. 4. Need for "lock and key" insertion fitup of basket vertical support posts.		Comment acknowledged. The g loads have been reduced by: a. Referencing drop accelerations documented in the SARP, and b. Adding water to the cask at the CSB as the MCO is removed to "cushion" the drop.	
20	Item 19 continued: To ease the risks of operating complexity during fuel/basket loading, I'd like to suggest we try to elucidate/negotiate some reasonable hypotheses that allow us to obviate the need for 1-4 above. The engineering-imposed requirements that the Mark IA baskets have to be "bullet-proof" are causing potential headaches for operators, and would probably increase radiation dose for the fuel removal campaign.		Anticipating that some of the undesirable operating features can be deleted due to the reduction in g loads.	

REVIEW COMMENT RECORD (RCR)

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12/13/96	
3. Project No.	4. Page
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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO Phase 2 60% Design Review		J. J. Irwin	SNFP/CVDF	MO285/B109/372-3743

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

1-14-97 Jon J. Irwin

Date Reviewer/Point of Contact

Author/Originator

11. CLOSED

1-14-97 Jon J. Irwin

Date 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.	H-2-828041 Sht. 1; Recommend that the SK-2 dwgs. list in the parts list be change to appropriate H-2 drawing numbers.		Drawing reference will be corrected.	OK
2.	H-2-828041 Sht. 2; 1) Add a note that defines the Function of Port 1, 2, 3 and 4, ie. Vent Port, Rupture Disk Port, Dip Tube Port and Short Draw Tube Port, 2 An Index Mark needs to be added to the top of the MCO Assembly to assist in the proper orientation of the MCO within the Cask for hookup at the CVDF, and HCS station.		Functional requirements are normally not part of fabrication drawings. The Topical identifies the function of the ports by number. Orientation marking will be added.	OK
3.	H-2-828042 Sht. 1; Recommend that a note be added that the Canister Cover (part 6) is to be installed only after HCS utilizing a field weld.		Note will be added. Canister cover supplied as separate item for field assembly. Operational procedures to determine time of installation.	OK

REVIEW COMMENT RECORD (RCR)

1. Date	2. Revie
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	2 of 2

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
4.	H-2-828042 Sht. 3 and H-2-828045 Sht. 1;; Recommend that a detail be added that defines the machining requirement for the Helicoflex sealing surface. Follow the Helicoflex recommendations, eg., 32-64 finish with spiral pattern (not crisscross).		Machining detail will be added.	OK
5.	H-2-828043 Sht. 1; The 2.5 inch dimension for the drain pocket appears to conflict with the 2.875 dimension for the Dip Tube Guide detailed on H-2-828055		Will be corrected appropriately.	OK
6.	H-2-828045 Sht. 1; add "except as noted" to drawing note 3, if comment 4 is accepted.		Will be added as appropriate.	OK
7.	H-2-828050 Sht. 1; Per H-2-828045, all shield Plug flanges are 5-1/2", therefore the 4" and 5" caps may not be needed. A-36 carbon steel has been specified for the covers, recommend that 304 L be used.		Will be included in the final design drawings.	OK
8.	H-2-828053 Sht. 1; Shoulder is missing from the extension part as shown on the main assembly drawing ref. H-2-828041, sht.2.		Correction will be made.	OK

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Loca
MCO Phase 2 60% design review package	SNF Storage Projects, MO-285	L H Goldmann	DESH, SNF Storage Projects	373-63

17. Comment Submittal Approval:

_____

Organization Manager (Optional)
Reviewer/Point of Contact

_____

Author/Originator

10. Agreement with indicated comment disposition(s)

_____

Reviewer/Point of Contact

_____

Date

_____

Author/Originator

11. CLOSED

L H Goldmann
1/14/96

_____

Date

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.)
1	on many of the drawings need material call outs Drawings, 041 sheet 2, shorten the cover cap to the gretest extent practicable. Also, leave at least 1/2 inch of clearance between the appliance in the port and the cover plate to allow for possible deformation of the cover if it were hit by a drop of the cask lift fixture.		Will be addressed on final drawings OK Cover cap is shortened as far as possible to meet code criteria OK Will be considered in the final design OK

2	042, sheet 1. On finish tightening of the jack bolts we would like to be able to have the height of the locking & lifting ring and the top of the shield plug come out flush. Also, discussion in the meeting on wall thickness from 3/8 to 1/2 indicated that the 2 start thread of the ring may change to increase the remaining wall at the major diameter. If the wall gets too thick then the OD of the MCO and/or the ID of the threads in the collar will exceed current ranges for assembly or size envelop. Let us know how it works out.		The height of the shield plug needs to exten beyond (min 1/4") that of the locking ring t ensure drop loads are transmitted through bo shield plug The wall thickness issue will be addressed u final lifting criteria and loading determination.
3	045, sheet 1. It is desirabel to build the comprsssion limiter for the Helicoflex seal into the shield plug. Can the short verticle passages through the shield plug be drilled at an angle so they do not "SEE" pent fuel, hence reduce the dose out through the bore.		Compression limiter for the Helicoflex seal in the shield plug. Angled holes will be examined however initial investigation showe they increased the dose.
4	050, sheet 1. The 1/2 square drive seems small from a torque carrying stanpoint for a 5 " cover. Perhaps it should be bigger. Also, make the cover plates thicker, 1 -1/4 to 1 1-2 inch thick would be better from a structural view. This may not be possible however.		The cover plates are being redesigned to accomodate the bolted flanges.
5	052, sheet 1. The internal filters exit manifolding should be 1 inch inside diameter to minimize the possibility of water holdup and traps inside the piping.		The exit manifolds were decreased to the siz shown to minimize water holdup, yet provide minimum restriction in air flow based on fil size.
6	053 sheet 1. The part's section does not match drawing sheet 042 sheet 2. Als neet the cut out to match the basket index ramp located externally around the gripper area.		Will be addressed on final design.
7	065, sheet 2 and 3, likely want to delete the design for threaded adapter.		Will be deleted.

8	This warhouse plan is a good beginning, but now has to be actively worked by Parsons in the next 2 to 3 months and supported by people like Alvin Keck, Sherri Brisbin, Ed Ruff and others so an integrated plan is produced that ties in the components from the fabrication and shipping through to handling and usage poolside at the basins for the fuel removal campaigns. The workscope has more discussion of the activity. A lot of details have to be developed.		Will be worked in conjunction with DESH. DK
9	Fabrication specification, good start--I have input but not available right now. The SRS fabrication specification for their containers has a lot of infromation we can use. Things like, shop treatment, cleanliness, organic liquids use and guidelines, chlorides, labeling, etc. will be useful. We can discuss offline.		Input will be considered. DK

REVIEW COMMENT RECORD (RCR)

1. Date	2. Rev
12/12/96	MCO60%.RCR
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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Phase 2 MCO Design - 60% Design	SNF/MCO	WC Alaconis/ JD Mathews	Facility/System Startup	MO-285/376-9390

17. Comment Submittal Approval:

Organization Manager (Optional) — Date

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact — Author/Originator

11. CLOSED

1/15/97 — Date

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	H-2-828060, Sheet 2; This design concept of two independent sheet metal plates (items #12 & 13) is not acceptable. It will be extremely difficult to thread the fuel element and pieces of fuel elements through the holes in the bottom of the basket using a single manipulator. The original concept of a socket in the bottom of the basket was better. If sheet metal plates as shown continue to be use then connecting tubing or guides are required.	Y	Alternate Mark IA basket designs are being discussed with DESH. Anticipated solution is using an cast aluminum insert that rests on steel basket baseplate. The insert will be about 2.5" deep and look just like the Mark IV baseplate from a loading perspective. More details to follow. Agree that the 60% design is not acceptable and will not be pursued.	
2	H-2-828041, Sheet 2; A identification label plate consisting of 6 alpha/numeric characters is required on top of the shield plug for accountability tracking.	Y	Identification label will be added on final design.	
3	Fab. Spec., 6.3.4; Add a statement that the fit-up of MCO Plugs and MCO Shells should allow the components to be interchangeable.		Statement will be added.	
4	Fab. Spec., 7.2.1; The helium leak test should be called out as section 7.4.2.		Will be corrected as appropriate.	

REVIEW COMMENT RECORD (RCR)	1. Date 12/12/96	2. MCO60%.RCR
	3. Project No. W-442	4. Page 2 of 1

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
5	Fab. Spec., 9.3.1; Clarify what the "Certificate of Compliance" means with regard to the MCO assembly. Is each MCO (plug, shell, dip tube, etc) considered a matched set or are the parts considered to be separate parts. Operations does not want to deal with matched sets of parts. This would make warehousing and traceability of components more difficult.		Certificates of compliance is in regards to the drawings and specification. Current thinking is that the locking ring would be shipped threaded into the shell and remain with the shell until just prior to insertion in the basin. The shield plugs and accessories would be interchangable.	
6	H-2-828042, Sheet 4; A identification label plate consisting of 6 alpha/numeric characters is required on top of the canister cover for accountability tracking.	Y	Label plate requirements will be added on the final design drawings.	

REVIEW COMMENT RECORD (RCR)	1. Date 12/10/96	2. Review No.
	3. Project No. W-442	4. Page 1 of 3

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Fabrication Specification for Multi-Canister Overpack, and associated Dwgs.	MCO Sub-project	E. J. Shen, J. M. Henderson	DESH / FRS TRI / FRS	MO285/A117B/200E MO285/A151/200E

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

1/15/97
Date

Reviewer/Point of Contact

Author/Originator

11. CLOSED

1/15/97
Date

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

REVIEW COMMENT RECORD (RCR)	1. Date 12/10/96	2. Review No.
	3. Project No. W-442	4. Page 2 of 3

1	Dwg H-2-828060, K Basin SNF Storage Basket Mock-up Mark 1A : The MCO basket fuel positioning design approach is in conflict with IC Sheets 88/125 and 89/127. The design changes to the Mark 1A baskets to a two-layer, 14 gage fuel element positioning plate system, and a 12 gage air baffle-bottom fuel support plate may pose serious problems for fuel element loading using the FRS manipulator system. The FRS manipulators do not include force feed-back. The operators must place the fuel elements into the basket sockets via line-of-sight provided from video cameras. The difficult job of successfully locating one socket is more than doubled to locate two sockets for each element placement. Fuel element lowering through both layers of the positioning plate system will require precise vertical alignment; something difficult to perform manually with direct, hands-on action. Request a solid fuel positioning plate, or a thin-walled tube between the two separate plates. (Continued on next page)	H	Design alternatives are being investigated. Anticipate using a cast aluminum insert that looks just like the Mark IV baseplate from a loading standpoint.	
1	(continuation from page 1) The manipulator system is capable of applying over 1000 pounds of force in the vertical axis. This force would most certainly damage the two fuel positioning plates in a misalignment, and the 12 gage air baffle / fuel support plate at the bottom of the basket if an operator tried to force a fuel element into the basket.			
2	Discussions were held during the design review meeting on basket alignment relative to the cask / Basin by using a locating pin on the basket grapple. The hoist used to lower empty baskets into the Basin pool will not include a stiff back. The FRS process table and MCO basket storage queue do not include any alignment mechanisms. The first opportunity to align the basket relative to the cask would be at the MCO basket shuttle at the South Load-out Tunnel.		Design improvements since the 60% package have eliminated the need for basket alignment in the MCO.	

REVIEW COMMENT RECORD (RCR)	1. Date 12/10/96	2. Review No.
	3. Project No. W-442	4. Page 3 of 3

3	Dwg H-2-828060, K Basin SNF Storage Basket Mock-up Mark 1A, Dwg H-2-828070, K Basin SNF Storage Basket Mock-up Mark IV Dwg H-2-828075, K Basin SNF Storage Scrap Basket Mock-up Mark IV : The lifting grove on the center posts for these baskets is not detailed in these drawings. The lifting grove must be compatible with the MCO grapple currently under development.	H	Groove details will be added in the final drawings.	
4	Dwg H-2-828070, K Basin SNF Storage Basket Mock-up Mark IV : The fuel element support system appears to be consistent with the requirements of IC sheets 88/125 and 89/127 for critical fuel loading features and dimensions. Request that no changes be made to these features.		Based on analyses to date; no changes are anticipated.	
5	Dwg H-2-828065, K-Basin SNF Storage Scrap Basket Mock-up Mark 1A The center pipe does not include a lifting grove for the grapple. Assume that this will be added during next design cycle. The lifting grove must be compatible with the grapple under development.	H	Groove detail will be added.	
6	Dwg H-2-828075, K Basin SNF Storage Scrap Basket Mock-up Mark IV, Detail 2: The 0.5" wide tabs on the sides of the scrap baskets make the overall diameter a nominal 23.5". These tabs will interfere with placement of the baskets into the MCO (reference H-2-828044), with a nominal ID of 23".		These tabs are flexible and will compress during insertion into the MCO. The purpose of the tabs is to restrict gas flow from going around the basket instead of thru the baseplate and into the elements.	
7	Can the basket ID # be placed on a surface that would allow viewing from above after fuel / scrap loading? (Reference H-2-828060, H-2-828065, H-2-828070, and H-2-828075) The basket ID # as shown is consistent with the IC Sheet agreements; this is a requested change to facilitate basket identification from FRS video cameras while basket is located in process table and basket queue.		There is currently limited horizontal surface facing upward. We cannot identify a space large enough for labeling. Any suggestions?	
8	Dwg H-2-828065, K Basin SNF Storage Scrap Basket Mock-up Mark 1A, part #7: This item may interfere with scrap loading. Is the item needed for basket strength? Can it be removed? This feature is consistent with IC Sheet agreements; this is a request to facilitate scrap loading.		Per discussion with FR design authority, this item provides for keeping long scrap elements in a vertical orientation while loading scrap into sector. Need to leave in.	

REVIEW COMMENT RECORD (RCR)	1. Date 12/10/96	2. Review No.
	3. Project No. W-442	4. Page 4 of 3

9	Fabrication Specification, Section 6.1, General Requirements, page 6 : The application of 10CFR21 requirements to a procurement under a DOE program appears to be in conflict with the purpose of the regulation. Notification of problems or non-conformance to the NRC would seem to be of little value. Suggest requiring compliance with 10CFR820.		Agree. Discussions are being held with the QA people to resolve. Past practice was to leave requirement in, but have them report to DESH, rather than the NRC.	
10	Fabrication Specification, Section 9.0, Quality Assurance Requirements : The application of 10CFR71 quality assurance requirements should be in addition to the requirements of 10CFR830.120, in accordance with WHC-SD-SNF-QAPP-004.		Per DESH QA, we have not routinely passed the requirements of 830.120 on to our suppliers. We "DESH" have the responsibility to ensure that the appropriate requirements are met.	

This document was too large to scan as a single document. It has been divided into smaller sections.

Section
2 of 2

Document Information			
Document #	**SNF-5222**	**Revision**	**0**
Title	SNF MCO DESIGN REVIEW COMPLETION REPORT		
Date	**11/30/1999**		
Originator	**GOLDMANN LH**	**Originator Co.**	**FDH**
Recipient		**Recipient Co.**	
References	**EDT-628351**		
Keywords	**REVIEW COMMENT RECORDS, DESIGN VERIFICATION, CANISTER, FUEL BASKETS**		
Projects	**SNF, W-442**		
Other Information			

APPENDIX D
Phase II
MCO 90% Design

CORRESPONDENCE DISTRIBUTION COVERSHEET

Author	Addressee	Correspondence No.
K. E. Smith, 376-0273	J. L. Wise, FDNW	DESH-9751616

Subject: PROJECT W-442, LETTER OF INSTRUCTION #3, INDEPENDENT DESIGN REVIEW OF PHASE 2 DESIGN FOR THE MULTI-CANISTER OVERPACK

DISTRIBUTION

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		Correspondence Control	A3-01	
		DE&S Hanford, Inc.		
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		L. H. Goldmann	R3-86	
		D. M. Chenault	R3-86	
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		L. F. Meyer	R3-86	
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		K. E. Smith	R3-86	
		SNF Project File	R3-11	
		KES File/LB	R3-86	
		Fluor Daniel Northwest, Inc.		
		C. J. Moore	H5-57	
		H. P. Shrivastava	B4-40	

A-6001-538 (01/95) WEF008

DE&S Hanford, Inc.
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P.O. Box 350
Richland, WA 99352

February 26, 1997 DESH-9751616

Mr. J. L. Wise, Project Manager
Spent Nuclear Fuel Project
Fluor Daniel Northwest, Inc.
P. O. Box 1050 MSIN: X3-85
Richland, WA 99352

Dear Mr. Wise:

PROJECT W-442, LETTER OF INSTRUCTION #3, INDEPENDENT DESIGN REVIEW OF PHASE 2 DESIGN FOR THE MULTI-CANISTER OVERPACK

INTRODUCTION

This Letter of Instruction (LOI) provides authorization and funding to complete an independent design review of the Multi-Canister Overpack (MCO) Phase 2 90% design media. The independent design review will be performed by a three-member team consisting of H. P. (Harry) Shrivastava and C. J. (Carleton) Moore of Fluor Daniel Northwest (FDNW), and L. D. (Larry) Blackburn (retired ICF Kaiser Hanford Company). This LOI provides direction and funding for the FDNW participation in the review.

SCOPE

Perform a review of the structural analyses, calculations, and material selections completed by Parsons Infrastructure and Technology Group, Inc. for the Multi-Canister Overpack (MCO). The review shall address adequacy of assumptions, methods of calculations, compliance with American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code as noted in the MCO Performance Specification (HNF-S-0426, Revision 3) and compliance with the MCO Performance Specification requirements.

SCHEDULE

The design media will be distributed on March 6, 1997. A design presentation meeting will be held on March 10, 1997, at the Parsons office. All comments shall be submitted by close of business March 14, 1997. Comment disposition and close-out will occur the week of March 24, 1997.

COST

Work Order # E23596 will be issued in the amount of $12,000 to fund this review.

DELIVERABLES

Review Comment Record (RCR) forms shall be submitted electronically to Mr. L. H. Goldmann, Design Authority by the close of business March 14, 1997. After review comments are dispositioned and resolved, signed RCRs shall be evidence that the comments were closed to the satisfaction of the reviewer.

A listing of the experience and qualifications of the reviewers shall also be submitted with the comments.

If you have any questions or require additional information, please contact me on 376-0273.

Very truly yours,

K E Smith

K. E. Smith, Manager
Multi-Canister Subproject Manager
Spent Nuclear Fuel Project

ec

DE&S HANFORD

Internal Memo

From: MCO Subproject
Phone: 376-0273
Date: February 13, 1998
Subject: MCO Phase 2 Design Review Documentation

To: SNF Project File R3-11

cc: L.H. Goldmann R3-86
C.R. Hoover H1-15
R.W. Rasmussen R3-86
D.M. Chenault R3-86
KES File/LB

An independent design review of the 90% Multi-Canister Overpack Phase 2 Design was initiated on March 6, 1997. The reviewers included design authorities from interfacing SNF sub-projects, operations personnel, nuclear safety, quality assurance, structural and fabrication engineers, welding engineer, and a three-member Independent Design Review team comprised of personnel not associated with the SNF Project. This team consisted of two qualified structural engineers and a materials engineer, all with ASME code experience. A listing of the reviewers and the documentation provided for review is attached.

Comments received via RCR were dispositioned jointly by the Design Agent and the MCO project. Reviewers returned the dispositioned RCRs with signature indicating acceptance of the dispositions. Several of the comment dispositions committed the MCO project to carry out further work. A comment resolution table was created to document the resolution plans (see attached table).

Some additional analyses were performed by the Design Agent during and after the 90% design review. These analyses were issued with the 100% Design Report. Mr. Harry Shrivastava, a member of the outside Independent Design Review team, performed a review of the 100% Design Report. His comments are documented in an RCR, and acceptance of all but one comment disposition was given in Mr. Shrivastava's cc:mail message dated 8/26/97. This is the only remaining comment requiring resolution, as shown in the comment resolution table.

A review of the RCRs has shown that several signatures are not properly documented (i.e., signatures not dated, signatures not in the proper location, author/originator signatures absent, etc.). The MCO project is currently taking steps to obtain the proper signatures to demonstrate compliance with site procedures.

K. E. Smith, K E Smith
MCO Project Manager

Multi-Canister Overpack Phase 2 90% Design Review
Reviewer Summary

Reviewer	Design Report	Warehouse Plan	Shielding Evaluation	Exception Report	Fabrication Spec.	Drawings	Structural. Calcs.
L. H. Goldmann (2)	X	X	X	X	X	X	X
E. S. Ruff	X	X			X	X	
R. G. Cowan	X		X		X	X	
D. M. Chenault	X			X	X	X	X
J. J. Irwin	X		X			X	
C. R. Miska	X		X			X	
G. D. Bazinet	X		X			X	
C. E. Swenson	X					X	
D. W. McNally	X	X	X	X	X	X	X
J. I. Diehl	X	X	X	X	X	X	X
W. C. Aleconis (3)	X	X	X			X	
R. W. Rasmussen	X	X		X	X	X	
J. S. Lan	X		X			X	
K. E. Smith (3)	X	X	X	X	X	X	X
C. B. Loftis (2)	X	X	X	X	X	X	X
A. T. Kee	X		X			X	
E. J. Shen	X					X	
S. R. Crow	X	X			X	X	
W. H. Nelson	X				X	X	
T. A. Delucchi	X				X	X	
Independent Review Team (3)	X		X	X	X	X	X
A. H. Keck		X					
C. S. Haller	X	X	X			X	

MCO PHASE 2 DESIGN REVIEW

COMMENTS REQUIRING RESOLUTION

Reviewer	Com #	Issue	Resolution Plan
R.G. Cowan	2	Dose rate without locking ring in place may be excessive.	Jay Lan will perform dose calculations w/o the ring installed. Dose rates will be reviewed by Operations for acceptability. Update: HNF-SD-SNF-CN-026, "MCO Shield Plug Dose Rate Analysis" issued 10/6/97 demonstrates acceptable dose rates for operations around the MCO/cask. THIS COMMENT IS CLOSED.
R.G. Cowan	6	Guard plate welds are oversized (5/16")	This was left to the Design Authority for resolution. He prefers to keep weld size at 5/16" per AISC guidance. THIS COMMENT IS CLOSED.
G.R. Wagenblast	7	Mark IA outer support rod structural calcs. have non-conservative assumptions.	Per recommendation by the reviewer, the outer rod material was upgraded to 304N in the 100% design package to provide higher strength. THIS COMMENT IS CLOSED.
C.R. Miska	15	Galling of process valves	Based on additional input from Numatec, the process valve material was changed to Nitronic 60, a stainless steel alloy specifically made to address galling potential. THIS COMMENT IS CLOSED.
C.R. Miska	17	316SS rupture disk material may not be adequate for long term storage	With the change in the MCO sealing strategy, the rupture disk is not active after Cold Vacuum drying. However, the material was changed from 316SS to Inconel 600 based on fabrication advantages. THIS COMMENT IS CLOSED.
J.S. Lan	6	For shielding analysis, flux to dose conversion factors not apparent.	Jay Lan to perform separate shielding analysis to verify Design Agent's results. Update: HNF-SD-SNF-CN-026, "MCO Shield Plug Dose Rate Analysis" issued 10/6/97 demonstrates that the dose rate at the top of the shield plug meets the MCO Performance Specification requirements. THIS COMMENT IS CLOSED.
C.B. Loftis	7	Structural calc. using 304 strength properties for 304L shell material not good practice.	Calculation will be revised to show stress ratio with 304L strength properties, followed with a statement indicating the margin can be increased by requiring 304 strength properties for 304L shell material. Update: ECN 645028 issued 9/30/97 revises the calculation mentioned above (Appendix 11 to the Design Report). THIS COMMENT IS CLOSED.
W.C. Alaconis	14	Scrap basket dividing fins should be sloped to permit redistribution of scrap from one segment to another	This issue will be covered with the scrap basket redesign activitiy. Input from the FRS subproject is required. Update: Revised scrap basket design was completed and issued 9/30/97 (ECN 645027). THIS COMMENT IS CLOSED.

9/8/98

J.I. Diehl	1,3,6	Final closure weld inspection, relief valve set pressure, and leak testing not finalized	These items will be documented in the Topical Report as they are finalized. Update: Baseline changes to reflect the sealed MCO include: 1) the final cover cap to collar weld will be examined ultrasonically and with liquid penetrant; 2) the pressure relief valve was deleted; and 3) MCO mechanical closure will be helium leak tested at the CVD after drying operations, and the closure weld will be leak tested after completion, prior to moving the MCO to the CSB storage tubes for interim storage. THIS COMMENT IS CLOSED.
H.P. Shrivastava		Heat rate of 100 deg. C/hr not included in analyses	Lou- we need to work this with Doug to closure Please note attached for closure

LWG 9/8/98

September 8, 1998 file snf\comres.hs

Response to Harry Shrivastava comment that the maximum allowable 100 C degrees per hour temperature change of the MCO has not been completely addressed for the MCO.

There has been much discussion on the subject with Harry and now Harry has left the site. This maximum heating and cooling rate design allowable requirement was a directed constraint specifically applicable toward the hot conditioning system (HCS). The HCS process for the MCO has since been deleted from the SNF project. With the deletion of the HCS and as no other system will subject the MCO to a forced heat transfer rate comparable to the HCS, the maximum heat up and cool down rate allowable has been deleted from the MCO performance specification.

The original comments by Harry are now considered moot and not pertinent to the MCO.

Submitted by

9/8/98

Louis Goldmann, MCO Design Authority Date

Concurred by

9-8-98

Doug Chenault Date
Cask/Transportation Design Authority & SNF Structural Coordinator

9/8/98

Kimball Smith Date
MCO Project Implementation Manager

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	MCO Subproject	Date 03/06/97
Project Title/Work Order		EDT No. N/A
MCO Phase 2 90% Design Review		ECN No. N/A

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
W. C. Alaconis	R3-85	X			
G. D. Bazinet	B4-55	X			
D. M. Chenault	R3-86	X			
R. G. Cowan	R3-86	X			
S. R. Crow	H1-15	X			
T. A. Delucchi	L6-38	X			
J. I. Diehl	X3-80	X			
L. H. Goldmann	R3-86	X			
C. S. Haller	X3-74	X			
J. J. Irwin	R3-86	X			
A. H. Keck	X3-74	X			
A. T. Kee	R3-86	X			
J. S. Lan	H0-35	X			
C. B. Loftis	S7-41	X			
D. W. McNally	G1-12	X			
C. R. Miska	R3-86	X			
W. H. Nelson	L6-36	X			
R. W. Rasmussen	R3-86	X			
E. W. Ruff	H5-70	X			
E. J. Shen	R3-86	X			
K. E. Smith	R3-86	X			
C. E. Swenson	S8-07	X			
Independent Review Team	R3-86	X			
SNF Project File	R3-11	X			
MCO Project File	R3-86	X			

PARSONS INFRASTRUCTURE & TECHNOLOGY GROU
1955 Jadwin Avenue • Richland, Washington 99352 • (509) 946-0415 • Fax: (509) 946-8811

MCO-8-2797

September 22, 1997

xc: L. Goldmann
E. Ruff
SNF File

Peter Braun
Fluor Daniel Hanford, Inc.
2355 Stevens, MSIN G1-25
Richland, WA 99352

Subject: Task Order KH-8009-8; Phase 2 MCO Design Dispositions to 90% Comments and Action Items List, Rev. 11

Dear Mr. Braun:

On March 5, 1997, Parsons submitted the 90% Design Package for review and comment. Attached is a final copy of Parsons response to each comment to that design transmittal. It has been verified that the comment resolutions indicated on the RCR forms have been incorporated into the design documentation. In cases where the resolution was not incorporated into the design documentation, the comment was added to the project Action Items List.

Attached is the Action Items List, Rev. 11, which has been updated as a result of the review of the 90% comments against the Final Design Package.

If you have any questions, please call me at 946-0415.

Sincerely,

for Neil A. Norman, P.E.
Hanford Operations Manager

RB/dms

Attachment

cc w/attach: K. Smith
L. Goldmann
E. Ruff
R. Bastar
C. Temus
File: KH-8009-8; 3.2.4.1, 3.1.6

PARSONS

REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
03/14/97	MCO 90%
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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO DESIGN REPORT, Revision A, March 1997	W-442	G. R. Wagenblast	FDNW, Civil Structural Eng	SO-04 376-5736

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

4-22-97
Date

Gary R Wagenblast
Reviewer/Point of Contact

John W Eldman 9/8/98
Author/Originator

11. CLOSED - #7 open

4-22-97
Date

Gary R Wagenblast
Reviewer/Point of Contact

John W Eldman 9/8/98
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	Drawing H-2-828043; Material list calls out 24", schedule 80S, stainless pipe with an alternate in note 6 to fabricate from ½" plate. Schedule 80S seamless stainless pipe is available only in sizes up to 12" diameter. The MCO shell will have to be fabricated from welded rolled plate as allowed by notes 6, 7, and 8.		The material list allows seamless, this does not limit manufacturing to seamless. Both Ryerson & Wisconsin Centrifugal make seamless pipe in this size.	C
2	1. Provide documentation showing verification and validation of computer programs (ANSYS) in accordance with DOE quality requirements. 2. Provide ANSYS input files in the calculation report such that computer runs may be duplicated.		Will be provided at 100% deliverables.	C
3	Shield Plug: 1. Drawing H-2-828045, sheet 1, shield plug section specifies OD = 23.950 +/- 0.005. Section B-B specifies OD = 23.980 +/- 0.003. Which is it?		The correct diameter of the shield plug is 23.980 +/- 0.003.	C

REVIEW COMMENT RECORD (RCR)

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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
4 v	Groove for main seal: 1. Manufacturers data sheet included in Fabrication Spec WHC-S-0453, Appendix A, page 3, and in Design Report, Appendix 13, page 3, specifies groove depth to be = 0.155" -0.004"/+0. Drawing H-2-828045, sheet 1, section B-B, specifies groove depth = 0.155" +/-0.005". Why the deviation from the manufacturers recommendation?		Accepted. The tolerance of the groove depth has been changed to read - 0.004/+0.	C
	2. Manufacturers data sheet included in Fabrication Spec WHC-S-0453, Appendix A, page 3, and in Design Report, Appendix 13, page 3, specifies seal OD to be = 23.420" +/-0.005", and seal groove OD to be = 23.440" (no tolerance was specified). Drawing H-2-828045, sheet 1, section B-B, specifies shield plug OD = 23.980" +/-0.003" with the OD of the seal groove inset 0.270" +/-0.010". There could be an interference fit with the seal OD = 23.425" and the groove OD = 23.980 - 0.003 - 2(0.270 + 0.010) = 23.417", an interference of 0.008". Drawing H-2-828045, sheet 1, shield plug section, specifies shield plug OD = 23.950" +/-0.005" with the OD of the seal groove inset 0.270" +/-0.010". There could be an interference fit with the seal OD = 23.425" and the groove OD = 23.950 - 0.005 - 2(0.270 + 0.010) = 23.385", an interference of 0.40". Recommend revising dimensions and tolerances to eliminate interference fit of seal. The manufacturers data sheet, pages 15 and 22, recommends a minimum clearance of 0.8 mm.		Accepted. The seal groove detail has been redimensioned to minimize tolerance impact and seal interference.	

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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
5 ↘	Main Seal. The manufacturers data sheet, page 14, requires "Never untighten and retighten to previous torque or lower, since sealing cannot be guaranteed." As the compression of the seal is limited by the depth of the seal groove, verify with the manufacturer that reuse of the seal is allowed given that the compression of the seal is always equal to or lower than the original seal compression. Verify with the manufacturer the number of times the seal may be reused.		We are not intending to reuse the main seal. Seals used in testing the first few MCO's at the fabricators shop will be discarded. Once the fabrication process is proved out, elastomeric seals will be used for shop testing. Should a seal problem be discovered after fuel loading and installation of the locking ring, the old seal will be removed and a new seal put in place.	C
6 ↘	MCO Design Report, Appendix 6. Section 8.1, the lifting load should consider the stress in the collar at the base of the threads. OD = 25.27, th = 0.349, A = 27.3, stress = 878 psi. Section 8.2, the OD of the ring at the base of the threads is 25.27. The pressure stress is then 5356 psi. Section 8.3, the sum of the lifting plus pressure stress is thus 878 + 5356/2 = 3556 psi.		See Calculation KH-8009-8-04, Appendix 6. Comments are addressed in the calculation.	C

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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
V 7 Open	MCO Design Report, Appendix 7. 1. The vertical load capacity of the Mark 1A basket is listed as the capacity of the center pipe (section 8.1) plus the capacity of the six outer support rods (section 8.2) with the center pipe capacity of 55.9% of the demand and the outer rod capacity of 48.5% of the demand. Section 8.5 lists the load distribution as 42% to the center pipe and 58% to the outer rods. Section 8.5 states, "the six-rod capacity is insufficient to carry the bottom basket 35g loading." Please explain how the outer rods, having a capacity of 48.5% of the demand, are concluded to be adequate for 58% of the demand. 2. The capacity of the rods to withstand vertical impact loads is sensitive to bending stresses due to eccentricity of loading. According to NF-3324.1(b), axially stressed members not loaded at the center of gravity shall be designed for bending stress due to eccentricity. What provisions are made to ensure that vertical impact loads to the basket rods are through the neutral axis of the rods? A 4% margin on axial load capacity leaves little room for eccentric loading. 3. The use of friction to provide lateral restraint		1. As discussed in Section 8.5, the 42%/58% support rod/center pipe load distribution is for the "perfect fit" case. Section 8.5 demonstrates that if the support rod/center pipe height range is maintained with 0.030 in., load sharing will occur which will prevent a collapse as long as the combined capacity exceeds the drop loading. For a Level D event, Section III does permit a "plastic system analysis" (F-1340) which allows for significant load redistribution associated with plastic deformations. 2. Since load eccentricities are difficult to quantitize, the following justification is offered for ignoring load eccentricities: (1)The basket interface geometry results in significant "self-correcting" of load eccentricities. That is, the rotation of the top of the support rod, resulting from an eccentric load, will move the load center toward the high point of the support rod and reduce the eccentricity.	OPEN

See cover sheet for #7
46 9/8/98

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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
	to the top of the basket support rods during a drop accident load is not conservative. The rod effective length should be no less than the actual length (K=1) or even possibly K=2 for cantilevers.		(2)A 0.25-inch load eccentricity was considered in the Section 8.5 non-linear instability analysis and the resulting support rod capacity exceeded the calculated code capacity. (3)As mentioned in the last paragraph of Section 8.5, the 0.25-inch chamfer on the bottom plate (see Figure 2) biases the eccentricity towards the center of the basket, resulting in a preferential buckling direction toward the I.D. of the MCO shell. The MCO shell constraint results in a higher support rod capacity. (4)The non-linear/large deflection buckling analysis, discussed in Section 8.5, included a sensitivity study on the effect of friction on the buckling capacity of the support rods. A friction coefficient of 0.1 was found to be adequate to prevent lateral movement of the top of the rods. Accounting for lateral constraint at the top of the rods significantly increases the margin. (5)Paragraph F-1322.3© permits an adjustment of the stress-strain properties to account for strain rate effects.	

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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 increase in the yield strength for the drop accident load cases was conservatively ignored. This justification was added to Section 8.2 of Appendix 7. 3. As discussed in the last paragraph of Section 8.2, the support rod/center pipe combined capacity exceeds the loading by 4% without taking credit for friction. **Per discussion with the reviewer, this comment can be closed by making a change to the outer support bar material to higher strength material (35 ksi yield), or by completing additional analyses that increase the load to 150% and demonstrating that buckling does not occur.**	

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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
8	MCO Design Report, Appendix 8. 1. Table 1 should reference H-2-828070. 2. page 7, table should be marked Table 2. 3. reference to section 4.11 of the performance spec should be section 4.12. 4. page 12. Ip should be 2.35. Rp should be 0.815. Revise calcs on page 16. 5. page 16, bottom of page. What weld is this? The weld size is calculated to be 0.25 in required. The weld at the base of the center post, H-2-828070, is 1/8 inch. 6. page 17, bottom of page. In Ratio calc., where did 4005 come from? 7. Section 8.2 SUPPORT RODS. Assumes all 6 rods loaded equally. How do we ensure that the load is equally distributed? 8. Section 8.3 FUEL RETAINING BARS. I don't understand the formula given for the stress in the bar. The moment for a fixed/fixed uniformly loaded beam should be WxLxL/8. The stress would be 9821 psi which exceeds the allowable of 7013 psi. Bars do not meet N-14.6 requirements.		1-4. Accepted. Comment incorporated. 5. The 0.25 weld was a carryover from a previous design. Current Appendix 8 calculation correctly addresses the 1/8" bevel weld. 6. This was part of the 0.25-in. weld evaluation, which is no longer in the report. 7. Section 8.6 of the current revision of Appendix 8 addresses the case of three rods carrying the load and establishes appropriate fabrication tolerances to assure adequate load sharing. 8. The formula shown is for a simply supported beam with the fuel load concentrated at the center (M=WL/4). A fixed-fixed beam, with a concentrated center load gives a moment of WL/8. The worst case stress (s.s. beam) is the 6500 psi shown (3/8" bar is adequate). The text introducing the calculation has been corrected.	C

REVIEW COMMENT RECORD (RCR)	1. Date 03/14/97	2. Review No. MCO 90%
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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
9	MCO Design Report, Appendix 8. continued 9. Section 8.3 FUEL RETAINING BARS, page 23, weld calcs. The calculated weld size is .25 inch. The weld specified on H-2-828070, sheet 3, view G is 1/8 inch fillet. The weld length is 0.17 inch. According to NF 3324.5, the effective weld size is maximum 1/4 times the weld length, or 0.0425 inch. Weld stresses do not meet N-14.6 requirements. 10. Section 8.4, page 24, last paragraph. Support ring is 3/8 inch, not 1/4 inch. 11. Section 8.4, page 25. Design calc specifies welds to be restricted to heavier ligament sections centered at 30 degree intervals. Drawing H-2-828070, sheet 3, Section C-C, specifies 1/8 fillet all around. Why the difference?		9. Accepted. Appendix 8 has been modified to conform to the NF 3324.5 requirement (single weld on the side of the bar, rather than the bottom). 10. Accepted. Comment incorporated. 11. Accepted. Drawings will specify a 2-inch skip weld on 30° centers and limited to 0.43 inch or thicker ligaments.	C

REVIEW COMMENT RECORD (RCR)

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO Design Report, Revision A, March 1997.	SNF	L. D. Blackburn		

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

4-18-97
Date

L D Blackburn
Reviewer/Point of Contact

Author/Originator 9/8/98

11. CLOSED

Date

L D Blackburn 9/9/98
Reviewer/Point of Contact

Author/Originator 9/8/98

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
	TEXT COMMENTS			
1	Page 10, Section 2.8, sentence 5- change "8M" to "B8M" to be consistent with Drawing H-2-828042 sht 1. Explain why 316 SS (B8M) screws are used instead of 304 SS (B8) screws. Note that screws for process port flanges are 304 SS (B8), per H-2-828048 sht 1.		"8M" has been changed to "B8M". B8M screws were used because of higher strength at temperatures of question and also reduced galling potential.	
2	Page 10, Section 2.9. para. 2, sent. 3- The use of an aluminum alloy for the spacer plate is not supported by a chemical and thermal compatibility assessment as required by Performance Specification (Section 4.15), in either the text or the appendices.		An evaluation was performed by Cary Graves and was approved and released as HNF-SD-SNF-ER-018 titled "Evaluation of Cast Carbon Steel and Aluminum for Rack Insert in MCO Mark IA Fuel Basket". The report recommended ASTM B26 356.0-T6 sand cast aluminum alloy for the "eggcrate" rack for the fuel.	This report should be referenced in Design Report
3	Page 11, Section 2.9, last para.- Change "302 stainless steel" to "302 or 304 stainless steel" to be consistent with Drawing H-2-828060 sht 1.		Design Report has been changed.	
4	Page 13, Section 3.2, para. 2, sent. 3-- Add qualifier that there are exceptions to Subsection NB.		Clarification has been added to Design Report.	

Ref.?

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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
5	Page 36, Section 3.15, para. 2, sent. 2-- Explain why process plugs are made of 316L stainless steel (Drawing H-2-828047) rather than 304L stainless steel. See Comment 1. The spring pins are not really specified to an ASME material specification; the ASME/ANSI Specification 18.8.2 is not a true material specification.		The process plugs are made from 316L stainless to take advantage of its higher strength and reduce galling potential.	
6	Page 44, Section 3.19.4, next to last para., sent. 1--There is no indication in the drawings or Appendix 12 that the rupture disk must meet Subsection NB requirements.		Code requirements for rupture disk have been added to the drawing.	
7	Page 44, Section 3.19.4, last para., sent. 5-- Omit this sentence. Code requirements are either met or not.		Agree. However, since we are explaining to numerous audiences what "intent" of the codes means, we would prefer to leave this as is.	
8	Page 45, Section 3.20, last para., sent. 3--Add qualifying phrase of statement that there are exceptions to some Code requirements (i.e. "full compliance" is not actually achieved).		Clarification has been added to the Design Report.	
9	Page 46, Section 4.0 table, row 3, column 2-- Change "After sealed by weld or hot conditioning" to "When sealed by welding after hot conditioning"		Clarification has been added to the Design Report.	
10	Page 46, Section 4.0 table, row 3, last column-- Explain how inspection by liquid penetrant assures attaining a leak rate of one times ten to minus seven scc/sec.		The weld is inspected for integrity. It is not inspected as is all closure welds on NRC approved SNF storage canisters for leaktightness. Remove statement about leak rate of 1×10^{-7}	

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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
	APPENDIX 1 COMMENTS			
11	H-2-828043 sht 1, notes 6,7,8-- In note 6, change "ASTM A 240" to "ASME SA 240". SA 312 permits only welding by automatic process WITHOUT addition of filler metal, so the longitudinal seam weld made with filler metal addition permitted by note 7 would seem to represent an exception to SA 312 that is not included in the Exception Report, Appendix 18. Notes 7 and 8 need to be changed to include requirements for qualifying welds and welder/welding operators and to specify acceptance standards for radiographic examination. NB-2560 and the SA specifications noted therein should be useful in developing appropriate details for these changes.		SA-312 pipe is acceptable as is rolled and welded plate welded with an ASME Section III Division I Subsection NB weld. This weld would be done by qualified weld procedures and welders and inspected to NB requirements. (Longitudinal welds require radiograph and liquid penetrant.). Rolled & welded plate is intended to be a third option (first two are seamless or welded SA-312), which is OK. But welds in plate must be identified in drawing note as Code welds, i.e. "weld and examine to ASME B&PV Code, Sect III, NB"	
12	H-2-828060 sht 1, General Notes-- There should be a note for the welds attaching the center post to the bottom plate that "Welding and NDE shall be in accordance with ASME B & PV Code, 1995 Edition, Section III, Division 1, Subsection NG." This note would be consistent with Appendix 7, page 7, assumption 3. Examination should be at least VT per Appendix 7, but upgrading to PT would be more consistent with the call out for non-code welds per HS-V-S-0013 (PT final pass).		Add the note to the drawing.	

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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
	APPENDIX 2 COMMENTS			
✓13	Since the materials identified in the other appendices do not show selection of a ferritic steel for the shield plug or locking ring, the first four paragraphs are really not necessary. If the Design Agent prefers to retain these paragraphs, the following comments are provided: (a) The first paragraph should state that Regulatory Guide 7.12 uses a fracture arrest criterion and that the -140 F NDT applies for a 12-inch thick section; (b) In the second paragraph, sentence 2 should relate LSMT to the provisions in the Performance Specification; (c) In the second paragraph, this reviewer does not agree with sentences 3,6,7,9,11, and does not understand sentence 8.		If the concerns indicate that there is regulatory justification to change materials please provide technical basis for statement (c). Discussion here led to idea to remove all or most of 2nd paragraph.	
	APPENDIX 7 COMMENTS			
✓14	Page 11, Section 5, sent. 2-- Drawing H-2-828060 sht 1 permits either 302 or 304 for the spring pin. See Comment 3.		Accepted. Comment incorporated.	
✓15	Page 22, Section 8.1.4, para. 3, sent. 1--Change "ASE 30302" to "SAE 30302 or 30304" per the drawing. See Comment 14.		Accepted. Comment incorporated.	

REVIEW COMMENT RECORD (RCR)	1. Date 03/14/97	2. Review No. MCO 90%
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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
	APPENDIX 10 COMMENTS			
16	Pages 7-8, Section 5.0, Tables 1 and 3-- Correct the following inconsistencies in Tables: (a) Cover plate bolts are SA-A193-B16 (1 Cr-1/2 Mo-V) in Table 1, but SA-193-B8 (304 SS) in Table 3; (b) elastic modulus values in Table 3 are for Group C (1 Cr-1/2 Mo-V) rather than for Group G (304 and 316L SS); (c) Sm for 316L process valves should be the same as for 304L in Table 2.		Bolts are being changed to 316 SS. Tables will be changed accordingly.	
	APPENDIX 18 COMMENTS			
17	Page 2, Section 1.0, last para.--There is no requirement to meet the intent of Subsection NF, so this Subsection can be omitted.		Clarification has been added to the Appendix.	
18	Page 5, Section 2.3, second bullet-- Change to "Section III for materials, design, fabrication,..." to be consistent with inclusion of Article NB-2000 in Table 3.1.		Change incorporated in Appendix.	
19	Page 7, Section 3.0, Table 3.1, row for NB-3350, last column-- This entry only lists Code requirements. It should identify the specific exception(s) and should provide a justification (explanation, rationale) for the exception as required by Performance Specification (Section 4.9.1).		Justification has been added.	
20	Page 9, Section 3.0, Table 3.1, row for NB-3670, last column--Same as Comment 19.		Justification has been added.	
21	Page 9, Section 3.0, Table 3.1, last column-- This entry does not provide justification (explanation, rationale) for the exception as required by the Performance Specification (Section 4.9.1).		Justification has been added.	

Author: Harendra P Shrivastava at ~WHC4
Date: 4/15/97 11:56 AM
Priority: Normal
Subject: MCO 90% Design Review - RCR Comment Disposition
---------- Message Contents ----------

I have reviewed Parsons responses. The majority of their responses are satisfactory, however, further clarification is needed regarding the thermal transients considered in the analysis. I do not believe a 100 C/hr heat up rate will overstress the MCO assembly. Therefore, I do not understand why a 25 C/hr rate was used although the performance specification requires a higher heat up rate. Also, the temperature distributions given in Figure 1 of the report may not be sufficient to calculate thermal stresses.

My comments are included in Column 16, "status", of the RCRs.

Harry S.

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO Design Report	W-442	H. P. Shrivastava	FDNW, Mechanical Engineering	B4-40/376-3636

17. Comment Submittal Approval:

Organization Manager (Optional) _____ Date _____

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact _____ Date _____

Author/Originator _____

11. CLOSED

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
1.	Section 3.3 If the closure weld cannot be volumetrically inspected, what inspection procedure will be used?		The cover cap weld can not be volumetrically examined by radiographic means. The examination by ultrasonic inspection is not a sure thing although one vendor that is working with the hot conditioning system claims to be able to do the examination by ultrasonic although the determination would not demonstrate the welds to be 100% "efficient". As to the minimum inspection for this weld, dye penetrant inspection of the root and final passes for the cover cap closure weld is planned.	Accepted. This is an exception to Subsection NB.

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22	Page 11, Section 3.0, Table 3.1, row for NB-4240, last column-- Same as Comment 19.		Justification has been added.	
23	Page 11, Section 3.0, Table 3.1, last column--Same as Comment 21. Explanation for the acceptability of not meeting minimum wall thickness requirements of NB-3000 would seem to be significant. Explain how the weld configuration gives "some assurance" that the requirement is met.		Justification has been added.	
24	Page 15, Section 3.0, Table 3.1, last column, sentence 2-- The meaning of this sentence is unclear; provide clarification.		Hydro of the shell assembly and mechanical closure is performed. No hydro of the canister cover or assembly with the closure cap is done.	
25	Page 17, Section 3.0, Table 3.1, row for NG-4000, last column-- Same as Comment 21.		Justification has been added.	
26	Page 16, Section 3.0, Table 3.1, row for NG-2000, last column-- The designation of the spring pins as conforming to ASME/ANSI 18.8.2 does not really qualify as a Section II material specification, but it may be possible to use a Section II specification for the actual procurement.		An exception is taken to as noted since attempting to qualify to Section II has no benefit. End result of discussion here was that real reason for exception is that commercially available spring pins are much cheaper. I have no other problem with that.	
27	Table 3.1-- Explain why this table does not contain an entry for an exception for the weld in the rupture disk process valve that is identified in Appendix 10 as not meeting Subsection NB requirements.		Exception has been added.	

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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
2.	Section 3.9.2: 8th bullet There is no evidence that this transient has been evaluated in the Design Report. Is 100 °C/h applicable to the inlet air temperature? If so, Figure 1 does not provide correct temperature distributions because it is based on approximately 25 °C/h rate of temperature change of the inlet air.		Originally a heating or cooling rate maximum of 100 Celsius degrees per hour for any place on the MCO containment boundary and maximum 100 Celsius degrees differential temperature between any two places in the containment boundary were selected as a performance allowables for the MCO and would also be used in process requirements for CVD and HCS as allowable maximums for use in the design their equipment. In the Case of the HCS, the differential temperature allowable controls the heat up rate because higher heat flows would create a differential temperature that would exceed the 100 Celsius degrees differential allowable in the MCO containment boundary material. In this HCS case the heatup rate turns out to be about 25 Celsius degrees per hour which is well below the 100 Celsius degrees per hour rate of change originally called out as a design allowable. The 100 Celsius degrees per hour rate of change transient in itself will not create differential expansion/contraction strain in the MCO and thus will not cause stress in the materials. Differential expansion/contraction and resulting strain leading to stress in the materials is due to the temperature differentials in the materials. As a result of the structural analysis performed by Parsons, the 100 degrees Celsius per hour transient allowable is acceptable as long as the 100 degrees Celci Celsius differential temperature allowable on the MCO containment boundary is honored by the HCS and other faciities. Until such time that another more severe transient is identified, then no further analyses are warranted. As such, the 100 C/hr does not apply to the inlet air temperature.	The heat up rate controls the differential temperature and the reverse is not true as stated. One has to keep in mind what is controlled during the heating process. Certainly no one will measure temperatures at the center of the plug and at the outside surface of the MCO to determine the differential temperature that varies with time. The temperature and the flow rate of the heating/cooling air will perhaps be measured to control the transient. The air temperature rising at 100 C/hr will cause higher radial temperature gradient (and thus higher stresses) than those resulting from 25 C/hr temperature increase. Parsons has performed an analysis of 25 C/hr heat up rate as shown in Figure 1 of the report. The results of this analysis cannot be used to justify 100 C/hr heat up rate. Therefore, either the performance specification should be revised to limit the heat up rate to 25 C/hr or less or a new analysis should be performed to determine the temperature distributions for 100 C/hr transient.

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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
3.	Section 3.9.2: 10th bullet Design Report does not show that the requirement of maximum temperature difference of 100 °C between the outer MCO surface and the center of the shield plug is met. Instead, it lists this thermal gradient as a requirement for load case 5 in Section 1 of Appendix 11 to evaluate thermal stresses. Since no input data is available it is not clear whether a uniform temperatures of 275 °C for the shield plug and 375 °C for the MCO and locking ring was assumed or the above radial gradient was actually used in the load case 5 analysis. Explain how the above specification requirement and the requirement of limiting the temperature difference between the inner and outer surface of the MCO wall to 5 °C are met.		See Calculation KH-8009-8-09, Appendix 11. The temperature differentials of the shell at 375°C and the center at 275°C and the case of the center at 375°C and the shell at 275°C are addressed. With this temperature range the thermal stresses evaluated bound the limit of the temperature change across the MCO wall of 5°C.	As Appendix 11 does not include the ANSYS input file, we cannot verify how the analysis was performed. Was a radial temperature gradient assumed? If so, as Figure 1 provides only the average temperture of the plug, was the gradient assumed linear?
4.	Appendix 4 Compressive capacity of the bolts: The allowable stress for service loads is per NB-3232.1 and not per NB-3120 as stated. Also, move the last sentence that provides allowable shear stress in the thread under "Thread Engagement" heading. Page 15 of 17: DT_{wall} should be equal to 24.567 in. not 25.562 in. and S_m is 13,500 psi. Figure 1 is not included.		Appendix 4 has been revised.	Accepted.-

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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
5.	Appendix 5 The filter guard plate and closure seals are evaluated for 28g loading although the vertical acceleration of Mark IA basket for a MCO drop in the CSB tube is specified to be 35g. Also, when the MCO impacts the concrete floor in a 2' drop, the internal components may strike the guard plate with a vertical acceleration of 34g. Why the bounding case of 35g was not considered?		See Calculation KH-8009-8-03, Appendix 5. The guard plate is only loaded by the fuel in the top down drop which is bounded by the 28 g's in the cask. The attachments for the guard plate are evaluated for the bounding condition of 101 g's.	Accepted. However, both the performance specification and the design report do not indicate that the top-down drop is postulated only when the MCO is dropped with the cask.
6.	Appendix 5, Page 12 K_{Mb} and K_y are not linear functions of b/a. Was it verified that the linear assumption is conservative?		See Table 8 of Appendix 5 for ANSYS results. The hand calculation for the guard plate has been replaced by including the guard plate in the ANSYS analysis.	Accepted.
7.	Appendix 5, Section 9.4 In Section 9.4.2, a hydrostatic pressure of 716.76 psi due to 54g drop acceleration is calculated at the bottom of the MCO. The total pressure near the bottom is thus nearly 867 psi. This pressure will result in a very high secondary stress near the bottom plate and cylindrical shell joint. No stress evaluation is performed, however. Section 10 calculation is not necessary as it is bounded by Section 9 loading.		Level D limits stresses only to primary stresses ($P_m + P_b$). Section 10 is necessary as it evaluates a top end drop.	Accepted.
8.	Appendix 5, Section 12 The axisymmetric mesh near structural discontinuities (bottom plate and collar regions) are not refined enough to capture the local secondary stresses. Sections 9.4.2 and 12.2.1 although analyze the same loading case, the calculated bottom pressures are different.		Only primary stresses are considered. Reanalysis with finer mesh shows no change in results.	Accepted.

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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
9.	Appendix 5, Section 13 Buckling is evaluated per NB-3133.6 and ASME Code Case N-284. Code Case N-284 capacity reduction factor is applicable only if the tolerance requirements of NE-4220 are met. Does the MCO design meet NE-4220 requirements?		The MCO design must meet the requirements of Subsection NB, which meet the requirements of Subsection NE.	Accepted.
10.	Appendix 7, Section 8.1.2 The assumption that center pipe of each basket acts like a propped cantilever does not seem to be justifiable. As there is a 3/16-in. gap between the MCO shell and the basket bottom plate, the propped assumption is valid once these gaps are closed. Until then all six pipes connected together will act like a single simply-supported beam.		The maximum moment for a simply supported beam is the same as for a propped cantilever ($wl^2/8$). Due to the inertia of the bottom plate and fuel, there will be a non-zero moment at the center pipe/bottom plate connection. The propped cantilever assumption results in a conservative moment at the connection, which is used later to evaluate the connection weld.	Accepted.
11.	Appendix 7, Section 8.2 The buckling strength is calculated assuming the axial load acts at the center of the cross-section. A slight eccentricity will reduce the buckling strength significantly. Therefore, a 4% design margin on combined center pipe and support rod strength may not be adequate.		Because it is difficult to quantitize the eccentricities, the following justification is offered for ignoring load eccentricities: (1)The basket interface geometry results in significant "self-correcting" of load eccentricities. That is, the rotation of the top of the support rod, resulting from an eccentric load, will move the load center toward the high point of the support rod and reduce the eccentricity. (2)A 0.25-inch load eccentricity was considered in the Section 8.5 non-linear instability analysis and the resulting support rod capacity exceed the calculated code capacity. (3)As mentioned in the last paragraph of Section 8.5, the 0.25-inch chamfer on the bottom plate (see Figure 2) biases the eccentricity towards the center of the basket, resulting in a preferential buckling direction toward the I.D. of the MCO shell. The MCO shell constraint results in a higher support rod capacity. (4)The non-linear/large deflection buckling analysis, discussed in Section 8.5,	Accepted, however, it is always desirable to have at least 10% safety margin during the initial design.

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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
			included a sensitivity study on the effect of friction on the buckling capacity of the support rods. A friction coefficient of 0.1 was found to be adequate to prevent lateral movement of the top of the rods. Accounting for lateral constraint at the top of the rods significantly increases the margin. (5)Paragraph F-1322.3(c) permits an adjustment of the stress-strain properties to account for strain rate effects. The increase in the yield strength for the drop accident load cases was conservatively ignored. This justification was added to Section 8.2 of Appendix 7.	
12.	Appendix 7, Section 8.3.3 Is the no-hole model based on an equivalent plate with reduced thickness to account for the holes? The ANSYS stress contour plots have no contour values.		The no-hole model geometry was not altered to account for the holes. As discussed in Section 8.3.3, the no-hole model stress results were found to be adequate without modifying either the geometry or material properties. The missing contour values will be corrected.	Accepted.
13.	Appendix 7, Section 9. The buckling evaluation for the support plate 1.49-in. high perhaps is not required. However, the stresses in the welds between these plates and the MCO bottom plate need to be checked. Again, only 27g acceleration is considered when the performance specification specifies up to 35g vertical accelerations for Mark IA baskets.		Weld stress evaluation has been added. Failure of the support plates is of concern only for the sequential drop ("dropped with cask"), which has a maximum vertical g load of 27 g's or 33.5 g's for a corner drop. The corner drop controls and was used in the current calc. revision.	Accepted.
14.	Appendix 8, page 13 As the ASME Code uses Tresca's yield criteria as failure criteria, the yield shear strength is 0.5 S_y. Then the allowable shear stress is 0.17 S_y and not 0.2 S_y.		When evaluating"the average primary shear stress across a section loaded in pure shear", the code specifies an allowable of 0.6 S_m (See *Para. NB3227.2 & NG-3227.2). This allows somewhat higher* stresses for application like shear keys than would be permitted for the normal P_m limit of S_m, which would result in a pure shear limit of 0.5 S_m.	Accepted.

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15.	It is not clear from Figure 5 how Pm + Pb = 5.9 ksi was obtained. A linearized stress plot like one shown in Figure 6 needs to generated to obtain this combination.		The 5.9 ksi stress intensity was obtained from the ANSYS output. Text has been modified for clarification.	Accepted.
16.	Appendix 10, Table 3 The elastic modulus for 316L should be 24.8 x 10^6 psi. S_m for the material is conservative at 12 ksi.		Accepted. Appendix 10 Text has been modified.	Accepted.
17.	Appendix 11 General comment: The ANSYS input listing is not available. Therefore, analysis methodology, temperature and pressure input, and boundary conditions could not be verified. The mesh near the bottom plate and cylindrical shell joint and in the collar region is coarse and, therefore, resulting stresses in these regions may not be accurate. The reviewer performed a hand calculation using Section III, Appendix A methodology to calculate discontinuity stresses at the bottom plate to cylindrical shell joint resulting from a 150 psi pressure loading. The stress intensity at this location is significantly higher than that at a section away from this structural discontinuity. It is recognized that the Appendix A methodology is conservative because it does not account for fillets at that joint. However, ANSYS stresses seem to be low and, therefore, a mesh refinement in the final analysis is recommended specially for the design basis accident cases because of high pressure loading at the bottom.		Since drop loads govern, only primary stresses are of interest. Reanalysis with a model using finer mesh shows no significant change.	For Level A and B loads, an evaluation of secondary stresses are required. The mesh in question is in the bottom plate to cylidrical shell joint area. Response is accepted if Parsons has already verified that a finer mesh shows no significant change.
18.	Appendix 11: Load Case 5: See comments 2 and 3.		See Calculation KH-8009-8-09, Appendix 11. See response to comments 2 and 3.	The package provided did not have sufficient details to verify these comments.

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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
19.	Appendix 11: Load Case 6: The transient analysis performed may not be appropriate if the average temperature of the shield plug given in Figure 1 of the performance specification was used. The radial temperature gradient must also be included.		See Calculation KH-8009-8-09, Appendix 11. See response to comments 2 and 3.	The comment response did not provide answer to the question whether a radial temperature gradient was considered in the analysis or not.
20.	No code compliance evaluation is provided for the collar and lifting/closure ring threaded joint. ANSYS analyses and hand calculations performed in Appendices 5, 6, and 11 are not adequate for thread evaluation.		Detail thread analysis has been added to Appendix 6.	Accepted.

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO Design - 90% Review	SNF MCO Design	JI Diehl	SNFQA	100K 1719 Bldg/rm7 273-4734

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

John I Diehl *
Reviewer/Point of Contact

4-18-97
Date

KE Smith
Author/Originator

11. CLOSED

Date

Reviewer/Point of Contact 9/8/98

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.	Ref. page 4 Intro. last para. Does this mean the cap is not required for containment safety or criticality, or that we can not take credit for the cap due to the inability to test the final weld.		Inspection of the final closure weld cannot be performed to ASME requirements; this is similar to other commercial spent fuel canisters. There will be some level of UT inspection or liquid penetrant testing.	
2.	ref. page 5. 3rd para. I don't beleive the cover cap has been installed so we can't place it back on the MCO		Corrected. Will this be part of the spec? when	4-18-97
3.	ref. page 7. 2.6.1 PPRV. Q: Have these pressures been established?		The performance pressures have been tentatively established for the PPRV as follows; initial release at approximately 100 PSI differential on the valve poppet and with the valve performing at rated flow conditions at a release pressure not higher than 119 PSID on the valve. Please note that these pressure values are tentative and are subject to change. Reference where?	4-18-97

* Un-Deferred items 1, 3, 6 shall be documented in Topical Report when determined

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4.	General Question on Pressure relief devices: If we do not meet ASME for pressure relief of the vessel/MCO, how do we provide design verification/validation? ref. table 3.1 Code Exemptions		We do meet ASME; just Subsection ND rather than NB, so this becomes an exception to NB. Meeting ASME subsection ND for overpressure protection has been deemed acceptable by the MCO subproject?	Accept JLD 4-18-97
5.	Ref. page 45. graded quality assurance approach. I don't see how we are in full compliance with ASME section III NB.		All MCO components that serve a safety class function will be provided by a supplier that has been audited by the MCO fabricator for compliance with applicable QA requirements. CMTR's for these materials will document that they are in compliance with ASME (SA) specs. MCO components that are safety significant and general service can be provided in accordance with the Fab. Spec. Sections 9.1.2 and 9.1.3. This is the graded quality assurance approach that conforms with ASME requirements (with the exception that we are not requiring a stamped vessel).	JLD 4-18-97 don't know?
6.	General Question leak tightness of MCO's: How do we verify/validate leak tightness of the MCO's?		This issue is currently being debated. The original plan was to perform a cursory (bubble type test) leak check on the MCO prior to movement from the basin and rely on the qualified assembly procedure to ensure that the 1 x 10-4 criterion was achieved. However, the HCS believes that a full blown helium leak test will be required before they can accept it at their Annex. We are having the leak test folks look at the options and evaluate the feasibility of performing this test. when & where?	JLD 4-18-97

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7.	Ref. page 17. 3.9.1 Code Requirements: missing SSC.designation top page 21. I assume the primary rupture disk is correct.		Corrected.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO 90% Design Package	SFD/MO-277	C. Loftis, N. Seagle, G. Bishop	DOE	MO-277/372-3108

17. disposition(s)
E.D. Sellers

Organization Manager (Optional)

Comment Submittal Approval:
11. CLOSED
Charles Loftis
3/14/97
Charles B. Loftis 5/23/97
Reviewer/Point of Contact
Date

Charles Loftis
Author/Originator

10. Agreement with indicated comment
Charles B. Loftis 5/23/97
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
1	MCO Design Report, page 9, 4th paragraph regarding Port 4: It appears that the exception to Subsection NB regarding the pressure boundary weld of the rupture disk is not addressed in Appendix 18. NS	Y	Exception added to Appendix 18.	Accepted NLS 4/24/97
2	MCO Design Report, page 9, 4th paragraph regarding Port 4: It is suggested that a simple diagram or sketch be provided to clearly specify the pressure boundary for the MCO which would include the rupture disk and rupture disk seal. NS	N	Clarification added.	Accepted NLS 4/24/97

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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
3	MCO Design Report, page 10, 3th paragraph regarding basket support rods: As a possible cost savings alternate to tolerancing the basket support rods so that they share the load with the center tube during axial loading, it is suggested that the analysis consider the consequences of an uneven load distribution. NS	N	Has been done, results are reflected in the tolerances provided. In order to allow the 304L material option for the center pipe and the support rods, load sharing is necessary. Relaxing the tolerances would require using a higher strength material.	Accepted NLS 4/24/97
4	MCO Design Report, page 23, Section 3.9.3: The weights listed are "nominal", not "maximum" as indicated in the second paragraph ("weights with maximum material condition"). Furthermore, the Performance Specification weight requirements are exceeded. This fact should be noted in the Design Report and subsequent revisions to the Performance Specification should provide "rounded" values for maximum weight requirements. NS	N	"...maximum material condition" will be removed from the second paragraph. The Performance Spec. weights are design goals and it was understood they would be subject to change. Future revision to the Perf. spec. will include update to the weight requirements.	Accepted NLS 4/24/97

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5	MCO Design Report, page 23, Section 3.9.5: Retrievability of the MCO from the transport cask and retrievability of the fuel baskets from the MCO should be addressed as part of the postulated drop accident which has the potential of distortion of the circumference of the shell. NS	N	Assuming the drop occurs on the way to CSB or in the CSB, after a such a drop of the MCO/cask assembly, then eventually a decision will be made to either remove the fueled MCO from the cask at the CSB or take the MCO/Cask assembly back to the 100K area. At the 100K area the MCO would be flooded with water and then moved on to a basin load out pit, open the MCO and remove the baskets and fuel from the MCO in the load out pit. The drop that would cause the MCO shell to deform inside the cask would not necessarily damage the mechanical closure features necessary to open up the MCO for fuel removal. If the MCO is stuck in the cask at the CSB and the MCO/Cask assembly is sound for transport then the MCO/cask assembly would be sent back to the 100K area for downloading as discussed above. If the cask is found to be unsound for transport, which is unlikely, then the cask would have to be repaired or made suitable for transport back to the 100K area. If the cask cannot be made sound then the MCO would have to be down loaded	Accepted ALS 4/24/97

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			Removal of the fuel and baskets from an MCO could be difficult if the MCO shell were ovalized or deformed greatly as a result of the drop while in the cask. Special tools and equipment may have to be developed at the time to remove the contents of the MCO. After the fuel is removed from the MCO/cask assembly, an appraisal would have to made to determine if decontamination of the cask and empty MCO is economically viable in order to remove the MCO shell and thus salvage the cask. If not, the entire assembly would be prepared for disposal as a unit. This plan information is presented here to demonstrate that a damaged MCO inside the cask is manageable and that alternatives are possible to remove the fuel from the MCO while still in the cask. Recovery and accident mitigation from drop damage to the MCO is not part of the performance specification so this information will not be included in the design report.	Accepted ALS 4/24/97

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6	MCO Design Report, page 26, Section 3.11: The first sentence on page 26 indicates that the locking ring is threaded within 1/8 inch of the shield plug and then the bolts are torqued. Appendix 5, MCO Drop Analysis (page 23) assumes that the load is transferred through the shield plug, not the locking ring. Ensure consistency between the drop analysis, design drawings, and the Design Report regarding the load path for the drop accidents. NS	Y	Clarification added, see Drawings H-2-828042, sheet 2 & H-2-828045, sheet 1 for locking ring and plug dimensions.	Accepted MLS 4/24/97
7	MCO Design Report, page 23, Section 3.9.3: Provide analysis of the drop accidents with the MOC cover plate installed which has the load path through the 0.349 inch thick threaded portion of canister collar. NS	Y	Drop analysis with cover cap has been added, see Calculation KH-8009-03. MLS 4/24/97	* Comments on KH-8009-03 provided 4/17/97.
8	MCO Design Report, page 29, Section 3.12.4, 6th paragraph: Indicate how the Project will verify compliance with the Performance Specification requirement that the "baskets shall support gas flows needed to properly dry and condition intact fuel....". NS	N	Hydraulic calculations were completed in-house using a 3-D model of the MCO and baskets to determine the flow distribution during hot conditioning. The calculations showed the flow distribution within the baskets to closely match the surface area of the fuel element inners and outers. Design of the baskets has been coordinated with the CVD and HCS project teams to ensure their acceptability.	Accepted MLS 4/24/97

KES * Regarding the 304L/304 material property comment, DESH will revise the structural calcs. to show the stress ratio with 304L properties, followed with a statement ing the margin can be increased by requiring 304 strength

Accepted

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9	MCO Design Report, page 30, Section 3.12, 2nd paragraph: It appears that the statement "Mark IV baskets which have no structural integrity code criteria per the Performance Specification.." is not correct. The Performance Specification only indicates that the Mark IV baskets "do not have to be designed to meet the intent of the ASME Code". Revise Design Report. NS	N	Clarification of required analysis has been added.	Accepted NLS 4/24/97
10	**Performance Specification, Section 4.13,** MCO Design Report, page 31, Section 3.13: It is not clear why the lifting of the MCO is considered a "non-critical lift" in accordance with ANSI N14.6. Note that page 4 of the Performance Specification should specify the 1993 version of ANSI N14.6. NS	Y	The lifting rim of the MCO is used to lift the loaded MCO only at the CSB. The exposure consequences off-site from drops of the MCO by the MHM inside the CSB Building and its handling equipment do not fall into the critical lift category as defined in the ANSI N14.6 specification.	Accepted NLS 4/24/97
11	MCO Design Report, page 31, Section 3.13: It is recommended that the results of the shield plug shielding analysis be provided in the Design Report and compared with the average and worst case requirements for dose rate. NS	N	Will be added to the Design Report.	Accepted NLS 4/24/97

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12	MCO Design Report, page 31, Section 3.13: It appears that the requirement that the "connections leading to the long and short process tubes shall be easily differentiated" has not been adequately addressed by only providing different cover plate bolt patterns. NS	Y	Differentiation was agreed upon by DESH. This was reviewed with interfacing subprojects and with Operations before settling on the five bolt configuration.	Accepted TLS 4/24/97
13	MCO Design Report, page 35, Section 3.13, 4th bullet: Consideration should be given to bolt head design for remote alignment operations. NS	N	Cone head bolts for cover plates are being incorporated into the design for remote handling capability.	Accepted TLS 4/24/97
14	Appendix 1, MCO Drawings, H-2-828041, Sh 2 of 3: It is suggested that the MCO shield plug port be numbered (1 through 4) on the drawings consistent with the Design Report. NS	N	Accepted.	Accepted TLS 4/24/97
15	Appendix 1, MCO Drawings, H-2-828048, Sh 1 of 1: It the 1/4 inch optional hole is installed in Assembly 2, then it appears that the seal is not required. NS	Y	1/4 inch hole is a metering orifice and regulates flow therefore does require a seal.	Accepted TLS 4/24/97

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16	Appendix 1, MCO Drawings, General Comment: It is recommended that a fabricatability review be performed to access the degree of tolerancing and machining required for the various MCO components with an overall goal to reduce fabrication costs on a per unit basis while maintaining critical functions and interfaces. NS, CL	Y	This review was accomplished as part of the 90% design review. Ed Ruff met with machinists from our onsite shop and received their input relative to fabricability and tolerancing. Ed also performed his own thorough review of the drawings for tolerancing. This led to an all day meeting with the Design Agent to address tolerancing and fabrication concerns. Drawing mark-ups were passed on to the Design Agent as part of the 90% comment package.	Accepted NLS 4/24/97
17	Appendix 1, MCO Drawings, H-2-828060, Sh 1 of 5: Item 13 lists ASTM A-240 specification for an item that is described as sheet metal. Confirm that A-240 is a sheet metal specification and not a plate specification. NS	N	SA-240/ASTM A-240 covers both plate and sheet.	Accepted NLS 4/24/97

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18	Appendix 1, MCO Drawings, H-2-828043, Sh 1 of 1: Item 1 is the MCO shell. The drawing calls for a shell ID of 23.00 inches. Drawing H-2-828041 Rev C shows a required overall OD for the vessel of 24.000 +/- 0.015. In order to achieve these dimensional tolerances for SA-312 pipe (the material specified for the shell) the entire shell will require machining. Specification SA 312 is a pipe specification and has a far wider tolerance range than these drawings specify. Piping will have a thicker wall and will meet the SA-312 spec. The tolerances in the drawing should be compared to the tolerances allowed in SA 312. NS, CL	N	The tolerance on the MCO shell has been revised to agree with the critical dimensions listed in the Fabrication specification. The critical dimensions were developed to ensure the MCO will interface with the cask as shown on the cask/MCO interface drawing.	Accepted NLS 4/24/97
19	Appendix 1, MCO Drawings, H-2-828041, Sh 1 of 3: It is recommended that the butt weld joining the shell to the canister collar be welded from both sides. Otherwise, weld shrinkage will reduce the ID and will prevent the installation of internals. NS	N	Welding from both sides is permitted. Alternate welds will be allowed at the direction of the buyer. Note was added to the collar drawing: "Equivalent ASME Code Section III, Div. 1, Subsection NB weld details may be submitted for approval."	Accepted NLS 4/24/97

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20	Appendix 1, MCO Drawings, H-2-828045, Sh 1 of 3: The shield plug major diameter given on drawing H-2-828045 Rev C is 23.950 +/- 0.005 inches. The shield plug is to fit in the canister collar. The location of fit in the collar shows a dimension of 24.040+/-0.005 inches. At the maximum difference allowed by the tolerances, the shield plug is 0.09 inch smaller in diameter. Drawing H-2-828041 shows the helicoflex seal in detail F. This 0.09 inch may allow the seal to be offset to the extent that the seat point of the seal is close or over the edge of the collar, permitting a leak. This tolerance may need to be narrowed. Also, these dimensions seem to conflict with Section 7.3.4.2, page 26 of the Fabrication Specification (Appendix 19). NS	N	Redimensioning of the shield plug has eliminated the possibility of the seal being offset and now maintain a min. .095 overlap.	Accepted NLS 4/24/97
21	Appendix 6, Stress Analysis of the Lifting Cap and Canister Collar: The analysis should address the locking and lifting ring/collar threaded interface. NS	Y	Analysis of the threaded interface was performed and incorporated.	Accepted NLS 4/24/97
22	Appendix 6, Stress Analysis of the Lifting Cap and Canister Collar: The analysis should address the stresses in the cap and collar lip which interfaces with the six gripping shoes. NS	Y	Calculation KH-8009-8-04 is clarified to address comment.	Accepted NLS 4/24/97

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23	Appendix 6, Stress Analysis of the Lifting Cap and Canister Collar: The analysis is based on a maximum lifting temperature of 132°C which is specified in the Performance Specification. Figure 1 of the Performance Specification indicates that the closure plug is above 175°C after 100 hours. Based on this analysis and the requirement in the Performance Specification, there should be a Technical Specification for cool-down of the MCO prior to lifting from hot conditioning. NS	Y	Agree. The MCO will not be allowed to be moved from HCS until it has cooled to at least 132 deg. C. This TSR will be developed by the HCS subproject. The interface control which limits movement to and from the Hot Conditioning System only when the MCO external temperature is below 132 deg. C is documented in the MCO Interface Table, IC #003-014b.	Accepted TLS 4/24/97
24	Appendix 8, Mark IV Storage Calculation: It appears that this calculation does not address the Design Basis Accident Drops specified in Table 3 of the Performance Specification. NS	Y	Section 4.19.1 of the MCO Performance Specification identifies the safety class (SC) components of the MCO. The Mark IV baskets are not included as SC items. As the Mark IV baskets provide no safety class function, and failure of the Mark IV baskets during a DBA would not jeopardize the performance of other SC systems, their performance during design basis drops was not evaluated.	Accepted TLS 4/24/97

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25	Appendix 5, MCO Structural Drop Analysis, page 23: It is recommended that the analysis include a case where the MCO load path is through the locking ring instead of the shield plug. Also the reference to the weight of the loaded Mark IV baskets should be Appendix 3 rather than the Performance Specification. NS	N	Thank you for your recommendation. There has already been much discussion on this subject. The shield plug is designed to protrude 1/4 inch above the lifting & locking ring after the MCO is assembled a the K basin load out pits. Having the shield plug be the contact extremity allows for the impact force loads to be distributed more uniformly about the collar of the MCO. While sealed in the cask and in the case of the lower MCO in a CSB storage tube all direct impact forces due to accidents, drops, etc. will go through the shield plug to the collar on the MCO shell. The analysis you mentioned has been previously been done and it was decided to not put it in the report.	Accepted NLS 4/24/97
26	Appendix 5, MCO Structural Drop Analysis, page 22: Ensure that the assumption that the MCO is restricted by the CSB Tube is a valid assumption based on the design of the CSB. NS	N	In discussion with Jerry Bazinet, CSB Design Authority, it was confirmed that the CSB storage tube is designed to withstand the impact of the upper MCO dropped onto the lower MCO.	Accepted NLS 4/24/97

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27	Appendix 16, MCO Shield Plug Thickness: To show compliance to specification, it is recommended that pertinent summary level details be provided. That is, source terms, description of geometry model used in shielding analysis (for all cases) and summary of results that show compliance. For cases where there is streaming to be combined with bulk dose rate results, use area averaging techniques. NS	N	The source term, model and detector geometry, and the dose rate will be added to the shielding analysis.	Accepted TLS 4/24/97
28	Appendix 16, MCO Shield Plug Thickness: Neutron dose rates may be significant based on shielding design (use of thick high Z materials). It is recommended that at least one neutron case be performed to ensure Performance Specification (<10% of gamma dose rate) is accurate. NS	N	Dose calculations performed by J. Lan and documented in the MCO Topical, Section 5.4.3 and Table 5-8 demonstrate the neutron dose is approximately 1.7% of photon dose.	Accepted TLS 4/24/97

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29	Appendix 16. MCO Shield Plug Thickness: Convergence is difficult for the current model with error values of 0.3 to 0.5. Per instructions of the MCNP manual, error values above 0.1 should not considered reliable. Suggest using the code for streaming purposes only. Suggest that the source be represented as a homogenous cylinder of sufficient thickness (10 cm seems sufficient) and locate below the shield plug. Concentrate source in areas of most significance to streaming through port plugs. Run gamma and neutron cases. Delete use of multiple detector types. Use detector that represents volume susceptible to streaming flux. There should be relatively little difference in the tissue equivalent dose rate response. Current differences are probably due to statistical uncertainties. Place detector at locations of higher anticipated dose rates, i.e., above port plugs or other areas of lesser shielding. Monte Carlo is not a brute force type of code. Must be manipulated to achieve statistical accuracy. Application of importance grading like region importance and path-length stretching is needed. Perform bulk shielding using appropriate approach (point kernel application, i.e., Microshield or discrete ordinance solution,	N	The MCNP code was chosen because of the complexity of the MCO Lid, e.g., multiple ports, varying port configurations, and various holes through the lid causing varying shield thickness. The modeling and run designs were developed for the most realistic (accurate) results. Under this realistic mode, streaming was not a significant contributor withing the directed bounds of the calculations, i.e., not consider streaming between MCO and cask. Design of the detector system covered the concerns stated (streaming, ports, detector type, unknown areas of potentially enhanced dose rate, etc.) And allowed for averaging to develop the doses required. The application was "manipulated" to achieve understanding of all known and suspected variables. Some runs were made with MicroShield to determine the contributions from various fuel levels and locations as a basis for designing the MCNP runs to minimize run times an analytical effort while maintaining accuracy and statistical significance.	Accepted MLS 4/24/97

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			less than 0.2 for areas that are significant dose contributors. Other detectors would have lower convergences for a specific source. Since the higher values of convergences have a larger uncertainty, the doses were recalculated using values with convergence results of less than 0.3 for one of the analyses. The results of this recalculation were comparable so it is reasonable to assume that the estimate is reasonable and conservative. Since the basic source geometry is simple it is a reasonable assumption that the area where there would be significant dose contributions would be the areas where the convergence is low, since the photon flux in these areas are highest. Note, the top layer of sources (i.e., the upper 10 cm of the first fuel element) requires 108 separate runs and each run required about 7 hours to complete so the 10,000,000 particles analysis reflects a reasonable limit for this analysis.	Accepted MLS 4/24/97

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30	The closure lid does not show the planned installation of a rupture disk. Need for this disk (ie, regulatory driver) is unclear). Mention was made of a Department of Health "requirement". Regulatory basis for such a statement is unclear. In essence, I am unconvinced of the need for this. This is a significant design change. There can be substantial impact on the CSB accident analysis which has not thus far included this in the hazard/accident analysis. Impact of this on the SAR has not been addressed. GB	Y	The MCO cover cap is being designed to accommodate a rupture disk for release of gas build up inside the MCO during interim storage. The official path includes the rupture disk in the MCO cover cap. The option to seal the MCO for interim storage with out a rupture disk is being considered and likely will not be decided for several years. So for the time being the cap design will include the rupture disk. It is anticipated that no production cover caps will be built until the deliberations are complete. As to the release created by the MCO cover cap rupture disk actuating, it would be quite similar to the release caused by the actuation of the rupture disk in the shield plug.	OK GEB
31	Weights of the MCO may not be coordinated with the 'K' Basin crane capacity. Max weight is up to 20,900 # which is 800 # higher than the weight shown in the MCO Topical Report. GB	Y	The weights of the fueled MCO/cask assembly are being coordinated with the crane capacities a the K basins and the lifted component weights are being evaluated to assure there is no problem. We are aware of the importance of not exceeding the load capacity of cranes at the basins.	OK GEB
32	When is the revised drop analysis based on the 90% design going to be validated and issued? GB	N	Revised drop analyses resulting from comments received during the Topical review will be finished around end of April, with summary results included in the revised Topical. Issued reports will follow around end of May.	OK GEB

Charlie Loftis - 5/23/97 See item #7 Page 5 of RCR

In response to our comment number 7 on the MOC 90% design review regarding the drop analysis of the MCO with the cover cap installed, Kim Smith provided me a copy of Parsons Calculation KH-8009-03, Rev 0 dated 4/15/97 (unsigned and unchecked).

The calculation did address the case of the MOC drop with the cover cap installed. However, a brief review of the calculation resulted in some additional comments and observations which are noted below:

1) Section 4, Material Properties states: "For the shell, Type 304L is used with the tensile and yield properties of Type 304 stainless steel (75 and 30 ksi, respectively)." This approach of using allowable stress values in excess of that specified in ASME Section III for the design of the MCO appears to be non-compliant with ASME B&PV as well as Appendix B of the MCO Performance Specification.

2) The second paragraph of Section 4, Material Propoerties states: "For the shield plug, locking ring, lifting cap and canister collar, Type 304L stainless steel may be replaced with Type 304N at the discretion of the designer." The substitution of 304N for the lifting cap and canister collar appear to be non-compliant with Section 4.15 of the MCO Performance Specification which states that the MCO shell shall be fabricatied from Type 304L stainless steel and the lifting cap and canister collar are considered part of the MCO shell.

3) The copy of Parsons Calcualtion KH-8009-8-03 (Doc. No. HNF-SD-SNF-DR-003, Rev 0, Appendix 5),MCO Final Design, dated 4/15/97, provided for my review, had not been signed by the preparer or checked. The 4/15/97 version of the calculation contained significant changes from the version dated 3/5/97 which was provided with the MCO 90% Design Review Package. Considering the current stage of the MCO development (MCO fabrication bids are in-house for evaluation with award of contract scheduled for the near term) it is recommended that this and any other calculation which could impact the MCO materials, design, and/or configuration be completed, checked, and approved prior to award of fabrication contract.

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MCO Phase 2 90% Design Review	CSB/SNF	D.M. Black	SNF/CSB Project Safety/Systems/ Process	MO-043 MSIN: S0-04 /376-6609

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

4/18/97
Date

D.M. Black
Reviewer/Point of Contact

9/8/98
Author/Originator

11. Closed

4/18/97
Date

D.M. Black
Reviewer/Point of Contact

9/8/98
Author/Originator

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1.	General comment about Cover Cap: Addition of the cover cap (if provided with 150 psig pressure relief capability) will cause decreased volume into which the venting gases must be contained. This design feature is unacceptable for CSB storage and would cause re-design of the storage tube system with accompanying project delays. The preferred MCO design from the point of view of CSB is no cover cap. A cover cap without pressure relief (which may not be allowable) would probably work out O.K. for CSB. A viable alternative may be to retain pressure relief capability in the original MCO after hot conditioning.	x	Many options are out there for the interim storage of the MCO in the CSB after HCS. The cover cap with the 150 PSI rupture disk is one of them. Earlier it was discussed to open up the impact limiters so the volume they displace would be available for pressurized gas migration into the inside of the impact limiters. This way the interactive volume inside the CSB Storage Tube would be increased. If the caps go on the MCO with 150 psi rupture disks then the CSB should be ready for them. I would recommend that the cap, when installed on the MCO, have a lesser release pressure so we may manage the gas release from the MCO. This would help by allowing for the possibility a preference flow of the gas through the internal filter inside the MCO. Which in turn, would reduce contamination released inside the CSB storage tube.	Closed
2.	General comment on Draft 90% drawings: Many items identified on Parts/Materials List (e.g., H-2-828041, sheet 1) don't correspond with the items shown on the drawing. For example 25, 26, 27, & 28 appear to be differently identified. See also item 35 on sheet 2, same drawing.		Item 35 accepted. Items 25, 26, 27, and 28 in the material/parts list correspond to the Mark 1A and Mark IV baskets. Both baskets and corresponding item numbers are correctly depicted on sheet one.	
3.	Drawings call for coating of contact surfaces with "Neolube" -- while the Design Report recommends "Never-Seize" for the same use. Specification should agree with drawings and add "or approved equal" to avoid confusion.		Accepted, the drawings and the Fabrication Specification will refer to the same lubricant. Experience has shown that "or approved equal" is not acceptable on the Hanford Site as Quality Assurance can not verify equality.	

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✓ 4.	Editorial comment on Design Report, 1st paragraph under 1.0 Introduction: Last sentence uses term "final" storage. And, last sentence third paragraph of 2.1 uses "long-term." These *should be "interim" storage.*		References to "final" and "long-term" storage have been deleted.	
✓ 5.	Section 2.6: Make sure configuration of ports as received at CSB is clearly stated. CSB is to receive MCOs with an active pressure relief valve, and an uncovered rupture disk.		The physical configuration capabilities of the MCO are described in the design report. The configuration at any given time for the equipment during operations is left to operational procedures.	
✓ 6.	Next to last paragraph of 2.6 states that cover plates have the capability of having capture bolts. CSB operations are assuming capture bolts are provided.		Capture bolts are provided for the cover plates, as shown on the drawings.	
✓ 7.	Table 3.1: Fluoride, Sodium, Calcium, and Iron should probably all be shown as < or = numbers. Numbers shown imply =.		These numbers were provided by the K Basin water quality personnel as input to the MCO Performance Specification.	
✓ 8.	3.9.1 Code Requirements, second sentence: SSC stands for Structures, Systems, and Components -- NOT Safety Significant Components.		Correction has been made in the Design Report.	
✓ 9.	Editorial: Figure 1. Clarify in title that this figure is for Hot Conditioning.		Clarification has been added. Needs to changed on Perf. Spec.	
✓ 10.	General: Discussion of benefits of "work hardening" the threads and bolts by installing the lifting ring with a polymer seal instead of the helicoflex seal one time for empty MCOs to be delivered to K-basin from CSB should be included somewhere in the design report. A very good explanation of this was given by Chuck in the 90% meeting on 3/10.		A discussion has been added to the calculation package.	
✓ 11.	Jerry Strickler will give comment on recessing the four shield plug port covers.		N/A	

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MERRICK
Engineers & Architects

Merrick & Company
195 East Road
Los Alamos, New Mexico / 87544 / USA
505/662-3600 / FAX: 505/662-3295

MCF-

Facsimile Transmittal

Page 1 of 6

To: KIM SMITH Fax #: 509-376-3252

Company: DUKE

From: SCOTT GUSTAFSON

Date: 4/21/97 Job #: 30012491

Comments: KIM,

HERE IS THE SIGNED-OFF SHEET FOR MCO 907 DESIGN COMMENT DISPOSITIONS. ROSS MEYER AND I HAVE DISCUSSED THIS AND HAVE AGREED THAT YOUR DISPOSITIONS WILL SUFFICE. THANKS FOR YOUR RESPONSE.

IF YOU HAVE ANY QUESTIONS ABOUT THE INTERFACES PLEASE FEEL FREE TO CALL ME OR ROSS MEYER.

SCOTT GUSTAFSON

SENT BY:Merrick P/E OPS Center; 4-21-97 ; 11:35 ;Process/Equipment Op→ 509 376 3252;# 2

REVIEW COMMENT RECORD (RCR)

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5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO 90% design review	SNF	Scott Gustafson (Merrick HCS designer by request from Curt Miska)	HCS Designer Merrick	1-505-662-0606 or Contact Curt Miska at 376-7183

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

4/21/97 Date

Reviewer/Point of Contact

Scott Gustafson

Author/Originator

11. CLOSED

4/21/97 Date

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
	all closed			

Louis H Hanson 9/8/98

Louis H Hanson 9/8/98

A-6400-090.1 (03/92) MEF011

SENT BY:Merrick P/E OPS Center; 4-21-97 ; 11:35 ;Process/Equipment Op→ 509 376 3252;# 3

REVIEW COMMENT RECORD (RCR)	1. Date	2. Review No.
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1	H-2-828045: The HCS designers recommends a cone-shaped hole in the MCO head, or recommend a roll pin (1/4" diameter, protruding 1/2" above surface) be placed in the bottom of the Long Draw Tube and HEPA Filter Conterbores. If the cone-shaped hole or roll pins are placed opposite of one another on the diameter of the MCO, the Process Valve/Plug Operaters can be sufficiently differentiated at Hot Conditioning and Cold Vacuum Drying.		I am assuming the cone shaped hole mentioned would be the wall of the counterbore for the port cover to set below the surface of the MCO for only port #3. This type of tapered counterbore is more expensive to make than a straight wall counterbore. The idea of using pins as the discriminating feature is not a strong and robust enough feature for me. The pins can be removed, fall out, not installed, or be broken off in service. The differentiation using the attachment bolt pattern is a much stronger feature in my opinion. The five bolt pattern is used solely on the #3 port for process access to the long process tube. It is my understanding that the 5 bolt pattern has been accepted by the CVD and the HCS projects and as a result the MCO project would like to stay with the 5 bolt #3 port arrangement if that is OK with you.	Agreed (SG)
2	H2-828048: It appears that the tapped hole for the cap-screw is not deep enough. The screw would bottom out before the flange is sealed to the MCO.		Accepted. Just prior to the release of the 90% design package, it was determined that 5/8" bolts were needed as opposed to 1/2" bolts. The tap callout was changed to show the intent, however the views were not able to be changed. This will be corrected.	Agreed (SG)

A-6400-097.1 (03/92) WEF011

SENT BY:Merrick P/E OPS Center; 4-21-97 ; 11:35 ;Process/Equipment Op→ 509 376 3252;# 4 004

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3	H2-828048: It is recommend that another type of bolt/screw is used for the flange covers. A socket head cap screw is very non-remote friendly and would be very difficult if not impossible to handle. According to ORNL, socket head cap screws require approximately 4 to 8 times more operator time to connect and disconnect remotely. The use a special cone head bolt and still keep the dead of the screw flush with the surface of the MCO, a few modifications would be necessary. These modifications would include a larger counterbore in the flange covers to allow room for a socket drive. 1/2" bolts on a 4.25" BC would be necessary. The cone-shaped heads must not follow Oak Ridge National Laboratory guidelines exactly; they could be shorter, but still have a cone shape for a better lead-in; there should also be a lead-in on the bottom of the screws to prevent cross threading. Merrick could provide a sketch if necessary.		Cone head bolts are in the works as you request. We will be working with Merrick and the CVD and HCS projects to implement these bolts.	Agreed (56)

A-6400-000.1 (03/92) WEF011

SENT BY:Merrick P/E OPS Center; 4-21-97 ; 11:36 ;Process/Equipment Op→ 509 376 3252;# 5 008

REVIEW COMMENT RECORD (RCR)	1. Date	2. Review No.
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4	H2-828048: The five bolt hole pattern vs four bolt hole pattern method for differentiating the ports was a good idea. However, upon reevaluation, Merrick would prefer to differentiate the ports using a different method while maintaining the same bolt hole pattern on both ports. The reason include: (1) Merrick cannot create flats on the side of the Process Plug/Valve Operator, if a five bolt hole pattern is used. The flats are necessary for the manipulator to grab and place the operator. (2) Considering the this is a remote connection, Merrick would prefer to keep the number of bolts to a minimum. (3) If another mechanism, such as a cone-shaped hole or roll pin in the counterbore is used, this device could be located and sized to serve the purpose of alignment as well as differentiation between the ports. For these reasons, we would prefer two ports with a four bolt hole pattern, (1/2" bolts, cone-shaped on a 4.25"BC). We would also prefer a different method for alignment and differentiation of ports such as a roll pin or cone-shaped hole. Please Note: Merrick will provide hardened bolts, such as H17-type 440 ss or Nitronic 60 for the Process Value/Plug Operators. This should prevent galling.		I understand 5 bolt pattern for port #3 is OK now, also, please see response #1 above.	Agreed (56)
5	H2-828048: Are the bolt holes circles 4.25" or 4.375" as indicated on H-2-828045, Sheet 3? There is a discrepancy between the two drawings.		The correct diameter for the bolt circle is 4.375".	Agreed (56)

SENT BY:Merrick P/E OPS Center; 4-21-97 ; 11:36 ;Process/Equipment Op→ 509 376 3252:# 6

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6	H2-828048: What holds the c-ring on the flange cover in place? Is there a potential that the c-ring could be left behind when the cover is removed?		The C-seal incorporates an eccentric geometry that will hold the seal in place.	Agreed (56)
7	H2-828048: The tap drill diameter for the flange cover bolts seems to be incorrect. The tap drill diameter for a 5/8" bolt should be .531" and not .421".		Again, the 5/8" tap callout was incorporated into the drawings to show the intent of the bolt size. The views were not able to be changed.	Agreed (56)
8	H2-828048: It appears that all of the dimensions for a 1/2" socket-head cap screw were called out, but the screw itself is called out as a 5/8-11.		See above justification.	Agreed (5
9	H2-828048: The fit between the flange covers and the MCO head counterbores is too tight (approx 40 thousands diametrically). We are concerned with the flange getting stuck in the hole when trying to remove it remotely.		Accepted. The clearance between the covers and the shield plug can be increased.	Agreed (5
10	H2-828048: It would be beneficial to get a 1/4" tapped hole by 1/4" deep in the center of the flange covers so that a small lifting tab could be screwed in by the manipulator to place and remove the covers. The tapped hole would also need a cone shaped lead in as well. I know that this would require a reevaluation of the flange cover pressure-retention capabilities, but this option would be more remote friendly than using a suction cup to remove and replace the covers.		This change will be addressed/incorporated into the design drawings and calculations.	Agreed (56)

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO DESIGN REPORT CONTRACT KH-8009-8	SPENT NUCLEAR FUEL	DOUG CHENAULT	SNF TECHNICAL INTEGRATION	MO-285/376-6230

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

Dm Chenault
Reviewer/Point of Contact

Date

Gus H Goldmann 9/8/98
Author/Originator

11. CLOSED

Dm Chenault
Reviewer/Point of Contact

Date

Gus H Goldmann 9/8/98
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
DR 1	PG. 9 SENTENCE...THE RUPTURE DISK IS SANDWICHED...CONFUSING, NEEDS CLARIFICATION	N	Clarification has been added.	
DR 2	PG 10 LAST PARA. SEE APPENDIX 6 SHOULD BE 7, REFERENCE [5] SHOULD BE [6.5]	N	Reference 5 is correct. All references are listed in Section 6.	
DR 3	PG 21 TABLE SHOWING GRAPPLE RECEPTACLE TO BE SAFETY SIGNIFICANT (SS) IS INCORRECT, LIFTING IS NOT A CODED REQUIREMENT.	N	The application of Safety Significant (SS) to the basket grapple does not invoke a requirement that the grapple comply with the ASME code. It does require that the supplier/manufacturer of the grapple have an adequate QA program to ensure compliance with the drawing and specification, which in turn will provide confidence that the grapple will perform its intended function.	
DR 4	PG 23 LAST PARAGRAPH 74.04 SHOULD BE 73.04	N	Typo is corrected.	
DR 5	PG 25 REFERENCE TO ITEMS 10 AND 11 SHOULD BE 18 AND 19	N	Correction has been made.	
DR 6	MAKE SURE COVER CAP IS ANALYSED. PAGE 26.	Y	See Calculation KH-8009-04, Appendix 6.	
DR 7	PAGE 27, SECTION 3.12.2, SECOND PARA.....DESCRIPTION OF GRAPPLE INTERFACE IS INCORRECT.	N	This will be modifed per L. H. Goldmann fax showing correct dimensions for the internal groove.	

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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
DR 8	LUBRICANTS USED MUST BE ACCEPTABLE TO K-BASINS OPERATIONS. PAGE 36	Y	Comment noted. Will pass on to K-Basins personnel.	
APP 1 #9	DWG. H-2-828041 SHEET 4 IS REFERENCED IN PARTS LIST, WHERE IS IT?	Y	Accepted, sheet number should be 2.	
APP 1 #10	DWG. H-2-828041, SHEET 3, SECTION G-G ANGLE ON LEFT, WHERE ARE DETAILS?	Y	The angle shown to the left in Section G-G is include in the filter assembly. This can be seen more clearly in H-2-828049.	
APP 1 #11	DWG. H-2-828042 TITLE SPELLED WRONG	N	Accepted. Drawing H-2-828042 is a three sheet series. All three sheets must have the same title. The new title will be Mechanical Closure Details.	
APP 1 #12	DWG. H-2-828045, SHEET 3...HOW ARE LIFT HOLES POSITIONED WITH RESPECT TO PORT HOLES?	N	H-2-828045, sheet 3 depicts the details for process ports only. Lifting hole details are found on sheet 1, same drawing as 3/4" holes. Sheet 1, which depicts the lifting holes is dimensioned in accordance with ANSI Y14.5M.	
APP 1 #13	DWG H-2-828060, SHT. 3 GRAPPLE RECEPTACLE DIMENSIONED AND SHOWN INCORRECTLY.. OTHER DWGS. ALSO.	Y	See response to comment #7.	
APP 2 #14	PAGE 2, PARA. 6, AUESENITIC (TWO PLACES) SHOULD BE AUSTENITIC	N	Corrections incorporated.	

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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
APP 3 #15	THE MCO PERF. SPEC. SET THE MAXIMUM WEIGHT GOAL AT 20,357 lbs. THE PARSONS DESIGN HAS ESTABLISHED THIS TO BE 20,916 lbs. AN OVERWEIGHT OF 3%. HAS THE DESIGN BEEN THOROUGHLY INVESTIGATED AND CHANGES PROPOSED THAT WILL BRING THE WEIGHT BACK WITHIN THE GOAL? EXAMPLE, THE MKIV CENTER TUBE DIAMETER HAS BEEN DECREASED IN ALL CRITICAL STRESS AREAS BUT NOT OVERALL, WHY NOT?	Y	The weight limit was a design goal, not a hard requirement. Maximizing basket payload, meeting criticality control requirements, designing for DBA's, etc. all took precedence over the weight. We did not specifically request that Parsons perform any redesign for the sole purpose of reducing weight. If the combined cask/MCO weight cannot be managed with the Basin crane, we can start looking at trimming the MCO.	
APP 4 & REM #16	ANALYSES AS PRESENTED SHOW NO AUTHOR OR REVIEWER. THIS IS NOT ACCEPTABLE TO HANFORD NOR DUKE PROCEDURES, PLEASE CORRECT.	Y	This was a draft and the final documents will be signed.	

REVIEW COMMENT RECORD (RCR)

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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
APP 4 #17	CONCERN IS THAT THE PRELOAD VARIATION IS TOO SMALL BASED ON REVIEWERS EXPERIENCE AND AVAILABLE DATA. WOULD SUGGEST THAT AN EQUIVALENT GEOMETRY (OR ACTUAL) BE USED FOR MEASURING PRELOAD WITH ENOUGH BOLTS TO ESTABLISH A STATISTICAL TWO SIGMA VARIATION AND USE THAT. PRELOAD CAN BE MEASURED BY BOLT COMPRESSION MEASUREMENT BY DRILLED CENTERS OR ULTRASOUND.	N	The comment is accepted. We will perform variability testing on jacking bolts to confirm what compression forces are delivered with bolt torque. One possibility is a test stand that would likely be simple and utilize a single bolt and nut at a time to record the variables and determine the loading forces produced. Another possibility is to utilize the first 5 MCOs and collect data from them during various jacking bolt tightening cycles while applying the variables such as lubrication, # of pretorque/preload cycles for the 18 bolt-nut sets in the locking & lifting, torque application and rate of application, etc. There is probably not the time available to build a full scale 18 position test stand unless we make a sensing load ring that replaces the shield plug in a test MCO. This sort of information can also be used, if required, to determine the minimum forces required to initiate the seal and also maintain the seal. We will be in touch with you for your input to the test planning and work.	
APP 4 #18	PAGE 13, THE VARIABLE P_{MAX} IS USED WITH TWO VALUES, CONFUSING.	N	Clarification incorporated.	
APP 4 #19	PAGE 13, THE MAX. BOLT STRESS, 8047 PSI, EXCEEDS THE ALLOWABLE AT 707 DEGREES, i.e.. 5993 PSI.	Y	The allowable per code is 5943 (2) or 11,986 psi which is greater than 8047 psi.	
APP 4 #20	WHAT REF. ALLOWS THE COMPRESSIVE STRESS UNDER THE BOLTS EXCEED THE YIELD STRENGTH? ref.pg. 14.	N	Yield value at temperature is used for capacity.	

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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
APP 4 #21	REF. PG. 15, THE STRESS AT THE THREAD RELIEF IS NOT SHOWN FOR OPERATING CONDITIONS WHERE BOTH PRELOAD AND PRESSURE WILL APPLY.	Y	The thinnest part at the thread relief is used in the calculations.	
APP 4 #22	PAGE 17, THE ANSYS SOLUTION USES A MAXBOLT = 7005 lb., WHERE FROM? IT APPEARS THAT THIS VALUE SHOULD BE 186200/18 = 10344 lb. ALSO, WHAT ABOUT THERMAL EFFECTS IN COMPUTER MODEL, AS THIS INCREASES THE LOADING IN JOINT.	Y	As indicated in the Table header, the "Preload" column is a "Bolt Stress (psi)", not lb. Thus, by dividing 10,334 lb bolt load by the bolt area of 1.49 in^2, the resulting bolt stress in 6942 psi, which is close to the 7005 psi stress shown. Concerning thermal effects, as indicated in the 1st sentence of Section 12.2, the ANSYS runs addressed two load cases only: 1) preload and 2) preload plus pressure (no thermal). The ANSYS runs were not made to qualify the bolts, but to indicate the change in bolt & seal loads due to the pressure loading.	
APP 4 #23	HAS PARSONS ANSYS PROGRAM AND COMPUTER USED BEEN VERIFIED AND VALIDATED TO Q.A. STANDARDS? IF SO HAS THE VALIDATION PROGRAM BEEN SENT TO K. SMITH FOR FILING?	Y	Yes and will be provided at 100% deliverables.	
APP 5 #24	THE MATERIAL LIMITS FOR 304L MATERIALS WERE GIVEN IN THE HWS-S-0426 SPEC., PARSONS HAS SELECTED DIFFERENT VALUES FOR USE IN THE DESIGN REPORT AND PROBABLY WITH JUSTIFICATION, HOWEVER THIS JUSTIFICATION MUST BE GIVEN OR THE REPORT IS IN VIOLATION OF THE SPECIFICATION LIMITS.	Y	The only difference in values is at the upper temperature per Spec. Is 375°C Table in Appendix B of Spec. Gives values at 400°C. See Calculation KH-8009-03, Appendix 5.	
APP 5 #25	PAGE 15, ANALYSIS OF THE FILTER GUARD PLATE IS FOR ELASTIC DEFORMATION IN AN INELASTIC REGIME, PLEASE SHOW INELASTIC DEFORMATION SIMILAR TO ANALYSIS ON PAGE 15.	Y	See Section 7.8 of Appendix 5 for ANSYS results.	
APP 5 #26	PAGE 14, THE QUOTED WEIGHT OF 19,603 lbs SHOULD BE CHANGED TO 19,571 AS SHOWN IN APP.3.	N	Nominal weight of 19,374 lbs. is used since nominal dimensions are used.	

D-7069ja

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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
APP 5 #27	PAGE 28, THE USAGE OF THE STRESS MARGIN RATIO "SR" WITHOUT AN EXPLANATION IS CONFUSING AS IT IS NOT AN ACCEPTED STANDARD. PLEASE INCLUDE A DEFINITION UPON FIRST USAGE.	N	Corrected.	
APP 5 #28	THE CHECK FOR BUCKLING DUE TO A TOP MCO DROP IS COMMENDABLE AS IT HAS BEEN OVERLOOKED PREVIOUSLY, HOWEVER THE EFFECTS OF AN INTERNAL PRESSURE ON THE RESULTS SHOULD BE ADDRESSED AS THIS WILL RAISE QUESTIONS. PAGE 33.	N	See Calculation KH-8009-03, Appendix 5.	
APP 6 #29	PAGE 4, FIRST SENTENCE OF THE INTRODUCTION IS INCORRECT.	N	Collar is welded before basket insertion. Corrected and reworded.	
APP 7 #30	PAGE 12, EQUATION $S_u/5 = 65.6/3$ SHOULD BE/5.	N	Accepted. Comment incorporated.	
APP 7 #31	PAGE 13, AND PAGE 51, 27 G CAN BE 33.5 FOR CORNER THEN HORIZONTAL DROP.	Y	Accepted. Comment incorporated. (Note that a 33.5g corner drop @ 10.5° = 32.9 vertical)	
APP 7 #32	PAGE 16 SHOWS A WEIGHT OF 2350 LBS AND NOT AGREEING WITH THE WEIGHT TABLE (APP 3) OF 2292 LBS. IT IS LATER EXPLAINED AS A CONSERVATIVE WEIGHT ON PG 31. PLEASE MOVE EXPLANATION TO FIRST PLACED USED.	N	Accepted. Comment incorporated.	
APP 7 #33	PAGE 19, VARIABLE DEFINITION CAN NOT BE FOUND AND RESULTS APPEAR UNCLEAR AND IN ERROR. PLEASE CLARIFY.	Y	Accepted and corrected.	
APP 7 #34	PAGE 22, SHEAR (DROP) EQUATION CANNOT BE UNDERSTOOD AS WRITTEN, PLEASE CLARIFY.	Y	Accepted and corrected.	
APP 7 #35	PAGE 26, THE SIGNIFICANCE OF THE ASSUMPTION OR REQUIREMENT,AS IT MAY BE, FOR A 30 DEGREE BOTTOM BASKET ORIENTATION WITH RESPECT TO THE UPPER BASKETS IS UNCLEAR. EXPLAIN IF REQUIREMENT FOR LOADING OR JUST A WORST CASE ASSUMPTION.	Y	Accepted. Clarification text was added to the calculation write-up.	

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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
APP 7 #36	PAGE 39, FIRST PARA., LAST SENTENCE. IS THE WORD LIKELY USED INCORRECTLY?	Y	Accepted, will reword.	
APP 7 #37	THE ARGUMENT ON PAGE 44 FOR THE SHROUD-TO-BOTTOM-PLATE WELD BEING A NON-STRUCTURAL WELD WILL RAISE QUESTIONS. IT WOULD BE BEST TO SHOW THE STRESS LEVELS AND THEN IF BAD, USE THE ARGUMENT.	N	Report text has been modified to reduce the concern raised by the comment.	
APP 7 #38	PAGE 49, THE ALLOWABLE RATIOS SHOWN IN TABLE 5 WITH MARGINAL VALUES ARE DIFFERENT FROM THOSE DISCUSSED IN THE PRIOR TEXT. THIS IS CONFUSING AND WILL RAISE QUESTIONS ON THE ANALYSIS--PLEASE CHANGE WRITEUP TO MATCH THE TABLE.	Y	Accepted. Report modified to address the comment.	
APP 8 #39	PAGE 5, SECTION 5, SECOND SENTENCE IS INCORRECT.	N	Accepted. Text has been changed.	
APP 8 #40	PAGE 8, EQUATION WRONG AS 65.6/3 SHOULD BE /5.	N	Accepted. Comment incorporated.	
APP 8 #41	THE DRAWINGS ARE UNCLEAR AS TO WHETHER THE PAGE 22 RECOMMENDED WELD WAS INCORPORATED.	N	Fuel retaining bar welds have been modified since the 90% package submittal. See current drawings.	
APP 8 #42	PAGE 23, WAS THE DESIGN MOD RECOMMENDED INCORPORATED? IT APPEARS TO BE, IF SO, SO STATE.	N	Report and weld design have been modified.	
APP 8 #43	PAGE 25, QUOTE OF FIG. NG-4427-1 OF SUBSECTION NG AS SPECIFYING A MINIMUM WELD SIZE...TAKE EXCEPTION TO THAT ON THE BASIS THAT THE WELDS ARE BASICALLY NON-STRUCTURAL.	N	Accepted. Text modified	
APP 8 #44	Comment retracted			

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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
APP 8 #45	PAGE 30, THE CENTER TUBE O.D. HAS BEEN DECREASED AT THE TWO MAX-STRESS LOCATIONS, WHY NOT DECREASE THE DIAMETER OVER THE FULL LENGTH OF THE TUBE AND TAKE CREDIT FOR THE WEIGHT SAVINGS?		With the Basin crane capacity increased to 32 tons, the combined MCO/cask weight has additional margin. If something changes and the MCO weight becomes a problem, this is one area that could be examined for possible reductions.	
APP 8 #46	PAGE 8, EQUATION 70.0/3 IS INCORRECT SHOULD BE /5.	N	Accepted. Comment incorporated. (Note: 1st col. Should read APP 9, not APP 8)	
APP 8 #47	PAGE 9, 10, AND 11 THE BUCKLING VALUES DO NOT SHOW A SAFETY MARGIN, PLEASE INCLUDE.	N	The buckling design calculations are based upon the center pipe carrying the entire dead weight when the baskets are stacked inside the MCO. The center pipe buckling margin is provided on p. 14.	
APP 8 #48	PAGE 13, THE O.D. IN THE GRAPPLE RECEPTACLE REGION WAS CHANGED BY PARSONS, HOWEVER INCORRECTLY SHOWN IN STRESS CALCULATIONS AS THE OLD VALUE.	Y	The grapple dimensions have been changed per DESH direction.	

WHCPATH~WEF011X~

NOTE: DR 3 MEANS DESIGN REPORT WRITEUP, COMMENT NUMBER 3 OVERALL.
APP 3 MEANS APPENDIX 3, LOCATION IN REMARKS.
#11 MEANS COMMENT NUMBER 11 OVERALL.

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1. Date	2. Review No.
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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO, Phase II, 90% Design Review	SNF-MCO/W-442 212H	ES Ruff	Mechanisms Engrg. (MCO Fabrication)	376-1943 H5-70 TCPC 431

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

4/14/97. Date

Reviewer/Point of Contact

9/8/98

Author/Originator

11. CLOSED

9/8/98. Date

9/8/98

Reviewer/Point of Contact

9/8/98

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	Fab Spec. 3.1.A.: Define DE&S as Duke Engineering and Services. Flour should be spelled Fluor.		Corrected.	C
2	Fab Spec. 4.3: Be sure to include specific component drawing numbers, catalog pages, part numbers, etc...		Identified in attached appendices.	C
3	Fab Spec. 6.1, para 2: Refer the reader to Table 9-1 for a summary of nuclear saftety related classifications for the components.		Reference added to 6.1.	C
4	Fab Spec. 7.2.1: I believe the transportation group now says that the acceptable leak criteria can be relaxed to $1x10^{-4}$ std. cm^3/sec.		You are correct for onsite transport. However, the MCO Performance Specification, section 4.3 requires the MCO with welded cover cap in place to meet 1 x 10-7 scc/sec. This will facilitate future offsite shipment.	C

A-6400-090.1 (03/92) WEF011

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1. Date	2. Review No.
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5	Fab Spec. 7.3.5: I think it unecessary to weigh each MCO and shield plug. (See if DESH would be willing to waive this requirement.) In lieu of weighing all MCO's, perhaps only the first articles of production could be weighed - to serve as a check on design calculations. Follow-on production of MCO components to dimensioned tolerances would ensure acceptable weight uniformity.		The first five or so of each production run should be thoroughly weighed and recorded. There after every tenth or so MCO should be weighed in the same production run. The greatest variation in the MCO weight will likely be due to the 1/2 inch plate used to make the shell, as everything else is pretty much machined to tolerance. If we change heat number and/or rolling mill supplier for the shell plate then more scrutiny will be needed for the MCOs until a new baseline for weight variation is established. After we have some data on production weights and we have identified the important variables, then the weighing scenario can be solidified and implemented to everyone's satisfaction.	C
6	Fab Spec and Drawings: General Comment; Lou Goldmann told me there has been a nomenclature change. "Dip Tube or Draw Tube" should be changed to "Process Tube".		Corrected, all references are to "Process Tube".	C
7	Fab Spec. 7.5: Calibration of basket gages before and after each test is excessive. Have the gages measured and certified, and leave it at that. Stipulate that basket gages need to be re-checked only if they are dropped, bent, or otherwise damaged during the course of testing/handling. Same philosophy holds true for pressure gages used in pressure testing. As long as the gage is in "current calibration" - generally good for 1 year, there is no need to recalibrate before and after each test.		Experience has shown this is the best course of action to maintain the close tolerances for this project with the prospect of components bieng fabricated by various vendors and the existing requirements for interchangeability.	C

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8	Fab Spec 8.0.Part Tagging: Section A. Rather than use the DOE-XXX-YYY MCO designation, just stipulate they use the Purchase Order Number (maybe this is what you meant ?). Section B: Include Vendor or Fabricator Name. Section c: Include Drawing Revision Number.		Agree. Modified to read: A. Purchase Order number and Serial number (or Lot number). The serial number or lot number shall be traceable through the accompanying data package to a heat number where applicable. B. Specific accessory part name, vendor, and part number. C. Drawing reference, revision number, and part item number.	C
8	Fab Spec. 9.2.6, Change last sentence to read: " The proposed Nonconformance disposition shall include a technical justification provided by the Seller" .		The Seller is providing a recommended justification when the nonconformance is submitted (see 2nd sentence of 9.2.6). The Buyer concurs with this justification or modifies it during the approval process.	C
9	Fab Spec. 11.3: Whenever signatures are called for, stipulate: "signature and legibly typed or printed full name of the authorized representative..." This is intended to preclude the old "illegible-signature-we-don't-know-who-signed-off-on-it" dodge.		Note added to Section 11.3.1-3.	C
10	Fab Spec. Table 11-2: Consider eliminating the requirement for Item 10, Weight Certificates.		The #10 item, weight certificates, is listed in table 11-3 records submittal list. I would assume weight certificates would be supplied for only those components that are weighed. I.e., if it is weighed then a certificate or weigh-in sheet is supplied.	C
11	Fab Spec 7.2.1: Elastomeric is misspelled.		Corrected.	C

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12	Fab Spec Appendix 4: Please try to weed out some of the pages of the Helicoflex catalog cuts that are not directly related to the MCO seal. The fabricator can obtain the catalog as necessary.		This is support documentation used in other areas.	C
13	Fab Spec Appendix 6: Delete page that has drawing of weld-wire Mark IV basket.		Performed.	C
14	Fab Spec: 4.1, T: Define thread standard. Is this to be the ANSI Buttress Thread standard ?		Thread standard will be indentified on subassembly drawings.	C
15	Fab Spec 4.3: Wheelabrator-Frye misspelled.		Corrected.	C
16	Fab Spec 5.1: Add explanatory note regarding subassembly critical dimensions. Refer the reader to section 6.3.5 Piece Part Tolerance.		Reference to 6.3.5 added.	C
17	Fab Spec 6.1: change "his" subcontractors to "their" subcontractors.		Changed.	C
18	Fab Spec: Is there is an inconsistency between 6.4.3.2 and 6.5. Section 6.5 says that high-stress die stamping and pin stamping are not permitted. Section 6.4.3.2 says that the locking ring and canister shell shall be die stamped or pin stamped. Perhaps this apparent inconsistency can be remedied by adding a sentence to 6.5 stating that blunt-nosed dies and blunt nosed pin stamps are acceptable.		Low stress stamps are acceptable.	C

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19	Fab Spec 6.5.1: Several vendors have stated that submerged arc welding is their method of choice for the shell longitudinal weld and the collar/baseplate welds. They vendors say that submerged arc is faster, uses less heat than TIG, and can consistently pass radiographic exam. Consider allowing submerged arc process, with the proviso that the weld cannot be completed all in one pass, to avoid excessive heat and base metal sensitization (ref. telecon Tom Delucchi, weld engineer)		Not accepted. Experience has shown that the risks associated with distortion and metal sensitization as related to life expectancy does not make the savings from submerged arc justified. The buyer may accept submerge arc that meets the ASME Code and sensitization evaluation that is applicable to the design life.	C
20	Fab Spec: 6.2.1.C.1.d: Vendor comments that since flux-cored welding is not allowed per section 6.5.1, reference to flux-cored weld material are irrelevant to this spec.		References to flux-core removed.	C
21	Fab Spec 10.2.2: 1a. change "shells juxtapositioned" to read "shells positioned"...simpler English....		Changed made to "side by side".	C
22	General Comment on Calculation Package: Very professional. The calculations are presented in a logical, concise, and clear format. It is a pleasure to read. Obviously a lot of good, thorough, work has gone into the preparation.		Thanks.	C

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23	General Comment on Warehouse Plan: Also very professional. The document is logical, clear, detailed, and thorough. There are 3 areas that should be considered for future additional scope-of-work: 1. A specific floor plan of the warehouse, showing floor space allocations for specific MCO assemblies in the assumed quantities. 2. A material flow path, superimposed on the floor plan, which verifies that MCO shell assemblies, on fork lifts (or other conveyance), can be moved around corners, and through existing doors in the warehouse. 3. Obtain signature approval/concurrence of the warehouse operations management for the Warehouse Plan.		The additional work proposed would be useful and aid in the warehouse planning. However, it is probably beyond the scope of the intended plan and probably would be better address this additional work once the production support organizations are firmly established at the basins. Once these organizational arrangements are made, then the detailed procedures, bookkeeping needs, warehouse needs, equipment needs, personnel needs, handling routes and paths, etc. may be established and approved.	C
24	General Comment on ASME Code Exception Report: Very thorough. The format is easy to follow, and the exceptions are clearly noted and justified.		Comment noted.	C
	THE FOLLOWING COMMENTS PERTAIN TO THE DESIGN DRAWINGS: H-2-828040 THRU H-2-828065.			

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25	Per Lou Goldmann, Kim Smith, and Ed Ruff: As Additional Scope-of-Work: Please create the following subassembly drawings (post-welded and trued condition). Clearly elucidate the critical dimensions as specified in MCO fabrication spec: 1. Bottom Plate Subassembly 2. Shield Plug Subassembly 3. Vessel Subassembly (shell+collar+baseplate) 4. Fuel Basket Subassembly (each type of basket)		The subassembly drawings have been developed and provided to DESH as of 3/31/97.	C
26	Per Lou Goldmann: Please number the shield plug ports as follows: 1. Short Process Tube. 2. Process Pressure Relief (currently named HEPA Filter) 3. Long Process Tube (currently named Long Draw Tube) 4. Rupture Disk. Note: To meet the requirements of the Hot Conditioning valve connector, Ports 2 and 3 MUST BE diametrally opposed, that is, 180 degrees apart.		Accepted, see SEAGLE 14.	C
27	Per Lou Goldmann: Add a legend to drawing H-2-828041 which lists the number and name of the shield plug ports listed above.		Accepted, see SEAGLE 14.	C
28	Per Lou Goldmann: On every occurrence of every drawing where a shield plug is shown, label the shield plug ports/passages with the port number as listed above. This is intended to provide clarity to the reader.		Accepted, see SEAGLE 14.	C
29	Comment retracted			C
	Comment retracted			C

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31	Per Lou Goldmann: Please check and verify that there is no potential for interference between the Helicoflex seal retainer and the vessel collar. Ref: H-2-828041, VIEW F.		Tolerances between shield plug and collar eliminate the possibility of interference.	C
32	Per Lou Goldmann: Please change the location (and define orientation) of the 1" drain holes in the guard plate such that no portion of the filters are directly underneath the drain holes. This is intended to enhance protection of the filters from internal projectiles during a drop accident. Ref.H-2-828041 and 046.		Accepted, the location will be changed.	C
33	Per Lou Goldmann: Change drain holes in the guard plate to 1" straight drilled holes, with 1/4" chamfer on top. Ref. H-2-828041 AND 046.		Accepted.	C
34	Per Lou Goldmann: Add wrench flats to enable insertion of Bushing, Item 31, H-2-828041. Note ESR: Be sure to allow adequate wrench clearance around the bushing.		Accepted.	C
35	Comment Pertaining to all drawings: Consider global change to general notes: "All machined surfaces shall be 250 RMS or better in accordance with ANSI B46.1, unless otherwise specified." (If 250 RMS is generally acceptable, be sure to apply surface finish callouts as necessary on the ball detent grapple, and sealing surfaces.) Machinists state that metal cutting rates can be approximately doubled in many cases where 250 RMS is acceptable (as compared to 125 RMS).		Drawings will remain showing 125 RMS finish per L. Goldmann direction.	C
	The following apply to H-2-828042 SHEET 1:			

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36	Change title to be " MCO Collar Detail".		Accepted.	C
37	Zone C-7, check 24.50 ID of collar for interference with locking ring thread.		The collar ID has been redimensioned to allow sufficient clearance for the locking ring.	
38	Zone A-7, consider changing 24.000 +/-0.005 to 24.000 +/-0.010		Not allowed.	C
39	View C: Add flag note 8: "Fabricator may submit alternate equivalent full-penetration weld prep detail for Buyer's engineering approval".		A note pertaining to alternate welds has been incorporated on the assembly drawings H-2-820841.	C
40	Zone F-1: Consider changing locking ring material to 304N to increase hardness difference between collar and locking ring to assist in preventing galling.		Accepted. Depending on cost and schedule considerations changing to 304N or 304LN would be acceptable. A proper lubrication program will adequately address galling with the current design.	C
41	Per Lou Goldmann and MHM: the vessel collar must be dimensioned such that the locking ring "protects" the collar weld prep. State another way, the weld prep will be damaged by the MCO Handling Machine (MHM) if the collar weld prep sticks above the locking ring.		Accepted, 0.065 will be removed from the locking ring and added to the cap.	C
42	Zone C/D-5: Consider tolerancing the part w.r.t. the inside diameter, not the outside diameter. Consider relaxing the perp. and cyl. tolerances to 0.010".		42 sh1 has been re-toleranced.	C
43	Per Lou Goldmann: Zone C/D-6: Consider increasing OD from 25.270 to 25.310 +0.000/-0.030		Accepted.	C
	The following apply to H-2-828042 SHEET 2, MCO LOCKING AND LIFTING RING DETAIL:			
44	Per Lou Goldmann/MHM: Zone B-8: Add flatness tolerance of 0.005 to underside of lifting lip (for MHM interface).		Accepted.	C

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45	Zone C-6: Consider relaxing locking ring ID tolerance to +/-0.010"		Due to tolerancing stackup, this would result in an interference w/shield plug.	C
46	Per Lou Goldmann/MHM: Zone B-5: change tolerance requirement on thickness of lifting lip to 1.000 +/- 0.010".		Accepted.	C
47	Per Lou Goldmann/MHM: Zone B-5: add controlled dimension of 2.130 +/-0.020"		Accepted.	C
48	Zone C-3: Consider relaxing flatness requirement of set screw, say from 0.004-0.010".		Accepted.	C
	The following apply to H-2-828042 SHEET 3, "MCO CANISTER COVER DETAIL".			
49	Per Lou Goldmann: Zone C-8: Add flatness callout of 0.005" to underside of lifting lip.		Accepted.	C
50	Per Lou Goldmann: Zone B-5: Change 2.13 dimension to 2.130 +/-0.020"		Accepted.	C
51	Per Lou Goldmann: Zone C-7: Consider changing OD to 25.310 +0.000 - 0.030.		Accepted.	C
52	Zone B-5: Delete flatness requirement for weld prep face		Accepted.	C
	The following apply to H-2-828043 SHEET 1, "MCO SHELL FOR MECHANICAL CLOSURE ASSEMBLY".			
53	View B and C: Add flag note 10: "Alternate equivalent full-penetration weld detail may be submitted for Buyer's engineering approval."		Incorporated on H-2-820041.	C
54	For tolerance zone B: apply the tolerances for pipe diameter, ovality, straightness, etc, as used on MCO/Cask interface drawing, Rev. J. Also, add tolerancing general notes as per MCO/Cask interface drawing to general notes on this sheet.		Being evaluated.	C

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55	Change perpendicularity requirements to 0.015 on each end. Delete parallelism of 0.005 in Zone C-2.		Accepted.	C
56	Zone C-7: Delete flatness requirement of 0.002 on weld prep face.		Accepted.	C
57	Zone C-8: Re-evaluate possibility of loosening circularity tolerance of 0.010" for tolerance zone A and C. Pipe ends will be align-clamped to match collar and base plate diameters before they are tack-welded together.		Being evaluated.	C
	H-2-828044 SHEET 1, MCO SHELL BOTTOM MACHINED FORGING: Zone F-4: Relax flatness tolerance to 0.010		Accepted.	C
58	The following apply to H-2-828045 SHEET 1, MCO *MECHANICAL CLOSURE SHIELD PLUG:*			
59	Zone C-6: Consider relaxing tolerance on the 15.780 dimension to +/-0.010.		Due to tolerance stackup this would result in an interference w/locking ring.	C
60	Number and label the ports and passages per previous comment.		Accepted, see SEAGLE-14	C
61	Zone D-2: change flag note 6 to refer to MCO fab spec, not Hanford spec.		Accepted.	C
62	H-2-828045: 1. Zone C-7: Allow drill point terminus at bottom of hole. 2. Double check to make sure the 2.000 hole ID provides adequate socket clearance.		Accepted.	C
	The following apply to H-2-828047 SHEET 1, MCO *PROCESS VALVES*			
63	Zone D-4: Item 2: check to ensure sufficient wall thickness on the hex to withstand installation torques.		The critical hex head (hollow head, rupture disc valve) is evaluated in Appendix 10, p. 20.	C

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64	Per Lou Goldmann: Add General Note: "Valve shall be nominally rated for 150 psig at 200 deg.C. Valve must also withstand transient pressure of 75 psig at 375 deg. C."		Accepted. Both conditions are applied to the rupture disc specification.	C
65	Per Lou Goldmann: change class of threads from 3A to 2A. This will allow a looser fit, and reduce the tendency to gall.		Accepted.	C
66	Zone F-1, Body, Bar material: Consider changing to 422 martensitic stainless steel alloy. This is harder than 316L, will reduce tendency to gall. Alloy is also magnetic, allowing easier pickup if unthreaded from MCO. Ryerson catalog says this alloy is used for steam turbine blading and bolting, and it is available in stock round bar, heat treated and rough turned.		It is believed that sufficient lubrication will be provided from Never Seize to eliminate galling. 316L will therefore be specified initially. If it is late found during prototype assembly that a harder material is needed, it will be specified at that time.	C
67	If valve material is not changed, consider specifying rolled threads. Rolled threads will work harden the material, reducing tendency to gall.		See Ruff 66.	C
	The following apply to H-2-828048 SHEET 1, MCO PROCESS PORT FLANGES:			
68	Per Lou Goldmann: Add a new part, 4-bolt blind flange.		A 4-bolt blind cover is depicted on H-2-828048 as assembly 2.	C
69	Per Lou Goldmann: Add a new part, 4-bolt flange with 1" hole, hole to be offset away from center.		Accepted.	C
70	Per Lou Goldmann: Modify Item 2: offset 1/4" hole away from center, and add 4 gas grooves to enable gas to escape when MCO is covered by an impact limiter.		Process port cover caps have been recessed, eliminating the need for gas grooves.	C
	The following apply to H-2-828050 SHEET 1:			
71	Zone E-6: Specify thread callout for process tube.		Accepted.	C

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72	Add flag note 6:"Thread relief may be omitted if threads are milled (or bottom-tapped) to very bottom of hole to enable full-seating of process tube".		The thread relief is used after final assembly to minimize effects of tolerance stack up.	C
73	Zone E-5: Consider relaxing flatness tolerance of datum A.		Accepted.	C
74	Per Lou Goldmann: Consider adding a perpendicularity tolerance of the process tube threads on a shield plug subassembly drawing.		Accepted.	C
	The following apply to H-2-828051 SHEET 1, MCO MECHANICAL CLOSURE DIP TUBE:			
75	Per Lou Golmann: Change "dip tube" to "process tube" for item 1 Zone B-6 and title block.		Accepted.	C
76	Comment retracted			C
77	Comment retracted			C
78	Comment retracted			C
79	Please give reference dimension for ID of process tube.		Accepted.	C
	The following pertain to H-2-82852 SHEET 1 MCO DIP TUBE GUIDE CONE:			
80	Per Lou Goldmann: Change "dip tube" to "process tube" in title block and item 1 title.		Accepted.	C
81	Consider loosening tolerances wherever possible. For instance: 1. Flatness of datum A - +/- 0.005 2. Cylindricity to 0.005 3. Parllelism tO 0.010 4. OAL: 3.175 +/-0.005		Accepted.	C

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82	Note: If ID were changed from 1.400 to 1.375, a stock mechanical tube of 2-7/8" OD x 1.375 ID could be used as starting material for the part.		Accepted.	C
83	Zone B-6 Check: should the .690 dimension really be .590 ? Do you really want that shoulder to stand above the basket support plate ?		Accepted.	C
84	H-2-82853 SHEET 1, MCO BASKET SUPPORT PLATE: Zone C-4: Add reference dimension of .590 for process tube guide cone shoulder.		A Reference dimension is not required at this location.	C
85	H-2-828070 SHEET 1, MCO MARK IV SNF STORAGE BASKET: Per Kim Smith and Lou Goldmann: Change material to carbon steel for basket construction: 1. Use medium carbon casting alloy ASTM A516 Grade 70 for base plate casting. 2. Use A-36 or better carbon steel for other parts.		HOLD.	
86	H-2-828070 SHEET 2 or 3: Add dimensions to clearly show thickness and allowable tolerance for base plate casting (after machining).		Accepted.	C
	The following pertain to H-2-828070 SHEET 3:			
87	Machinists ask if it is permissible to machine the bar slots all the way across the bottom face of the baseplate - this would allow thru-feeding of the part into a multiple slot-cutter setup. Note: if thru slots are not acceptable, drawing needs to show slot-stop end detail. Suggest end detail that can be machined by fluted end-mill (i.e. no square-edged blind stops).		Machining the slot all the way across the bottom face is acceptable from the structural standpoint. Drawing views will clarify slot conditions.	C

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88	View G: The shop noted that there is not enough slot depth for an 1/8" fillet. It is only possible to place a 1/16" on both sides of the bar. Revise weld detail accordingly, and check stress calc as necessary.		The fillet welds on the fuel support bar has been moved from the bottom of the bar to the sides of the bar.	C
89	Item 6: specify whether round bar is to be hot-finished (annealed condition) or cold finished (drawn to size, cold worked).		The material specification (SA-479) requires a "solution annealed condition, with subsequent light cold drawing and straightening permitted".	C
90	Item 6: the prototype baskets used 1.375 dia. bar. Are you sure you wanted to reduce the size to 1.250 diameter ?		The 1.25-inch size was specified on the preliminary design drawings at the beginning of the Phase II design. Since there are no drop load requirements for the Mark IV design, the 1.25-inch size is adequate.	C
91	H-2-828060 SHEET 1, STORAGE BASKET MARK IA: View A, Will the 1/8 fillet weld that tacks the post on one side to the baseplate will tend to pull the vertical support rod inward, out of perpendicular ? Vertical alignment of support rods, within tolerance was a difficult problem (even without welding) during prototype fabrication.		Since the tack welds are small relative to the size of the bar, significant distortion of the support rod is not expected. If problems are encountered during fabrication, some adjustments to the fab. Procedures and/or tack welding can be made. As long as: 1) Basket OD envelope is met, 2) Basket height is within tolerance for all 6 posts and center post, then the basket is acceptable. No change on drawings.	C
	The following pertain to H-2-828060 SHEET 2, STORAGE BASKET MARK IA			
92	Zone E-4: Machinists ask: Can the outermost row of holes be deleted ? (Approx. 3 holes between each support post.) This would reduce machining cost.		Holes are required for proper gas distribution during HCS.	C

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93	Zone B-4: Consider relaxing flatness to 0.010". Machinists say the interrupted cuts across holes will be difficult to smooth.		Accepted.	C
94	Transfer the perpendicularity and parallelism callouts to new subassembly drawing.		Accepted.	C
	The following pertain to H-2-828060 SHEET 3, STORAGE BASKET MARK IA:			
95	Machinists suggest: Center bushing, item 7 be welded in place rather than pinned. This is an exception to their general rule that welds should be avoided where possible. If acceptable, then delete pin hole on centerpipe, and detail a weld prep on the bottom of the center bushing.		The pinned design should require fewer operations than a welded design, and still meet all functional design requirements. Leave this detail as is.	C
	The following pertain to H-2-828060 SHEET 4, STORAGE BASKET MARK IA:			
97	Zone E-8: Machinists ask: Can the outermost row of holes be deleted ? (Approx. 3 holes between each support post.) This would reduce machining cost.		Holes are required for proper flow distribution during HCS.	C
98	Zone E-7: Can you relax true position of rod holes to 0.010"		Accepted. Changed datums to H & G, changed form LMC to MMC	C
99	Zone E-5: Can you relax the perpendicularity of these 2 holes to 0.003" ?		Accepted, critical dimension on final product must be met.	C
	The following pertain to H-2-828060 SHEET 5, STORAGE BASKET MARK IA:			
100	Zone D-3: Can you relax the perpendicularity of the pin hole to 0.003" ?		Deleted perpendicularity specification, changed to locational specification, dia .005, datums L & J.	C
101	Zone C-3: Can you relax the nominal cross section dimensions of the bar ? Say, nominal +/- 0.010" ?		Accepted.	C

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102	Item 12, post, Machinists ask: Can the post be machined with a small flat edge on either side, rather than the sharp vertex ? They feel that this would ease machine setups, and allow the use of a dual-cutter.		Accepted, point to point was 3.073 nominal, will give 0.020 on each side for flats resulting 3.043 +/- 0.010	C
103	REPEAT COMMENTS FOR MARK IA SCRAP BASKET: All comments mentioned above on the Mark IA storage basket, also apply to the Mark IA Scrap Basket drawing, H-2-828065.		As for storage basket.	C
	The following questions were submitted by a vendor bidding on the MCO fabrication contract:			
104	Drawing H-2-828065 Verify the width dimension as shown on sheet 5 detail 17 compared to the bill of materials list on sheet 1.		Corrected width on BOM to 6.45".	C
105	Drawing H-2-828070Sheet 3, detail 6 references note 14 which is not found.		Accepted.	C
106	Drawing H-2-828045 Sheet 1 detail 1 area B-8 shows plug to be .546" dia. which conflicts with referenced note 8 in bill of materials list.		Detail will show 0.566-in. diameter, which will be consistent with the inside diameter of the process tube.	C
107	Drawing H-2-828047 Item 5 in the bill of materials list requires 316L material. Is this correct?		316L is the correct identification.	C
108	Drawing H-2-828049 Title block shows sheet 1 of 2. We did not receive sheet 2.		Sheet 2 was eliminated.	C

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109	Drawing H-2-828041 Sheet 2 bill of materials quantity for several items shows "AR". Please clarify.		Accepted.	C
110	Drawing H-2-828075 Bill of materials list item 4 references note 15 which is not found.		Accepted, should read 12.	C
111	Drawing H-2-828042 Sheet 2 item 2 shows collar being 20.38" dia. This does not allow adequate room to install the set screws from the top.		Set screws must be threaded and installed from bottom of locking ring. Notes on drawing 828042 sheet 1 reflect this.	C
112	We have been approached by other bidders for a quotation on materials and prefabrication. Our concern is the way they are specifying the quality assurance requirements, especially for material. According to the fabrication specification WHC-S-0453 paragraph 1.0 states "..fabricated in accordance with the requirements of the ASME Boiler and Pressure Vessel Code Section III, Div. 1, Subsection NB...NG unless otherwise noted by this specification." This paragraph directs you towards article NB-4000 Fabrication and Installation. Paragraph NB-4110 states "...shall be manufactured from materials which meet the requirements of NB-2000." Paragraph 6.2 and 6.2.1 of this same fabrication specification continues to reiterate these same requirements mentioned above. Our concern is the quotations we have seen from other bidders request we quote material to only NQA1 which clearly does not meet your requirements (ASME III NB/NG as applicable to Table 9.1).		Safety class materials must meet specified requirements of the ASME code. This will be clarified to the bidders.	C

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	The following questions/comments are from a second vendor who is bidding on the MCO fabrication contract:			
113	Section 1.2.B (p. 2) - This section indicates that shield plug and the lifting/locking ring will be placed remotely. We were advised during the pre-bid demo that only the top shield plug will be placed remotely. Please advise.		The shield plug will be inserted while the MCO is approx. 10 ft. underwater. The locking ring will be inserted after the MCO has been brought to the surface, however, special tooling will be used to insert the locking ring into the MCO. This special tooling will be "semi-remote" - it is a combination of manual guidance and machine operation. Personnel will have to avoid the shield plug area as much as possible to avoid streaming radiation from between the MCO and the shielding cask. All things considered, it is correct to imply that locking ring installation is a remote placement task.	C
114	Section 3.1.G (p. 3) - With respect to the definition of "First Article of Production," please define what is meant by a production run.		Changed to read "First Article of Production is the first component/subcomponent fabricated...	C
115	Section 4.3.E (p. 6) - When will buyer specify the relief valve to be used?		Requirements for the valve and suggested manufacturers were sent to the bidders on 3/20/97.	C
116	Section 6.1, 3rd para. (p.7) - Please explain what is meant by "The Seller shall accept complete responsibility for all work performed in compliance with this specification". It would seem that in view of the build-to-print nature of the project that if the work is performed in compliance with the specification, Buyer will be responsible.		This is intended to be an emphasis statement. No change to document.	C

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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 are the second vendor's questions on Table 6.3.6-1 - MCO Shell:			
117	a. Re stated min wall thickness of 0.410. PCC suggests that this be added to the applicable shell drawing.		Min. wall thickness determined to be 0.425 and will be incorporated on drawing. See Calculation KH-8009-8-03, Appendix 5.	C
118	b. Re dip tube guide top surface to top surface of support plate dimension, the min/max dimensions listed do not agree with Drawing H-2-828041, Rev. C.		Correct Drawing to 2.595, 2.565.	C
119	c. Re support plate top surface parallelism, we are not able to find this requirement on Drawing H-2-82804, Rev. C.		Accepted, incorporated in on assembly drawings.	C
120	d. Re outside length, the min/max dimensions listed do not agree with the MCO length shown on Drawing H-2-8284, Rev. C.		Accepted - Table to be corrected.	C
121	e. Re inside length, top surface of support plates, to collar seating surface. This dimension does not seem to appear on any of the existing MCO drawings.		To appear on assembly sketches.	C
122	f. Re sealing surface flatness, the max listed does not agree with Drawing H-2-828042, Rev. C.		Accepted - Dwg. to change.	C
123	g. Re collar lip flatness, there is no such callout on Drawing H-2-828042, Rev. C. However, there is a callout for the collar lip to be parallel with Datum A to within 0.006".		Parallelism to be removed from top of the collar.	C

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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
124 ✓	h. General Comment - It is strongly recommended that Buyer provide a contract drawing showing the finished MCO shell assembly. Currently, the following drawings must all be viewed in order to determine the requirement of a completed MCO shell assembly. Canister Collar H-2-8208042, Sheet 1, Rev. C Shell Bottom H-2-828044, Rev. C MCO Shell H-2-828043, Rev. C Guide Cone H-2-828052, Rev. C Support Plate H-2-828053, Rev. C Overpack Assembly H-2-828041, Rev. C Additionally, it is unlikely that any fabricator will be able to make and assemble the above MCO shell assembly piece parts as depicted on the above drawings and obtain the required MCO shell assembly. A drawing depicting the final MCO shell assembly will allow the fabricator the latitude of establishing piece part sizes, in-process dimensions and weld joint designs and locations to achieve the required final dimensions of the MCO shell assembly.		Many of your questions pertain to critical dimensions for the MCO. To clarify the critical dimensions (and their associated tolerances) the MCO Design Agent has been instructed to prepare a set of subassembly drawings that clearly illustrate all critical dimensions that are listed in Table 6.3.6-1, page 11, of the MCO Fabrication Specification. The subassembly drawings will include: 1. Shield Plug Subassembly 2. Vessel Subassembly (including bottom plate, shell, and collar) 3. Bottom plate Subassembly 4. Critical Dimensions drawing for each one of the 4 types of fuel baskets.	C
125 ✓	Table 6.3.6-2 - Dip Tube (p. 11) Re the bottom 3" O.D. maximum, Drawing H-2-828051, Revision C, does not call out a maximum size.		Accepted, removed from critical dimension.	C
	The following are the second vendor's questions pertaining to Table (not labeled) - Shield Plug (p. 12):			
126 ✓	a. Re locating diameter flatness, the called out maximum flatness does not agree with Drawing H-2-828045, Rev. C.		To be 0.003	C

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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
127	b. Re major O.D. above locating diameter, the called out min/max diameter does not agree with Drawing H-2-828045, Rev. C.		Fab Spec. To read 23.980 +/- 0.003	C
128	c. Re vertical distance between locating diameter and sealing surface, the called out min/max dimension does not agree with Drawing H-2-828045, Rev. C.		Accepted, drawing and Fab. Spec. agree, 0.155+.000,-.004 per helicoflex specification.	C
129	d. Re sealing surface flatness, Drawing H-2-82045, Rev. C, requires a parallelism to Datum A not flatness.		Change drawing and Fab. Spec. to flatness 0.002,	C
130	e. Re vertical distance between locating diameter and the guard plate bottom surface, the min/max of this feature cannot be located on any of the supplied drawings.		Incorporated on Assembly dwgs.	C
131	f. Re basket stabilizer I.D., the min/max dimensions called out do not agree with the dimensions on Drawing H-2-828050, Rev. C.		Fab. Spec. To change to 2.715 +/- 0.005.	C
132	g. Re port flange o-ring flatness, the max flatness requirement called out does not exist on Drawing H-2-828048, Rev. C.		Accepted flatness 0.002 to be incorporated.	C
133	h. General Comment - It is strongly suggested that Buyer provide a contract drawing showing the finished shield plug assembly. This drawing would show the assembly of the shield plug (Item 1 of H-2-828045), guard plate (Item 1 of H-2-828046), guard plate ring (Item 2 of H-2-828046), basket stabilizer extension (Item 1 of H-2-828050) and internal filter assembly (H-2-828049) as a minimum along with all the necessary final dimensions that are required. The reasoning for this is as stated above.		See disposition to comment #124.	C

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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
134	Table 6.3.6-3 - Locking Ring (p. 13) Re: lifting ring I.D. the min/max dimensions listed do not agree with Drawing H-2-828042, Rev. C.		Table dimensions changed to match drawings.	C
135	Table 6.3.6-4 - Cover Cap (p. 13) Re: major diameter thickness and lifting ring I.D. the min/max dimensions listed does not agree with Drawing H-2-828042, Rev. C.		Table dimensions changed to match drawings.	C
136	Section 6.4.1 (p. 15) - The wording implies that the basket assemblies will be inserted into the MCO by the fabricator.		Wording change: To identify this as a cleaning concern and not a shipping configuration.	C
137	Section 6.5.5.A (p. 19) - The first sentence of this section seems somewhat unclear--could it be reworded?		Corrected to read "All machined surfaces shall be examined at completion of machining..	C
138	Section 6.5.5.D (p. 21) - We have not noted any requirement on the design drawing to UT any welds.		Will be identified on subassembly drawings.	C
139	Section 7.1.2 (p. 24) - There appears to be conflicting requirements with regard to the UT of forgings. In one sentence, forgings must be UT-inspected for minimum thickness. In another sentence, the UT can be performed before generating final dimensions.		Wording change to clarify one UT as material integrity only.	C

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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
140 ↘	Section 7.2.1 (p. 25) This section advises that the first unit of each production run is to be helium leak-tested with metallic seals and follow-on units can be tested with elastomeric seals. Item 25 (p. 8) of DESH Letter 97-JJJ-012, dated 3/6/97, states that the first 20 or 25 MCOs should be tested with metallic seals.		At the very least the first batch of 5 MCOs should be tested with helicoflex seals. We should spot check MCOs after that. We should plan on a minimum of 1 out of every 10 MCOs being tested with a helicoflex seal. On this schedule, we would test about 45 MCOs with Helicoflex seals and as such we would pay for the additional 45 Helicoflex seals. The elastomeric seals should be reusable for quite a few MCOs. If we get into sealing problems then we may test more often with the Helicoflex seals.	C
141 ↘	Section 7.2.1 (p. 25) It is suggested that the timing of the leak test procedure submittal be revised to "...prior to the start of testing."		Change made, submittal is now prior to start of testing.	C
142 ↘	Section 7.3.1 (p. 25) - It is assumed that the fuel assembly basket insertion gauge called out is in fact the MCO internal gauge listed in Figure 7-1.		This is correct.	C
143 ↘	Section 7.3.2 (p. 25) - It is assumed that the MCO assembly to be tested is the assembly consisting of the canister collar (Item 1 of H-2-828042), the MCO shell (Item 1 of H-2-828043), and the shell bottom assembly (Item 3 of H-2-828041). Please confirm.		This is correct.	C
144 ↘	Section 7.3.3 (p. 25 - 26) - It is suggested that the requirement to record actual gauge resistance be modified to establish a max resistance force as in Test #1.		Max. resistance force added.	C
145 ↘	Section 7.3.4.1 (p. 26) - PCC cannot find a center grapple point (or any other obvious handling point for that matter) on the shield plug.		By lifting points, 4 holes. Lifting apparatus by DESH.	C

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146	Section 7.3.5 (p. 26) - Is it acceptable to weigh the shield plug and then assembled MCO in the 7.3.4.3 fit-up test and subtract the former from the latter?		Yes, the weight may be obtained in this manner.	C
147	Section 7.3.6 (p. 26 & 27) - This test appears to be identical to Test #2.		First test is for fabricator info. Second test is hold point for buyer.	C
148	Figure 7-1 (p. 27) - Note "**" appears to be misworded. Please advise.		Changed to read: Gage diameter is 0.050" larger than basket envelope gauge internal diameter to ensure adequate clearance between actual baskets and the MCO interior shell.	C
149	Section 9.3 (p. 31) - We respect the right of Buyer to call for the repetition of any and all tests. Will this be a priced option or done on a time-and-material basis? If it is to be included as part of the fixed price, please advise the type and how many Buyer requested test repetitions should be included by bidders.		The Buyer should show up and witness any tests as they occur, or pay time-and-materials if requesting to have the tests repeated.	C
150	Section 10.1.3 (p. 33) We understand that delivery is to be F.O.B., fabricator's plant. Further, we understand that fabricator is responsible for any damage as a result of improper packaging assuming that good handling and transportation practices are followed by others. In view of the above, we suggest that the first sentence of this section be deleted.		First sentence removed.	C
151	Section 10.1.3 (p. 33) 2nd paragraph - The requirements of this paragraph appear to conflict with the requirements of Section 10.2.1 (i.e., ship MCO with the locking ring installed).		Paragraph reworded to indicate all parts will be present so test can be performed if Buyer so desires.	C

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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
152 ✓	Section 10.3 (p. 35) - It is our understanding that DESH will be handling the transportation from fabricator's site to the ultimate shipping destination. As such, all but the first sentence of this section is not applicable and should be deleted.		First sentence deleted.	C
153 ✓	Section 11.1.1 (p. 35) - In order to assure that all bidders have the same requirements and workscope, it is suggested that DESH require that all shop drawings be prepared using a CAD system.		This is fine with us, the Buyer, if there are no objections from the other bidders.	C
154 ✓	Section 11.3 (p. 36) - The wording in this section is somewhat confusing. It is our understanding that an original and one (1) copy of the final document package is required.		The "sample document package" is intended to weed out all problems prior to fabrication and delivery of the actual document package.	C
	The following are the second vendor's comments/questions on the drawings:			
155	Drawing H-2-828041, Rev. C:			
156 ✓	1. It would appear that the required quantity for Item 16 should be 2.		Accepted.	C
157 ✓	2. It would appear that the required quantity for Item 10 should be 18.		Accepted.	C
158 ✓	3. It would appear that the required quantity for Item 24 should be 6.		Accepted.	C
159 ✓	4. It would appear that this list should be modified to show that Items 13, 14, 15 and 20 should be included as part of Part - 040 (shield plug subassembly).		Accepted.	C
160 ✓	5. It would appear that note #10 applies to Item 38 (Helicoflex seal).		Accepted.	C

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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
161	Drawing H-2-828042, Rev. C (Sheet 3) Please advise when the necessary details for the optional rupture disk cover design will be available.		Details will probably be available some time after contract award, but prior to approval of shop drawings - before the start of fabrication of the First Article of Production.	C
162	Drawing H-2-828045, Rev. C Please add a detail that shows the number and size of the mounting holes for the main helicoflex seal mounting clips.		Accepted, incorporated on 828045, sheet 1.	C
163	Drawing H-2-828045, Rev. C DESH may want to consider using helicoil inserts for the various tapped holes on the top face of the shield plug.		Thank you for the suggestion. It is certainly worth considering. However, for the present bid submittal, assume that the threads are tapped directly into the shield plug. Helicoil inserts could be an engineer-approved controlled change negotiated during the development of shop drawings.	C
164	Drawing H-2-82046, Rev. C Please advise if the dimensions of the guard plate and the guard plate ring are in-process or final. If they are final, it is suggested that DESH include them on a drawing depicting the shield plug subassembly.		The Design Agent has been instructed to prepare a shield plug subassembly drawing with the critical dimensions.	C
165	Drawing H-2-828047, Rev. C It would appear that the Item 6 seal on this drawing is the same Item 40 seal shown on Drawing H-2-828041, Rev. C. We suggest that Item 6 be deleted from the H-2-828047 drawing.		Accepted.	C
166	Drawing H-2-828048, Rev. C Please explain note 7 and how bidders should handle.		Approximately 1/3 of the four bolt cover flanges will be procured with the 1/4 orifice hole. The others will not require the orifice hole.	C

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167	Drawing H-2-828048, Rev. C We don't understand the applicability of note 4 to the parts shown.		Accepted.	C
168	Drawing H-2-828049, Rev. C This drawing is unclear. Item 4 is in the drawing field, but not called out in parts list; some of the items appear to be identical to what are shown on H-2-828041, Rev. C.		Accepted, should be 1.	C
169	Drawing H-2-828053, Rev. C We recommend that the length of the basket support plate be revised to result in a minimum of 0.375 inch radial gap between the support plates and the MCO shell wall. This is in in order to facilitate the placement of film for the RT of the bottom plate subassembly to shell weld.		Accepted.	C

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO Fabrication Specification, WHC-S-0453, Revision B		S. R. Crow	Packaging Engineering	345 Hills/376-5388

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

4/14/97 — Date

S R Crow — Reviewer/Point of Contact

9/8/98 — Author/Originator

11. CLOSED

4/14/97 — Date

S R Crow — Reviewer/Point of Contact

9/8/98 — 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	Page 3, para 3.1,A: typo, "Flour" should be "Fluor"		Typo corrected.	
2	Page 6, para 4.3.F: typo, "Wheelabrazor" should be "Wheelabrator"		Typo corrected.	
3	Page 11: Shell support plates top surface parallelism required to be 0.0026". Could not find this requirement implemented on the drawings.		Will be incorporated on sketch drawings, appendix to FabSpec.	
4	Page 11: Shell outside length 157.83/158.02. This dimension doesn't match the drawing requirement of 157.53/157.72.		Table 6.3.6 of Fabspec. changed to reflect correct dimensions.	
5	Page 11: Shell sealing surface flatness required to be 0.002". Drawing only requires a flatness of 0.003" and that is before welding the collar in place.		Drawing corrected to reflect correct dimension.	
6	Page 11: Dip tube threaded length must be minimum of 1.5". Drawing tolerance allows 1.47" minimum.		Fabspec Table 6.3.6 corrected to proper dimension.	
7	Page 12: Typo, no title for Shield Plug Critical Dimensions table.		Table 6.3.6 corrected.	
8	Page 12: Why is the plug major OD different from the major OD above locating diameter?		Table 6.3.6 corrected.	

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9	Page 12: Locating diameter flatness is required to be 0.003". Drawings shows a flatness requirement of 0.002".		Table 6.3.6 corrected.	
10	Page 12: Basket stabilizer ID is required to be 2.645/2.655. Drawings require ID to be 2.710/2.720.		Table 6.3.6 corrected to match drawings.	
11	Page 12: Vertical distance between locating diameter and the basket stabilizer thread relief top surface is required to be 2.780/2.800. Drawings show this dimension to be 1.370/1.380.		Table 6.3.6 corrected to match drawings.	
12	Page 12: Port flange O-ring recess flatness required to be 0.002". This flatness requirement is not shown on the drawings.		Drawing corrected to reflect dimension.	
13	Page 13: Critical dimension for Lifting Ring ID is shown to be 19.220/19.280 in 2 places. Shouldn't the critical dimension be the 18.75 dimension?		Dimension changed. Table 6.3.6 and drawings coincide.	
14	Page 13: Critical dimension for the cover cap major diameter is shown to be 23.156/23.182. Shouldn't the dimension be 25.270/25.280?		Table 6.3.6 corrected to match drawings.	
15	Pages 13 and 14: Required to measure vertical fuel room. Location of this measurement should be specified.		Will be identified on sketch drawings, Fabspec appendix.	
16	Page 25, 1st para, 3rd sentence: typo, "elastomanic" should be "elastomeric"		Typo corrected.	

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MCO Drawings, 90% Draft		S. R. Crow	Packaging Engineering	345 Hills/376-5388

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

4/14/97
Date

S R Crow
Reviewer/Point of Contact

Author/Originator 9/8/98

11. CLOSED

4/14/97
Date

S R Crow
Reviewer/Point of Contact

Author/Originator 9/8/98

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	Drawing H-2-828041, Sheet 1: Tolerance for pipe outside diameter seems much tighter than required. Tolerances for ovality and straightness of the pipe are applied prior to welding on the collar and bottom plate (H-2-828043). Shouldn't these tolerances also be required after welding. This same comment applies to the collar (H-2-828042).		Piece/part tolerances on these drawings should lend the acceptable assembly geometries as specified by critical dimensions list.	
2	Drawing H-2-828041, Sheet 1: Height of guide cone above support plates has a tolerance of +/-0.005". Fabrication spec. only requires a tolerance of +/- 0.015".		Accepted - Fab Spec tolerances are unacceptable for MKIV baskets. Needs to be 2.580 to 2.585. Fab. Spec. to be revised.	
3	Drawing H-2-828041, Sheet 2: 4 place dimensions on Item 31 seems unnecessary.		Accepted should read 1.0", 0.25"	
4	Drawing H-2-828042, Sheet 1: typo, "cainster" should be "canister" in title block.		Accepted - MCO Canister	
5	Drawing H-2-828042, Sheet 1: Should add a note to coat the set screws with Nickel Never-Seez or other approved lubricant prior to assembly.		A note will be added to the assembly drawing indicating that a nuclear grade lubricant approved by the Buyer shall be applied prior to assembly.	

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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
6	Drawing H-2-828042, Sheet 2: a thread allowance for easy assembly should be applied to the external buttress thread on the locking ring.		Accepted.	
7	Drawing H-2-828042, Sheet 2: What does the 30° chamfer on the top edge the locking ring buttress thread provide?		Provides allowances for caps.	
8	Drawing H-2-828042, Sheet 2: The size of the hex socket on the set screw did not show up on my drawing.		3/4 hex will be incorporated.	
9	Drawing H-2-828043, Sheet 1: Note 7 is not consistent with Note 5 on drawing H-2-828041.		7- for vertical weld in special case 5- for horizontal welds in general	
10	Drawing H-2-828043, Sheet 1: Wall thickness of the pipe is shown as 0.500 NPS. What is NPS?		Nominal Pipe Size.	
11	Drawing H-2-828044, Sheet 1: Tolerance for location of radii in View A seems too tight.		Accepted - 0.38 and 1.10	
12	Drawing H-2-828045, Sheet 1: Height of shield plug should be an actual dimension rather than a reference dimension.		Critical dimensions are from the locating diameter to the top and bottom surfaces. Results in total thickness as reference.	
13	Drawing H-2-828045, Sheet 1: Flatness tolerance for Helicoflex sealing surface is tighter than the fabrication spec. requires (0.002 vs. 0.003).		Fabrication Spec and drawings will reflect a flatness of 0.002 on the sealing surface.	
14	Drawing H-2-828047, Sheet 1: Process valves will have stainless to stainless threads. Is an anti-galling compound allowed? If allowed, this should be specified on the assembly drawing.		A note will be added to the assembly drawing indicating that a nuclear grade lubricant approved by the Buyer shall be applied prior to assembly.	
15	Drawing H-2-828048, Sheet 1: Port flange screws will have stainless to stainless threads. Is an anti-galling compound allowed? If allowed, this should be specified on the assembly drawing.		A note will be added to the assembly drawing indicating that a nuclear grade lubricant approved by the Buyer shall be applied prior to assembly.	
16	Drawing H-2-828060, Sheet 1, View A: typo, "item 20" should be "item 2".		Accepted.	

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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
17	Drawings H-2-828060 and H-2-828065: Are the trapezoidal bars used to transfer the load through the baskets necessary? Tolerances are relatively tight and a lot of machining is required. Also, the spring pins that are used to hold them in place seem unnecessary and require additional machining.		1)Trapezoidal bars could possibly be removed from the design by either adding material thickness to, or increasing the strength of the center post. Additional calculations would need to be performed to show that the center post remains within 2" of center on a side drop following the end drop. 2)Spring pins allow for large tolerance windows on the piece/parts. These holes should require only minimal machining.	
18	Drawing H-2-828040, Sheet 1: typo, "dip tub" should be "dip tube"		Accepted.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO Design Report, Revision A		S. R. Crow	Packaging Engineering	345 Hills/376-5388

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

4/14/97 Date — S.R. Crow Reviewer/Point of Contact

John H Goldman 9/8/98 Author/Originator

11. CLOSED

4/14/97 Date — S.R. Crow Reviewer/Point of Contact

John H Goldman 9/8/98 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	Page 9, 4th para, 6th sentence: typo, "relative" should be "relatively"		Corrected.	
2	Page 9, 4th para, 7th sentence: specify where the rupture disk is sandwiched. "...between the top of the plug.." and ?		Clarifying.	
3	Page 10, 1st para, 2nd to last sentence: typo, "and" should be "an"		Corrected.	
4	Page 23, last para, 1st sentence: typo, "74.04" should be "73.04"		Corrected.	
5	Page 25, last para, 3rd sentence: typo, "grove" should be "groove"		Corrected.	
6	Page 37, 2nd para, 2nd sentence: It states that all components of the MCO are fabricated from stainless steel to preclude corrosion. However, the "eggcrate" on the Mk 1A baskets is fabricated from aluminum and there is a potential for galvanic corrosion when the baskets are wet. In a dry state there should be no "galvanic" coupling, but when wet, corrosion of the aluminum may occur.		The eggcrate is recommended to be made of aluminum in a recent evaluation performed by Cary Graves HNF-SD-SNF-ER-018, "Evaluation of Cast Carbon Steel and Aluminum for Rack Insert in MCO Mark IA Fuel Basket". The text will be corrected to reflect the material selections.	

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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
7	Page 40, Table 3: g loadings for "Dropped With Cask" column do not match the SARP. The g load for a horizontal drop is 60 in the SARP and 101 in the table. Also, the SARP tables referenced are incorrect. The actual tables in the SARP containing the g loadings are B7-20, B7-23, B7-26, and B7-31.		The MCO/cask assembly is handled outside the authority of the SARP in the basin buildings and in the canister storage building, so I would not expect them to necessarily match. However, I would expect the MCO performance specification to be bounding and at least "bound" the Gs listed in the SARP.	
8	App. 2, page 1, 1st para, 3rd sentence: typo, delete "did"		Corrected.	
9	App. 2, page 2, 4th para, 1st sentence: typo, "availability" should be "available"		Corrected.	
10	App. 2, page 2, 6th para, 1st sentence: typo, "auesenitic" should "austenitic"		Corrected.	
11	App. 2, page 3, 1st para, 3rd sentence: typo, "build" should be "built"		Corrected.	
12	App. 2, page 3, last para, 5th sentence: typo, "lubriccant" should be "lubricant". "Sieze" should be "Seez"		Corrected.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO 90% design review	SNFP - MCO	Richard Cowan	Technical Integration	R3-86/376-9682

17. Comment Submittal Approval:

Organization Manager (Optional)

Date

10. Agreement with indicated comment disposition(s)

R. L. Cowan
Reviewer/Point of Contact

Chris H. Johnson 9/8/98
Author/Originator

11. CLOSED

4/23/97
Date

R. L. Cowan
Reviewer/Point of Contact

Chris H. Johnson 9/8/98
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	MCNP shielding code can pick a poor energy fit for Cs-137 gamma and it can make a difference. Be sure it has a bin at 0.66 MEV as this is almost all the dose. (60% comment) *All Cs-137 gamma was input at 0.800 MEV which is conservative and the shield still works but this seems excessive and ignored the 60% comment. This could over state the dose rate by a factor of 2 or more.*		Correct. Cs-137, 0.662 MeV photon is in 0.800 MeV bin. This bin accounts for 49.6% of the direct dose rate. It is conservative by about a factor of 3.8. In the 0.600 MeV bin, it would have been under conservative by about a factor of 2. If we were to do it again, it would be less uncertain to build a special bin for 0.662 MeV. We will state in the text that due to this approach, the maximum areal average dose will be less than 7mrem/h, without the +/- uncertainty of the calculation. This information will be added to the text.	

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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
2	The evaluation of the shield plug thickness did not include the case with the ring removed. This is the case when the MCO is removed from the water. This should be checked.	X	Parsons scope was to show that the shield plug and locking ring design met the Perf. Spec. dose limits. Those dose limits applied to the shield plug with the locking ring in place. Preliminary dose calcs. without the locking ring were performed in-house in support of the mechanical vs. welded decision made last August. We will have Jay Lan perform detailed dose calculations of the final shield plug design without the locking ring in place. Operations will assess the acceptability of the dose uptake during dewatering and other load-out pit operations. As required by this assessment, means to reduce dose will be evaluated, including reducing thickness of the locking ring.	
3	The threads on the ring may be tighter than required. The height and form could be changed to make a lose thread which would have more vertical movement allowed during assembly and increase the minimum wall thickness. I still do not like this thread but I guess it will work.		Minimum wall is determined by thread engagement. Engagement is needed for strength and thermal differentials. The buttress threads are class 2, having the loosest fit. In addition these threads incorporate additional allowances for ease of assembly. Based on prototype production, these threads will work.	

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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
4	The radius grove at the bottom of the thread H-2-82042 sheet 1 view B could be wider (flat bottom) and not quite as deep to ease fabrication and to increase the minimum wall of the MCO.		The maximum major diameter or the internal thread for the specified thread is 24.566 inches. The thread relief specified is 24.567 +.005, -.000. Additionally, the minimum wall thickness in this area can be no less than 0.349 inches. This eliminates the possibility of changing the depth of the thread relief. The width however can be increased. The thread relief at the top of the collar has been increase to match the bottom (24.567").	
5	The seal of the dip tube to the shield plug was not clear - This is one of the most important items to seal. It provides for removal of the water from the bottom of the cask. It can leak a little but not grossly.		The interface of the long process tube and the basket stabilizer will incorporate a combined tolerance of 0.010. This combined with the straight pipe thread should prevent gross leakage of the processed water.	
6	The weld on the guard plate to guard plate ring to shield plug seems excessive, 5/16 inch. The assembly is trapped in the MCO and can only have significant loads in compression. Why not just a seal weld? If you must center the ring, cut a shoulder on the plate and the shield plug. Do not use so much heat on the machined plug or it may have to be refinished after welding. Why not a 1/16" seal weld (4+ sq. in. of weld)?		See Appendix 5 for sizing of the weld. The 5/16" weld is a "good practice" standard from AISC. Pending approval from the Design Authority, this weld size could be reduced to 1/16".	
7	Although others will also comment on this, a complete review of dimensional tolerances is needed. The dip tube is 149.93 +/- 0.015 inches which is equivalent to an +/- 11 °F change in temperature! Chamfers are shown as +/- 0.005" to intersection with OD when it appears +/- 0.05 would work just as well.		An overall review of the tolerances will be performed prior to a 100% design release.	

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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
	Basket comments			
8	-070 sheet 2 view F, The weld may be hard to make as the base plate does not have a uniform shoulder where the weld is made. May require welding on the inside?		Structurally this weld can be located on the inside.	
9	MARK IV The current design has bars set in machined groves and welded across the bottom of the fuel sockets. If the plate is going to be cast, cast the fuel sockets tapered with the bottom of the hole about 2.3 inches. Then machine the diameter to size to about 1/4" above the bottom and leave a ledge. Just press fit short 1/4 X ½ bars with 1/4" cut outs on each end into the sockets. No welding or slotting of the basket bottom would be required.		The method of fabrication is left open to the MCO fabricator. Since the Mark IV basket has much less rigorous structural requirements than the Mark IA, discussions will be held with the fabricator on ways to reduce costs. This suggestion, as well as others, will be discussed with the MCO fabricator.	

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WHC-S-0453 REV B	MCO	TA Delucchi	SESC	306E/376-3116

17. Comment Submittal Approval: 10. Agreement with indicated comment disposition(s) 11. CLOSED

Organization Manager (Optional) Date

Reviewer/Point of Contact
Author/Originator
4/11/97

Date

Reviewer/Point of Contact
Author/Originator
4/11/97

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	Section 6.5.1. Add Submerged Arc Welding		Not accepted. Submerged arc welding could be added at buyers direction provided risks associated with distortion, sensitization of heat affected areas as related to corrosion could be found acceptable and controlled. Experience has shown that the uncertainties associated with submerge arc as related to the long life expectancy is typically not justified.	
2	H-2-828041, Have vendor submit detailed Weld symbol for circumfrential welds.		Accepted.	
3	H-2-828043, A narrow groove weld will result in less shrinkage and destortion.		Fabricator may submit equivalent full penetration weld to buyer.	

closed 9/8/98

9/8/98

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO Design Report		K. E. Smith		M0285, 376-0273

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

Date 4/17/97 — Reviewer/Point of Contact K E Smith

Date 9/8/98 — Author/Originator John W Waldman

11. CLOSED

Date 4/17/97 — Reviewer/Point of Contact K E Smith

Date 9/8/98 — Author/Originator John W Waldman

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	Section 1.0 Introduction, last para.: Suggest inserting "Mark IV" in front of "baskets" in 5th sentence. Suggest deleting or rewording the last sentence so the reader is not left hanging.		Corrected.	
2	Section 2.1 General, 2nd para.: Current plan is for the relief valve and rupture disk to remain active during transport to CSB (cover not in place over the relief valve, but orifice plate in place over rupture disk). Last sentence: "interim storage" should be replaced with "staging"		Corrected.	
3	Section 2.1 General, 3rd para., 3rd sentence: Delete the work "back".		Corrected.	
4	Section 2.5 Shield plug: shield plug now has four penetrations in lieu of three. Last para: Suggest replacing "during transfer" with "as needed".		Corrected.	
5	Fabrication Specification: Section 1.2, Item F. Change to "Cover Cap" to be consistent with nomenclature elsewhere.		Corrected.	
6	Page 5, Item G. Delete per comment #10.		Left in per direction on Comment 10.	
7	Page 6, Item T. What thread standard is referenced?		Added.	

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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
8	Page 6, Item F. Listing the internal HEPA and the Johnson screen separate might avoid confunsion. Also, update Appendix 6 to only show the process tube strainer. Exclude the rerack basket info.		Corrected.	
9	Page 7, Section 5.1: There is ambiguity regarding whether all tolerances shown on the design drawings must be met vs. meeting the critical dimensions on assembled components after welding and machining. Please clarify.		Will be clarified in Section 6.3.5 and 6.3.6.	
10	Page 7, Section 6.1: Please remove reference to 10CFR21. We are not required to pass this on to our fabricators. We do want to add the following words to Section 9.2.6. "The Seller shall report any nonconformances discovered after delivery of the MCOs in writing to the Buyer within 15 working days."		Incorporated.	
11	Page 8, Section 6.2. Delete the first sentence and replace with "Procured materials shall meet the quality assurance requirements detailed in Section 9.1 of this specification."		Corrected. See response to Comment 15.	
12	Page 23, Section 7.1, 3rd para.: Suggest inserting "assembly" after "MCO shell" in second sentence. This would include the baseplate and collar.		Corrected, comment incorporated.	
13	Page 26, Section 7.3.5: Add locking ring together with shield plug.		Corrected, comment incorporated.	
14	Page 28, Section 9.0, 2nd sentence: Replace this sentence with the following, "This program shall be in accordance with Section 3.6.2 of the Statement of Work."		Corrected, comment incorporated.	

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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
15	Page 29, Section 9.1.1: Replace with, "Category 'SC' materials shall be procuredc from a supplier/manufacturer whose QA program has been surveyed/audited by the Seller to assure that all materials will be manufactured and controlled under a Quality System Program in accordance with the latest issue of ASME Section III, NCA-3800. The supplier/manufacturer shall be audited, approved, and qualified by ASME, i.e., possess a Quality System Certificate (Material Manufacturer, Material Supplier)."		Wording changed per K. Smith: Category "SC" materials shall be procured from a supplier/manufacturer whose QA Program has been surveyed and/or audited by the Seller to assure the program meets the applicable requirements of 10CFR71 Subpart H. QA programs meeting the requirements of ASME Section III, NCA-38000, or the applicable requirements of NQA-1 are an acceptable basis for these surveys/audits.	
16	Since DESH is specifying an FOB ship point in the Solicitation, please delete the first sentence of this section. The remaining language is consistent with the Seller's responsibility for packaging the MCOs to prevent damage.		First sentence of 10.1.3 removed.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO 90% design report and Drawings	SNF / MCO	C.R. Miska	SPENT NUCLEAR FUEL Process Engineering	MO 285 376-7103

17. Comment Submittal Approval:

Organization Manager (Optional) — Date: 4-22-97

10. Agreement with indicated comment disposition(s)

CR Miska 4-22-97
Reviewer/Point of Contact

Date

Author/Originator 9/8/98

11. CLOSED

Date

CR Miska 4-22-97
Reviewer/Point of Contact

Author/Originator 9/8/98

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	H-2-828041, Sheet 2: The naming of the shield plug ports: "Long Draw" Tube", "Short Draw Tube", "HEPA Filter", "Rupture Disk" is a good idea, but it was not executed clearly (and may in fact be incorrect). The way that the naming was done only adds confusion. This needs to be redone.		The drawing will show the ports numbered, with a key showing the port function.	
2	H-2-828042, Sheet 3: The canister cover needs to have a shallow central hole drilled and tapped (3/8 inch by 3/8 inch deep minimum) to allow temporary insertion of a lifting feature to be used at HCS. The grapple feature intended to lift the entire MCO is too large and unwieldy to be used to remotely pick, place and center the canister cover remotely.	X	Alternate means of lifting have been agreed upon between DESH and Parsons.	

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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
3	H-2-828042, Sheet 3: The optional rupture disk cover shown must have the same height (7.75") as the evaluated cover to ensure that MCO's with this cover in place will fit within the HCS process pit.	X	The rupture disc will be recessed into the top of the cap, not effecting the height of the MCO cap.	
4	H-2-828045, Sheet 1 & 3: The long draw tube passage in the MCO head needs to have the same ID as the 1"XXS draw tube that is attached to this port.		The passage will be sized just larger, based on the next standard drill size.	
5	H-2-828045: A feature may be required on the MCO head (such as an extra cone shaped hole) to aide in guiding the process connector into position at HCS. The benefit/need for this type of feature can likely not be fully determined until after cold testing the valve actuator/MCO head with the prototype manipulator.		Extra holes and chamfers on existing and new holes are possible on the top of the MCO shield plug, but keep in mind, from a structural standpoint, that shield plug bearing area is needed to support the impact limiter above in the CSB. Also, the longer we wait to make changes to the design the more difficult the change will be.	
6	H-2-828047, View A: The detail of how the process valve seal is retained needs to be shown, or describe sufficient detail to allow reviewer to understand how the design ensures that the seal will not move out of place when the process valve is opened.		Process valve seal (EG&G) AN series type is shown in the seal Appendix with the retainer.	

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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
7	H-2-828047, View A: The seal should be designed to prevent damage from over tightening the process valve. Although I would not be surprised to see that this is the case this feature that ensure that the seal will function repeatable needs to be either shown in detail or described.		The process plug (H-2-828045, sheet 3, Detail A) provides a 0.056 +.000/-0.003 recess. This limits the seal to a 10 to 15% crush which according to the vendor is optimum for situation.	
8	H-2-828075, sheet 1: If the HCS technical scope change request to delete the partial oxidation step is approved then the MK-IV scrap basket flow restrictors could potentially be deleted. Note deletion of the flow restrictors is only practical if the number/size of the scrap basket holes is significantly increased.		The flow restrictors will remain in the design at this time, since the change request has not approved yet. The decision on whether they are removed in the future will consider the need to analyze the flow path thru the baseplates.	
9	H-2-828075, sheet 2: The basket dividers for the scrap basket should not be extended to the full height of the scrap basket. Extending the divider to the full height of the scrap basket could aggravate any problems filling the scrap basket uniformly.		Per discussions with Eric Shen, Design Authority for FRS, the current loading equipment does not have the capability of adjusting the height of the scrap between partitions, other than lifting individual pieces out of a sector and placing them in a different sector. There is no plan to "sweep" the scrap into the basket and adjust heights between sectors by "pushing" scrap from one sector to another. Eric has the responsibility for loading the baskets and he concurred with the decision to change to full height partitions.	

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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
10 v	H-2-828065, sheet 2: If the HCS technical scope change request to delete the partial oxidation step is approved then the MK-1A scrap basket flow restrictors for the could potentially be deleted. Note deletion of the flow restrictors is only piratical if the number/size of the scrap basket holes is significantly increased.		See #8 above.	
11 v	MCO design report, 2.6 Shield plug ports, page 9: The long draw tube passage in the MCO head needs to have the same ID as the 1"XXS draw tube that is attached to this port.		See response to comment #4.	

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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
v 12	MCO design report, 3.9.1 Code Requirements, page 19: A failure consequence of a leak in the connection of the long process tube to the head of the MCO would be failure of ability to drain MCO at CVD. This leak could thus also potentially initiate the retained water/fuel reaction and thermal transient at CVD that is currently presenting a "SAR challenge".		The long dip tube is threaded into the axial basket stabilizer extension with 1.07 inches of thread engagement on the 1" NPSM threads. The tube is tightened "end on", flat to flat, against the shoulder in the extension which is normal to the MCO shield plug axis. This method of assembling the tube to the shield plug creates two sealing mechanisms; 1) the threads and 2) the direct butting of the metal to metal surfaces, flat to flat, when the pipe is tightened into the shield plug. It is my understanding that liquid pumping as well as gas pressure "push" inside the MCO will be used to remove the bulk water from the MCO. To overcome the 12 feet of head required to move the water up the tube to this proposed suspect joint will require the development of 5.2 PSI to be developed inside the MCO. Development of a 5.2 PSI pressure across this potential leak is relatively easy. The MCO port #2 will allow a 1 inch diameter passage through the internal filters to pressurize the MCO with this "push" gas. I don't think there is a problem here as some testing already has been done on water removal from the MCO. However, testing can continue, as you require, to assure the seal can be reliably made up. Please let us know what drawings and information you need for your testing work.	

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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
13	MCO design report, 3.11 MCO Closure Design, page 25: The canister cover needs to have a shallow central hole drilled and tapped to allow temporary insertion of a lifting feature to be used at HCS. The grapey feature intended to lift the entire MCO is too large and unwieldy to be used to remotely pick, place and center the canister cover remotely.		We will put an axial lifting interface on the MCO cover cap to allow for its lifting onto the MCO by the HCS welding system. The interface will likely be a threaded cylindrical area around the centrally located rupture disk. The thread diameter will be on the order of 2 to 3 inches. The design is not completed yet.	
14	MCO design report, 3.11 MCO Closure Design, page 26: Currently for HCS the closure weld is envisioned to be volumetrically examined via ultrasonic testing equipment. Note the manufactures of this type of testing equipment indicate that this weld can be examined by this means, but that testing is need to determine if 100% weld efficiency can be proven given the MCO/Weld geometry.		Per DESH direction weld is assumed to be not 100% volumetric examined and is evaluated accordingly.	

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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
15	MCO design report, 3.15 Materials, Processes, and Parts, page 36: The requirement "Provisions shall be made to preclude metal-to-metal galling in threaded MCO components" is not adequately addressed by the statement "metal to metal galling is minimized by requiring the use of lubricants on all threaded surfaces" The impact of galled MCO shield plug threads would be very severe (potentially precluding processing or safe storage without re-flooding the MCO and returning it to the K-basins for down loading). The process "valve plugs" which will have an estimated total number of actuations equal to 5 cycles x 2 directions (open/close) x 2 ports x 430 MCO's = 8,600 must have positive design (material) features to PREVENT galling! Note a suggested design to prevent galling would be to use a significantly harder SST material for the valve plug, or to use a totally dissimilar material such as inconel.	X	The referenced material indicates that a proper lubrication program will prevent the galling. The materials are currently different 316 vs 304L, as indicated in initial design direction. The materials could be changed to harder materials with impact on cost and schedule, if directed so by DESH. An MCO bolt test plan is being developed to address selection of lubricants and determine extent of galling tendencies. Material changes will be considered based on test results.	

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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
16	MCO design report, 3.17 Welded Joints: Note HCS is currently planning on performing ultrasonic inspection of the MCO cover weld after completion of the final pass. Note a manufacture of ultrasonic testing equipment contacted indicate that this weld can be examined by this means, but that testing is need to determine if 100% weld efficiency can be proven given the MCO/Weld geometry.		Per DESH direction the weld is evaluated as not 100% volumetric examined. The better the evaluation the better the buyer will be able to evaluate the risk associated with this exception to the ASME code requirement.	
17	MCO design report, Appendix 12, Rupture Disk Data, Continental Disk Corporation drawing # 0196-042: I have serious reservations about the long term performance of a 316 SST rupture disk. Given the long storage period (40 years extendable to 75 years), the exposure to hydrogen, and the magnitude of the economic loss associated with false (early) actuation I believe that a more corrosion resistant material may be required. Furthermore I did not see any information in Appendix 12 that would indicate that the recommended rupture disk has been evaluated for this application. The rupture disk must survive being heated to 375 degrees C, exposure to high concentrations (and pressures) of hydrogen, all without require replacement or experiencing false (early actuations). I am sure that a rupture disk can be found for this application, What is needed is sufficient documentation to indicate that the selected rupture disk does meet the criteria.	X	Per the corrosion data provided in the performance specification the 316 material is acceptable. The environment (hydrogen) as described in the performance specification is provided in the specification for the rupture disk. A more detailed analysis of rupture disk material selection will be performed as a follow-on activity.	

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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
18	Appendix 6, Stress Analysis of the Lifting Cap and Canister Collar: It is not clear to me from the analysis how close the design is to the allowable stress (what the margin is or what weld efficiency is required). The documentation needs to make it clear how close the design is to the allowed stress, and clearly indicate what the margin is (or conversely what the minimum weld efficiency must be). Note because I did not see a clear presentation of this information I attempted to draw conclusions my self, are these conclusions correct??? if not this is just an indication of what happens when documented conclusions are not presented. ATTEMPT AT drawing a conclusion which should have been documented in this appendix.... If one assumes a maximum stress of 6.6 KSI from section 6.1, and uses the stress through the shell from pressure at the thinnest point (5084 PSI from section 8.2), and add the lifting load (649 PSI from section 8.3), the result would be a stress of 5,733 PSI (which is not the total reached in section 8.3). This could indicate a design margin of 6.6 KSI/5.7 KSI = 1.15 (a 15% margin beyond design criteria indicating that a weld efficiency of at least 87% is required).		See calculation KH-8009-8-04. The stress ratio for the weld is calculated. The stress ratio is 0.28 for the pressure plus lifting loads. The stress ratio from calculation KH 8009-8-03 is 0.46 for the CSB tube drop of one MCO on another. This stress ratio would indicate in the terms of weld efficiencies like those used in Section VII that the weld needs to be approximately 50% efficient.	

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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
19	Appendix 10, Shield Plug Interface Components (Bolt Stress and Torque: While the minimum preload torque for the cover plate bolts (10 ft-lb) at first sounds acceptable, I can not accept a maximum allowed torque of 13 ft-lb. This is totally unrealistic, with the maximum allowed torque this close to the minimum required preload for the seal there is a significant likely hood that bolts will "stick" slightly more than the nominal values assumed resulting in insufficient seal preload. The ability to repeatable torque the flange bolts to 11.5 ft-lb +/- 1.5 ft in a remote environment will likely require very custom tooling ($$$). It is likely that this custom tooling would need to be thrown away frequently when its calibration expires because it likely could not be deconed adequately to go to a specialized calibration laboratory. A better option would have been to specify a somewhat harder bolt (which would be less likely to gall) so that the allowed shield plug stripping stress limit controls (~25 ft-lb). Furthermore it does not appear that the decrease in seal preloading due to the internal pressure loading the bolts was considered when calculating the minimum torque of 10 ft-lb. Considering the loading of the bolts due to pressure if properly considered would likely indicate that at 10 ft-lb only 55% of the required preload would be present (and the seal would thus likely leak). The appropriate minimum preload torque considering internal pressure reducing the preload would likely be 15 ft-lb.	X	A bolt material change to XM-19 is recommended, which results in a torque recommendation of 20 +/- 50%. Per a telecon with NOVA Corp., the XM-19 bolt material would increase the cost by about 20%, if a lead time of about 20 weeks is allowed.	

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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
20	Appendix 10, Shield Plug Interface Components, Valve Plug Stress and Torque: Same previous comment on bolt torque above.... The MCO designers need to set a realistic margin between the minimum required torque, and the maximum allowed torque. Also the valve minimum preload torque needs to consider the pressure under the valve reducing the preload. Proper consideration of this reduction in preload would likely indicate that at the specified 25 ft-lb torque only 75% of the required preload would be present (and the seal would thus likely leak). The appropriate minimum preload torque considering internal pressure reducing the preload would likely be 31 ft-lb.	X	Realistic margins have been set for torque of all threaded components. Valve plug material and torque recommendations have been modified. Allowance for preload loss due to pressure has been made.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
WHC-SD-W442-DR-002, Rev. 0	MCO 90% Design Review	J. S. Lan	Criticality & Shielding FDNW	Rm 395 Fed. Bldg./376-9965

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

3-14-97 K. E. Smith & L. H. Goldmann

Date Reviewer/Point of Contact

John H. Goldmann 9/8/98

Author/Originator

11. CLOSED

J. S. Lan

5-20-97 Reviewer/Point of Contact

Date

John H. Goldmann 9/8/98

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	Page 1, Section 2.0, 5th paragraph "...Fifty-four fuel element are assumed per layer...". But at Bullet 2 of basic assumptions it states "calculation are based on... 4-tier Concept A ...". Then on page 4, Fig 2-1B, there are 55 circles. Q. 54 fuel/layer is a Concept B repacked design, 4-tier Concept A is a 2 canister (14 fuel elements/tier) design. which one was used ? Wording need to be cleared.	N	54 element, repackaged, Concept B was used. Center circle in Figure 2-1B is not occupied by fuel. The text will be revised to clarify the concept.	
2	Page 7, Section 3.1 5th paragraph" The emission spectra ..." Q. Is the spectra too long to be shown in the report ? If not, it would be a good idea to include them.	N	The detailed emission spectrum requires about 70 pages to print. We recommend not putting it into the report. It is available should Mr. Lan want to see it.	
3	Page 7, Section 3.1 Q. Are the Bremsstrahlung photons within the source region been included in the calculation of the source ?	Y	Bremsstrahlung was not included in the source as it was shown to contribute only a few % to the dose.	

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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
4	Page 7, Section 3.1 Q. How much total fuel weight (MTU) per MCO and what total photon source strength (γ/sec) per MCO are used ?	Y	The total fuel weight used per MCO was 11,966 lbs (5.43MTU). The total photon source strength was 8.294 E15 photon/s. This information will be added to the text.	
5	Page 8, Section 3.4, 3rd paragraph "...108 cases..." 4th paragraph "bottom 3 fuel element tiers ....." Q. 108 sounds like Concept B, where bottom 3 fuel element tier sounds like Concept A ?	N	The 108 number comes from treating the inner and outer tubes of fuel, of each element, as a single source. This is the same case for the computer runs.	
6	Page 8, Section 3.4 Q. What is the Flux-To-Dose Rate Conversion factor used ?	Y	The dose was measured directly by the detectors oriented over the MCO Lid model. No conversion factors were applied. **Closed upon completion of checking the agreement between the dose results from energy tally and flux (through flux-to-dose conversion) tally.** 8/31	
7	Page 8, Section 3.3, Table 3-2 the numbers at 3rd column, second row, 2600, 3rd row 1800, 4th row 9200 etc. are not consistent with the foot note.	N	Correct. The numbers will be corrected in the table.	
8	Page 11, Table 4-1, The numbers in the table show radial profile (hot spot). Q. How about the circumferential hot spots ?	Y	No circumferential hot spots were discernable in the results.	

D-129128

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO PHASE II 90%, DESIGN SUBMITTAL	SNFP/W-442	WC ALACONIS JD MATHEWS RA LARSON	Facilities/System Startup	MO-285/C-104 376-9390

17. Comment Submittal Approval:

Organization Manager (Optional) Contact

Date

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact

Date 9/8/98

Author/Originator

11. CLOSED

Reviewer/Point of Contact

4/18/97 Date

Author/Originator 9/8/98

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 wa	pg 5, sec. 2.1, 2nd para; MCO will be shipped from CVD to CSB with active relief valve and rupture disk. Also the rupture disk cover will be left in place since this is the protection for the disk.		Wording changed that all covers may be installed or removed per appropriate operating procedures.	

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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
2 wa	pg 8, 2nd para; The restrictive orifice is on the rupture disk, not the process pressure relief valve. Also the paragraph needs to be rewritten to clarify what is being said.		The orifice plate MAY also apply to the process pressure relief valve if the valve cannot be sized to be self-limiting (see next to last sentence). The relief valve will be replaced with a rupture disk after HCS, which will require an orifice plate. The details of which cover plates are in place at which step will be developed and documented elsewhere. The intent of the this Section is to show the flexibility that Port 1 has.	
3 wa	pg 9, port 4 para; The description of the rupture disk sandwich is not complete. Something has been left out.		A detail of the process plug with rupture disk is clarified in the drawings; wording is changed to clarify.	
4 wa	pg 10, sec 2.9; State purpose of the 2mm size limitation. How will this be verified? What are the consequences? A 2mm particle could be suspended in the water and easily trapped in the next basket.		The 2mm was chosen by the design agent and is conservative for design purposes. No verification is needed for this dimension selection as the fuel is supposed to be greater than 1/4 inch. An occasional particle less that 1/4 inch have no consequence as far as criticality is concerned.	
5 wa	pg 14, sec 3.4; 1) There is no external HEPA. Design only allows for an external HEPA to be added. 2) Is there any retorque requirement for the seal ring?		External HEPA is an option in place of the relief valve. There is no retorque requirement for the seal.	

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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
6 wa	pg 19 & pg 46; Again the mention of external HEPAs. Are these HEPAs going to be provided as misc. parts? Or is operations required to design and fabricate at a later date? If called out in the design report they should be provided by the MCO project.		They are called out in the Design Report to demonstrate that the design has considered the option to install the external HEPA, should the SNF Project revert back to the vented storage configuration. However, they will not be purchased unless the baseline changes back to venting. These are off-the-shelf drum filters that are warehoused at Purex.	
7 wa	pg 23, sec 3.9.5; The inside circumference in the first para is different than the second para with no explanation given. Difference of a full inch. Is this a typo?		Yes, this is a typo. The circumference is maintained less than 73.04 inches.	
8 wa	pg 43, note 1 A; The sealed relief configuration is not listed in the table. When is it used?		This Table was extracted from a direction letter from J.R. Frederickson to the MCO project. Originally the sealed configuration was used for transport between CVD and CSB. With recent notification from Wash. State DOH, the MCO will have active pressure relief at all times.	
9 wa	App. 13; The tightening/torquing pattern requirements of the seal are different than the pattern being developed by the special tool design. This difference needs to be reviewed/accepted by the seal manufacturer.	Y	The torquing tool uses hydraulic pressure which equalizes to apply the same torque to all the bolts at the same time. This is actually a better method of ensuring that the seal is squeezed evenly. Stan Crow, Cog. Engineer for the torquing tool, contacted the seal manufacturer about our torquing method and he agreed it was a better method than that recommended in their catalog.	

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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
10 wa	app 17, pg 4: Storage of the MCO Caps may be significantly longer than five years. Warehouse plan should have this contingency.		The 400 caps will not be ordered until the SNF Project commits to welding directly after HCS. Delivery of the caps will be delayed in this case to match the need date based on HCS completion. If the decision is made to monitor first for several years and then weld, a small number of caps will be on hand to accomodate welding any leaking MCOs.	
11 wa	App 17; There is no discussion in the plan about special tools for handling or loading MCOs into the cask, or assembly of the MCO components. This discussion on special tools needs to be added to the design report.	Y	Since the MCO will be delivered with the locking ring in place, lifting of the empty MCO into the cask may be accomplished using the lifting ring and conventional rigging methods. The final determination of acceptable lifting methods must be worked out between Operations and the MCO subproject. All assembly tools are by DESH.	
12 wa	App 16, Table 4-1; All calculations show are worst case fuel without the seal ring in place. The ring provides several inches of shielding. Additional tables should be added to show worst case fuel with the ring and nominal fuel with and without the ring.	Y	The calculations were made with the locking ring in place. Parsons scope was to show that the shield plug and locking ring design met the Perf. Spec. dose limits. Preliminary dose calcs. without the locking ring were performed in-house in support of the mechanical vs. welded decision made last August. These calcs. can be updated to reflect minor design changes since August if the need arises.	

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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
13 jm	A discussion needs to be added on the ability and procedure to maintain double confinement during replacement of relief valves or failed rupture disks.		Removing and/or replacing of the appliances in the shield plug ports are not part of the task for Parsons. The process valve operators and other devices needed to maintain the MCO and replace components are the responsibility of others. It is recognized that equipment of this sort is needed to make the change outs and/or maintenance is required but no one has been tasked with the work. The maintenance of double containment, if found to be needed, for the MCO during operations could be addressed at that time. So as a result of this comment, no changes to the report are anticipated at this time.	
14 jm	drw 828075 & 828065; The dividing fins in the scrap baskets needs to have an angle as in the preliminary design to allow for leveling of the loads in the baskets. Current manipulator capabilities do not support scooping scrap from one segment of the basket to another.	Y	Discussions with Eric Shen, FRS Design Authority, have indicated the full height partitions are compatible with the current loading system. They are not designing the loading system to scoop material from one chamber to another. Please see Eric Shen for further info. on this. Update: Final resolution of this issue will be coupled with CVD driven design changes to the scrap baskets.	open
15 rl	pg 10, para 2.9; Third sentence reads funny. Technically the MK 1A fuel is shorter and smaller in diameter but this sentence sounds just the opposite.		The wording has been corrected to clarify actual sizing.	

See note on coversheet for #14
9/8/98

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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
16 rl	pg 50, #23; Second column lists MK 1A fuel as 4739 lbs & MK IV fuel as 4192 lbs, the numbers are backwards. An MCO load of .95 should be heavier than an MCO loaded with 1.25.		The numbers have been corrected.	

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~~MCO 90% rev. base~~ MCO 90% Rev. 10 4

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO 90% design review	SNF Storage Projects	L H Goldmann	DESH, SNF Project	MO-285/373-6371

17. Comment Submittal Approval:

Organization Manager (Optional) Date

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact Date

Author/Originator

11. CLOSED

all Seven pages of 26 Comments Closed.

L H Goldmann 11/3/99

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	MCO Design Report, Page 7, section 2.6, the MCO Rupture disk is rated at 150 PSI at 200 C. As a side note transients to higher temps are possible although the pressure rating will decrease somewhat due to materials properties.		Conditions included in Fab. Spec. and Design Report corrected.	
2	General, In the text change the words "dip" tube(s) to "process" tube(s) etc.		Changes incorporated.	
3	Page 25 section 3.11, It would halp to add to the first paragraph that the shield plug closure design features an integral compression limiter to prevent over compression of the helicoflex seal.		Incorporated.	

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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
4	Page 27 section 3.12.3, in the second paragraph, The grapple groove geometry and position should be corrected. Next paragraph change to read; for "non" critical		Corrected.	
5	Page 31 section 3.13, forth paragraph (one sentence) is the "rim area" of the ring and cap the lifting rim area or the whole ring and cap being discussed?		Clarified.	
6	Page 36, section 3.15, second paragraph second sentence, looks like ferric should be changed to ferritic.		Corrected.	
7	Page 50, section 22, second column, add "up to" in front of the 20 as the actual configuration of the filers has not been established yet.		Added.	
8	Appendix 2, page 3 last paragraph, Ther are restrictions on lubricants on the locking ring fasteners/threads as the lube materials may survive hot conditioning and then make (pressure inside the MCO) gas after the cover cap is installed.		Restrictions added. Thread lubricants referenced have working range to 2400°F. After heating to 450°F the petroleum based carriers are driven off. Therefore no off gassing after hot conditioning.	
9	Appendix 15 for the Nuc fil filter the neoprene gasket should be noted as not used in our case and replaced with a c ring.		Incorporated.	

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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
10	Appendix 5 section 8 the evaluation is based on 28 G it should be done on 35 g as this is the design for the drop in the CSB tube.		See Calculation KH-8009-8-03. Lower MCO bottom drop of 35 g's is bounded by the 54 g bottom drop (2 ft.). The 28 g of the upper MCO weight on the top of the lower MCO is evaluated.	
11	Appendix 9, page 4 of 40, ANSI N14.6-1993 is called out, the reference was initially called out as the 1986 version. Has there been an appreciable change between the two dates?		There is no significant difference relative to the MCO basket design application, i.e. the $\theta y/3$ and $\theta u/5$ limits have not changed. The later version was referenced because it is the current version of the standard.	
12	pge 8 of 40, section 6.2, First line, the support temperature for the 1 G load is 375 C.		Should be "375", will be corrected.	
13	Fab Spec page 9, at one time the welding folks wanted to use low carbon and low silicon weld wire. Is 308L Or 309L low in silicon?		The range of silicon for ER 308L and ER 309L are such that it provides typically a good flow and wetting of the weld puddle while limiting the silicon content to allow for a reasonable ferrite contact.	
14	page 21 The acronym DAC is used. What does it stand for? please clarify.		Corrected.	
15	Page 22, H, the cleanliness should be extended to the tooling, handling equipment, testing equipment, gauges, hold downs, forming equipment etc. Cleanliness is really important.		Paragraph expanded to include tooling, handling equipment, etc.	

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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
16	Page 28, 4 Even 304 tools should be cleaned prior to cnatact with the MCO. As ferritic materials could be on the gauges.		Incorporated.	
17 17	Page 34, linee 1a of table, the shell should nest on the packaging so the shell are stable when any banding is removed.		Incorporated.	
18 18	Appendix 1 Pall also has a all metal barrel HEPA filter that should be allowed.		Since the external HEPA filter is not part of the initial procurement all data has been removed from the Fab. Spec.	
19 19	Warehouse Plan, page 9 line 1a add that the integrity of theweld prep area at the end of the MCO is preserved, note a protector may be needed during shipment.		Seller responsibility, this Section is for removal of packaging, no change to Fab. Spec.	
20 20	Drawings, Label each passage way through the shield plug on each end on all prints and put a legend on the drawing series someplace. Legend for ports/passages 1 Filtered process pressure relief 2 Filtered process exit 3 Long process tube 4 SC rupture disk Ports 2 and 3 should be opposed on the top of the MCO shield plug. Label views also		Accepted.	
21 21	047 sheet 1, the 1 bore of the process valves does not have to be so deep. The 0.688 inch bore shoud		accomplished in the design	

REVIEW COMMENT RECORD (RCR)

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MCO	5 of 47

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
21 (cont.)	break out by themselves, if the 1 inch bore is less deep. Then there is more metal for shielding in the valve. Can the port covers be let into the plug by 1/8 inch? see sketch.			
22 22	On whole fuel baskets, can a band of sheet metal go around the top to prevent fuel leaning out?		On Hold per DESH (cc:mail 03/21/97).	

REVIEW COMMENT RECORD (RCR)

mco 90% rv. res

1. Date	2. Review No.
3/19/97	second
3. Project No.	4. Page 6 of 7 ~~1 of 2~~
MCO	4/3/97

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
90% MCO design Review	MCO	L H Goldmann	SNF Storage Projects	MO-285 373-6371

17. Comment Submittal Approval:

Organization Manager (Optional) _____ Date

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact _____ Date

Author/Originator

11. CLOSED

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
23	On the drawings and components involved make sure the 12 inch interface control dimension is observed for the top of the MCO to the end of the taper to 24 inch OD. On the assembled MCO, this dimension is from the top of the shield plug to the intersection of the taper and the 24 inch OD shell.		Tolerance stack-up a basic 12" dimension can not be achieved, so tolerance is necessary. Currently this dimension ranges from 12.020-12.14, if a tighter tolerance is required please respond.	OK
24	On the Safety Class rupture disk built into the valve plug for the Number 4 port, the 6 side holes in the tightening flats for the operator have to be rated at the full equivalent flow of the 1 inch rupture disk. These 6 holes would likely have to add up in area to much more than a 1 inch dia. hole.		Condition passed on to rupture disk holder vendor and will require a larger process plug and operator. area match of 6 lateral holes is OK	

REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
3/19/97	second
3. Project No.	4. Page 7 of 7
MCO	11/3/99 2 of 2

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
25	Earlier we had requested clearance between the bottom of the port covers and the appliance installed underneath. I reccommend at leat 3/8 inch. This will allow the cover to be bashed by a fixture in a drop from above and deform, yet the cover would not reach the appliance below.		Not in Spec. OK done later in design	
26	A vendor has requesson to cast out of 304L the shell assembly and other parts of the shield plug assy. What is the code allowables on this and what is possible? They claim lower cost and near wrought specifications on their castings and will X-ray the components. How much derating of the components is needed?		Not evaluated, not in Spec. OK	

APPENDIX E
Phase II
MCO 100% Design

Author: Louis H Goldmann at ~HANFORD06B
Date: 8/26/97 12:15 PM
Priority: Normal
Subject: Re: H. Shrivastava RCR responses from Parsons (MCO design)
---------- Message Contents ----------

fyi, lou

---------- Forward Header ----------
Subject: Re: H. Shrivastava RCR responses from Parsons (MCO design)
Author: Harendra P Shrivastava at ~WHC4
Date: 8/26/97 11:24 AM

Louis,

I reviewed Parson's responses. Their responses to items 1 to 11 and 13 are acceptable. I still have problems with item 12. Parson's position is that DESH did not authorize them to perform thermal analyses. Therefore, they used whatever was available in the Performance Specification to evaluate thermal stresses. My position is that you cannot verify temperature differential by performing steady state analysis. I am not concerned about thermal stresses. My concern is whether we meet 100 C temperature differential as required by the performance specification. The Company who performed the thermal analyses to provide temperature distribution given in Figure 1 of the Design Report can provide you this information. Therefore, I do not see any need for my discussions with Parsons again.

If you have any questions, please call me at 376-3636.

Harry

---------- Reply Separator ----------
Subject: H. Shrivastava RCR responses from Parsons (MCO design)
Author: Louis H Goldmann at ~HANFORD06B
Date: 8/26/97 10:12 AM

Harry, attached are Parsons' proposed dispositions/responses to your May 19, 1997 comments. Please review so we can get together and review this week if poossible. Please call me after your initial reivew so we can discuss and set up a mutually agreeable time. A conference call with Parsons is also possible if you prefer.

Thanks for your support. Lou Goldmann

September 8, 1998 file snf\comres.hs

Response to Harry Shrivastava comment that the maximum allowable 100 C degrees per hour temperature change of the MCO has not been completely addressed for the MCO.

There has been much discussion on the subject with Harry and now Harry has left the site. This maximum heating and cooling rate design allowable requirement was a directed constraint specifically applicable toward the hot conditioning system (HCS). The HCS process for the MCO has since been deleted from the SNF project. With the deletion of the HCS and as no other system will subject the MCO to a forced heat transfer rate comparable to the HCS, the maximum heat up and cool down rate allowable has been deleted from the MCO performance specification.

The original comments by Harry are now considered moot and not pertinent to the MCO.

Submitted by

9/8/98

Louis Goldmann, MCO Design Authority Date

Concurred by

9-8-98

Doug Chenault Date
Cask/Transportation Design Authority & SNF Structural Coordinator

9/8/98

Kimball Smith Date
MCO Project Implementation Manager

REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
05/19/97	2
3. Project No.	**4. Page**
W-442	1 of 5

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO Design Report (100%)	W-442	H. P. Shrivastava	FDNW, Mechanical Engineering	B4-40/ 376-3636

17. Comment Submittal Approval: 10. Agreement with indicated comment disposition(s) 11. CLOSED

Organization Manager (Optional) Date

Reviewer/Point of Contact 9/8/98
Author/Originator

Date

Reviewer/Point of Contact 9/8/98
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.	Appendix 4, Section 10 Using Eqn. 1 of the ASME Code, Section III, Appendix E and the allowable stress at the design temperature, the margin of safety is 81%. Using Eqn. 2 and the allowable stress at atmospheric temperature, the safety margin is 98%. Therefore, 19% safety margin shown on page 10 is conservative. No response is required.		Noted	
2.	Appendix 5, Section 7.8.2 On page 17, using a factor of 2, the base metal F_w is 11.9 ksi and the weld metal F_w is 36 ksi. The base metal and weld allowable stresses calculated on page 17 and used on page 18 are just the opposite. As the error is on the conservative side, no response is required.		Will be corrected.	

REVIEW COMMENT RECORD (RCR)	1. Date 05/19/97	2. Review No. 2
	3. Project No. W-442	4. Page 2 of 5

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
3.	Appendix 5, Section 8 Page 18: Table 7 is indicated to provide seal stop stresses. This table, however, provides shell circumferences. Page 19: The seal load change is calculated assuming uniform normal stress and strain in the seal stop. Because the seal stop is narrow and has only 0.155-in depth, this assumption does not seem to be justifiable. The finite-element model shown in Figure 21 of Appendix 6 perhaps will yield a more reliable strain distribution in the seal stop.		Page 18: Table 7 to read Table 11. Page 19: The analysis using the strain hardening slope (Ref 12 of Appendix 7) is highly conservative since the model assumes all the bolt preload force takes no credit for the load carried by the seal. A more representative approach can be found in Appendix 5 (TED.INP input file) where the seal is modeled with gap elements (representing spring constant, obtained from vendor supplied data) around the seal stop. See also results in Table 13.	
4.	Appendix 5, Section 13.1.1 It seems the canister shell material has been changed from 304L to 304 because the shell stress intensities reported in Tables 12 and 13 do not meet the NB-3133.6 compressive allowable stress. Only the longitudinal compressive stress and not the membrane stress intensity, however, have to meet the NB-3133.6 allowable. The longitudinal compressive stress should be compared with the NB-3133.6 allowable. If the allowable is exceeded, either an alternate evaluation per the ASME Code Case N-284 should be performed or material should be changed as has been suggested.		The shell material was not changed from 304L to 304. The appendix states that the shell shall be fabricated from 304L with the yield and tensile strengths of 304 (chemical composition of 304L) to meet NB3133.6. by comparing membrane stress intensity rather than longitudinal compressive stress, the analysis is conservative.	

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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
5.	Appendix 7, Section 6.3 For a 2-foot drop case, HNF-S-0426, Rev. 3 specifies a 34 *g* loading. The Design Report, Table 3 specifies 54 *g* loading for the same case. Which is correct? If 54 *g* vertical acceleration is correct then 35 *g* loading considered in the analysis is not the bounding acceleration.		35g drop performed in Appendix 7 Section 6.3 is correct. Design Report (Table 3) should read 34g, not 54g. Change will be made.	
6.	Appendix 7, Section 8.2, Page 24 Reference for the effective length factor, K, cannot be the Performance Specification, HNF-S-0426. Provide correct reference.		Should read Reference 11; will make change.	

REVIEW COMMENT RECORD (RCR)	1. Date 05/19/97	2. Review No. 2
	3. Project No. W-442	4. Page 4 of 5

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
7.	Appendix 7, Section 8.2, Page 25-26 The cantilevered load carrying capacity of the support rods is calculated to be 40.9% of the demand. The effect of load eccentricities is not considered. Based on the analyses performed in Section 8.5, justification is provided for using this capacity in evaluating the structural adequacy of the support rods and center tube. Section 8.5, Figure 14 indicates that the support rods could carry up to 220,000 lbf axial compressive loads before they start to buckle. Using 2/3 of this value, as required by Appendix F, the allowable load for the six support rods is 146,700 lbf which is 36.4% of the demand. The total capacity of the support rods/center pipe is thus 103.7% and not 108.2% as shown on page 26. Note that the above 3.7% margin is valid only if we take credit for friction (coefficient = 0.1) to provide lateral restraint to the top of the rods.		108.2% calculated does not account for eccentricities. Figure 14 accounts for eccentricities so 103.7% is based on Figure 14 and 1/4" eccentricity. It is true that margins are small. If higher margins are desired, then use of higher yield material is recommended. Note: The support rod material was changed to 304N to address a similar comment from G. Wagenblast.	
8.	Appendix 8, Pages 16, 19, and 20 r_p should be equal to $1/4(D_0^2 + (D_0 - 2T)^2)^{0.5}$.		Yes. The result of this change will make the column buckling ratio more conservative.	
9.	Appendix 8, Page 36, third line Should "....or greater..." read "....or smaller"?		Agree. Will be changed.	
10.	Appendix 9, Page 9 The stiffener plates are also 12 gage not 10 gage as stated. No response required.		Noted. The .109" used is correct though.	

REVIEW COMMENT RECORD (RCR)	1. Date 05/19/97	2. Review No. 2
	3. Project No. W-442	4. Page 5 of 5

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
11.	Appendix 11, Load Case 5 Thermal conductivity for the bolt material is specified in Btu/hr-ft-F instead of Btu/hr-in-F. Page 16: Figure 11 is a temperature plot for Load Case 5, not 6 as stated. As this plot shows a constant temperature through the canister wall, it is claimed that the radial temperature difference between the outside and inside of the wall never exceeds 5 °C. However, no such conclusion can be drawn from Figure 11 or the steady state thermal analysis that was performed assuming all shield plug nodes at 527 °F and all outside nodes of the shell at 707 °F. As the differential temperature is time-dependent, only a transient solution will provide its variation with time. Figure 11 thus does not prove compliance with the Performance Specification requirement of maximum temperature difference of 5 °C between the inside and outside of the shell wall.		Noted. Page 16 - Figure 11 noted for load case 5. The performance specification provided no details of the heat-up. DESH instructions were to perform no thermal analysis and temperature profiles. These were to be provided by DESH. The temperature differentials of the shell at 375 deg. C and center at 275 deg. C are addressed. With this temperature range, the thermal stresses evaluated bound the limit of the temperature change across the MCO wall at 5 deg. C.	

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	3. Project No. W-442	4. Page 6 of 5

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.	Appendix 11, Load Case 6 Again, the thermal conductivity for the bolt material is not specified in consistent unit. Load case 6 addresses two separate thermal load cases - one during heating at 24 hrs. and the other during cooling at 73 hrs. The temperatures from Figure 1 of the Design Report are input and static analysis is performed to obtain the steady state temperatures which are then used to perform stress analyses. There are several comments regarding these analyses that require clarification: i) The temperatures given in Figure 1 are from a transient solution. As such, to obtain the stresses at a desired time, one has to input the temperatures directly in the structural analysis. The temperatures given in Figure 1 are not be used for performing a steady state analysis. ii) From Figure 1, it is obvious that the shield plug average temperature never reaches the maximum during the heatup/cooldown cycle. Therefore, a radial temperature gradient exists at all times. The analyses performed, however, assume that all nodes of the shield plug are at the same temperature at any given time. iii) Figure 1 does not have sufficient temperature data to perform a meaningful thermal analysis. Only the average temperatures at various heights of the canister and the average temperature of the shield plug are plotted. These are not sufficient for calculating thermal stresses, if thermal gradient is a concern.		Noted. i) See response to Item 11. ii) The analysis assumes that shield plug nodes are same at 24 hrs. and again same at 73 hrs, since no details were given by DESH and no temperature profiles were provided. iv) DESH instructions were to perform no thermal analysis. All thermal analysis were performed by DESH and are outside the scope of this request. v) Noted.	

REVIEW COMMENT RECORD (RCR)	1. Date 05/19/97	2. Review No. 2
	3. Project No. W-442	4. Page 7 of 5

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
	iv) A steady state thermal analysis generally will not provide the maximum through-the-wall temperature gradient nor the maximum stresses during the heatup/cooldown cycles. The analyses performed, therefore, do not prove compliance with the Performance Specification requirement that the maximum difference between the shield plug center temperature and the canister collar outside wall temperature should not exceed 100 °C. v) Analyses performed for Load Case 5 prove, of course, that if the shield plug and canister outside wall temperatures are maintained at 275 ° and 375 °C respectively, the stress intensities will not exceed the Code allowables.		Node 10 is restricted in Y direction for stability of the model only. Notice that nodes at X = 0 plane are restricted in x direction. The bottom plate elements are only restricted in the Y direction at Node 1a. This allows the plate to deflect in the Y direction (+/-) applying bending stresses in the shell and bottom plate similar to it being restricted at Node 1 on the centerline only.	
13.	Appendix 11, All Load Cases Node 10 at the outer edge of the bottom plate is restrained in the vertical (y) direction. Other nodes at the bottom of the bottom plate are free. In reality, all the bottom nodes of the bottom plate are restrained in the vertically downward direction and are free to lift up. A model utilizing contact elements at the bottom will be more appropriate. As the nodes are free to lift up, this may result in higher bending stress in the shell at the bottom plate to cylindrical shell joint.		This goes here Yong Gordon OK 9/8/98	

APPENDIX F
450 PSIG
Design Change

DE&S HANFORD

Internal Memo

From: K. E. Smith
Phone: 376-0273
Date: April 3, 1998
Subject: DESIGN REVIEW FOR INCREASED PRESSURE RATING REDESIGN OF THE MULTI-CANISTER OVERPACK

To:				
	J. D. Cloud	R3-86	J. R. Frederickson	R3-86
	E. S. Ruff	E6-15	C. B. Loftis	S7-41
	D. M. Chenault	R3-86	E. J. Shen	X3-75
	J. J. Irwin	R3-86	S. R. Crow	H1-15
	C. R. Miska	R3-86	T. A. Delucchi	L6-38
	G. D. Bazinet	S8-06	L. D. Blackburn	E6-46
	C. E. Swenson	S8-07	L. J. Julyk	R1-56
	T. D. Merkling	X3-79	G. R. Wagenblast	E6-46
	C. R. Hoover	H1-15	B. D. Lorenz	R3-15
	W. C. Alaconis	R3-86		

cc: L. H. Goldmann
K. E. Smith
SNF Project File

Attached is a copy of draft Revision 1 to the MCO Design Report, HNF-SD-SNF-DR-003 for your review and comment. This revision incorporates changes to the MCO design to facilitate the sealing strategy, and other modifications that have been incorporated as a result of input from fabricators and interfacing subprojects.

Only those sections of the design report that are changed are included in this review. Several appendices, including the weight summary, shielding analysis, warehouse plan, and HEPA filter data are not impacted, and therefore, are not included in this review. Also, the MCO Fabrication Specification, which was previously an appendix to the Design Report, will be revised as a stand-alone document. A matrix showing the reviewers and the sections of the report included for each reviewer is also attached.

The design media should be reviewed against the design criteria listed in the MCO Performance Specification, HNF-S-0426, draft Rev. 4, a copy of which is also attached. All comments should be documented on RCR forms and returned electronically to Lou Goldmann and Kimball Smith by close of business on Tuesday April 14, 1998. COMPLETION OF THIS REVIEW IN A TIMELY FASHION IS CRITICAL TO MINIMIZING FABRICATION RELATED DELAYS. THEREFORE, ANY COMMENTS NOT RECEIVED BY CLOSE OF BUSINESS ON TUESDAY, APRIL 14TH WILL BE REJECTED. Our goal is to release the approved revision to the Design Report on May 4, 1998, so we're working to a very tight review/comment incorporation cycle.

A comment resolution meeting will be held the week of April 20th to reach agreement on comment dispositions that may not be easily resolved. You will be notified in advance of the meeting time and location.

If you have any questions regarding this design review, please contact Lou Goldmann on 373-6371 or Kimball Smith on 376-0273.

Sincerely,

K. E. Smith
MCO Implementation Manager

L. H. Goldmann
MCO Design Authority

Attachments

Multi-Canister Overpack Design Review for Increased Pressure Rating Redesign

Reviewer Summary

Reviewer	Design Report /Material Evaluation	Exception Rpt.	Drawings	Structural Calcs.	
L. H. Goldmann (2)	X	X	X	X	
E. S. Ruff	X		X		
D. M. Chenault	X	X	X	X	
J. J. Irwin	X		X		
C. R. Miska	X		X		
G. D. Bazinet (2)	X		X		
C. E. Swenson	X		X		
T. D. Merkling	X	X	X	X	
C. R. Hoover	X	X	X	X	
W. C. Alaconis (3)	X		X		
J. D. Cloud	X	X	X		
C. B. Loftis	5 copies	5 copies	5 copies	3 copies	
E. J. Shen	X		X		
S. R. Crow	X		X		
T. A. Delucchi	X		X		
Independent Review Team (3)	X	X	X	X	
B. D. Lorenz	X	X	X		
J. R. Frederickson	X		X		
K. E. Smith (3)	X	X	X	X	

REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
3. Project No.	4. Page 1 of

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
HNF-SD-SNF-DR-003 REV.1		TA DELUCCHI	COGEMA ENGINEERING	306E

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

5/14/98
Date

Reviewer/Point of Contact

Author/Originator

11. CLOSED

8/3/98
Date

Reviewer/Point of Contact

9/28/98
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	H-2-82804 Sheet 1-3; Note 14 references Hot Conditioning. Thought HC had been eliminted.		Reference to Hot Conditioning will be deleted.	
2	H-2-82806 Rev 1A Sheets 1-5; Weld symbols are confusing. Contain non-standard characters.		Weld symbols have been requested by the 200 West Area fabrication shops.	
3	H-2-828042 Rev 1, Sheet 1, View-A; sheet 3, View-D; Add a .032 flat to the region between the root face and the .093" Radius of the U-Groove joint prep.		Will make change.	

A-6400-090.1 (03/92) WEF011

REVIEW COMMENT RECORD (RCR)

1. Date	2. Rev
3. Project No.	4. Page 2 of

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
4	H-2-828065 Rev.1A, Sheet 1, Zone B-5; Square Groove joint will be difficult to penetrate, need filler in the joint to prevent cracking. Filler ERNiCr-3 is a better choice.		The joint's gap between the copper and the stainless base plate is maintained by the screen and the under cut of the outer rim of the 1 1/4 inch plate. The screen is 0.108 inches thick and the rim is cut down to 1.200 to 1.210 inches from its 1.25 inch nominal thickness. The nominal gap between the edge of the 1/8 inch thick copper shroud and the stainless steel structural plate is then 0.148 to 0.158 inches. This produced gap precludes direct contact of the 1/8 inch thick copper with the 1 1/4 inch thick plate. With such a large gap, the filler metal will fill the gap from the stainless steel baseplate up to the copper assembly and as a result any melted copper will be diluted in the ERCuNi-7 filler metal. Test welds were performed using a similar gap and the weld results were acceptable. The gas tungsten welding procedure for welding stainless steel to copper using ERCuNi-7 weld filler material was written and tested in accordance with ASME Section IX. There were no cracks in the bend tests and the tensile tests broke in the copper base metal. The ERCuNi-7 filler metal has been shown to be adequate for the copper assembly to stainless steel base plate joint. To change now to another weld filler metal would require a change to the drawings, the fabrication shop to start over with procurement of the new filler metal, the fabrication shop to do welding procedure development and new welding tests. Although your recommendation has merit, changing to ERNiCr-3 now would unnecessarily upset the schedule for the fabrication of the baskets, as the existing weld filler material appears adequate. Thanks for your comment.	
5	H-2-828065 Rev. 1A, Sheet 1, Parts List, Item 16; Backing Rod not Badking Rod.		Parts list will be corrected to read "Backing rod."	
6	H-2-828075 Rev.1, Sheet 2, Part 2; Unconventional Weld Symbol.		Inspection criteria will be added to existing weld symbols.	
7	H-2-828075 Rev.1, Sheet 1, Part 2; Weld Symbol has inspection line with no characters.		See RCR #6 above.	
8	Design report, Page 9, para.2.10; Test welds indicated some advantages with ERNiCr-3 (Inc 82).		See RCR #4 above.	

A-6400-090.1 (03/92) WEF011

REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
4/14/98	98-039
3. Project No.	**4. Page**
SNF MCO	1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
DESIGN REVIEW FOR INCREASED PRESSURE RATING REDESIGN OF THE MULTI-CANISTER OVERPACK	SNF MCO	Rob E. Piippo/RCR.MCO	Nuclear Safety	100K/373-3285

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

5-11-98
Date

Rob E Piippo
Reviewer/Point of Contact

Rob E Piippo
Author/Originator

11. CLOSED

8-3-98
Date

Rob E Piippo
Reviewer/Point of Contact

Chris H Johnson 9/28/98
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

A-6400-090.1 (03/92) WEF011

REVIEW COMMENT RECORD (RCR)	1. Date 4/14/98	2. Review No. 98-039
	3. Project No. SNF MCO	4. Page 2 of 1

1	Comment on HNF-SD-SNF-DR-003, appendix 18 Page 7 of 19, Justification, "The MCO design does not have redundant closure welds." It has been discussed that the MCO will be final welded with 5 passes. Does this not meet the intent of redundant closure welds? Typo bottom of page 7, "it" should be capitalized and at bottom of page in exception section "he" to the and "inpetion" to inspection. Page 13 of 19 para 6220, justification "because the calculated pressure stresses in the weld are relatively small and the probability of generating the design pressure low." Identify the documentation that supports the statement small and low and be quantitative versus qualitative. This is a generic comment to all justification statements. Para 7110 Typo Just. section, inten should be intend. Para 7130 Typo Specificatiokn.		Multiple pass welds are considered one weld. The redundant welds closures referred to have to be separated. Revised with corrections. Change to "The inability to perform a hydrostatic test on the field closure weld results in a moderate risk, as the calculated primary membrane stress is 15842 psi with an allowable stress of 16700 psi". Regarding supporting documentation: A bounding pressure of 50 psig is calculated in "MCO Internal Gas Composition and Pressure During Interim Storage", HNF-SD-SNF-TI-040, Rev. 1. This value corresponds to MCO water contents predicted by HNF-1523 and HNF-1527. A probability analysis showing that the bounding water contents have less than 10^{-6} probability are provided in HNF-2234, "Sensitivity of Probabilistic MCO Water Content Estimation to Key Assumptions." All of these documents are internally released and have gone through independent reviews. Corrections made.

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2	HNF-SD-SNF-DR-003 Design Report Page 4 of 50, 2nd para last sentence does not make sense. 4th para last sentence delete are. Page 7 2.6 3rd para. with should be deleted. Page 8 2nd para. plateing should be plating. 2.9 1st para delete certain. Page 12 3rd para. needs rewrite. Page 25 3.12.6, 1st para., 2nd sentence scape should be scrap. Page 26 last sent., provide should be provided. Page 30, 1st sent., "the" should be deleted. 9th para. add there is "a" guard Page 37, 3.19.3, Nuclear Criticality Safety, the limiting conditions identified in SD-SNF-CSER-005, Rev 3 that are applicable to the design should be identified and it should be stated how the design will meet the applicable requirement. Suggest limit 4, 6, 7, 9, 10 and 16 which appear to be design constraints. This comment also applies to the		Revised with corrections accordingly. " " " " " " " The design constraints are listed in the Peformance Specification and compliance with those constraints is described in the Design Report. They are included in different sections of the Design Report (see Sections 3.9.5, 3.12.5, 3.19.3). This issue was discussed with the reviewer during review and approval of the Performance Specification.

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	"Performance Specification for the Spent Nuclear Fuel Project Multi-Canister Overpack, HNF-S-0426, Rev 4, 4.19.3 Nuclear Criticality Safety. Page 37, 3.19.3, In the criticality section 2nd Para., 4th sent., "and the criticality control geometry was met for all load conditions." Has the criticality engineer assigned to the MCO project verified this statement? 3rd para. needs rewrite cleanup. Page 38 3.19.4 needs rewrite cleanup 1st & 2nd para.		Criticality control is accomplished by designing the components to maintain a specific geometry under various load conditions. Multiple structural engineers have reviewed the design calculations to verify that they are correct. Verification that criticality controls are met is performed via the review of the structural calculations ensuring the the criticality related design loads are satisfied. Corrected.	
3	Appendix 2.Material Evaluation page 4, 3rd para., 2nd to last sent spelling grater to greater.		Corrected.	
4	KH-8009-8-04, calc package, page 13, 1st para., references figure 13 was not located nor is in the list of figures referenced in the list of figures in page 3. page 20, 10.1, 3rd sent., delete the. page 22, 1st para., "Both the modeling approximations and the dimensional changes are judged to have a small effect on the results." Please provide a quantitative statement as to "small effect". 4th para., no figure 22 and 23 exist.		The sentence with reference to Figure 13 will be deleted. Deleted. By small, it is meant negligible. Figures corrected.	

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5	KH-8009-8-05 Page 44, 3rd para., "Per the drawings [13], a 6 inch weld is adequate. It is recommended that the weld not be attempted at the segment intersections and a weld of up to 9 inches is suggested." Please clarify this apparent contradiction. Page 45, 4th para., " Also note that the six-rod capacity is insufficient to carry the bottom basket 35g loading. It is recommended that a maximum range of .030-in. be imposed on support rod and support rod/center pipe fabrication length differences." Has this been incorporated into the design?		The reference to 9 inches will be deleted. Yes, this has been built into the tolerancing.	

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KH-8009-8-08 Page 6, 3. Assumptions, 4. "Since the dimensions are vendor dependent, some of the calculations may need to be modified, depending on the final rupture disc manufacturer selected." How will the need for new calculations be reviewed, tracked and funded? Page 7, 1st para., 2nd sent. "The filter details are not specified by the drawing because it is supplied by others." Why are only the attachment welds analyzed and not the details of the filters included? Page 10, "using an electron beam process weld which is questionable relative to the ASME Subsection weld configuration requirements." Please clarify as to why the EB weld is questionable.			Parsons, as MCO Design Agent, reviews all drawing submittals from the MCO fabricator, before they can be approved. In the course of their review of the rupture disk drawing, Parsons will determine if additional calcs are required and document the need as a review comment. Parsons is funded for fabrication support throughout the MCO fabrication activity. The ability of the filter assembly to withstand a drop load is included in the test reports provided by the filter manufacturer. Parsons is responsible for the weld attaching the filter to the bottom of the shield plug. The reference to questionable will be deleted.

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6	Appendix 13 Provide description as to how the test has met the specific requirement of the MCO and passed.		This test was performed to ascertain the force-deflection relationship of the Helicoflex seal for use in bolt preload calculations. The cross-section was 0.176 inch versus the actual MCO seal cross-section of 0.186 inch, and for the stated purpose, the results could be utilized by applying a ratio of the cross-section diameters. The load to seat the seal was very close to the manufacturer's data for the actual MCO seal presented on Helicoflex Drawing Number H-305236 Rev. NC. The performance of the actual MCO seal is assured by the manufacturer.	

REVIEW COMMENT RECORD (RCR)	1. Date April 9, 1998	2. Review No. ES Ruff
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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO Design Review for Increased Pressure Rating. April 9, 1998	SNF/MCO	Ed S. Ruff	FDNW/Engineering	376-1943

17. Comment Submittal Approval:

Organization Manager (Optional) Date

10. Agreement with indicated comment disposition(s)

5/12/98
Reviewer/Point of Contact Date

Author/Originator

11. CLOSED

5/12/98
Reviewer/Point of Contact Date

9/28/98
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
	HNF-SD-SNF-DR-003, Design Report, Rev 1 Draft			
1	pg 43: Item 12, Requirement: Should that read "Full internal vacuum" ?		Yes, will be corrected.	
	Appendix 2, MCO Material Evaluation			
2	pg 2, para 1, "specific" is misspelled.		Correction made.	
3	pg 4, para 3, "greater is misspelled.		Correction made.	
4	pg 4, para, Recent testing of threaded components for the MCO shield plug indicates that lubricant is not needed for the Nitronic 60 - 304L/304N couple.		Historical precedence has shown that better control of preload can be obtained by lubrication. Design Report revised for control of preload only. It will be up to the project operations to determine the torque or other parameters of the installation system to ensure that the preload is within the analyzed range.	
	Appendix 13, Main Seal Data:			
5	pg 2: Seal retainer does not match current design configuration per the drawings.		Correct, the vendor data regarding the main seal will be updated to match the current design.	

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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
6	Attached graph entitled "Weld Sample Compression Report" is illegible, and does not appear to be a traceable document. For example, there is no seal part number on the graph - how can we be sure this data is for the seal that is specified for the MCO main closure ?		The graph forms a portion of a report produced by Helicoflex entitled "Sample Seal Leak Test" dated 3/11/98. The cross-section of the test seal is not the same as the MCO seal (Test Seal=0.176 in. and MCO Seal=0.186in.). This data corresponds very closely in the minimum load/unit circumference to those of the same cross-section with the same construction shown in the Helicoflex catalog data. The load required to seat the seal is taken from the drawing for the MCO seal supplied by Helicoflex (H-305236 Rev. NC) shown in Appendix 13. A request was made directly to Helicoflex for a better graph, which is now available and a copy can be supplied if needed.	
	Multi-Canister Overpack Drawing Set, Rev 1, Draft			
7	General Comment: Should PM approval name in signature block be updated ?		The released drawings will maintain the same signatures and dates that appear on the May 18, release of the drawings. The revision block however, will be updated to reflect a revision change.	
8	H-2-828041, sht 3: Part 31, should be 1 1/16-12 thread callout. Is the chamfer height really .125" or is it .094" ?		The thread callout will be corrected to read 1 1/16-12UN-2A. The current chamfer is listed as 0.125. I believe however, that this dimension was incorporated after testing of threaded components. If testing is affected by this change, the 0.94 chamfer can be reinstated.	
9	H-2-828042, sht 1 zone B-7: part 1, why are there two different ID callouts on the canister collar ID (22.985 and 22.990) ?		The 22.985 dia. dimension maximizes the sealing surface of the collar. Using only this dimension would require the +/- 0.005 tolerance to be held the entire length of the collar. Since this is not necessary, a dimension that maximizes wall thickness, but uses a looser tolerance was referenced.	
10	H-2-808042, sht 3, zone D-2: part 6, probably need to callout a radius on the vertices of the hex in order to fit a standard socket.		Hex heads will incorporate dimensional limits as specified in ANSI/ASME B18.2.2-87.	

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11	H-2-828045, sht 1, zone A-7: part 1, recommend that the dimension of the counterbore in the bottom of the shield plug for the basket stabilizer extension be changed from 4.280 to 4.260" diameter. This will provide better alignment to centerline, and still be a readily achievable fitup.		This dimension will be changed to read 4.255 +0.005/-0.000.	
	H-2-828047, sht 1:			
12	zone d-8, part 1 should be entitled "Process Valve/Rupture Disk Assembly".		Description will be changed to read "Process Valve/Rupture Disk"	
13	part 5 and 6: provide a radius callout for the vertices of the hex so that they can fit a standard socket.		Hex heads will incorporate dimensional limits as specified in ANSI/ASME B18.2.2-87.	
14	part 4, zone B-8: do you want a 60 degree lead-in chamfer on the thread ? (i.e., do you want it the same as the process valve lead-in ?)		This chamfer is incorporated during final machining. See Item #1.	
15	view B, zone C-6: should the .120 dimension really be .140 ?		The 0.140 dimension is incorporated during final machining. See View A, from Item #1.	
16	view A, zone D-7: part of flag note numeral is not visible.		The flagnote numeral will be made visible.	
17	part 6, zone C-4, thread callout of 1 78 is erroneous.		The thread callout will be corrected to read 1 7/8-12UN-2A.	
18	part 6, diameter of center flow passage needs to be specified and toleranced (presumably it should be 1.000 +/- 0.030).		The diameter of the center flow passage will be dimensioned to read 1.010, to a depth of 0.58 inches.	
	H-2-828048, sht 1			
19	part 7, Cover Bolt: specify radius callout for hex so it fits standard socket.		Hex heads will incorporate dimensional limits as specified in ANSI/ASME B18.2.2-87.	

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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
20	part 7, lab testing revealed that a 60 degree chamfer on the thread lead-in and lead-out works very well. Suggest adding a 60 deg. chamfer on both start and tail-end of the threaded portion of the bolt shank.		A 60 degree chamfer will be added to the leading and trailing threads of the cover bolt.	
	H-2-828049, sht 1			
21	part 1, zone C-7, please add a reference dimension that calls out the nominal separation distance between the two innermost filter cylinders (i.e., a reference dimension that shows available clearance for the basket stabilizer extension component).		A reference dimension showing the minimum clearance between the two innermost filters will be provided.	
22	zone F-2: Parts/Material list: should the sub-components of the assembly be itemized ?		This assembly is purchased as a single unit per Filter Specification HNF-S-0556. As such there are no sub-components to be referenced.	
23	H-2-828050, zone E-6: internal thread relief in the basket stabilizer extension can be deleted if using a flat-end process tube (wherein the tube itself has an OD thread relief of 1.172" dia for the first .25" of length).		For ease of fabrication (i.e. tool runout while turning the threads) the fabricator has requested that the thread relief remain.	
	H-2-828051			
24	zone B/F-7: decision was made to delete metal o-ring, and use flat-end process tube. End flat within .002, 32 surface finish, thread relief of 1.172" dia. for the first .25"		Reference tot the metal C-Seal will be removed based on testing results.	
25	flag note 8: this may cause interpretation squabbles. Datum A (the OD of the process tube) will not ever be straight, flat, or true within .002" along its entire length. As an alternative, you could specify Datum A as a machined diameter for the first inch or two only, below the threaded end. This would make life easier on the QC inspectors...		Datum A will be relocated to the thread relief. Additionally, the runout for the thread relief will be extended.	
26	H-2-828053, sht 1: please add reference dimension of .590" from shoulder ledge to top-of-plate.		The vertical dimensions for the basket support plate are very clear. It is not clear for what purpose a reference dimension is needed.	
	H-2-828060			

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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
27	sht 2, zone C-5: "See View K" - view K not found for that particular detail.		Reference to "View K" will be deleted.	
28	flag note 5: "interferance" is misspelled.		Interference will be corrected.	
29	sht 4, zone B-7: "symetry" is misspelled.		Symmetry will be corrected.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO Design Report, HNF-SD-SNF-DR-003, Rev 1.		S. R. Crow	Packaging Engineering	345 Hills/376-5388

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

5/8/98
Date

S R Crow
Reviewer/Point of Contact

Author/Originator

11. CLOSED

5/8/98
Date

S R Crow
Reviewer/Point of Contact

9/28/98
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	Page 4, 2nd para, last sentence: typo, "...or the requested of by the buyer..." should be "...or requested by the buyer..."		Corrected.	
2	Page 4, 3rd para, last sentence: typo, "filters, as" should be "as filters,"		Corrected.	
3	Page 4, last para, last sentence: typo, "per" and "are" should be deleted.		Corrected.	
4	Page 5, 1st para, 2nd sentence: typo, "steel canister is approximately" should be "steel canister approximately"		Corrected.	
5	Page 5, 1st para, 2nd sentence: "160-inches" should be "166-inches"		Corrected.	
6	Page 7, 1st para, 3rd sentence: typo, second "either" should be deleted.		Corrected.	
7	Page 7, 1st para, 2nd to last sentence: typo, "indentifications" should be "indentification"		Corrected.	
8	Page 7, 2nd para, last sentence: 150 psig is not the design pressure of the MCO as stated. It is only the specified relief pressure. Reword.		Reworded.	
9	Page 8, 2nd para, 1st sentence: typo, "plateing" should be "plating"		Corrected.	
10	Page 12, 2nd para, 2nd sentence: typo, "operators" should be deleted		Corrected.	

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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
11	Page 12, 3rd para, last sentence: typo, "provides" should be "provide"		Corrected.	
12	Page 18, 5th para, last sentence: typo, "165.4 inches" should be "166.4 inches"		Corrected.	
13	Page 21, 5th para, 2nd to last sentence: grapple interface requirements should be as shown in the Performance Specification		Corrected.	
14	Page 25, 2nd para, 2nd sentence: typo, "scape" should be "scrap"		Corrected.	
15	Page 25, 3rd para, 1st sentence: typo, "scap" should be "scrap"		Corrected.	
16	Page 26, last para: typo, "2two" should be "two" in two places		Corrected.	
17	Page 33, 1st para: HWNF-CM-4-46 and WHNF-CM-4-46 do not exist. Need to list the appropriate HNF-PRO-XX.		References have been deleted.	
18	Page 39, 2nd para: Performance Specification also addresses OCRWM for QA. This needs to be shown.		Revised.	
19	Page 39, 1st para: typo, "teir" should be "tier"		Corrected.	
20	Page 39, 7th para, 1st sentence: WNF is an incorrect abbreviation and WNF-CM-1-5 does not exist. Occurrence Reporting covered by HNF-PRO-60.		Reference has been deleted.	
21	Page 44, Item 21 Requirement: Was "WHC-IP-1043" changed to "HNF-IP-1043"?		No. This should remain as WHC-IP-1043, per revision 4 to the Performance Specification.	
22	Page 46, Item 30: Does "HNF-CM-4-46" exist?		No. References to WHC-CM-4-46 will be changed to HNF-PRO-516, per Rev. 4 of the Performance Specification.	
23	Page 49, Reference 6.1: Date should be "April, 1998"		Corrected.	
24	Page 32, 1st para, 1st sentence: typos, need comma after steel and "he" should be "the"		Corrected.	
25	Material Evaluation, page 4, 1st para, 2nd sentence: typo, "is" should be "in"		Corrected.	

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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
26	Dwg H-2-828041, sheet 2, note 19 and 21: typos, "uppon" should be "upon" and "mainfold" should be "manifold"		Corrected.	
27	Dwg H-2-828042, sheet 1, material list: material and description of Item 6 is missing. No seal or assembly of Item 6 is shown.		The material list will be revised to present both the locking/lifting ring and the cover cap as assemblies.	
28	Dwg H-2-828051: Is the seal groove needed? A seal is not shown in the assembly on Dwg H-2-828041.		DESH testing has shown that sufficient sealing is provided through metal to metal contact of the long process tube and the basket stabilizer. DESH says process tube seal no longer required based on acceptable leak rate testing without the seal in place.	

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	3. Project No.	4. Page 1 of 4

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
HNF-SD-SNF-DR-003/Rev 1: Multi-Canister Overpack Design Report	N/A	J. E. Kurtz	SNFP Radiological Control	100K/1709K/373-3249

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

5/24/98
Date

J. E. K
Reviewer/Point of Contact

Author/Originator

11. CLOSED

5/24/98
Date

J. E. K
Reviewer/Point of Contact

[signature] 9/28/98
Author/Originator

Need to ensure documentation is thought & Complete. Will be a ORR item. CFR Design Objectives must be discussed.

J. E. K.

A-6400-090.1 (03/92) WEF011

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1. Date	2. Review
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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
3.13	Only references 10CFR835 design requirements, and discusses dose rates. This is not adequate to show how design objective requirements are met for this regulation. The regulation is based on physical features and analysis to show cumulative dose criteria are expected to meet 10CFR835 design objectives. Need to show person-hours vs. Dose rates with calculations to gauge against design objectives, optimzation decisons made, show that design is ALARA.		The design of the shield plug reflects numerous features selected to achieve ALARA. The thickness of the stainless steel plug was maximized as much as possible to minimize the dose at the top of the shield plug. Passageways through the shield plug include 90 deg. angles to prevent streaming. Shield plug appurtenances were designed to be actuated via both remote-operated and long handled tooling. MCO components have been selected that do not require maintenance or have an operating life longer than planned use. The selection of the mechanical closure shield plug over the welded shield plug option was made after a thorough study was performed (WHC-SD-SNF-ES-021). This study included a detailed dose estimation based on specific operational steps involved with closing the MCO and cask. Based on these dose/manhour estimates, the decision to proceed with the mechanical closure was made. Therefore, the design does reflect consideration of the cumulative dose. As far as meeting design objectives, Operations has enlisted ALARA representatives in defining the performance criteria and reviewing all MCO related documentation for compliance with the criteria. Their reviews to date have indicated that the MCO design is acceptable from a overall radiation dose standpoint, considering the specific operational steps associated with loading, closing, processing, and handling the MCO in each facility. Within the constraints of other interface requirements (dimensional restrictions, weight restrictions, fuel loading volume requirements, etc.) the current MCO design has resulted in the lowest dose rates possible	

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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
APPX 16	Shielding analysis is but a small part of the overall documentation of an ALARA design. The regulations require the use of optimization for design decisions and that records be kept of ALARA decisions and features.		See above response.	
	If this is your final design report, it is not adequate to show design is ALARA and meets 10CFR835 requirements.		See above.	
	Comparision against the MCO performance specification is not really possible due to the specification itself being flawed in not having the CFR design requirements as part of it. It mearly states as a funtional criteria "Shield workers against gamma and neutron.." and in section 4.13 requirements, only talks to shielding and list some limits on dose rates. Designing to a dose rate is not the same as meeting a design objective based on cumulative dose. You must show that you meet the design objectives and below that level as is ALARA. You must have a basis and it must be defendable.		See above.	

REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
HNF-SD-SNF-DR-003 REV 1. DRAFT Multi-Canister Overpack Design	SNFP/W-442	WC Alaconis RA Larson DR Henry	Facility/System Startup	MO-285/A-157 376-9390

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

6/5/98
Date

Reviewer/Point of Contact

Author/Originator

11. CLOSED

6/5/98
Date

Reviewer/Point of Contact

9/28/98
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 WCA	General note: Several references to the Hot Conditioning Process still exist in the text. Copy of text provided with RCR identify the locations found.		References to hot conditioning are being removed.	
2 WCA	General note: The lack of paragraph numbering make very difficult to identify comment locations.		Noted.	
3 DRH	Page 5, section 2.2: The MHM needs to be added to the list of components interfacing with the MCO.		Added.	
4 DRH	Page 6, section 2.5, 2nd paragraph, 2nd sentence: This sentence needs to be revised as follows: .....the fuel and scrap baskets to the shield plug assembly.....		Revised accordingly.	
5 DRH	Page 7, section 2.6, 1st paragraph, last sentence states: The rupture disk is designed to fail at the design pressure of the MCO, 150 psig at 132 degree C. HNF-S-0426, Rev. 4 draft, Performance Specification for the Spent Nuclear Fuel Project Multi-Canister Overpack, gives a rupture disk relief pressure of only 150 psig and does not state a specific temperature. The specifications of these two documents should match.		Revised and clarified accordingly.	

REVIEW COMMENT RECORD (RCR)

1. Date	MCODRR1.RCR
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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
6 WCA	Page 12, 2nd line; Replace the "and staging at CSB prior to hot conditioning" with prior to weld cap installation. 6th line delete "hot conditioning"		Revised accordingly.	
7 DRH	Page 12 of 50, section 3.5, second sentence should be revised to state .....while wearing safety and radiological zone worker personal protective equipment (PPE) (e.g. coveralls, safety glasses, gloves.....		This wording is taken directly from Rev. 4 of the MCO Performance Specification. Ergonomics associated with MCO operations are facility specific and will need to be addressed for each facility where it is used.	
8 RAL	Page 14, External Environmental Conditions. This table is the Min/Max environmental conditions as seen by the MCO. There is no mention of rate of decrease for Temperature (air) to Temperature (water). Example, an empty mco/cask package sits outside in 110 degree heat all day then at 8:30 pm we place it into a 50 degree loadout pit. Is it possible this cask could drop 40 to 50 degrees in less than 1 hour.		The MCO is allowed to have a differential of 100 celsius degrees (180 Fahrenheit degrees) on any two areas. This differential allowable adequately bounds expected temperature changes. So what you have mentioned should not be a problem for the MCO. This a design review document for the MCO. The cask will probably stay hot for quite a while in the load out pit, 1 hour may not be long enough.	
9 RAL	Page 14, Table 3.1. **K Basin Storage Pool** Temperature (Water) lists the current range as 43 degrees to 100 degrees. The DOE has instructed us in writing to not allow the basins to drop below 50 degrees. Also the reference for max allowable temp {see 3.3.1.3} does not exist within this document.		The values provided are for the design envelop for the MCO. They are intended to be broader than and bound the operating specification of the basin. They are not intended to be specifications for the basin to follow.	
10 RAL	Page 14, CVD temp is still referenced as 75°C.		See # 9 RAL above	
11 WCA	Page 16, Row 3; There would be a release consequence in the event of a thermal runaway reaction.		Yes, there would be release consequences from a runaway reaction event occurring inside the MCO.	
12 WCA	Page 16, Row 10; Should the < sign be a > sign.		Revised to show >.	

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13 WCA	Page 16, Row 15; This row should be deleted.		We will add an "optional use" qualifier to the row.	
14 WCA	Page 17, 2nd Row; Do not understand the statement under the function column.		Revised to read "Provides an interface between the baskets and the MCO Loading System"	
15 DRH	Page 18, section 3.9.3, 1st paragraph; The weights identified for 288 Mark IA SNF assembly fuel weight differs from weights identified in on page 7, table 1, of HNF-S-0426, Rev. 4 draft, Performance Specification For The SNF Project Multi-Canister Overpack.		The discrepancy in listing of fuel element weights will be corrected in the MCO Performance specification. The difference is not significant to the design calculations.	
16 WCA	Page 18, Section 3.9.3, 2nd paragraph; The flooded weight (line 3) for Mark 1A exceeds the criteria in the first paragraph (line 2).		Agree. The weight limits are listed as design goals, not hard requirements. The combined MCO and cask weights have been thoroughly reviewed by DM Chenualt and found to be within the allowable limits of the basin crane.	
17 WCA	Page 18, Section 3.9.4; Both dimensions given for maximum height differ from H-2-828041.		Revised for consistency.	
18 WCA	Page 19, Section 3.10, 2nd paragraph; In the 10th line change "rigging (slings etc.)" to engineered lifting devices.		Revised accordingly.	
19 DRH	Page 21, section 3.12.3, 2nd paragraph states.....Other materials may be used if shown suitable. There needs to be a statement which specifies a standard which other materials must comply with prior to use on the Mark IA and Mark IV Baskets.		This sentence was removed from the Performance Specification and will be deleted here also.	
20 WCA	Page 21, Section 3.12.3, 2nd paragraph; The 1/8"0.14-inch, 1"0.77-inch, & 1-7/8".980 inches must be typos.		Revised with corrections.	

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21 WCA	Page 27, 3rd bullet; Insert the word plug between "threaded & with".		Revised accordingly.	
22 WCA	Page 28, Port #4; Operations questions the need of the safety class rupture disk with the new sealing strategy. It appears that the during amount of time the rupture disk is actually functional it would be in creditable for a thermal runaway which is the only time the rupture disk could activate. Request safety review need for the disk.		Safety is still looking at the credibility aspects of a runaway of an MCO and the need of a rupture disk. The safety organization is looking into runaway corrosion events probability and they have not been able to declare runaways incredible at this time. So the disk device stays in the MCO design until somebody says it is incredible in writing or the project is told in writing to take it out and, of course, this would absolve the MCO project of liability and its assigned personnel would be held harmless for the deletion. The safety folks are doing the work and it is supposed to go in the CVD facility SAR. This is a "TBD".	
23 DRH	Page 28, section 3.13, towards bottom of page, states: The MCO can be pressurized by the gas of choice through any of the process valves. This statement should be revised to state the following: The MCO shall only be pressurized with argon or helium gases.		This is a design report not a operational guide or procedure. The design does not preclude later use of other gases. Operations will see to the proper use of the MCO and proper gas insertion into the MCO.	
24 WCA	Page 33, Section 3.19.1; The 2nd & 3rd bullet appear to contain the same information.		Revised eliminating one bullet.	

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25 DRH	Page 34, Section 3.19.2: This section does not include an analysis of a MCO being dropped into the service pit located at the north east end of the CSB Operating deck.		The design agents report for the MCO is to assess the MCO for HNF-S-0396 (Performance Specification) specified conditions only. There are facility specific drops that violate the specification requirements that are being addressed by further analysis or mitigation features. For further discussion please refer to the MCO Topical Report, HNF-SD-SNF-SARR-005, Rev. 1, Chapter 3.	
26 RAL	Page 46 & 47, Item 31 Requirements: The spacing/wording is not accurate. I think the word flow should be replaced with fire.		Revised with corrections.	
27 WCA	H-2-828041 sheet 2, section D-D: Enlarge the view of the C-seal seal area with a seal in place. Also views D-D, G-G sheet 3 and H-2-828045 sheet 1, show different configurations of this sealing surface. Please clarify.		An enlarged view of the C-seal area in Section D-D can be provided. However the enlarged detail will be referenced from the "Shield Plug Assembly" section.	
28 WCA	H-2-828045; Show a detailed cross section of the a process valve with C-seal in the valve body. A composite of the valve, C-seal, valve body and valve operator showing flow paths through the valve would help to explain the arrangement to operators.		A view of the process valve will not be added to H-2-828045, as this is a detailed drawing of the shield plug. Full size "F" drawings should provide the clarity needed to describe the mechanics of the process valve.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
"Multicanister Overpack Design Report", April, 1998	MCO	Guy Bishop,(GB), R. P. Denise(RD), TAG, C. Loftis(CL)	DOE-RL, TAG	MO-277/372-3108

17. Comment Submittal Approval:

Organization Manager (Optional) Date

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact Date

Author/Originator 9/29/98

11. ~~CLOSED~~ 6/15/98

4/14/98 Date

Charles Loftis 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
	Appendix 18: ASME Code Exception Report			
	Table 3.1:			
1	Page 9: Para 3590: Why is the design good enough? Justification states that the relief valve doesn't discharge into a pipe and so the connections do not need the strength to carry this weight and load. What loads are imposed and are they adequately accommodated? Justification states only that the loading was evaluated.(GB)	N	The pressure relief valve has been eliminated from the design and Para NB-3950 only applies to pressure relief valves. The Report will be revised accordingly.	
2	Page 10: Para 4120: Thought that material certs, etc were being obtained. Without this, certification for use of MCO may be impossible. (GB)	N	The ASME code exception is that certification (final data package) will not be performed by an ASME certificate holder. However, certified material test reports and certificates of compliance will be obtained for all materials used in fabrication, and a data package will be prepared for each MCO.	

Items 3, 70, 71 and 78 To be closed prior to CD-3

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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
3	Page 10: Para 4240: 2nd paragraph of justification is not adequate. Why will the rupture disk welds be adequate w/o meeting ASME?(GB)	N	A request has been made to have this issue addressed in the MCO Topical Report and will be settled by the time we release the MCO (with DOE's concurrence) for fabrication at CD #3.	open closed CBL 9-28-99

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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
4	Page 14: Para 7110: Thought that an Overpressurization Report was being prepared (may be called something else). Justification is not adequate.(GB)	N	Please see appendix 18 supplement #1, which begins immediately after page 19 of 19 of the exception report. The item of interest is explained beginning on page 10 of 13 of the supplement item number 13. Basically the discussion is about the flow calculation performed in HNF-SD-SNF-CN-016, Evaluation of MCO Pressure Relief Orifice Effectiveness. The report will be submitted to Parson's the next time we send a letter to them. Although this report is not in the "Code" format, it is a suitable substitute in the case of the MCO. The relief path provided in the MCO design is in accordance with the flow calculation. As to the MCOs relief capacity during interim storage of MCOs at the CSB, the maximum pressure build up is considered to be in the 50 PSI range at the extreme. With the design of the MCO at 450 PSI, the need for an operational pressure relief system during this period is not required. So, the relief system will be blanked off in the CSB during the interim storage period. If this situation were to change in the future, the MCO still has the #4 port which is capable to support a possible change to a requirement or the need of an active pressure relief system. In either of the operational cases for the relief system, the design provides for use or non use of the pressure relief system. This flexibility of operations should not affe affe affect the release of the MCO design or the fabrication of the MCO hardware.	

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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
5	Page 14: Para 7130: Justification is not adequate. Why is it acceptable not to meet ASME?(GB)	ON	Please see the discussion in the supplement item number 15. The pressure relief valve, if used, would be backed up with the safety class rupture disk. So, if the valve became inoperable and pressures became high enough, the rupture disk would actuate to protect the MCO. There are two distinct periods possibly requiring pressure relief on the MCO. The first is before and during the cold vacuum drying (CVD) process and the second period is after CVD. Before CVD the rupture disk will be active as discussed above. After CVD the MCO will be sealed for interim storage. The current plan is to not have a reclosing pressure relief valve on the MCO. If pressure relief is needed the rupture disk at port 4 is available to do the relief. During interim storage of the MCO, pressure relief will not be needed as the higher pressures are not expected. Also, see # 4 above for further discussion of the subject. More text will be added to the supplement's item 15 when it is rewritten in the near future.	
6	Page 15: Para 7200: Thought that an Overpressurization Report was being prepared (may be called something else). Justification is not adequate.(GB)	N	Please see item 17 in the supplement for the discussion. Again the relief path has been analyzed and found adequate. Please see the discussion above in the response to #4.	

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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
7	Page 18: App 23: Understanding was that personnel do not meet the ASME (ie, do not have III stamp) but are otherwise fully qualified and have documentation to show this. This is not clear from Justification.(GB)	N	Please see item 26 in the supplement for discussion. The MCO is not N stamped so we do not have 100% of the formal code requirements and formal code reports for the fabricator. As a result, such items as the code paperwork and code inspectors are not used. However, the fabrication specification invokes applicable sections of the ASME code on the materials and fabrication for the MCO components. The use of the words "to the intent of the code" are being avoided, as the phrase is open to a very broad interpretation by the reader. The item #26 of the supplement will be beefed up to reflect our position that the adopted plan to manufacture the MCO and baskets has no apparent impact on the quality through the use of alternative methods and programs. The rewrite of the supplement will be done in the near future after the design report is released.	
	App 18, Supplement 1:			

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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
8	Page 3: "Other Exceptions and Clarifications": What is the basis for the statements (2) that the design does not "substantially increase the risk or reduce the margins of safety"?(GB)	N	To prove something is safe you have to go through the design and verify that the hardware and features designed are not offering opportunities for unsafe conditions during planned operation and use. The component or feature is then possibly shown as not being safe for test or evaluated situation. These two quoted sentences refer to the items referenced in the clarification discussion. The first sentence's items discuss the cover plates, MCO mechanical closure, when the MCO is pressure tested, the basket spring pins, and another sub section that was invoked. The second discusses the use of a code paragraph, non-applicability of a code paragraph, and clarify application of a code paragraph. Nothing is apparent that appreciably changes the safety of the hardware, so we can make the statement you quoted from the clarification supplement. If you believe what has been offered is unsafe or increases risk please point them out to us for resolution. As it stands now, there is no apparent impact on safety. This section of the supplement will be amended to include more discussion of the logic. Thanks for the comment.	

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9	Page 4: Part (1) G1: ● 2nd para: Design pressure is 450#. ● 4th para: Thought that the first pass weld is being PT'd and that a leak test of the MCO is being considered?(GB)	N	The 150 will be changed and the text adjusted. This fourth paragraph is devoted to volumetric examination by ultrasonic means. The previous paragraph (third) discusses dye penetrant of the first and last weld passes. The leakage rate testing (LT) is planned for the cover cap attachment weld to the MCO collar. Also, mention is made of this LT in the last paragraph in the discussion of the draft code case.	
10	Page 10: top of page: What is this "'prequalification' by hydrostatic means"? Let's be specific on what is being done. Understood that the vendor will do a 125% hydro.(GB)	N	Item 11 discusses the hydrostatic testing of the MCO. The testing is done at the fabricator where the assembled MCO is tested to 1.25 times the design pressure. The paragraph discusses this pressure testing at the vendor's shop. In the discussion, prequalification is the correct term, I believe, in reference to the earlier text of the paragraph, as the MCO would have been previously hydrostatically tested (qualified) at the vendor's shop. Yes, the assembled MCO is being hydrostatically tested at the vendors. This 125% hydrostatic pressure testing at the fabricators before fuel loading will be noted in the rewrite of the supplement 1 under item # 11.	

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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
11	Page 11: 14: Justification here is not adequate. Also, design pressure is now 450#.(GB)	N	The MCO has no requirement to have pressure sensors and none are needed for process reasons as the facilities and equipment take care of the process needs. If sensors were installed in the MCO, maintenance and calibration of the device would be a concern due to personnel exposure and also possible handling of the umbilical or instrumentation data path design in the CSB tubes and handling machine would have to be addressed. Yes, the design pressure has gone up to 450 PSI for the MCO. The rupture disk is still set at 150 PSI in the new design so the proposed runaway blow down would begin at 150 instead of the 450 PSI of the design. Also the "blow down" analysis previously mentioned in the clarification discussion does not have to be redone beginning at 450 PSI as the initial release point is still 150 PSI. The actuation of the disk due to runaway is still low probability due to the cask shipping window and process procedures that will be applied in the CVD. As a result, the design remains adequate.	
12	Page 12: 22: What ASME code are the pins designed to? Briefly explain why that code section is adequate.(GB)	N	The pins are designated as specification ANSI/ASME B18.8.2 in SAE 30302 or 30304 metal. The pins need to have a double shear value of approximately 6,000 pounds to just be adequate and have no margin. The pins being used are in the 12,500 to 14,500 pound range based on testing. So the resulting basket's use of these spring pins has ample margin.	

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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
13	Sections 3.6 and Table 4 indicate that any set of like baskets can be loaded into any MCO shell. A check of the drawings appears to indicate that a mixture of Mark 1A and Mark IV baskets could be loaded into the same MCO, insofar as the centerpost dimensions are concerned. Is a misloading mix of Mark IA and Mark IV baskets a Design Basis event for the MCO? The Report, including the Human Factors section 3.5, does not indicate how this is prevented, so some additions to the text would be appropriate to establish the position. If mixed baskets is a Design Basis event, the structural criteria for the baskets given in the report would not be adequate.(RD)		It is not a requirement of the MCO to preclude such a misloading of Mark IA and IV baskets to occur. The MCO project assumes the MCO will be loaded correctly. If someone wanted to load a mix of IA and IV baskets in the same MCO, it could be done as the MCO shells and shield plug are the same--whether the MCO is eventually designated a Mark IA or IV MCO. In order to discriminate, features to prevent the first basket engaging the center piece in the bottom of the MCO and the last basket in engaging the shield plug extension in the MCO being different than the MCO designation, the MCOs and baskets would have to be keyed and sized some way so like designations would only be joined. This misloading prevention task is being taken care of by the MCO loading system (MLS). This MLS system directs the grapple to the correct height on the loading shuttle pickup point and also senses placement heights of the baskets in the MCO and as a result baskets of differing height would be sensed and the loading cycle stopped. You are correct in stating a misloaded MCO internally would not have the needed structural adequacy.	

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14	Section 2.1, end of 2nd ¶, indicates that the first 24 MCOs loaded with fuel will be monitored from within the storage tubes as they arrive from CVD. Please indicate the nature and purpose of the monitoring to be done, indicate where in the report and on the drawings the monitoring features and interfaces are provided, provide the basis for the selection (number and first MCOs) of the monitored MCOs, and indicate the expected use of the monitoring information in MCO design, fabrication, or loading, if any.(RD)		The first MCOs from each basin will be validation tested at the CSB. The testing consists of the MCO being brought to the weld station where a gas sample will be taken from the MCO. The CSB is planning on using MCO port number 2 to access the interior gas of the MCO. Testing will include such things as pressure, gas composition, etc. After the gas sample is collected the MCO is sealed and returned to a empty CSB storage tube. CSB is designing the sampling equipment. The actual plan with all the details is presented in the SNF Project Validation Requirements (HNF-SD-SNF-CN-027. This validation operation is not part of the MCO project. It is my understanding, one of the purposes of this plan is to verify some of the modeling work that has been conducted on the fuel inside the MCO. The validation activities are not expected to affect the MCO design, but it could possibly influence the K basin loading scenarios of subsequent MCOs.	
15	Section 2.4, and other sections of the report, indicate that the Cover Cap cannot be radiographically inspected due to the configuration and contents of the MCO. Please provide a reference to the study which reached this conclusion. It appears that a radioactive source could be inserted through the hole in the canister cover assembly to expose film wrapped on the outside of the weld.(RD)		An evaluation employing radiography to examine the MCO closure weld was conducted by the site NDE examination organization. It is documented in DYNCORP letter DYN-9760406.	

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16	Section 2.6, end of 1st ¶, indicates that the rupture disk is designed to fail at the design pressure of the MCO. Since the design pressure of the MCO is 450 psi, and the rupture disk is designed to fail at 150 psi, the language should be corrected.(RD)		The rupture disc is designed to actuate at 150 psi, which is below the design pressure of 450 psi. This will be revised accordingly.	
17	Section 2.8 indicates that (the design of the MCO) allows the locking ring to be threaded into the MCO collar after the MCO is removed from the pool, but does not indicate the features which govern this capability. Please explain. If the locking ring is to be installed anytime except immediately after the MCO and cask are placed on the transporter, please so indicate.(RD)		The locking & lifting ring can be threaded into the MCO collar anytime with or without a bare shield plug in place. In the planned closure order of the MCO, the MCO with the shield plug inserted is raised above the pool at the load out pit, the shield plug lift fixture is removed, (the fixture has to be removed before the ring can go in) and then the cavity where the locking & lifting ring goes is dewatered and decontaminated if needed. The locking & lifting ring is then placed and threaded into the collar where the set screws (jack bolts) are tightened and torqued down onto the shield plug. This drives the shield plug into the collar and contact with the seal. The compression limiter built into the shield plug limits the strain on the helicoflex seal. The mechanical closure joint is made up and tightened in the collar before the MCO/cask assembly is lifted out of the load out pail structure in the load out pit. This way the locking & lifting ring is already installed in the MCO collar when the MCO/cask assembly is put aboard the conveyance.	
18	Section 3.3, 1st ¶, indicates staging and hot conditioning at the CSB. These indications should be deleted.(RD)		This will be revised accordingly.	

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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
19	Sections 3.4 and 4 indicate that the MCO shall be designed to allow replacement of the externally mounted pressure relief devices. Such pressure relief devices do not appear to be otherwise described in the text or identified on the drawings. Please remedy this discrepancy.(RD)		Reference to pressure relief devices will be clarified.	
20	Section 3.9.3 indicates weight design goals and current estimates. The weight limits (not just goals) should be provided. For example, there is an obvious weight limit set by the lifting ring capacity.(RD)		This is a design report in response to the performance specification for the MCO and as such the design agent is responding to the needs indicated in the performance specification. The first text in the section is a quote from the performance specification, so it can not be changed. The locking ring is sized for a 24,000 pound load. An MCO of solid steel is approximately 20,500 pounds. The current maximum weight MCO is approximately 20,567 which includes an MCO with all whole fuel, flooded, and no scrap baskets. The maximum weight of the MCO is approximately reached with the current design. We are at the point that if we add substantial steel to the MCO we will start to loose SNF payload. The cask/MCO assembly weighs approximately 59,800 pounds when rigged with a fully fueled and flooded maximum weight MCO. The K Basin cranes are rated at 64,000 pounds. There is adequate margin on the MCO locking & lifting ring and on the K basin cranes and the situation is well in hand. There is still room in the design for a slightly heavier MCO but we won't be going there.	

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21	Section 3.9.4 indicates the maximum height of the MCO as 165.4 inches. Drawing H-2-828041, sheet 1, indicates a height of 166.4 inches.(RD)		Dimensions will be revised to read 166.420 +/- 0.145.	
22	Section 3.12.3, 2nd ¶, indicates the allowance of other materials to replace copper in the scrap baskets. Since there is no project benefit due to this allowance, it should be deleted.(RD)		Since the sentence allowing other materials was deleted from Rev. 4 of the Performance specification, it will be deleted from the Design Report.	
23	Section 3.13, top of page 29 seems to indicate an intent to test seals in accordance with ANSI N14.5 by assembling the entire MCO and filling it with a detectable gas through one of the ports, and placing in a chamber where a vacuum could be established. Does this include the Helicoflex seal(item 38), and if so, what is the effect of seal compression/decompression on later use after MCO loading?(RD)		This text quoted is the design agents response to be capable of leak testing the assembled MCO. This idea, as presented by the design agent, would likely include the helicoflex seal. If the MCO were tested this way the helicoflex seal would not be reused. New helicoflex seals will be used on the shield plugs to make up the mechanical closure at the basins.	
24	Section 3.17, last ¶, indicates that acceptance of no RT, but UT, of the pressure boundary field weld is partly justified by closure of a stabilized system. What documents were relied upon to justify the conclusion of a stabilized system?(RD)		The documents are the same as those used to justifiy the sealed strategy, which has been approved by RL. Refer to HNF-SD-SNF-OCD-001, Rev. 2 (SNF Project Product Specification) and HNF-2256, Rev. 0 (Simulation of Normal and Off-Normal Multi-Canister Overpack Behavior).	

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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
25	Section 4, item 21. indicates compliance with ANSI N14.6 for non-critical lifts of the MCO using the integral lifting ring. Why are loaded MCO lifts non-critical?(RD)		ANSI 14.6 does not apply to the MCO as the MCO is not a shipping container. We have taken some of our specification language out of 14.6 in the area of non-critical load design allowables. I.e. Use of safety factor of 3 to yield and 5 to failure for a number of components. We are using these allowables on the rim area of the cover cap and locking & lifting ring for lifting a loaded MCO and on the support structures of the fuel baskets in basin. The basket grapple interface has been qualification tested. If 14.6 did apply to the MCO under the current handling scenarios at the CSB, the loads would be non-critical.	
26	Section 4, item 28, indicates that the final closure weld can not be volumetrically inspected. Section 3.11 and 3.17 appear to indicate that these welds will be 100% volumetrically inspected using UT techniques. Does item 28 mean to refer to RT, or are the other sections not correct?(RD)		This section will be revised to reflect the use of RT inspection only.	
27	Section 4, item 31, has some missing words.(RD)		Will be corrected.	

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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
28	Appendix 18, Table 3.1, is not completely useful in that the requirements of the code for which exceptions are taken, are not always stated. The table should be revised to remedy this situation, taking into account the comments of Supplement 1 of appendix 18, and providing clear statements indicating why and how not complying with the Code requirements still ensures safety. The intent of the reviewer is to obtain from the responsible designers and managers a Project document which fully and clearly identifies the Code requirements which are applicable but not met, why they are not met, and why not meeting those requirements nevertheless results in adequate safety. The content of this Project document should not be preparer or user sensitive or dependent.(RD)		To begin the discussion the code is copyrighted by the ASME. If we reproduce the code sections wholesale in our exception report we are probably in violation of the copyright law. I believe a reviewer should have ready access to his own code books or know where to go to borrow the appropriate section. Also, in my opinion, I disagree with your idea that the full text should be offered here. The exception report adequately summarizes the situation in relation to the MCO. In your remarks you imply that complying with the code ensures safety. Complying with any code does not ensure safety as long as the device in question is not used properly. Many of the code section are not applicable to the MCO, this is a listing of all the exceptions to the NB code. The approach here is that if a person is reviewing in reference to the code that person should have ready access to a set of code books. In reference to the last remark "The content of this project document should not be preparer or user sensitive or dependent.", the project is not doing what you indicate, but the project does expect that reviewers would not be overly disadvantaged or challenged in relation to gaining access to the needed knowledge. I would suggest that the reviewer read NUREGs/CR-3854 and CR-3019 and the needed applicability of the appropriate code sections will become more apparent and more acceptable to the reviewer.	

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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
29	App 18,Table 3.1, page 10, entry for ¶4120. The material and fabrication is not required to be certified by an ASME certificate holder, on the basis of not being Code stamped. This is backwards thinking. Even if a decision is made to not apply the code stamp, which does not in itself reduce safety or technical requirements, it should not be used as a basis to justify all manner of relaxed requirements.(RD)		See response to comment #2. The MCOs and baskets do not need to be fabricated by code stamp holders. Requirements for fabrication, including compliance with applicable ASME code requirements, are in the MCO Fabrication Specification (HNF-S-0453). This specification calls out the needed procurement documentation, QA, inspections, procedures, controls, data packages, etc. to adequately build and deliver acceptable and suitable MCOs and baskets. I do not believe the manufacturing requirements have been relaxed. For further discussion please see the appendix 18 supplement 1 to the exception report item 5.	
30	App 18, Table 3.1, page 11, entry for ¶5220. It is indicated that the field closure weld can not be radiographed due to the lack of accessibility and the radiation field. Please provide a reference to the study which reached this conclusion.(RD)		See response to comment #15.	
31	App 18, Table 3.1, page 12, entry for ¶5270. This is another example, see comment RPD-17, where there appears to be a relaxation of performance on the basis of non-Code work. All of the Code requirements should be applied to the fullest extent possible.(RD)		Independent acceptance inspectors, working on behalf of RL, and FDH source inspectors are performing the inspection function at the fabricators' facilities. The independent acceptance inspectors will also perform final acceptance of the closure weld. NUREG/CR 3854 does not require inspection with ASME code inspectors.	

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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
32	App 18, Table 3.1, page 13, entry for ¶6220. This entry indicates that the MCO assembly will be hydrostatically tested in the shop prior to fuel loading. Please indicate whether there are any negative effects on the Helicoflex seal of this testing cycle.(RD)		Helicoflex seals will not be reused as they are generally a single use seal. The shield plug when used at the basin load out pits will have a new seal installed on the plug. The first MCOs will be tested with helicoflex seals at the fabricator.	
33	App 18, Table 3.1, page 13, entry for ¶6220. The entry in the Justification column states that the probability of generating the design pressure is low. Please indicate this value numerically, and indicate the source document.(RD)		A bounding pressure of 50 psig is calculated in "MCO Internal Gas Composition and Pressure During Interim Storage", HNF-SD-SNF-TI-040, Rev. 1. This value corresponds to MCO water contents predicted by HNF-1523 and HNF-1527. A probability analysis showing that the bounding water contents have less than 10^{-6} probability are provided in HNF-2234, "Sensitivity of Probabilistic MCO Water Content Estimation to Key Assumptions." All of these documents are internally released and have gone through independent reviews.	
34	App 18, Table 3.1, page 15, entry for ¶7200. This entry indicates that no overpressurization protection report was provided by the owner/buyer as explanation and justification. Someone should prepare the report.(RD)		Please see appendix 18 supplement #1, which begins immediately after page 19 of 19 of the exception report. The item of interest is explained beginning on page 8 of 11 of the supplement item number 13.	
35	App 18, Table 3.1, page 17, entry for ¶NG-4000. This entry uses the condition of not being Code stamped (which in itself does not reduce safety) as the justification for not requiring fabrication by a certificate holder. this thinking has to be fixed.(RD)		DESH position regarding stamping and fabrication by certificate holders is explained in letter FDH-9753381, N.H. Williams to E. S. Sellers, dated 5/5/97.	

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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
36	App 18, Table 3.1, page 17, entry for Appendix V. This entry uses the condition on non-stamping as an excuse to not prepare official documentation sheets which meet code requirements. This needs to be fixed.(RD)		"Official documentation" per code is prepared and signed by authorized code inspectors. Since authorized code inspectors are not being utilized (because the vessel is not stamped), "official documentation" per code cannot be prepared. A sample of the documentation package (inspected and approved by the independent acceptance inspector on behalf of RL) that will accompany the MCOs can be provided at your request.	
37	App 18, Table 3.1, page 18, entry for Appendix XXIII. This entry uses the condition on non-stamping as an excuse to not require formal qualification and assigned duties of personnel. This is not good, and needs to be fixed.(RD)		The criteria for which personnel are qualified and certified are per the code. The difference, as explained above, is that code inspectors are not approving the qualifications since they are not inspecting the vessels. Review and approval of vendor personnel qualifications are performed by the certified site NDE engineers and welding engineers, with oversight from DESH.	

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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
38	App 18, Supplement 1, page 1. the Introduction indicates that the original report was written from the design agent's view, and that the supplement discussion is needed to clarify the explanation. The comments and views of Supplement 1 should be taken into account, but the project should produce a Project document which fully and clearly identifies the Code requirements which are applicable but not met, why they are not met, and why not meeting those requirements nevertheless results in adequate safety. The content of this Project document should not be preparer or user sensitive or dependent.(RD)		Some of the code sections are not applicable to the MCO in the first place. We have taken exceptions to these non-applicable code sections and continued to explain them away when we probably should have not been discussing them in the first place. Anyway our regulatory strategy is based on our "MCO Additional NRC Requirements" document (HNF-SD-SNF-DB-005). Even though the MCO is not a shipping container, the basis is NUREG/CR-3854, Fabrication Criteria for Shipping Containers". This NUREG and its first reference is mentioned in response #28 above and these NUREGS allow for the adoption of applicable sections of codes, including ASME, for fabrication, allow for the for the exception, modification, addition, application of alternative techniques, use of third party (not ASME certified) review, audit, and inspection for fabrication, and also allow for and recommend that no code stamping be applied to the MCO. The MCO project may have to prepare such a document to demonstrate our regulatory position to the people on the outside. Thanks for the comment. I cannot commit to the proposed new document at this time, however the concept will be discussed within the project.	
39	App 18, Supplement 1, page 1. G1. This section indicates that the weld joining the cover cap to the MCO collar is not capable of RT. Please identify the report which documents the study which reached this conclusion.(RD)		See response to #15.	

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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
40	App 18, Supplement 1, page 2,. G2. A reference which provides analysis to support the conclusion that the relief system is safe and adequate should be provided. In addition, the revised appendix should make it clear that the overpressure protection via pressure relief is only provided while the MCO is water-filled, and that no pressure relief is provided during MCO storage in the CSB.(RD)		The relief system is discussed in the supplement 1 to the appendix 18. Items 13 through 20 discuss various aspects of the relief system. Included in the discussion is the analytical report on effectiveness of the flow path. The pressure relief system is provided by the MCO project. How it is used is up to operations later in the removal campaign. The information provided is based on MCO design. The MCO project can not make an operations commitment in this document. The sealing strategy offered in BCR 98-006 details the operating basis for the MCO and includes a sealed MCO in the CSB. The BCR has been approved.	
41	App 18, Supplement 1, page 4, Part (1), G1. The second ¶ indicates that the weld was shown to be adequate under a 24,000 lb load and 150 psi conditions. The conditions at the design pressure of 450 psi should be provided. See similar statement in the top ¶ of page 5.(RD)		The recommended changes will be provided in the Appendix 18, Supplement 1 revision. Thanks.	
42	App 18, Supplement 1, page 4, Part (1), G1. The third ¶ indicates that the cover cap is welded onsite using qualified personnel, procedures, and equipment. Please specify the ASME codes which will be applied in this process, including verification examinations such as UT.(RD)		The same ASME code articles (NB-4000) apply to the cover cap weld as with welding of other MCO structural components (see Fab. Spec. Section 6.5 Welding). Nondestructive examination will be performed per NB-5000. PT examination is per Section V, Article 6 and UT examination, if performed, is per Section V, Article 5. See response to comment #56.	

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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
43	App 18, Supplement 1, page 6, item 5. The 1st ¶ indicates that the necessary quality control and manufacturing requirements have been implemented to ensure that the materials and fabrication are in accordance with the Code. Since this can only be accomplished by invoking the code requirements, this should be clearly stated. Also, another document should not be dragged in to establish Code requirements.(RD)		The code requirements are invoked by the Fabrication Specification, which sites specific sections of the code regarding welding, fabrication, materials, etc. Also see response to comment #2.	
44	App 18, Supplement 1, page 7, item 5. The last ¶ (Please note) indicates that the selected MCO shell and shield plug assembly fabricator is an ASME NPT certificate holder. Does this mean that the fabricator will use his procedures, personnel, equipment, materials, etc. which are Code compliant? If not, what is to be conveyed by the note?(RD)		Yes.	
45	App 18, Supplement 1, page 7, item 7. This item indicates that concavity of the weld cannot be inspected on the inside. It appears that a boroscope could be used to perform this inspection.(RD)		One could put a borescope through the cover cap penetration and try to go to the weld area for a look. But, the cover cap has an integral backing ring, behind the weld root, built into the joint design. As a result after welding, no weld melt through is exposed for viewing from the inside. Also if one wanted to look at the crack between the backing ring and the collar inside wall, the view would have to be looking up from inside the locking & lifting ring. So it probably would not work--this idea of inspecting the weld concavity using a bore scope.	

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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
56	App 18, Supplement 1, page 8, item 9. This item indicates that personnel, procedures, records, etc for the cover cap welding will be done to applicable sections of the ASME Code. Can the specific requirements which will be used or not used be designated now in this document?(RD)		For now it is defined as a ASME section III subsection NB weld with no radiographic examination. The drawings and the fabrication specification for the MCO (HNF-S-0453) would apply. So, the weld wire and gas would be purchased to the drawings and specs. The welding machine and welders would have to go through a qualification process. The dye penetrant tests are done on the first and last weld passes. The weld is leakage rate tested. Also the weld joint is designed to be UT examined, if deemed necessary. The inspectors are qualified. The welding tasks would occur in the CSB, several years from now at the earliest. As to what actually happens several years from now, it is only a plan at this time based on the MCO drawings, the MCO fabrication specification and the draft PFDs for the project. That is all I can write about the subject. See response to comment #42.	
57	App 18, Supplement 1, page 9, item 10, second ¶ on the page. This item indicates that the assembly are tested at 1.25 times the design pressure of 150 psig. This should be updated to 450 psig.(RD)		The supplement 1 clarification report will be updated.	

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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
58	App 18, Supplement 1, page 10; item 13. This item should be revised to clearly indicate that the pressure protection and BDBA discussion applies only to the water-filled MCO.(RD)		The first paragraph ending sentence states "This is the bounding, although beyond design basis, flow requirement accident involving the MCO and its intended payload." The pressure protection is provided by the MCO project in this design for the worst case accident. Whether the offered pressure protection is used or not by operations personnel is up to them at that time. The utilization of the protection system would not be under the control of the MCO project in the future. Also, the pressure protection system on the MCO is available on the MCO any time it is desired.	
59	App 18, Supplement 1, page 11, item 13, last ¶. This item indicates that cover caps will not be put on MCOs that have excessive gas buildup potential. What is meant by "excessive" and "potential"? Please reference the document which provides the description of how and when this determination is made. Please describe the pressure protection measures provided for such MCOs.(RD)		We do not have a reference document defining excessive and potential at this time. The first MCOs will be going through a validation step after receipt at CSB. This validation is done to evaluate the analytical modelling used on the MCO contents. As a practical and non-official matter, when the cover caps go on all the MCO is probably still open for discussion. The MCO design includes pressure protection and it is always available to the MCO if the MCO is configured to utilize the protection system. Again this report is a design report not an operations document.	
60	App 18, Supplement 1, page 11, item 14. This item indicates that a design pressure of 150 psig. If this refers to the MCO, it should be updated to 450 psig.(RD)		This will be corrected.	

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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
61	Appendix 4, Section 13, 2nd ¶. this section highly recommends a test program to develop the relationship between torque and preload for the specific lubricant, equipment, procedures, and environment for the MCO. Will this recommendation be accepted?(RD)		This test program is ongoing. Refer to "MCO Shield Plug Threaded Components, Torque/Gall Testing and C-Seal Testing, Test Plan and Procedures," HNF-SD-SNF-TP-035, Rev. 0.	
62	Appendix 6 Section 10 - The value of maximum preload cited (217,600 lbf) does not match the value of 308,900 lbf given in Appendix 4.(TAG)		This calculation will be revised to the correct preload (308,900 lb.).	
63	Appendix 5 MCO Structural Drop Analysis Editorial(?) Section 9.2 states the bottom shell thickness is 0.880 inches at the center and 1.76 inches at the edges. This does not match the values on the drawings which are 1/4 inch thicker.(TAG)		Section 9.2 will be revised to reflect the values on the drawings.	

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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
64	Appendix 4 MCO Closure Bolt Preload Modeling and Response- An MPR engineer with experience on preload calculations reviewed this section and provided the following comment: The nominal preload from an applied torque is obtained on page 14 of the Parsons calculation using a "nut factor" of 0.17. The "nut factor" approach to predicting the preload assumes that the threaded fastener involves a nut or a head on a cap screw where there is a sliding contact surface with an outside diameter of about 2.375 inch for a 1.5 inch thread. For the set screw configuration of the MCO closure, the outside diameter of the contact is less than the thread minor diameter of 1.347 inch. Consequently, the torque to rotate the set screw will be reduced compared to a nut or cap screw configuration and the "nut factor" will be correspondingly lower. In addition, no specific test results as to the friction coefficient for the screw material (Nitronic 60 on Type 304) and for a particular lubricant, such as Never-Seez, are known. In our own experience we have found that Never-Seez used on Type 304 versus Type 304 stainless steel leads to mean friction coefficients as low as 0.117 after the third torquing. If one uses the more complicated and accurate form of the torque versus preload relation (i.e, one that considers the diameter of the contact) a friction coefficient of 0.117, a mean contact diameter of 1.0 inch for the bottom of the screw on the plug, and an applied torque of the nominal value obtained in the calculation of 315 lbf-ft; The predicted load would be 389500 lbf rather than 266300 lbf as obtained in the calculation. Note that the "nut factor" in this case would be 0.116 rather than 0.17. Based on the above, it is considered that the actual preload from an applied torque of 315 lbf-ft will probably be substantially higher than calculated by Parsons and that the effect of this higher nominal preload on the stresses in the closure needs to be evaluated. This also supports the need to do mock up testing as a basis to set a preload torque value. 389500 lbf rather than 266300 lbf as obtained in the calculation. Note that the "nut factor" in this case would be 0.116 rather than 0.17. Based on the above, it is considered that the actual preload from an applied torque of 315 lbf-ft will probably be substantially higher than calculated by Parsons and that the effect of this higher nominal preload on the stresses in the closure needs to be evaluated. This also supports the need to do mock up testing as a basis to set a preload torque value.		Mock-up testing is now underway, with one of the objectives to determine the actual "nut factor". Presently, the desired minimum preload force is known and the mock up will help determine the range of actual dispersion in the torque/preload relationship. Further discussion is presented in the response to Item 1, reviewer-G.R. Wagenblast, FDNW, Civil Structural Engineering (listed below). "The installation torque cannot be increased due to excessive stress in the thread relief area of the shell collar. The reduced uncertainty allowance was selected as our best estimate at the time. The basis for this reduction in uncertainty was based on the knowledge of the project efforts to control the preload using custom tooling and attention to methods. Preliminary testing shows the desired preload range can be achieved. This preliminary data is HNF-N-62, Volume 1, *Multi-Canister Overpack (MCO) Component Testing*, Ruff, E.S., Issued 7/23/97."	
65	Spell check document, several words misspelled.(CL)		These corrections will be made.	

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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
66	Page 4 0f 50, last sentence, remove the word "are" after the word "code"(CL)		This revision will be made.	
67	Page 5 0f 50, 2.1 last sentence first paragraph "four processing ports" shouldn't this be 3 processing ports?(CL)		"Three processing ports" is correct. This will be revised accordingly.	
68	page 5 of 50, next to last sentence, discusses using the first 24 MCO's for monitoring. Where is the justification for using 24 MCOs?(CL)		There is a process validation document HNF-SD-SNF-CN-027 which has been released and describes the plan. It includes discussion of the 24 or so MCOs for validation.	
69	Page 5 of 50, section 2.2 discusses interfaces. What about interfacing with monitoring equipment interface?(CL)		We will add a interface indicating the pressure monitoring equipment at the CSB.	
70	Page 6 of 50, section 2.5 Shield Plug, discusses four ports. This is an open issue in the MCO Performance Specification.(CL)		Yes, it is.	closed ~~Open~~
71	Page 7 of 50, discussion of Port 4, still an open issue with RL.(CL)		Yes, it is.	~~Closed~~ Open
72	Page 8 of 50, section 2.7 Seal, third sentence, discusses seal being held in place with four clips. I couldn't find this on the drawings. Where is the illustration of these clips?(CL)		The clips are called out on Drawing H-2-828041, Sht. 2, Note 17. "Seal Retaining Screws and Clips are Supplied with Seal (Item 38)". The installation is depicted on Sht. 3 of the same drawing. The dimensions of the threads and clip recess are shown on Drawing H-2-828045, Sht. 1, Section A-A, Zone E-4.	
73	Page 12 of 50, first paragraph, remove reference on hot conditioning.(CL)		This will be revised accordingly.	

Charles Foltz
9-28-99

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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
74	Page 12 of 50, third paragraph discusses Ultrasonic inspection. What is the driver for this inspection?(CL)		The initial driver was to bring the weld as close to code compliance as possible by proving the UT was "equivalent" to RT. Note the NUREGS allow substitution of RT with UT. However, after further review and given input from DESH welding engineers, a recommendation has been made to FDH to delete the UT examination. The final weld will be LP tested, root and final pass, and then helium leak tested.	
75	Page 12 of 50, section 3.4 Maintainability, discusses and external pressure relief device. At what stage is this pressure device used and what is the technical drive for it's use?(CL)		An adder will be made to the sentence ", if utilized."	
76	Page 18 of 50, section 3.9.4 Height of the MCO, discusses two maximum heights. What is the maximum height? 167.3 inches or 165.4 inches?(CL)		This will be revised. (Drawing H-2-828041, Sht. 1 shows the overall height of the MCO at 166.420 inches.)	
77	Page 25 of 50, section 3.14.6, second sentence, change "scape" to "scrap"(CL)		This will be revised.	

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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
78	Page 38 of 50, section 3.19.4 Relieve Overpressure, this section discusses overpressure event in excess of 150 psig for the flooded MCO. What is the possibility of such and event? Where is this analysis?		Well you have asked a very good question here. The safety organization is looking into runaway corrosion events probability and they have not been able to declare runaways incredible at this time. So the disk device stays in the MCO design until somebody says it is incredible in writing or the project is told in writing to take it out and, of course, this would absolve the MCO project of liability and its assigned personnel would be held harmless for the deletion. The safety folks are doing the work and it is supposed to go in the CVD facility SAR. This is a "TBD".	OK closed
79	Material Evaluation Page 4 of 6, third paragraph next to last sentence. Change "grater" to "greater"(CL)		This will be revised.	

CL
9-28-99

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Multi-Canister Overpack Design Report, HNF-SD-SNF-DR-003, Rev.1, Draft, April 1998	SNF	L. D. Blackburn	XWEST	

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

6-22-98
Date

L D Blackburn
Reviewer/Point of Contact

Author/Originator

11. CLOSED

6-22-98
Date

L D Blackburn
Reviewer/Point of Contact

J M Bolton 9/29/98
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
	TEXT COMMENTS			
1	P.7, Sect. 2.6, 1st para., last sent.--Design pressure is not 150 psig; change to "...fail at a pressure of 150 psig at 132° C."		Section revised.	
2	P.12, Sect. 3.3, 1st para., last sent.--Eliminate "hot conditioning" as this process is no longer used. I suggest that all portions of the Design Report be searched for this term so that it can be consistently eliminated.		Wording revised.	
3	P. 19, Sect. 3.1, 2nd para., 3rd sent.--Modify to read "All components except the forged collar are made of 304L stainless steel; the forged collar is made of XM-19 stainless steel."		Description changed.	
4	P. 20, Sect. 3.11, 2nd para., last sent.--Explain how final sealing of the opening for the recessed threaded plug is to be achieved.		Threaded plug has a metallic seal like the rest of the process plugs. Sealing mechanism is the same.	
5	P. 20, Sect. 3.11, last para.,1st sent.--Eliminate "100%" to emphasize that no radiographic examination is to be conducted.		Revised.	

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6	P. 24, 3rd full para.--Eliminate "hot conditioning processes"		Revised.	
7	P. 30, Sect 3.14, 1st sent.--Eliminate "hot conditioning".		Revised.	
8	P. 31, Sect. 3.15, 2nd para.--In the first sentence, change "The MCO shell, shield plug assembly and locking ring..." to "The MCO shell and shield plug assembly..." In the second sentence, explain what compatibility is being assured (not insured) by the selection of 304N stainless steel for the locking ring. In the sixth sentence, change to "Nitronic 60 is used for threaded fasteners." Eliminate the seventh sentence, as 304LN or 304N were not selected for components, except as covered in preceding sentences. Recommend moving last sentence to become second sentence.		Revised.	
9	P. 31, Sect. 3.16, 1st para., last sent.--Eliminate the word "final" as the mechanical seals are not the final closure for all MCOs.		Revised.	
10	P. 32, Sect. 3.16, 2nd para.--Change Appendix D to Appendix A, as the Performance Specification has no Appendix D. The conclusions stated in this paragraph need to be supported by expanded discussions in Appendix 2, see Items 19 and 23.		Will change Appendix D to A. Conclusions will be based on response to Item 19.	

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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
11	P. 32, Sect. 3.17--In the first paragraph, last sentence, there is no Appendix C in the Design Report. As a general comment, this reviewer recognizes that the design agent's responsibility is only to provide a design that will permit ultrasonic examination of the field weld. Nevertheless, a full understanding of the project's intentions for examination of this weld is important enough to be clearly presented in the design report. I would suggest the third sentence in the last paragraph be modified to "...the quality is assured by welding qualification and the use of Code-mandated liquid penetrant examination and ultrasonic examination."		Appendix C reference will be deleted. The SNF project's position with respect to examination of the cover cap weld has not been finalized. Recommendations regarding the UT examination have been made to FDH. The process of reaching concurrence on this issue is lengthy and is not expected to go unchallenged. It is premature to include in the Design Report now.	
12	P. 38, Sect. 3.19.4, last para., 1st sent.--Change "...the design pressure of 150 psig." to "...a pressure of 150 psig." as the design pressure is 450 psig.		Revised.	
13	P. 41, Sect. 4, Item 3, Requirement column--Eliminate "hot conditioning"		Revised.	
14	P. 45, Sect. 4, Item 26, New Design Complies Column--Modify to reflect that XM-19 is a shell component that is welded.		Revised.	
15	P. 46, Sect. 4, Item 27--Final closure is not a mechanical seal. Explain how final closure methods affect MCO Corrosion Control.		Further clarification will be provided.	
	APPENDIX 1 COMMENTS			
16	Dwg H-2-828041, sht. 2--In General Note 14, change "hot conditioning" to "cold vacuum drying." In General Note 18, the service temperature limits for lubricants are too high in view of the 132° C design temperature.		Reference to hot conditioning will be removed and service temperatures for lubricants will be adjusted accordingly.	

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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
17	Dwg H-2-828043, sht 1, General Note 9-- Eliminate requirements for minimum yield and tensile strength of 304L. Parts list actually shows SA-240 304L SST, rather than welded or seamless SA-312 pipe, as indicated in note.		Minimum yield and tensile requirements are those of 304 SST and not 304L SST. Notes and parts list however, will be revised to eliminate reference to pipe and add dual certification.	
18	Dwg H-2-828070, sht. 1, General Note 10--This note should not be required since the Mark IV storage baskets are not Safety Class. This position is consistent with Dwg H-2-828075 where the NG Code requirement for the Mark IV scrap baskets is lined out.		Note 10 will be lined out on Dwg. H-2-828070.	
	APPENDIX 2 COMMENTS			

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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
19	P. 3, next to last para.--There are two aspects of the revised materials selections and revised design pressure which are not specifically evaluated in Appendix A (not Appendix D, as stated) of the Performance Specification, and which should therefore be addressed in the present Materials Evaluation for the Design Report. First, the assessment in the Performance Specification was based on the use of 304L stainless steel which provided protection against sensitization of the weld heat-affected zone. Resistance to stress corrosion cracking of 304 or 304L stainless steel is enhanced when sensitization is prevented. The XM-19 steel selected for the collar is not a low-carbon stainless steel, therefore some direct evidence of the acceptability of this steel from the standpoint of adequate stress corrosion cracking resistance and/or adequate resistance to sensitization should be cited in the Materials Evaluation. The revised design pressure is 450 psig. The assessment of hydrogen effects on 304L stainless steel given in the Performance Specification were based on a design pressure of 150 psig, which was conservatively assumed to be due to 100% hydrogen gas. A review of the Performance Specification based on the higher hydrogen pressure and on the use of higher strength XM-19 steel should be performed and the results reported in the Materials Evaluation. Finally, some discussion of welding XM-19 to 304L, including filler metal selection, should be added to support the selection of XM-19 for the collar.		1. Regarding XM-19 having adequate resistance to stress corrosion cracking: From Welding Journal, Aug. 1982, R.H. Espy, Weldability of Nitrogen Strengthened Stainless Steels, "Nitrogen added to the steel inhibits carbon migration so that the weld areas show little carbide precipitation even at 0.06% carbon." Nitrogen and carbon are both present as interstitial elements, so the presence of nitrogen reduces the diffusion of carbon, thereby retarding sensitization. Further, the material spec. calls for additions of columbium and vanadium. These elements are strong carbide formers and the material will form these carbides in preference to chromium carbides (sensitization). Therefore, XM-19 has equal-to or superior resistance to sensitization and equal-to or superior resistance to SCC. This information will be added to the Material Evaluation. 2. Regarding hydrogen and XM-19 at higher pressure: XM-19 is an austenitic solid solution alloy. As such, it will not embrittle due to hydrogen. The hydrogen pressures, concentrations, and temperatures are insufficient to cause diffusion of hydrogen into any ferritic or austenitic metal. Language addressing this will be added to the Materials Evaluation. In addition, a reference to "Hydrogen Compatibility Handbook for Stainless Steels" by George R. Caskey Jr. which has data on XM-19 will be added. 3. Regarding filler weld selection for welding of XM-19 to 304L: Both materials are considered austenitic stainless steels. XM-19 forgings procured to SA182 have balanced chemistries so that a small amount of weld metal ferrite is formed. John Tack of Armco Steel indicated that XM-19 can be welded with the same welding practices employed for other 300 series alloys. The project will consider the chemistries of the base materials to select the optimum filler metal, using USNRC Reg. Guide 1.31 methodology and the methodology in the previously referenced Welding Journal article. This will be added to the Material Evaluation.	
20	P.4, 2nd para., 2nd sent.--Explain if temperature cycles should still be considered "large" for a design temperature of 132° C.		The temperature cycles are still significant to warrant evaluation.	

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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
19	P. 3, next to last para.--There are two aspects of the revised materials selections and revised design pressure which are not specifically evaluated in Appendix A (not Appendix D, as stated) of the Performance Specification, and which should therefore be addressed in the present Materials Evaluation for the Design Report. First, the assessment in the Performance Specification was based on the use of 304L stainless steel which provided protection against sensitization of the weld heat-affected zone. Resistance to stress corrosion cracking of 304 or 304L stainless steel is enhanced when sensitization is prevented. The XM-19 steel selected for the collar is not a low-carbon stainless steel, therefore some direct evidence of the acceptability of this steel from the standpoint of adequate stress corrosion cracking resistance and/or adequate resistance to sensitization should be cited in the Materials Evaluation. The revised design pressure is 450 psig. The assessment of hydrogen effects on 304L stainless steel given in the Performance Specification were based on a design pressure of 150 psig, which was conservatively assumed to be due to 100% hydrogen gas. A review of the Performance Specification based on the higher hydrogen pressure and on the use of higher strength XM-19 steel should be performed and the results reported in the Materials Evaluation. Finally, some discussion of welding XM-19 to 304L, including filler metal selection, should be added to support the selection of XM-19 for the collar.		1. Regarding XM-19 having adequate resistance to stress corrosion cracking: From Welding Journal, Aug. 1982, R.H. Espy, Weldability of Nitrogen Strengthened Stainless Steels, "Nitrogen added to the steel inhibits carbon migration so that the weld areas show little carbide precipitation even at 0.06% carbon." Nitrogen and carbon are both present as interstitial elements, so the presence of nitrogen reduces the diffusion of carbon, thereby retarding sensitization. Further, the material spec. calls for additions of columbium and vanadium. These elements are strong carbide formers and the material will form these carbides in preference to chromium carbides (sensitization). Therefore, XM-19 has equal-to or superior resistance to sensitization and equal-to or superior resistance to SCC. 2. Regarding hydrogen and XM-19 at higher pressure: XM-19 is an austenitic solid solution alloy. As such, it will not embrittle due to hydrogen. The hydrogen pressures, concentrations, and temperatures are insufficient to cause diffusion of hydrogen into any ferritic or austenitic metal. Language addressing this will be added to the Materials Evaluation. 3. Regarding filler weld selection for welding of XM-19 to 304L: Both materials are considered austenitic stainless steels. XM-19 forgings procured to SA182 have balanced chemistries so that a small amount of weld metal ferrite is formed. John Tack of Armco Steel indicated that XM-19 can be welded with the same welding practices employed for other 300 series alloys. The project will consider the chemistries of the base materials to select the optimum filler metal, using USNRC Reg. Guide 1.31 methodology and the methodology in the previously referenced Welding Journal article.	This is what I was thinking. Will it be added to Materials Evaluation? Will this be added to Materials Evaluation, with emphasis on 304L to XM-19 welds?
20	P.4, 2nd para., 2nd sent.--Explain if temperature cycles should still be considered "large" for a design temperature of 132° C.		The temperature cycles are still significant to warrant evaluation.	

I think reference(s) need to be cited showing that hydrogen effects in XM-19 should be semi-important. One source is the Cadday handbook on hydrogen in stainless steel (Carrie Graves FD Northwest has a copy); this was used in the assessment included for the Performance Specification for 304L. It also has data for Tivalon 50 (XM-19). If you want to use H_2 concentration & temperatures to "no H_2 effect" do calculations and put [illegible]

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21	P. 4, 3rd para., 12th sent.--Eliminate "the N grade of..304L" since 304LN is not selected for the design.		Revised.	
22	P.4, 3rd para.,13th sent.--Eliminate type 316 and XM-19, as these alloys were not selected for bolts.		Revised.	
23	P. 5, 1st line--Explain if "will block" should be "will not block."		Revised to read "will not".	
24	P.5, Copper/Stainless Steel Evaluation--This section should present an expanded discussion of the proposed welding of the copper shrouds to the stainless steel base plate to support the selection of this fabrication method and weld filler metal. Liquid copper in contact with stainless steels like 304L can produce severe cracking of the steel in welding operations. Welding of copper can require very high heat input, and provisions for assuring liquid copper does not contact the stainless steel base plate should be addressed. The discussion should also address whether previous work supports the acceptability of the copper dilution offered by the proposed filler metal to avoid cracking.		The joint's gap between the copper and the stainless base plate is maintained by the screen and the under cut of the outer rim of the 1 1/4 inch plate. The screen is 0.108 inches thick and the rim is cut down to 1.200 to 1.210 inches from its 1.25 inch nominal thickness. The nominal gap between the edge of the 1/8 inch thick copper shroud and the stainless steel structural plate is then 0.148 to 0.158 inches. This produced gap precludes direct contact of the 1/8 inch thick copper with the 1 1/4 inch thick plate. With such a large gap, the filler metal will fill the gap from the stainless steel baseplate up to the copper assembly and as a result any melted copper will be diluted in the ERCuNi-7 filler metal. Due to the joint design, liquid copper in direct contact with the stainless steel base plate is not a likely event. So the possibility of liquid copper metal embrittlement induced cracking of the stainless steel base plate is not likely. Test welds were performed using a similar gap and the weld results were acceptable. The gas tungsten welding procedure for welding stainless steel to copper using ERCuNi-7 weld filler material was written and tested in accordance with ASME Section IX. There were no cracks in the bend tests and the tensile tests broke in the copper base metal. A section on welding of the copper to the stainless steel base plate will be included in the Copper/Stainless Evaluation section of Appendix 2. Discussion will include potential embrittlement of the stainless steel baseplate, dilution of the copper by the filler metal, test welds and testing of the weld specimens, and overall acceptability of this previous work to the project.	

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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
25	P. 5, Copper/Copper Evaluation--Eliminate the discussion of brazing, as this fabrication method is lined out on Dwg. H-2-828065, sht. 1. Add a discussion on practical problems of welding the copper components (typically very high heat inputs are required) that supports the selection of this joining method. The last paragraph refers to the baskets being exposed to water for one to two weeks. I agree that corrosion is not significant in this period, but note that the numerical values are different than the two days used in the Performance Specification corrosion assessment.		The brazing discussion will be deleted. A discussion will be added as you suggest. The text will include explanation of several weeks and 2 days corrosion periods indicated in the performance specification.	
	APPENDIX 6 COMMENTS			
26	P. 9, Sect. 6.3, Table 2--Explain why the allowables for XM-19 were selected, when the weld joins XM-19 to 304L stainless steel and filler metal is not specified. It would seem more conservative to use allowables for 304L.		Table 2 has been changed to the allowables for 304L. The lower strength of the materials being joined will be used for the acceptable weld stress value.	
	APPENDIX 11 COMMENTS			
27	P. 6, Sect. 4, 1st para., 2nd sent.--Omit this sentence as minimum tensile and yield strength properties for Type 304 stainless steel are no longer specified. Table 1 uses the appropriate strengths and allowables for 304L stainless steel.		The material is dual certified to 304L and 304.	
	APPENDIX 18 COMMENTS			
28	P.4, Sect. 2.1.2, last sent.--Revise sentence to reflect the Performance Specification requirement: "The closure cap shall be capable of being fitted with a recessed threaded plug to be used for helium leak testing after welding."		Revised.	
29	P.9, Table 3.1, Para. 3360, Justification column--Eliminate the term "hot conditioning"		Revised.	

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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
25	P. 5, Copper/Copper Evaluation--Eliminate the discussion of brazing, as this fabrication method is lined out on Dwg. H-2-828065, sht. 1. Add a discussion on practical problems of welding the copper components (typically very high heat inputs are required) that supports the selection of this joining method. The last paragraph refers to the baskets being exposed to water for one to two weeks. I agree that corrosion is not significant in this period, but note that the numerical values are different than the two days used in the Performance Specification corrosion assessment.		The brazing discussion will be deleted. A discussion will be added as you suggest. The text will include explanation of several weeks and 2 days corrosion periods indicated in the performance specification. This disposition is not accepted. The last sentence of Section 6.3 Weld pay allowables of Table 2 apply. These allowables are for XM-19 (see Table 1). Therefore, the second sentence of the response appears to be in error.	
	APPENDIX 6 COMMENTS			
26	P. 9, Sect. 6.3, Table 2--Explain why the allowables for XM-19 were selected, when the weld joins XM-19 to 304L stainless steel and filler metal is not specified. It would seem more conservative to use allowables for 304L.		Acceptable stress values for the material used depending on the location of the stress. In the areas of the weld the lower strength of the materials being joined is used.	
	APPENDIX 11 COMMENTS			
27	P. 6, Sect. 4, 1st para., 2nd sent.--Omit this sentence as minimum tensile and yield strength properties for Type 304 stainless steel are no longer specified. Table 1 uses the appropriate strengths and allowables for 304L stainless steel.		The material is dual certified to 304L and 304.	
	APPENDIX 18 COMMENTS			
28	P.4, Sect. 2.1.2, last sent.--Revise sentence to reflect the Performance Specification requirement: "The closure cap shall be capable of being fitted with a recessed threaded plug to be used for helium leak testing after welding."		Revised.	
29	P.9, Table 3.1, Para. 3360, Justification column--Eliminate the term "hot conditioning"		Revised.	

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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
30	P. 13, Table 3.1, Para.6220, Justification column--Explain whether the phrase "...the calculated pressure stresses in the weld are relatively small..." reflects calculations based on 450 psig design pressure.		Does reflect 450 psig.	
31	Supplement 1--It appears this supplement was written for a design pressure of 150 psig. It should be revised to reflect a design pressure of 450 psig.		A clarifying note will be added to the supplement that it is out of date and will be updated in the future. The revision will include the 450 PSI.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO DESIGN REPORT, HNF-SD-SNF-DR-003, Rev 1, DRAFT APRIL 1998	98-002H-002 SNF	G.R.Wagenblast	FDNW CIVIL STRUCTURAL ENG	1200 Jadwin 2-64 E6-46 376-5736

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

Gary R Wagenblast
5/18/98
Date

Reviewer/Point of Contact

Author/Originator

11. CLOSED

Gary R Wagenblast
5/18/98
Date

Reviewer/Point of Contact

9/28/98
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.	Increase installation torque of INSTALLATION RING SET SCREWS (part 9, H-2-828041) to 425 (+/-25) foot-pounds. Calculations, Appendix 4, page 15, specifies 315 (+/-10) foot-pounds. Justification: The values used in Appendix 4, 10.c, pages 12 and 13 for the five variables used in determining installation torque uncertainty are not conservative and not justified. By increasing the installation torque to 425 foot-pounds, the uncertainty that can be accommodated increases to +/-40% as compared to +16/-18.8% used in the appendix. This would accommodate a maximum uncertainty in using bolt torque to achieve target bolt pre-load forces in applying minimum seal seat forces without exceeding material stress limits. This would also have the added advantage of maintaining higher seal forces when under 450 psi internal pressure and thus higher reliability of maintaining leak-free service.		The installation torque cannot be increased due to excessive stress in the thread relief area of the shell collar. The reduced uncertainty allowance was selected as our best estimate at the time. The basis for this reduction in uncertainty was based on the knowledge of the project efforts to control the preload using custom tooling and attention to methods. Preliminary testing shows the desired preload range can be achieved. This preliminary data is HNF-N-62, Volume 1, Multi-Canister Overpack (MCO) Component Testing, Ruff, E.S., Issued 7/23/97.	Accepted. However, I recommend that you reconsider using 425 +/-25 Ft.-Lbs. HNF-N-62 was not provided for review nor was it referred to in the design report or in the calculations for justification of bolt torque. It appears to me that the bolt torque could be increased without approaching the stress limits at the thread relief area of the shell collar. Ref App. 6, pg 28 Jack Force for 18 bolts at 450 Ft-lb = Wb = 450(12)(18)/(1.5)(.17) = 381 K Total Axial Load = 24K + 214K + 381K = 619K Stress = 681K/27.72in^2 = 22.3 KSI < 31.9 KSI Therefor: 425 +/- 25 Ft-Lb OK

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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.	1. Continued Minimum bolt design force = 216200#/18=12000# Maximum bolt force allowed = 27860# (limited by least bolt/joint allowable force) Bolt comp. (2Sm) @ 70F = 1.49(2)16700 = 49700# Plug bearing (Sy) @ 70F = 1.41(25000) = 35250# Thread (.6Sm) @ 70F = 2.57(3.5)(.6)16700 = 90100# Bolt comp. (2Sm) @ 270F = 1.49(2)11600 = 34570# Plug bearing (Sy) @ 270F = 1.41(19760) = 27860# Thread (.6Sm) @ 270F = 2.57(3.5)(.6)11600 = 62610# Target Bolt Pre-Load = (12000 + 27860) 1/2 = 19930# Target Bolt Torque = .17(19930)1.5/12 = 425 ft-lbs Uncertainty = (27860/19930 -1) = 0.40 = 40%			
2.	Revise torque requirements for cover plate assembly bolts to 17 foot-pounds: Minimum cover plate design force must include the seal load plus the pressure load in order to maintain minimum seal load under pressure. F = 4467# pressure load + 3351 seal load = 7818# Bolt force for 4 bolts = 7818/4 = 1955# Torque required to assure minimum 1955# bolt force, use Kmean=.17 Tq = .17(1955)(.625)/12 = 17.3 ft-# Maximum torque based on uncertainty, use Kmax=1.3Kmean=1.3(.17) Tq = .17(1.3)(1955)(.625)/12 = 22.5 ft-# Maximum bolt preload force accounting for uncertainty, use Kmin=.11: F = 17.3/((.11)(.625/12)) = 3019# Allowable bolt tension (2Sm): Tall = 2(11600)(.189) = 4384# > 3019# OK Allowable plug thread shear (.6Sm): Vall = .6(16600)(1.42)(.5) = 7071# > 3019# OK Allowable bolt thread shear (.6Sm): Vall = .6(11600)(.998)(.5) = 3473# > 3019# OK		This torque can be increased and going one step further, taking the torque to the maximum allowed (based on bolt thread shear): Max Torque = 3473/3019(17.3) = 19.9 ft-lb. 17 +/- 2 ft-lb.	Accepted.

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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
3.	Revise torque requirements for Process Valve to 88 foot-pounds: *Justification:* The design force must include the seal load plus the pressure load in order to maintain minimum seal load under pressure. F = 1414# pressure load + 1885 seal load = 3299# Torque required to assure minimum 3299# design force, use Kmean=.17 Tq = .17(3299)(1.875)/12 = 87.6 ft-# Maximum torque based on uncertainty, use Kmax=1.3Kmean=1.3(.17) Note: use this torque in torsional stress calculations for the process plug and rupture disc weld, Appendix 10 pages 21 and 22. Tq = .17(1.3)(3299)(1.875)/12 = 113.9 ft-#		Page 31 of Appendix 10 suggests a torque of 90 +/- 15 ft-lb. This can be increased to 100 +/- 10 ft-lb., as there is no over stress condition at this loading.	Accepted. The specified torque of 90 Ft-Lbs is acceptable. However, the calculations, App 10, pg 18, should be revised to show that 88 ft-lbs is the minimum torque required, not 65 ft-lbs.
4.	Revise torque requirements for Process Plug to 26 foot-pounds: *Justification:* The design force must include the seal load plus the pressure load in order to maintain minimum seal load under pressure. F = 509# pressure load + 1131 seal load = 1640# Torque required to assure minimum 1640# design force, use Kmean=.17 Tq = .17(1640)(1.125)/12 = 26.1 ft-# Maximum torque based on uncertainty, use Kmax=1.3Kmean=1.3(.17) Tq = .17(1.3)(1640)(1.125)/12 = 34 ft-#		As no over stress condition exists, suggest the torque remain at 35 +/- 5 ft-lb.	Accepted. The specified torque of 35 ft-lbs is acceptable. However, the calculations, App 10, pg 24, should be revised to show that 26 ft-lbs is the minimum torque required, not 22 ft-lbs.
5.	Appendix 10 Table of Contents does not match the contents.		This will be revised accordingly.	Accepted.
6.	Revise jacking bolt load in Appendix 6, Section 10.1, page 20, and Section 10.3, page 27, to be 18(27860) = 500,000# in order to account for uncertainty in bolt torque. (See item 1, above)		See response to Item #1.	See Status of Item 1.
7.	The Figure numbers referred to in Appendix 6, Sections 10.1 and 10.2 do not agree with figures provided.		Corrected.	Accepted.

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	3. Project No. 98-002H-002	4. Page 4

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
8.	Appendix 6, Section 10.2 reports that a plastic strain of 0.16% is reached in the thread relief region. There is no discussion as to how this is used to show compliance to NB-3227.3 which limits the stress intensity to yield stress. It is not clear in Section 10.1 whether NB-3227.3 is concluded to be applicable. If applicable, state how it is satisfied. If not applicable, remove the ANSYS discussion.		An exception to NB-3227.3 is taken in the Code Exception Report and justification is provided. See Appendix 18, Table 3.1. Additional explanation will be provided in the Appendix text.	Accepted.

REVIEW COMMENT RECORD (RCR)	1. Date 4-14-98	2. Review No. 98-002H-002
	3. Project No. 98-002H-002	4. Page 5

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 COMMENTS ARE OPEN ITEMS REMAINING FROM THE 90% DESIGN REVIEW CONDUCTED 3-97			
97 1	Provide documentation showing verification and validation of computer programs (ANSYS) in accordance with DOE quality requirements.		Verification and validation of software used in Phase 2 design was released as HNF-SD-SNF-CSWD-005.	Accepted. This document should be referred to in the Design Report.
97 2	Appendix 7. The analysis does not show ASME code compliance for vertical drop accident of the Mark 1A baskets. Elastic criteria, F-1330, specifies maximum compressive load be limited to one of three options, one of which is a limit of 2/3 of the buckling load. Load eccentricities must be considered. Plastic criteria, F-1340, is allowed but must satisfy safety margins on ultimate strength and buckling collapse loads. Compliance to these criteria has not been shown.		The center pipe and support rods were evaluated using the criteria of Appendix F. F-1331.5 was used for center pipe compression and F-1334.3 was used for support rod buckling, considering 2/3 of the buckling load and eccentricities (See Table 4 for allowables). Compliance with the ASME Code was shown by calculating the possible combined center pipe/support rod capacity, calculating the allowable for pipe/rod combined capacity and ratioing the applied load to the allowable. See Table 6 for stress results summary.	Accepted.
97 3	Appendix 8. The analysis does not show ASME code compliance for stacking of the Mark IV baskets. The elastic analysis states that the support rods are adequate when all 6 rods are loaded equally. Non-Linear analysis is referenced to indicate that, using large-deflection criteria, 3 rods are adequate to support the load. Buckling collapse criteria, F-1340, is allowed but must satisfy safety margins on ultimate strength and buckling collapse loads. Explain how the ASME criteria are met.		In accordance with paragraph 4.12.3 of the Performance Specification the Mark IV Baskets do not have to meet ASME Code requirements.	Accepted.
97 4	Revise the Performance Specification, HNF-S-0426, Section 4.11, to prohibit the reuse of the Main Seal. Justification: The manufacturers data sheet, page 14, requires "Never untighten and retighten to previous torque or lower, since sealing cannot be guaranteed." For any reuse of the seal (as the compression of the seal is limited by the depth of the seal groove) the compression of the seal would always be equal to or lower than the original seal compression.		The manufacturer's restriction will be emphasized in the Design Report. Reuse of the main seal is not planned.	Accepted.

REVIEW COMMENT RECORD (RCR)

1. Date	2.
4/14/98	MCO-R1(Draft)/LJJ April 1998
3. Project No.	**4. Page**
SNF	1 of 5

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO Design Report, HNF-SD-SNF-DR-003, Rev. 1 Draft, April 1998	SNF	L. J. Julyk	FDNW, Mechanical Engineering	2750E/200E R1-56/376-4608

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

5/12/98 — Date

Reviewer/Point of Contact

Author/Originator

11. CLOSED

7/31/98 — Date

Reviewer/Point of Contact

9/28/98

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
	HNF-S-0426, Rev. 4, Draft (4/03/98) Performance Spec.			
1	1. Pg 4, Sect. 2.2, Codes and Standards: ASME Section III, Division 3, Containment Systems and Transport Packaging for Spent Nuclear Fuel and High Level Radioactive Waste," published in May 1997 would appear to be relevant, although not timely at this stage of the design effort. 2. Pg 11, Sect. 4.7, Table 2, K Basin Storage Pool:, Temperature (Water): reference to "[see 3.3.1.3]" does not exist.		Part 1: We have a copy of the mentioned code and it appears relevant for some of the tasks the MCO is performing. However, all the other various guides and regulations outside of the SNF project's control and all our own internal project documents would have to be changed to match up and "mesh" with the use of the new code. The changes would, of course, cause many more questions and require answers to them. I don't believe the cost associated with the implementation and use of the new code would be worth the value added to the project. If we were starting now, then I am sure that we would likely consider use of applicable portions of the new code in the design requirements. Part 2: This is a typographical error, it should have read "3.1.3.3". We will correct it.	
	Appendix A - MCO Corrosion Conditions			

REVIEW COMMENT RECORD (RCR)

1. Date	MCO-R1(Draft)/LJJ April 1998
3. Project No. SNF	4. Page 2 of 5

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
2	Pg A-8, 1st Par., Last Sent: Refers to bounding case where peak MCO wall temperature was predicted to be 261 °C (500 °F). This appears to be in conflict with revised Design Temperature of 132 °C (270 °F). Explain.		This redesign of the MCO lowered the maximum temperature at the new increased pressure resulting in 132 C as the design temperature at a pressure of 450 PSI inside the MCO. The higher temperatures in this paragraph represent accident transients and are not likely. It may appear as a conflict here, but we are trying to show that, in the unlikely event of this very conservative accidental transient, the MCO could endure the higher temperatures with out damaging the MCO's structure or functionality. Two possible ways of damaging the MCO are discussed. The first is exceeding the temperature limits of the MCO structural components and the second is the potential for eutectic melting of or cause damage to MCO structural components. On the first item, we will clarify the text to indicate the MCO's have capability up to 375 C, in that the MCO materials of construction will not be harmed by those higher temperatures. On the second item a clarification will be added into the text that these transient temperatures are not high enough to initiate eutectic melting of materials inside the MCO. As a result risk to the MCO components due to eutectic melting nearby is low.	
	HNF-SD-SNF-DR-003, Rev. 1, Draft, April 1998 - MCO Design Report			

REVIEW COMMENT RECORD (RCR)

1. Date	2
4/14/98	MCO-R1(Draft)/LJJ April 1998
3. Project No.	4. Page
SNF	3 of 5

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
3	1. Pg 4, Sect. 1, 2nd Par., Last Sent.: suggest "... or as requested by the buyer..." 2. Last Par., Last Sent.: suggest "... requirements of the code are to be applied." 3. Pg 6, Sect. 2.3, Line 4: states that MCO shell is fabricated from 24" schedule XS, SA-312 304L pipe but drawing H-2-828043 specifies 24" NPS Sch 80S, SA-240 304L pipe. Which is it? 4. Pg 7, Sect. 2.6, 1st Par., Last Sent.: states that rupture disk is designed to fail at the "design pressure" of the MCO, 150 psig at 132 °C. However, the revised design pressure of the MCO is 450 psig. Might better read as "...designed to fail at a pressure of 150 psig (below the MCO design pressure) at the MCO design temperature of 132 °C." 5. Pg 13, Sect. 3.6: Since all parts are interchangeable, is there a mechanical feature (defense in depth) to prevent Mark 1A fuel from being loaded into a Mark IV basket? 6. Pg 14, Table 3.1: see Item 1 with respect to Table 2 above. 7. Pg 15, Sect. 3.9.1, 1st Par., 2nd Sent.: suggest "... to the extent specified in the Performance Specification..."		3.1 Revised. 3.2 Revised. 3.2 SA 240 is a plate specification. Shells may be made from either SA-312 pipe or rolled from SA-240 plate. Clarification will be made. 3.4 Revised accordingly. 3.5 No. Dimensionally, the fuel elements are so close that a engineered basket feature to discriminate fuel types is not practicable. There are numerous administrative controls that prevent a misloading accident. These include two separate, independent checks of the fuel canister to verify fuel type before the fuel elements are placed on the loading table; a requirement to clear the fuel table of all fuel elements, including scrap, before the next set of canisters is dumped out, thus preventing mixing of fuel from different canister campaigns; and a check of the difference between the fuel height and the top of basket support rods (a large delta would raise question of proper fuel type loading). 3.6 The transferred typographical error will be corrected to "3.1.3.3". 3.7 Revised.	
	8. 2nd Par.: Reference HNF-CM-4-46 is not listed in REFERENCES. I don't believe this document was ever issued as an HNF document and should be referred to as WHC-CM-4-46 as a historical document. This document has been replaced by a series of HNF-PRO-XXX documents. The Performance Specification refers to HNF-PRO-516 as the "Safety Analysis Manual." 9. Table: SSC and GS are not defined in text. 10. Table, Column 1: What does "Deleted" refer to? 11. Pg 21, Sect. 3.12.3, 2nd Par. Lines 6 and 7: What is 1/8"0.14-inch, 1"0.77-inch, and 1-7/8".980 inches mean? Typo? 12. Pg 33, Sect. 3.19.1, 1st Par.: References to HWNF- or WHNF-CM-4-46 are incorrect (see Item 3 Comment 8 above). 13. Pg 38, Sect. 3.19.4, 1st Par., 4th Line: suggest "... shall be covered with ..." 14. 3rd Par., 2nd Line: suggest "...rupture disk set at pressure of 150 psig." (see Item 3 Comment 4 above) 15. Pg 39, Sect. 3.20.3: 10 CFR 71 (CFR 1995) and WNF-CM-1-5 (WNF 1996) are listed in REFERENCES. Is WNF the appropriate designation or should it be WHC as an historical document? Current "Standard Operating Practices" is HNF-PRO-060.		3.8 Reference deleted. 3.9 Definition to be added. 3.10 Means that the component previously used in the design is no longer needed or used in the current design to comply with the current specification. 3.11 Revised. 3.12 Reference deleted. 3.13 Revised. 3.14 Revised accordingly. 3.15 This section has been revised eliminating that reference.	
	Appendix 5 - MCO Structural Drop Analysis			

REVIEW COMMENT RECORD (RCR)

1. Date	2.
4/14/98	MCO-R1(Draft)/LJJ April 1998
3. Project No.	4. Page
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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
4	1. Pg 11, Sect. 7.1, Last Sent.: suggest "... 28 g's bounds the loading cases ..." 2. Pg 15, Sect. 8, 1st Par., Line 4: cannot trace reported calculated stress of 22.7 ksi at "seal stop" from referenced Table 11 or any other Table in Section 13. Table 11 contains displacement results. 3. Pg 18, Sect.9.4.2: Not clear what is the significance of h=26.431 inches and 18.58-inch elevation above inside bottom plate. Why are these value selected? A sketch might be helpful here. 4. Pg 20, Sect. 10.1, 1st Par., Line 2: suggest "... 28 g drops bound *the specified cases.*" 5. Pg 21, Sect.10.4.1, after therefore: Where does 3.53 ksi come from? 6. Pg 22, Sect.10.4.2: Not clear what is the significance of h=26.24 inches and 24.14-inch elevation below the filter guard plate. Why are these value selected? A sketch might be helpful here. 7. Pg 27, Sect. 13, 2nd Par., Line 4: Table 11 contains displacement results not stresses. 8. Pg 38, Sect. 13.2, Bottom of page: The result appear to be just under the acceptance criteria when stress interactions are considered with a "nominal" MCO shell wall thickness of 0.500 inches. At the minimum wall thickness (0.500 - 0.075 = 0.425 per H-2-828043) acceptance is not likely to be shown. Is it the intent of Code Case N-284-1 to use the nominal or minimum wall thickness?		1. Changed "load level of 28 g's binds..." to "load level of 28 g's bounds.." 2. Stress of 22.7 ksi should be 17.93 ksi from Table 10 not 11. Corrected. 3. H= 26.431 is height of the basket for the model. This number was selected to closely match the location of the nearest element, and to apply the necessary hydrostatic pressure, 18.58 inch elevation was arbitrarily selected from the model to compare hand calculated results vs. ANSYS results. 4. Corrected. 5. Corrected. 3.53 ksi should read 10.58 ksi. 6. See #3 above. However, this is applicable for a top end drop, the MCO is inverted. 7. Corrected. 8. *The intent of the Code is to use minimal wall* thickness. Further recommendations have led to the use of dual certified material (304L/304) for shell fabrication. By using dual certified material and minimum thickness values, the results of case N-284-1 are well below the acceptance criteria. Therefore, minimum values along with dual certified material will be used in recalculating ratios.	
	Appendix 6 - Stress Analysis of the Lifting Cap and Canister Collar			
5	1. Pg 9, Sect. 8.1, Bottom of page: The inner and outer diameter of the "MCO shell" are stated as 24.08 and 23.025, respectively. These values appear to be the "nominal" values of the canister collar (H-2-828042) just above the weld to the MCO shell. The corresponding nominal values on the MCO shell are 23.985 and 23.025, respectively (H-2-828043). In either case, shouldn't the minimum OD and maximum ID be used in order to consider the worst case? 2. Pg 21, Sect. 10.1, Bottom Par., Line 3: The maximum preload reported in Appendix 4 (pg 18) is 317,500 lbf not 308,900 lbf. 3. Pg 22, *2nd Par., Line 2, and Sect. 10.2, 2nd Par.: references to* Figures 21, 22, 23 and 24 appear to be incorrect -- no such figures. 4. Pg 22, Sect. 10.2, 2nd Par.: How does the plastic strain value of 0.16% demonstrate compliance to NB-3227.3 ASME Code criteria. 5. Pg 23: "G" is not defined in Figure 1. 6. Pg 27: see Item 5 Comment 2 above.		1. Yes they should be considered. However, this is not relevant since the controlling factor here is the stress through the shell at the thread relief. The thread relief is 0.354 inches minimum and is analyzed in later part of Section 8.1. 2. The reported preload of 308,900 lb. is correct. 317,500 is an error. 3. Corrected. 4. The plastic strain value does not demonstrate compliance to the Code. Therefore, an exception to the Code has been take. See Appendix 18, Table 3.1. 5. Deleted. 6. See Item 5, Comment #2 above.	
	Appendix 7 - Stress Analysis of the Mark 1A Storage and Scrap Baskets			

REVIEW COMMENT RECORD (RCR)	1. Date 4/14/98	2. Rev MCO-R1(Draft)/LJJ April 1998
	3. Project No. SNF	4. Page 5 of 5

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
6	1. Pg 15, Sect. 7, Last Sent.: suggest "... is addressed by examining the maximum..." 2. Pg 17, Sect. 8.1.1: Although calculated "A" appears correct the definition of "A" is in error, replace D_o by $D_o/2$. 3. Pg 18, Middle of page: $P=28.79 \times 10^4$ lbf is $> P_{PC}=26.21 \times 10^4$ lbf, not less than.		1. Changed to "...this concern is addressed by considering the maximum...". 2. Corrected. 3. Less than is correct. The value of B on page 17 has been corrected.	
	Appendix 8 - Stress Analysis of the Mark IV Storage Basket			
7	1. Pg 15, Sect. 8, Input Parameters: E should be 27.2×10^6 lbf/in^2. (apparent typo, no impact on results)		Corrected.	
	Appendix 18 - MCO ASME Code Exception Report			
8	Supplement 1 needs to be updated to address revised Design Pressure of 450 psig.		The supplement cannot be re-written until the exception report appendix 18 is finished. It will be updated after the main design report is released. A note will be added to the current (unrevised) supplement 1 in the design report indicating that a revision and update of the supplement will be released in the near future. The new supplement will reflect the change to the design including the 450 PSI changes.	

APPENDIX G
450/150 PSIG
Design Change

Distribution List 1/8/99

Name, Position	Mail Stop	Design Report Attachment
Walt Alaconis, Operations	R3-86	Yes
Jerry Bazinet, CSB Design Authority	S8-06	Yes
Sherri Brisbin, MCO Loading Design Authority	R3-86	Yes
Dave Bullock, Operations	R3-86	Yes
Mike Butterworth, Manager Site Fabrication	T2-10	No
Doug Chenault, Cask and Trans. Design Authority	R3-86	Yes
Jack Cloud, Manager SNF Storage Projects	R3-86	No
Tom Delucchi, Welding Engineer	L6-38	Yes
Denny Devine, Manager MCO Baskets	R3-86	Yes
Darrel Duncan, Process Engineering	R3-86	Yes
Susan Farnworth, Manager	E6-46	No
Jim Frederickson, Manager Process Engineering	R3-86	No
Brent Fryer, Thermal Analyst	H0-34	Yes
Jack Garvin, Safety Manager	R3-26	Yes
Lou Goldmann, MCO Design Authority	R3-86	Yes
Bruce Groth, FRS Project Engineer	X3-76	Yes
Carl Haller, Manager Design Authorities	R3-11	No
Pat Hickey, Operations	X3-80	Yes
Clif Hoover, QA	R3-86	Yes
John Irwin, CVD Design Authority	R3-86	Yes
Dave Isakson, Site Fabrication Engineer	T2-10	Yes
John Keve, NDE	L6-36	Yes
Steve Kessler, Criticality Analyst	R3-26	Yes
Charles Loftis, DOE	S7-41	Yes
Bruce Lorenz, MCO Topical Coordinator	R3-26	Yes
Jim Mathews, Operations	R3-86	No
Mark Medsker, Safety Analyst	R3-26	Yes
Curt Miska, CVD Engineer	R3-26	Yes
Norm Nelson, Cost and Planning	R3-86	No
Wes Nelson, NDE	L6-36	Yes
Ron Omberg, Safety Manager	R3-26	No
Rex Ozment, Site Fabrication	T2-10	No
Melvin Piepho, Safety Analyst	R3-26	Yes
Scott Pierce, MCO Engineer	R3-26	Yes
Roger Reedy, ASME Consultant--Reedy Engineering, Campbell, California		Yes
Ed Ruff, Fabrication and Test Engineer	E6-15	Yes
Eric Shen, FRS Design Authority	X3-76	Yes
Kimball Smith, MCO Project Manager	R3-86	Yes
Marvin Thurgood, Thermal Analyst	H0-34	Yes
Gary Wagenblast, Independent Reviewer	E6-46	Yes
SNF Project File	R3-11	Yes

CORRESPONDENCE DISTRIBUTION COVERSHEET

Author	Addressee	Correspondence Number
K. E. Smith, DESH L. H. Goldmann, 373-6371	R. M. Tanner FDNW	DESH-9860623

Subject: INDEPENDENT REVIEW OF THE RECENT CHANGES TO THE MULTI-CANISTER OVERPACK (MCO) DESIGN

DISTRIBUTION

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		SNF Project File	R3-11	

DE&S HANFORD

P.O. Box 350
Richland, WA 99352

December 28, 1998 DESH-9860623

Mr. R. M. Tanner
Flour Daniel Northwest, Inc.
Post Office Box 1050
Richland, Washington 99352-1050

Dear Mr. Tanner:

INDEPENDENT REVIEW OF THE RECENT CHANGES TO THE MULTI-CANISTER OVERPACK (MCO) DESIGN

Previously the Independent Review team for the Multi-Canister Overpack (MCO) design, which Mr. G. R. Wagenblast of FDNW has participated in, has consisted of three members evaluating the areas of American Society of Mechanical Engineers (ASME) Code Compliance, Materials Selection, and Structural Calculations. For this upcoming design review, it is appropriate to independently review and evaluate only the Structural Calculations. The services of Mr. G. R. Wagenblast are requested to perform this structural review. The review materials will be available on or about January 8, 1999.

Since the earlier reviews the procurement of the MCO pressure boundary and the baskets has been separated into two paths for procurement. The MCO pressure boundary components are planned for re-bid to an ASME N stamp certificate holder with a fabrication award in the summer of 1999. The on site fabrication services shop will build the baskets.

The MCO pressure boundary is the following:

A. The MCO shell assembly consisting of the lower cap, shell wall, and collar.

B. The shield plug assembly consisting of the shield plug, locking & lifting ring with set crews, port appliances, covers, seals, and other details.

C. The MCO cover cap and other details

The MCO baskets consist of the following:

A. Mark IA whole fuel and scrap baskets

B. Mark IV whole fuel and scrap baskets

C. SPR fuel baskets built on a Mark IA stainless steel criticality control structure

The MCO has undergone revision to the design in several areas. The major revisions are decreasing the design pressure rating of the mechanical closure assembly to 150 PSI from the 450 PSI design, deleting the XM-19 material in the collar and substituting 304L/304 dual certified material, and redesign of the fuel baskets so no structural welding is needed. The shell assembly and cover cap design pressure rating will remain at 450 PSI. The specification used in the MCO design is HNF-S-0426, "Performance Specification for the Spent Nuclear Fuel Multi-Canister Overpack", currently being released as Revision 5.

As part of your independent review please evaluate the structural calculations and submit your review comments on the site review comment record (RCR) forms. I would like to have your comment returned to Mr. L. H. Goldmann by January 18, 1999. We are planning on answering all the comments by January 29, 1999. In your opinion, if additional assistance or personnel are needed for this review, please contact me directly. Please send an estimated budget for this review and RCR response review and concurrence. Mr. N. W. Nelson will be in touch with your business practices department to prepare the proper budgetary/financial documents to authorize you to perform the work.

For your information and assistance in reviewing the design changes, the following list of requested changes was provided to the Design Agent, Parsons. These changes will be reflected in the revised design media provided for your review on January 8, 1999.

1. MCO Cover Cap

Move the penetration out 4.515 inches off center to line up over a port in the shield plug (either #1 or #2 port) and adjust the penetration's diameter to allow a bar wrench to access the socket head plug below. The bar drive size is dependent on the hex or square bar's torque transmission ability and its interface unit pressures with the torque drive socket in the head of the plug below. There will be only one penetration in the cover cap.

2. MCO Shield Plug

Change the plug in #1 port to include a socket head for operation through the cover cap penetration. The plug should be "cross drilled" beneath the seal and axially ported to allow for gas flow without the removal of the threaded plug. Determine what the option would look like if we wanted to actuate the #2 port valve or a suitably modified process valve instead. These new socket heads should be put into the existing hex heads on the plugs. An optional socket head added to the p/n 6 process plug valve of H-2-828047 or a new part number assigned for a similar valve with the socket would be appropriate. The intention is to also maintain the 1 5/16 inch hex head interface for all the plugs and valve heads.

3. MCO Collar

Change the collar to 304/304L dual certified material to accommodate the 450/150 PSI split pressure rating for the MCOs. This change from the XM-19 collar material will necessitate the reduction of the MCO mechanical closure system from 450 PSI to 150 PSI. We still want to hydrostatically test the mechanical closure system at the fabricator's shop, so the maximum code allowable stresses for test will have to be factored into the equations.

4. Fuel Baskets

A. For the Mark IV whole fuel basket, change from the egg crate structural base plate with let-in fuel support bars underneath to the support plate and post type structure. This would be a construction similar to the Mark IA whole fuel basket. The center post to base plate joint may be threaded if the joint is found to be adequate. Also the Mark IV baskets' central tube coupling/socket diameters are being reduced in their diameters to allow for easier fabrication at the shop. The Mark IV basket height may be increased up to 0.16 inch each to use up some of the differential temperature expansion allowable so at a minimum 0.65 inches of the differential expansion remains based on the nominal dimensions.

B. The aluminum fuel support rack could be made from the same cast or machined blank, as the Mark IA whole fuel rack, if possible. The on site shop would like the fuel rack design common enough so that a cast blank, if procured, could be used for a Mark IA or IV whole fuel rack. In the case of Mark IA use of the net formed blank, the only machining would be the larger center hole. The shop will be making their own shop forging, vendor rough cut, and fabrication prints and controlling them to their procedures.

C. The Mark 1A basket center post changes include a solid bar center and possible threaded connection to the 1 1/4 inch thick base plate. This concept will need some structural analysis to determine if the fillet welds can be reduced with the 6 5/8 inch diameter central bar being threaded into the 1 1/4 inch thick base plate. The shop would like to see the welds eliminated, but they understand that no welds on the assembly may not be achievable. To achieve a threaded joint the shop would like to see a raised boss (1 1/2 inch thick or so) in the center of a forged base plate to increase the thickness available for the threads. The rim of the forged base plate would also have a raised edge so that the weld to the copper assembly, if used, would not have to bridge such a large gap. They would like to see all four of the base plate forging blanks have the same dimensions. This may not work for the new Mark IV fuel basket as it may be thinner and the central material may be needed for piercing and upset to create the raised boss of the Mark IA style plates. The solid central bar would eliminate the roll pins securing the bushing and the coupling and have a precision 1.75 inch bore as delivered to the site in rough cut lengths. This solid central bar will add weight to the

Mark IA baskets and may affect the side drop analyses in the area of shear in the coupling area.

D. Modify the baskets' vertical support bars to base plate joint to a bolted joint eliminating the roll pins. The bolt head selection has to be decided in regard to minimizing the weakening of the base plate. The shop would like to see all the hole patterns in the base plates the same. Adoption of this will make the drilled and tapped holes locationally different for the scrap and whole fuel baskets' bars. This is due to the bar radial offset caused by the copper assembly wall thickness.

E. Scrap basket copper assemblies; evaluate the attachment method to the base plate--possibly stay welded or change to bolted joint to secure the copper to the structural 1 1/4 inch thick base plate. The shop may have ideas here on how to do this redesign task. If welded, the raised edge, mentioned in 3 B above, of the forged base plate may need to be worked in to the retention of the welded design. A mechanical joint joining the copper to the base plate would not need the inherent restraint of the assembly during welding. Fasteners such as bolts may be applied to join the assembly. During normal operations, the attachment strength is needed for the first two days until the baskets are loaded into the MCO in the
K Basin load out pits.

F. Fully implement extruded or drawn trapezoidal bars and cast aluminum blanks/plate for the fuel rack plate for the baskets based on economics. This is so much of a design change as it is fully allowable now, but an item for the fabrication end of the baskets' acquisition task. Revisit the trapezoidal bar straightness requirements, dimensional tolerances, and corner radii allowables so the shop's proposed vendors may have some flexibility in their manufacture of the bars.

G. Prepare detailed design of the single pass reactor (SPR) fuel support feature as an addition to a standard Mark IA basket structure for use in putting all the SPR fuel into a single MCO for dry storage at the Canister Storage Building.

5. Design Report

This design report is an update of the current MCO Design report, "HNF-SD-SNF-DR-003" and will include the 450/150 PSI split pressure rating, the deletion of the XM-19 collar, and discuss the addition of the 450 PSI test requirement of the shell assembly. The test plug's design, if used, is by others. The structural analysis of the shell assembly (collar, shell, and bottom cap) 450 PSI hydrostatic test should indicate it is within code allowables and capable of code acceptability. Also, other changes to items including the update of the design report test routines, structural analysis, weights, and drawing improvements.

6. Fabrication Specification

   Prepare a fabrication specification with the design report for the MCO portion to support the MCO fabrication work. The original fabrication specification HNF-S-0453 will remain with the MCO pressure boundary (shield plug closure assembly, MCO shell assembly, and the MCO cover cap) components. Include the ASME 1998 or later codes for the purchasing of the component materials. The fabrication specification for the baskets for on-site shop will be done later.

Should you have any questions, please contact Mr. L. H. Goldmann at 373-6371.

Very truly yours,

K. E. Smith, MCO Project Manager
Spent Nuclear Fuel Project

sla

Fluor Daniel Hanford	CONSTRUCTIBILITY REVIEW WORKSHEET	1 of 1

Project No.	Project Title	To:	From (Reviewer):	Date
W-442	MCO FABRICATION SPECIFICATION	KIM SMITH	MIKE EVARTS FDH AI	2-3-99

ITEM NO.	DOCUMENT NO./IDENITIFICATION	COMMENT/RECOMMENDATION	RESPONSE			RESPONSE/COMMENT
			ACC	REJ	INC	
1	PG 3,PARA 3.1.E	APPROVAL OF THE BUYER/FDH AI TO PROCEED				The Hold points imposed by the AI Plan will be incorporated contractually via the Statement of Work. As you've indicated, these AI Hold points may change over time, depending on the confidence level obtained. The Hold points included in the fab. spec. are for the Buyer and are intended to remain constant for the contract duration.
2	PG 4&5, PARA 4.1.A-F	ARE THERE ANY ADDENDA'S THAT APPLY				No Addenda have been issued to the 1998 Code yet. The 1998 Code Edition will be the code of record with respect to this fabrication.
3	PG 6, PARA 4.1.L	WHY ARE WE NOT USING THE 1996 CODE				The 1998 Code invokes the 92 Edition of SNT-TC-1A. Reference NB-5521.
4	PG 9, PARA 6.2.1.A	SECTION II FOR MARKING IS STEEL STAMPING ONLY FOR PLATES.				Will delete sentence providing acceptable marking examples. The Code will dictate acceptable marking.
5	PG 11, PARA 6.3.3	MACHINING NEEDS TO COMPLY TO THE CODE ALSO				Machining is not covered by Section III of the ASME Code. If machining is subcontracted to non Code shop, the N stamp holder must pass down applicable QA requirements per their ASME approved QA program.
6	PG 11, PARA 6.3.6	THERE IS NO RANDOM INSPECTIONS MENTIONED IN THIS SECTION, WHYNOT.				Critical dimensions must be 100% inspected relative to each MCO.
7	PG16, PARA 6.5	ARC STRIKES AND TEMPORARY ATTACHMENTS NEED TO BE REMOVED COMPLETELY PER THE CODE.				Will delete this as it is covered by the Code already.
8	PG 18, PARA 6.5.5.A	NEED TO ADD CWI WELDING INSPECTORS TO THIS SECTION AND NOT ASNT WELDING INSPECTORS.				Visual weld inspection is not required by Section III of the Code. This paragraph will be deleted.

Fluor Daniel Hanford	CONSTRUCTIBILITY REVIEW WORKSHEET			Page 1 of 1
Project No. W-442	Project Title MCO FABRICATION SPECIFICATION	To: KIM SMITH	From (Reviewer): MIKE EVARTS FDH AI	Date 2-3-99

ITEM NO.	DOCUMENT NO./IDENITIFICATION	COMMENT/RECOMMENDATION	RESPONSE			RESPONSE/COMMENT
			ACC	REJ	INC	
9	PG 27, PARA 7.4	WE DO NOT TELL THE SELLER WHAT THE DESIGN PRESSURES ARE. THIS INFO IS PUT ON THE CODE DATA PLATE.				The Design loads, including pressure, are defined in the ASME Design Specification, which is an attachment to the Statement of Work. The fabricator is required to produce an ASME Design Report addressing the Design Specification loads.
10	PG 29, PARA 9.1	ARE ALL MATERIALS TO HAVE CMTR'S ON THEM, (IE GS MATERIAL)				Will clarify which materials require CMTRs. Refer to updated Table 9-1

TRANSMITTAL TO: DE&S HANFORD, INC.

DATE OF CORRESPONDENCE: February 16, 1999 LOG NUMBER: SNF-TP-991100

TITLE/DESCRIPTION: DELIVERABLE TRANSMITTAL FOR RELEASE ORDER NO. 99-003E, Rev. 1, INDEPENDENT REVIEW OF CHANGES TO THE MULTI-CANISTER OVERPACK (MCO) DESIGN

A = ACTIONEE
KW = KEYWORD DESIGNEE/ORIGINATOR

SNF PROJECTS	ATT	
D. B. ANDERSON T5-47	☐	☐
P. G. BEAUDET S8-07	☐	☐
M. J. BOWMAN S2-51	☒	☒
P. J. DOTSON X3-85	☐	☐
S. G. HODGE X3-76	☐	☐
J. H. MORTIMER S8-07	☐	☐
S. L. PETERSEN S2-51	☐	☐
R. M. TANNER S2-51	☐	☐
J. B. TRUITT S2-51	☒	☒
P. G. ALMAGUER S2-51	☐	☐
J. L. KERN S2-51	☐	☐
M. A. MCLEAN S2-51	☒	☒
A. M. PRINDIVILLE S8-06	☐	☐
P. D. ROBERTS S2-51	☒	☒
R.A.. SPIVEY X2-90	☐	☐
ACTION LOG	☐	☐
PROJECT FILES (PIF)	☒	☒
TASK LOG	☐	☐
TDC	☐	☐

FDNW OFFICE	ATT	
J. H. ARSLANIAN B4-68	☐	☐
M.P. BERGLUND B2-63	☐	☐
G.D. CHADWICK E6-04	☐	☐
K. J. DEMPSEY G3-12	☐	☐
J. DYER B4-55	☐	☐
D. J. FOUCAULT B2-63	☐	☐
R. J. FRANK B4-58	☐	☐
S. E. GREGG H7-04	☐	☐
V. C. HODGIN H7-04	☐	☐
J. N. HOLLOWAY E6-64	☐	☐
B. T. JACKSON E6-64	☐	☐
E. R. JACOBS B4-09	☐	☐
J. R. JOINER E6-28	☐	☐
J. A. KOSZAREK B4-55	☐	☐
M. W MEAGHER B4-70	☐	☐
R. L. NEWELL B4-68	☐	☐
F. OTSU B4-52	☐	☐
J. A. PELTIER B4-68	☐	☐
S. SCHNEE B4-52	☐	☐
D. J. SHRIMPON E6-36	☐	☐
R. L. SMITH B7-50	☐	☐
J. B. TYLER B4-54	☐	☐
T. E. WARD H7-04	☐	☐

CLIENT	ATT	
L. L. CARPENTER R3-11	☐	☐
D. W. CARVER H5-30	☐	☐
G. P. CHEVRIER S2-48	☐	☐
T. CHOHO R3-86	☐	☐
A. S. DAUGHTRIDGE R3-86	☐	☐
J. W. FOSTER R3-11	☐	☐
J. R. FREDERICKSON R3-86	☐	☐
W. M. FUNDERBURKE X3-71	☐	☐
C. S. HALLER R3-11	☐	☐
A. R. HOLLINS R3-86	☐	☐
D. P. KIMBALL X3-71	☐	☐
R. J. KUHTA X3-76	☐	☐
D.A. KUMMER H6-02	☒	☒
P. G. LEROY X3-79	☐	☐
E. W. MARKLAND H5-30	☐	☐
T. L. McCONNELL H5-30	☐	☐
L. J. McKENZIE X3-86	☐	☐
A. H. McNEIL R3-11	☐	☐
R. W. RASMUSSEN X3-85	☐	☐
R. P. RUTH R3-11	☐	☐
A. M. SEGREST R3-11	☐	☐
K. E. SMITH R3-86	☒	☒
J. A. SWENSON R3-11	☐	☐
R. B. WILKINSON R3-11	☐	☐
R. O. WORTHINGTON H5-25	☐	☐

OTHERS

G. R. Wagenblast E6-46	☒	☒

OTHERS

L. H. Goldmann R3-86	☒	☒
_____	☐	☐
_____	☐	☐
_____	☐	☐
_____	☐	☐

DOCUMENT CAPTURE / STORAGE

■ Project File Location: 102.6.1R

ACTION ASSIGNMENTS / COMMENTS

Action? ☐ Yes ☐ No Task Manager: _____ Assigned to: _____

Due Date _____ Description _____

KEYWORDS

SNFP
TASK ORDER
MCO

ENTERED IN: TDC ✓ PIF ✓ TOL _____ ACTION LOG _____

Mr. D. A. Kummer
DE&S Hanford, Inc. H6-02
P. O. Box 350
Richland, WA 99352-0350



FLUOR DANIEL NORTHWEST, INC.

Date: February 16, 1999

Reference: DESH Contract **65100331**
Facilities Upgrades/MCO
Release Order No. 99-003E, Rev. 1

Transmittal No.: SNF-TP-991100

Dear Mr. Kummer:

TRANSMITTAL

We enclose 1 copy of the items listed below. These are issued for:

[ ] Approval [ ] Reference [ ] Review and Comment [X] Other – Record Comment Records

Response due to DESH: N/A
Responds to: N/A

Number	Rev	Date	Title
		2/08/99	Record Comment Records (RCRs) for the MCO Design Report, HNF-SD-SNF-DR-003, Rev 2D, DRAFT 1/07/99. NOTE: These RCRs meet the requested deliverables for Release Order 99-003E, Rev. 1, Independent Review of Changes to the MCO Design. The FDNW work scope was to perform an independent structural design review of the provided design media, including an evaluation of structural calculations and provide review comments on RCR forms. These RCRs include DESH dispositions and an evaluation of those dispositions.

Distribution:
L. H. Goldmann, DESH, w/1
K. E. Smith, DESH, w/1
G. R. Wagenblast, FDNW, w/1

Very truly yours,

Robert Tanner 2-17-99

Robert M. Tanner
Project Director

RMT:MAM:smh
Attachment

REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
3. Project No. SNF / MCO	4. Page 1 of 2

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
January MCO Design Review	SNFP	DR Duncan	Process Engineering	200E/MO285/2-1013

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

2/3/99
Date

DR Duncan
Reviewer/Point of Contact

Author/Originator

11. CLOSED

11/29/99
Date

KE Smith per telecon
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	MCO Des.Rpt p. 6, Sxn 2.6: Process plug 'special metal seal' should have metal alloy specified for clarity. Is resealing capability warrantied by manufacturer?		Will revise to specify inconel. Proven by tests at EG&G (seal manufacturer).	C
2	MCO Design Report Material Evaluation,Section 1.2: This is presented only for information in case topics are brought up by reviewers. During LMFBR research in the 1980's, a lot of work was done on corrosion mechanisms of 316 SS in various environments. It was found that CsOH would corrode 316 but temperatures were >500°C and partial pressures were ~ 0.1 atm. Also, a lot of work was done at Hanford on embrittlement of 316 cladding alloys, with CsTe compound identified as the culprit but this required T >500°C and fairly high constant strain rates. There are a lot of reports from that period on corrosion of 316 SS but the environments were all much higher T, constant strain rate, higher concentrations of corrodant, etc.		No action necessary.	N/A

REVIEW COMMENT RECORD (RCR)	1. Date	2. Revie
	3. Project No. SNF / MCO	4. Page 2 of 2

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
3	MCO Design Report Material Evaluation, references: Revs are out of date for Ref. #28 and #30. Cover sheets are attached for correct references.		Accept. - For #28 change reference (Section 2) to read: Pajunen, A. J., 1998, *Spent Nuclear Fuel Conditioning Product Criteria*, HNF-SD-SNF-OCD-001, Rev. 3, COGEMA Engineering Corporation, Richland, Washington - Change 2nd sentence of Section 1.3 (1st paragraph) to read: The allowable gas amounts defined in HNF-SD-SNF-OCD-001, *Spent Nuclear Fuel Conditioning Product Criteria* (Pajunen 1998), show that the total water and hydrogen content puts an upper limit on the hydrogen pressure of 2.14 MPa (310 psi) absolute at a temperature of 154°C (309°F). - For #30 change reference (Section 2) to read: Praga, A. N., 1998, HNF-SD-SNF-TI-009, *105-K Basin Material Design Basis Feed Description for Spent Nuclear Fuel Project Facilities*, Volume 1: Fuel, Rev. 2, Duke Engineering & Services Hanford, Richland, Washington. - No change in main text from new revision of TI-009.	

REVIEW COMMENT RECORD (RCR)	1. Date 1/18/98	2. Review No. 1
	3. Project No.	4. Page 1 of 3

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO Design Report, Rev. 3		Scott R. Pierce	SNF Storage Projects	M0285 373-3869

17. Comment Submittal Approval:

Organization Manager (Optional)

Date

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact

Author/Originator

11. CLOSED

11/29/99
Date

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	Drawing H-2-828041, Sh 1. General Note 1 should refer to the more recent ANSI Y14.5M-94 rather than ANSI Y14.5M-82.		Will correct.	
2	Drawing H-2-828041, Sh 1. For consistency, the length dimension (collar shoulder to bottom plate, zone D-4 of the drawing) should have a desired valued with three significant digits as opposed to none (i.e., 148.000 +/- .095 instead of 148 +/- .095).		Will correct. Noted.	
3	Drawing H-2-828041, Sh 2. Refer to Bottom Plate Subassembly shown in Zone E-6. When fabricating the first MCOs, Oregon Iron Works identified a problem with the assembly of the MCO bottom plate. When welding the basket support plates to the bottom plate, they could not maintain the overall dimensions of the assembly due to the bottom plate warping from the welding process. Suggest either reducing the size of welds that attach the basket support plates to the bottom plate, or relaxing the tolerances of the bottom plate. Recommend doing both, as the welds appear oversize (at present, two 3/8" welds or total of 3/4" of weld hold the 1/2" piece in place - the result, 50% more weld thickness than actual material thickness).		Will investigate the possibility of relaxing tolerances and reducing weld thickness.	
4	Drawing H-2-828041, Sh 2. Refer to items 37 and 39 in the parts/material list. During fabrication of the initial three MCOs, Oregon Iron Works protested greatly to having the drawings specify manufacturers and parts number for minor items such as the filter screen and the short draw tube. They felt they could have easily made the parts in-house, which was advantageous. By being directed to a specific vendor (such as Cook or Johnson), Oregon Iron Works had to extend their Quality Assurance program to that sub-tier supplier. This required Oregon Iron Works to expend time and money qualifying these suppliers through audits and inspections. For minor parts such as the filter screen and the short draw tube, I recommend that you drop the manufacturer and part		These items are now designated as GS, which does not require supplier evaluation. Another option would be to specify (Cook or Johnson) or equivalent. And impose an equivalency criteria, material, mesh size, tolerancy, testing both for low flow and high flow with blockages and other criterias as appropriate. Recommend keeping the vendor part numbers now and investigating options for equivalent parts if requested by the next MCO fabricator.	

REVIEW COMMENT RECORD (RCR)	1. Date 1/18/98	2. Review No. 1
	3. Project No.	4. Page 2 of 3

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
	number form the drawings. Include on the drawing, only the information necessary to manufacture the items.			
5	Drawing H-2-828042, Sh 1. It is my understanding that the collar material is to be made of F304L (and not XM-19). Revise Item 4 of the Part/Material List to indicate F304L instead of XM-19.		The collar will be fabricated out of Dual Certified F304/F304L.	
6	Drawing H-2-828043, Sh 1. Zone D-7 identifies the shell thickness as 0.500 with an unspecified tolerance. Per Note 1, the tolerance is +/- .015. Revision 0 of this drawing identified the shell tolerance as + .060 and - .075. Recommend revising the dimension to indicate the original tolerances of + .060 and - .075.		This will be changed to show a minimum wall thickness of 0.425 inches.	
7	Drawing H-2-838044, Sh 1. A dimensioning problem exists between drawings H-2-838044, H-2-838052 and H-2-838053. When attaching the basket support plates, the guide cone, and the filter screen to the bottom plate, they do not properly stack up. Specifically, the guide cone projects above, rather than resting on, the notches in the support plates (a misalignment of nominally .25 inches). Oregon Iron Works during fabrication of the first three MCOs confirmed this misalignment and could not weld the support plates to the guide cone.		Solution: Increase notch on support plates from 0.650 to 0.870 inches. Decrease base height or guide cone from 0.590 to 0.370 in. and overall height by same amount. Height for the filter cavity will then be 1.75 ± .0025 in. tall. Filter is 1.75 ± .03 in. tall	
8	Drawing H-2-828045, Sh 1. I did not receive this drawing as part of the review package. However, a comment from the earlier (Revision 1) drawing: Section A-A specifies an angle of 9 degrees for the chamfer (zone E-4). This angle does not agree with other dimensions shown in this section and the dimensions shown for the Shield Plug Assembly (also shown on this drawing). That is, the Shield Plug Assembly specifies (nominal) inner and outer diameters (Zone A-6 of the drawing) of the chamfer's edge as 22.50 and 22.900 (resulting in a chamfer width of .40/2 or .20). Section A-A specifies a chamfer length of 1.126 (Zone E-3). These dimensions, a width of .20 and a height of 1.126, do not result in an angle of 9 degrees. Recommend deleting the angle of 9 degrees from the drawing; the other dimensions provide for a larger chamfer than 9 degrees.		This has been resolved – the diameter 22.50 has been removed and the 9° kept. (Resolved under ECN 1).	
9	Drawing H-2-828045, Sh 2. I suggest adding end-marks to the radial plugs (Items 5 and 6 of this drawing) that uniquely will identify the short plugs from the long plugs. The problem is this: once welded in place, there is no indication that the correct plug was installed in the correct hole. In other words, a long plug could be installed in a short hole (and the process port blocked) and no one could tell. This problem was identified during fabrication of the first three MCOs, and DESH directed Oregon Iron Works to add such markings.		Flag note 5 will be modified to include the addition of ID marks at the ends of radial plugs.	
10	Drawing H-2-828048, Sh 1. Note 5 of this drawing refers to "optional holes" (Zone E-4,5). Revise the drawing to either show the new holes, or eliminate the holes from the drawing. Either way, eliminate the wording "optional". Note: if the optional holes are kept, the dimensions of hole size and location are missing from the drawing and must be added.		Will remove the work "optional". Will add dimensions to view 5 showing location and diameter of the hole.	
11	Drawing H-2-828053, Sh 1. The end of the basket support plate has been modified to include a .25 inch 45-degree chamfer (Zone C-7 of the drawing). This chamfer is too small to support the		Will correct as requested.	

REVIEW COMMENT RECORD (RCR)	1. Date 1/18/98	2. Review No. 1
	3. Project No.	4. Page 3 of 3

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
	radiographic testing required of the weld between the shell and the bottom plate; specifically, a deeper opening is needed so film may be inserted behind the weld. In fabricating the first three MCOs, Oregon Iron Works used a chamfer .25 wide by .75 deep (i.e., the chamfer extended deep enough to blend with the .5 radius of the lower edge). Recommend revising the .25 45-degree chamfer to be .25 by .75.			

REVIEW COMMENT RECORD (RCR)

1. Date	2. R
3. Project No.	4. Page 1 of 2

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
		BRUCE GROTH		

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

2/2/99
Date

BD Groth
Reviewer/Point of Contact

Author/Originator

11. CLOSED

2/2/99
Date

B D Groth
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	H-2-828070, rev.1, sht.1 - If a Mark IV basket is loaded with 54 length E elements and the basket weight is 228 lbs, the total weight would be 3218 lbs dry. The rated capacity of the grapple designed by MCE is 3200 lbs. Need to reduce the weight of the basket, or provide calculations to show that 3200 lbs will not be exceeded in water. Reference WHC-SD-SNF-TI-009 for actual weight of fuel as opposed to average weight of various fuel lengths.		The maximum payload whole fuel Mark IV basket will totally displace approximately 200 pounds of water, so your load force on the grapple will be less than 3,200 pounds. The determination of your rigging loads, crane loads, and submerged basket weights are your tasks as you are handling the baskets in the water with your lift systems. I do not know the design and details of your lift systems, so I believe that you should take appropriate responsibility and do it yourself. The design agent, **Parsons**, will check their weight calculation for a Mark IA storage basket with a maximum payload (as their value presented may be a bit high, ~ 6 lbs.)	
2	Need to add index mark as stipulated in IC 88/127 and IC 89/127: "The MCO sub-project shall provide an index mark on one of the fuel basket posts to assist operators in fuel loading. The mark shall be clearly visible		A note will be added to all basket drawings requiring the top surface of the outside post nearest the basket serial number to be colored marked. The specific size of the marking, the marking type, and color to be	

REVIEW COMMENT RECORD (RCR)	1. Date	2. Rev.
	3. Project No.	4. Page 2 of 2

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
	underwater when viewed through a closed-circuit television camera from a distance of 5-10 feet."		used will be included on the shop basket fabrication drawings, and will be reviewed with FRS prior to basket fabrication release.	

REVIEW COMMENT RECORD (RCR)	1. Date	2. R
	3. Project No.	4. Page 1 of 4

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
		JK Keve		

17. Comment Submittal Approval:

Organization Manager (Optional) Date

10. Agreement with indicated comment disposition(s)

2-3-99 Date — Reviewer/Point of Contact

Author/Originator

11. CLOSED

2-3-99 Date — 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	Multi-Canister Overpack Design Report – Material Evaluation – HNF-SD-SNF-DR-003, Appendix 2, Revision 2 dated January 1999. Section 1.1.1. Third Paragraph. From a leak testing point-of-view, it is recommended that lubricants used on threaded items to be leak tested, i.e. jacking bolts, shield plug threads, and port cover bolts use only the Neolube product and not the Nickel Never Seize or Fel-Pro Nickel 5000 Never Seize type of products. This is because when people apply the Nickel Never Seize type of products they tend, often unintentionally, to use copious amounts which tends to cause problems during leak testing (it is also very messy). I believe that my concerns are also echoed the Fabrication Specification in Section 10.2.1.		Will use Neolube only.	
2	Multi-Canister Overpack Design Report, HNF-SD-SNF-DR-003, Revision 2 dated January 1999. Section 3.11. Third paragraph, next to the last sentence. I was under the impression that the Main Seal was going to be leak tested at CVDF before being transported to CSB. Is this true or not? Forth Paragraph Sixth Sentence. Remove the word "also." It should read "After the plug is tested..."		- Will correct to reflect leakage test at CVDF, at a minimum. - Corrected.	

REVIEW COMMENT RECORD (RCR)	1. Date	2. Review No.
	3. Project No.	4. Page 2 of 4

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
3	Section 3.13. Page 30. After "Penetrations, connections, and seals shall be leakage rate testable in accordance with ANSI N14.5, Leakage Tests on Packages for Shipment of Radioactive Materials (ANSI 1987)." ADD " and ASME Section V Article 10, 1998." **Also change "(ANSI 1987)" to "(ANSI 1997)."** This is because the ANSI document has a lot to be desired as a how to document and this will also make it more consistent with the Fabrication Specification. I am not sure what the next italicized paragraph is trying to say. If it is expressing the leak rate acceptance criteria then it should be reworded to something similar to paragraph 7.2.2 of the Fabrication Specification.		- Will add ASME Section V and change 1987 to 1997. - The italicized paragraph merely responds to the comment listed above. It merely states that the MCO can be (& how it can be) leak tested under ANSI N14.5. Will add section V in response.	
4	Section 4.1. Paragraph E. Add. Leak Testing, Subsection A, Article 10. This has been specified in Sections 7.2.1, 7.2.2, and 7.2.3. In Paragraph L. Remove "-92, December." **Paragraph M. Add "1997 edition."**		Will Correct, except retain the 92 edition of SNT-TC-1A.	
5	Section 6.5.5.A First Paragraph, First Sentence. After "All" add "welds requiring..." As Section 7.1.2 requires ultrasonic examinations in certain stages of fabrication. Third Sentence. Remove "-92" and add "1996 edition." Paragraph 1. Reword to "Seller's and/or any subcontractor NDE personnel qualification and certification written practice shall be in accordance with ASNT's SNT-TC-1A 1996 edition." Be sure to remove "-92." Paragraph 2. Reword to "Sellers and/or any subcontractor...." Paragraph 3. Reword to "Seller's and/or any subcontractor NDE method procedures shall be...."		-Will add "welds requiring" - Code requires -92. - Regarding submittal of Seller's subcontractor's NDE documentation: The Seller's ASME accredited QA program requires him to verify that his subcontractors performing Code work are properly qualified to Code required standards. Review of subcontractor NDE program documentation will be performed by the Seller, and subject to surveillance by the Buyer.	
6	Section 6.5.5.C. First Paragraph, Second Sentence. Remove the word "end" and insert "weld joint" and at the end of the sentence add the words "and ultrasonic examinations." Paragraph 4. Delete as it is already covered by Code requirements.		- 1st paragraph corrected. - Paragraph 4 does not exist - Please clarify. was deleted in Draft C JM 1-7-99	

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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
7	Section 7.2.1. Add a paragraph stating "Personnel performing and interpreting leak test results shall be certified in accordance with Section 6.5.5.A." First Paragraph, Last Sentence add ", helium" after "atm-cm^3/sec"		1. Will insert new sentence. 2. "Helium" added.	
8	Section 7.2.2. Add a paragraph stating "Personnel performing and interpreting leak test results shall be certified in accordance with Section 6.5.5.A." First Paragraph, First Sentence and Second Sentence add ", helium" after "atm-cm^3/sec" Third Paragraph add "The helium standard must be continuously evacuated by an auxiliary pump just prior to being released into the system."		1. Will insert new sentence. 2. "Helium" added. 3. Will add new sentence.	
9	Section 7.2.3. Add a paragraph stating "Personnel performing and interpreting leak test results shall be certified in accordance with Section 6.5.5.A." First Paragraph, Last Sentence add ", helium" after "atm-cm^3/sec"		1. Will insert new sentence. 2. "Helium" added.	
10	Section 10.1.3. Second Paragraph. There is no section 7.3.6.		Section 7.3.6 exists "Final MCO OD & Length Test". Test #6. WAS added in Draft C JTH 2-3-99	
11	Section 11.3.1. Paragraph 18. Add "and ASME Section V, Article 10." Paragraph 20. Add after "inspectors" "(Section 6.5.5 and 7.2)."		Section 11.3.1 has been deleted.	
12	Table 11-2. Item 7. "Certification" is misspelled. Item 23. Add in reference column "& J".		- Certification not misspelled. WAS corrected in Draft C JTH 2-3-99 - "& J" not appropriate.	
13	Table 11-3. Item 1. Reference Column should be corrected to 11.3.1.11. Item 4 should be 11.3.1.16. Item 9 should be 11.3.1.19. Item 11 should be 11.3.1.12 & 18, 6.5.5.B, C, & D. Item 12 should be 11.3.1.6. Item 13 should be 11.3.1.19. Item 14 should be 11.3.1.20. Item 15 should be 11.3.1.21. Item 16 should be 11.3.1.22. Item 17 should be 11.3.1.23.		This table has been updated and is correct. JTH 2-3-99	
14	Drawing H-2-828041, Revision 1, Sheet 1. The Canister Cover Assembly (Item 10) to Canister Collar (Item 7) weld symbol should reflect NDE examination requirements. Penetrant examination of the weld root pass maybe good practice, but is not a requirement of the ASME Code for full		See Note 7 on the drawing. It covers all NDE Requirements * see note 1 JTH 2-3-99 Definition of accessible internal welds will	

*Note1: See page 4 JTH 2-3-99

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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
	penetration welds. However, it is required to perform surface examinations an all external and **accessible internal** weld surfaces and the adjacent base material for at least ½ inch on each side of the weld. The drawing should reflect which welds should be accessible from the inside.		be determined jointly with the fabricator and shown on the fabricator's shop drawings.	
15	Drawing H-2-828043, Revision 1, Sheet 1, Section A-A. Same penetrant issues as above.		See Comment # 14 (Disposition) * See note 1 below JHK 2-3-99	
16	Drawing H-2-828045, Revision 1 Sheet 1. Add a note number 14. Penetrant inspection of seal welds shall be after final surfacing.		That is covered under general note # 7. See Comment # 14 (Disposition) I don't believe note 7 is specific enough for this comment.	JHK 2-3-99

* Note 1: My point was that there is no examination Symbol on the welding Symbol for the collar to cover cap assembly. I believe it is the intent to perform a penetrant examination on the root & cover pass so the volumetric examination could be eliminated. This needs to be depicted on the drawing. Conversely, the welds that require radiography do not require a penetrant examination on the root pass. I also understand that the guard plate (Item 14) does not require a penetrant examination on the root pass since it is not a pressure boundary. These items should be removed from the drawings. JHK 2-3-99

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO Design Report HNF-SD-SNF-DR-003, Rev. 2	SNF / MCO	C. E. Graves	Mechanisms Engineering, FDNW	E6-15 376-5545

17. Comment Submittal Approval:

Organization Manager (Optional)

10. *Agreement with indicated comment disposition(s)*

2/3/99
Date

Reviewer/Point of Contact

Author/Originator

11. CLOSED

2/3/99
Date

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	*General Comment*: Several spelling errors and other minor errors found (e.g., 'he' instead of 'the').	N	Will correct.	
2	*Sections 2.9 and 2.11*: Identify the material for the expanded metal spacer (e.g., aluminum, SS, CS, etc.).	N	Will correct.	
3	*Sections 2.9 through 2.12 and 3.12.5*: The aluminum insert is referred to as a spacing plate (2.9), a positioning plate (2.10 & 3.12.5), and a fuel rack (2.11 & 2.12). Use a consistent name, preferably "fuel rack."	N	Will use "Fuel Rack."	
4	*Section 2.10*: Identify screen material (e.g., aluminum, SS, CS, etc.).	N	Will Identify.	
5	*Section 2.11*, 1st paragraph, 2nd to last sentence: "non structural" should be hyphenated.	N	Will correct.	
6	*Section 3.9.1*: The aluminum fuel rack (Mark IA and IV baskets) is not listed in the table. Is this an intentional omission?	N	No – Fuel Rack is a nits item – will be added to table to avoid further confusion.	
7	*Appendix 1*: no comments	N	N/A	
8	*Appendix 2, general comment*: This section comes from the MCO Topical Report (section 3.2.5), therefore, as the Topical is updated based on DOE comments, so should this appendix.	Y	Agree. We will ECN the Appendix, as necessary, when the Topical is approved by RL.	
9	*Appendix 2, general comment*: Several different fonts are used within the text. Please pick one.	N	Will correct.	
10	*Appendix 2, Section 1.2.1, 6th paragraph*: Hand character should be a hyphen.	N	Will correct.	

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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
11	*Appendix 2, Section 1.3, 1st paragraph*: Hand characters should be degree symbol.	N	Will correct.	
12	*Appendix 2, Section 1.3, equation*: Missing right brace "}" at end of equation just after right bracket, but before ½. Equation should look like this: $x \sim= \{D_o[\exp(-Q/RT)]\}^{½}$	N	Will correct.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
		BRUCE LORENZ		

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

2-3-99 Bruce Lorenz
Date Reviewer/Point of Contact

Author/Originator

11. CLOSED

2-3-99 Bruce Lorenz
Date 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	Appendix 3, Table 1-MCO Weight Summary: Suggest that the table values be confirmed. I was unable to obtain consistent numbers while working with the table values. Example; If I tried to obtain the weight of the shield plug by subtracting empty MCO weight (without from with shield plug) I do not get the same number as I do when subtracting weight of loaded MCO filled with water, without shield plug, from loaded MCO filled with water, WITH shield plug. It seems that these should be closer than they are. Also, if I try and derive table value for MCO, I can not get the table value by summing the individual component weights from the component weight summaries contained later in the appendix. Some values do match but others do not. We refer to weights in more than one place in the Topical Report and we should have a very consistent story here.	P	Will investigate and correct as necessary.	
2	Appendix 3, basket data, some of the center post and round bar numbers seem inconsistent from one design to another. Not sure there is a problem but I could not convince myself there was not. You may want to glance at the data.	P	Will review and modify as necessary.	
3	Appendix 3, cover page; Revision Description states that the revision results from the redesign of the MCO baskets. Are there other weight changes	P	Changes may have been made - however the corresponding weights have not.	

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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
	attributable to the remainder of design changes that are not reflected in the Appendix 3 weight table? (e.g., collar material change, center support design change)			
4	Appendix 5, page 6 of 114 states that the maximum weight of a fully loaded Mark IV basket is 3189.96 lbs. Table 1 in Appendix 3 states that this maximum weight is 3218.34 lbs.	P	Will Correct.	
5	Appendix 5 cover page states that the revision addressed is the update to lifting cap, material changes, update design pressure analysis, and revise drop loads to reflect design spec. The change in basket design is not specifically called out here. Does it matter? Are the basket design changes something that would impact the results of the analyses in this appendix?	P	No, it does not matter. Does not impact analysis of App. 5.	
6	Appendix 5 page 6, #4, material properties: Statement is made that remaining components of the MCO assembly are fabricated from 304L SS. Should copper in baskets be mentioned? What about the nitronic 60 bolt material...should that be noted?	P	No - we are only interested in the parts that pertain to this analysis.	
7	EDITORIAL COMMENT Appendix 5 page 7, #5 1st sentence: ... "define" should be "defined"	P	Will correct.	
8	Appendix 7, Section 2, REFERENCES; Reference 1 is incorrect in that it lists DE&S 1997, and it also lists November 1998. The Rev 5 is correcxt but it should be December 1998 . See Appendices 3 or 5 for proper reference.	P	Will correct.	
9	Appendix 7, Section 1, INTRODUCTION; It states that evaluations are based on ANSI N14.6. I thought we were going to use these criteria without committing to the standard. No big deal but thought I would mention it. Same situation exists for the other basket appendices.	P	References to ANSI N14.6 will be removed.	
10	Appendix 8, Section 1, INTRODUCTION; Reference 1 is incorrect, see comment 8 above.	P	Will correct.	

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	3. Project No.	4. Page 3 of 4

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
11	Appendix 10, Section 4, page 8, last sentence in the section (top of page). The statement is made that the plugged port has a threaded portion smaller than process valve threads. Does this mean that if we had to use the plugged port as a backup process port, the process valves would not be interchangeable? It seems that we would want the same size threads on both ports. Just a question...I'm sure you have thought this out.	P	The number one port plug is also a 1 5/16 inch hex. The CVD operator would have to reach farther into the shield plug to operate it. I do not know if it has the reach down to engage the plug. Also the # 1 port plug does not have the flow rate capacity of the larger plugs. With the MCO pressure monitoring going the way it is, it is likely that the # 1 port will be used for monitoring and not available for process use. Good question and it is becoming moot.	
12	Appendix 10, Section 6, page 10, 2nd paragraph. Statement is that the Performance Spec specifies that the MCO is to be designed to the INTENT (emphasis added) of Subsection NB... Is the "intent" wording still in Rev 5 of the Performance Spec?	P	Will change to "In accordance with..." or "to the requirements of..."	
13	Appendix 12, Rupture Disk Data: Don't we have anything to put into this appendix? If not, consider deleting.	P	App 12 should have Rupture disk data info.	
14	Appendix 18, Code Exception Report. I strongly suggest we delete this. If there are no exceptions, there is no need for the Appendix.	P	The Exception Report will be deleted and pertinent information regarding the path forward for full Code compliance will be moved to the Design Report narrative.	
15	General Comment: Do the figures that were transmitted with the Draft Design Report reflect all of the design changes, i.e., dual pressure rating and material changes as well as basket design changes? If so, are these figures close enough for us to consider for use? Actually, the real question is when can Parsons transmitt FINAL ELECTRONIC figures to us (Cam Thomas)?	P	No, drawings are still being changed as a result of review comments. Based on the number of basket drawing comments received, the basket drawings won't be ready for use until they are released (approx. 2/12/99). The MCO drawings transmitted with the Design Report have fewer changes and could be used for draft information only, however we recommend waiting until 2/12/99, when final electronic figures will be available.	

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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

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
		Roger Reedy		

17. Comment Submittal Approval:

Organization Manager (Optional) Date

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact

Author/Originator

11. CLOSED

3/10/99 Date

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	**ITEMS 1-5—DESIGN REPORT COMMENTS. Clarify what is meant regarding "not required to meet the Code for all accident cases."**		Section 4.19.2 of the MCO Performance Specification (HNF-S-0426, Rev.5) indicates that Service Level D allowable stresses may be exceeded for horizontal and corner drops while the MCO is in the cask. Will clarify in text.	
2	Page 11—There are no Code exceptions. (See 1st paragraph).		The exception report will be deleted and pertinent text describing the path forward for full Code compliance will be moved to the Design Report narrative.	
3	Page 15—There are no deviations from Subsection NB. (1st paragraph, last sentence)		This sentence came straight from the Performance Specification. It is understood that with Code Stamping, there will be no deviations or exceptions.	
4	Page 21—Should be made clear that there is no Code Stamp for MCO work Subsection NG.		No code stamp is required for NG work.	
5	Page 33—Last paragraph. "Sufficiently Smooth" will cause problems because it is undefined.		Surface finishes are defined on the design drawings. This sentence again came from the Performance Specification.	

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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
6	**ANALYSIS OF LIFTING CAP AND CANISTER COLLAR.** Page 12—8.3.2 "Bell mouthing" is only applicable to fatigue situations. This closure will not be cycled, so "bell mouthing" is not a concern.		Addressed in App 18 page: 6 - last paragraph. Clarification will be made - Bell mouthing is not a concern.	
7	**ASME CODE EXCEPTION REPORT.** All—I believe this part should be excluded from the Report. It will probably raise more questions than it answers. If you keep this Report, there are other issues still to be resolved. These other issues will be solved, but they could be addressed if the purpose of the Report is to cause unnecessary concerns. For the baskets, there are many more exceptions to the Code (Subsection NG), but why discuss a Code that is completely inappropriate for these structural baskets? Compliance with Subsection NG requires compliance with Subsection NCA. You don't even want to go close to there.		See response to #2 above. NG application is required by Performance Specification and is addressed. A clarification will be added to the narrative that the NCA requirements that pertain to the NG articles invoked by the Performance Specification are not applicable to basket construction.	
8	**FABRICATION SPECIFICATION.** All—I believe that too many Code requirements are repeated in this Specification. The problem is that many times the quoted requirements are not the same as in the Code Edition or Addenda used for construction. This causes conflicts and could lead to violations of Code requirements. It also causes misinterpretations of the Code and the Specification. For example, on page 20, what does, "A written report containing the requirements of Section V, Article 2", really mean? Does this mean that Article 2 must be copied into a special report? The Code requires no such report? The volume of this Specification could be considerably reduced with no reduction in requirements.		Being clarified and reduced.	

DATE: 1/18/99

TO: **NAME:** Lou Goldmann

TELECOPY NO: 509 373 9771

FROM: **NAME:** Roger Reedy

REEDY ENGINEERING, INC.
3425 S. Bascom Ave., Suite 210
Campbell, CA 95008-7300

****

To report any problems, verify copy, or speak with telecopy operator, please call 408-558-0330.

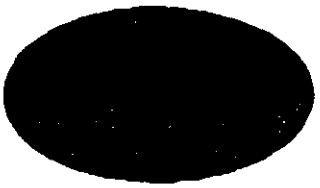
Cover plus 2 **page(s)**

Leanne

Please pnt on RCR's.

Thanks Lou

cc: Kim Smith



REEDY ENGINEERING, INC.
ENGINEERING MANAGEMENT CONSULTANTS

January 18, 1999
DES-99-001

Mr. Lou Goldmann
Multi-Canister Overpack Project
Spent Nuclear Fuel Project
DE&S Hanford
200 East Area
Bldg. 2750, Room C-229
Richland, WA 99352

Dear Lou,

Below are my comments:

DESIGN REPORT COMMENTS

Roger F. Reedy

Page	Comments
3	Clarify what is meant regarding "not required to meet the Code for all accident cases."
11	There are no Code exceptions. (See 1st paragraph.)
15	There are no deviations from Subsection NB. (1st para., last sentence.)
21	Should be made clear that there is no Code Stamp for MCO work to Subsection NG.
33	Last paragraph. "Sufficiently Smooth" will cause problems because it is undefined.

ANALYSIS OF LIFTING CAP AND CANISTER COLLAR

12	8.3.2 "Bell mouthing" is only applicable to fatigue situations. This closure will not be cycled, so "bell mouthing" is not a concern.

ASME CODE EXCEPTION REPORT

All I believe this part should be excluded from the Report. It will probably raise more questions than it answers. If you keep this Report, there are other issues still to be resolved. These other issues will be solved, but they could be addressed if the purpose of the Report is to cause unnecessary concerns.

For the baskets, there are many more exceptions to the Code (Subsection NG), but why discuss a Code that is completely inappropriate for these structural baskets? Compliance with Subsection NG requires compliance with Subsection NCA. You don't even want to go close to there.

FABRICATION SPECIFICATION

All I believe that too many Code requirements are repeated in this Specification. The problem is that many times the quoted requirements are not the same as in the Code Edition or Addenda used for construction. This causes conflicts and could lead to violations of Code requirements. It also causes misinterpretations of the Code and the Specification. For example, on page 20, what does, "A written report containing the requirements of Section V, Article 2", really mean? Does this mean that Article 2 must be copied into a special report? The Code requires no such report? The volume of this Specification could be considerably reduced with no reduction in requirements.

I will send you more comments when the next draft is released.

Very truly yours,

Roger F. Reedy

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	3. Project No.	4. Page 1 of 2

5. Document Number(s)/Title(s)	5. Program/Project/ Building Number	5. Reviewer	5. Organization/Group	5. Location/Phone
MCO Design Report, Rev. 2 Draft	W-442	K. E. Smith	SNF Projects	MO285/376-0273

17. Comment Submittal Approval:

Organization Manager (Optional)

Date

10. Agreement with indicated comment disposition(■)

K E Smith

Reviewer/Point of Contact

4/23/99

Date

Author/Originator

11. CLOSED

K E Smith

Reviewer/Point of Contact

4/23/99

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
1	Design Report: Incorporate editorial comments per attached mark up.		Will incorporate.	C
2	Page 38: The fourth sentence of the first paragraph says the horizontal and corner drop loads when the MCO is in the cask were not evaluated. This statement is unclear, as I believe they were evaluated, however they were allowed to excede the Service Level D limits. Please clarify this statement.		Will reword to reflect wording of Performance Specification.	C
3	Page 52: Please check to verify that Reference 6.4		Will check and delete if necessary.	C

REVIEW COMMENT RECORD (RCR)	1. Date	2. Review No.
	3. Project No.	4. Page 2 of 2

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
	is actually referenced in the report. I could not find it. If not referenced, it may be deleted.			C
4	Appendix 18: The initial concept of this Exception Report was to identify the specific articles of the Code that could not complied with. Now that a commitment has been made to Code Stamp the vessel, by definition there can be no exceptions to the Code. Any deviations must be addresses via submittal and approval of Code Cases. The fact that we still have an Exception Report is misleading to reviewers. Appendix 18 should be deleted in its entirety.		The Exception Report will be deleted and pertinent text describing the path forward for full Code compliance will be moved to the Design Report narrative.	

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	3. Project No.	4. Page 1 of 4

Received from Jon Tonke of Parsons

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
HNF-SD-SNF-DR-003 draft rev. 2D	MCO Project	L H Goldmann	SNF Storage Projects	MO-285, 373-6371

17. Comment Submittal Approval:

Organization Manager (Optional) Date

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact Date

Author/Originator

11. CLOSED

Reviewer/Point of Contact 5/11/99 Date

Author/Originator

mcorv2lhgrcr1.doc 1/18/99

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	Design Report, pg. 3 0f 53, in the closing paragraph of the introduction the words NB for welds of baskets are mentioned. Should be "ASME Section III NG". Exceptions should be eliminated for the pressure boundary. So we are planning on using code case N-595 and a new one for the rupture disk in port #4. Should be reference the pending use of code cases?		Will correct – need to get Approved version of N.595. This will need more clarification when resolved w/DESH The Performance Specification has more requirements than will be in the Code Design Specifications. The possible exception of the Code applied to the Performance Specifications is different than to the Code Design Specification.	Inc
2	Page 4, line F add basket. Lines H, I ,and J add after Remote, "and hands-on" to the lines. At Line P add, dye penetrant, and possible UT equipment.		Line F – corrected Line H, I, J & P will be corrected with Future ECN.	Inc
3	Page 5, Section 2.4, first line, add "at the CSB" after MCO. Second from last sentence add "selected" before shield and make word ports singular.		Corrected with the Exception; "Ports" will remain plural	Inc
4a.	Page 6, first complete paragraph, second paragraph, after coupling add the word "area".		a. Concur	Inc
b.	Section 2.6, third sentence the word disengaged should be changed to backed out 10 to 12 turns or something similar to indicate the port is active for flow, but the plug is not threaded out of or removed from the port.		b. Concur. Will use the word "unthreaded	Inc
c.	Last sentence the word fail is applied to the rupture disk, actuate is more appropriate. Change the parenthesis quote to read (which is the design		c. No – the rupture disk will rupture at 150 psi and not reclose.	Inc

A-6400-090.1 (03/92) WEF011

cc: Jon Tonke - for your file
Kim Smith

REVIEW COMMENT RECORD (RCR)	1. Date	2. Review
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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
	pressure of the main mechanical seal of the shield plug assembly) or something similar.		Actuate involves possible self-closure. OK for the ( ).	
d.	Second paragraph second sentence the word operations should be changed to "cover cap".		d. Cover cap should be changed to "Canister Cover" to match drawings.	Inc
e.	Next sentence need a discussion of the generic design and that silver is the plating, but gold plating is also acceptable.		e. Corrected	Inc
f.	Port 2 paragraph, may want to state that the cover cap will only have one penetration and that it will have to be conscientiously aligned above #1 or 2 ports before welding of the cover cap.		f. Will discuss – Needs to be resolved. The alignment method will be defined in detail with +/- tolerances and possible made a "critical dimension". Perhaps even use of gauging tool for alignment. Will the selection of either port 1 or port 2 differ from one MCO to the other? Comment added to Action Item List for Further evaluation	Not Inc
g.	Port 3 paragraph, second sentence, the word cap should be changed to "plate". Also "plate" for flange on page 28, second from bottom line and page 29 halfway and 3/4ths down.		g. Some, but not all. Corrected.	Inc
5	Page 7 top paragraph, the third from last sentence and last sentence, the word cap should be replaced with "plate". May want to mention that a 2 mm screen prevents larger pieces from exiting the MCO in the event of an actuation of the rupture disk. Last paragraph of section 2.6 please add that gold plating on the seals is also acceptable.		Corrected	Inc
6	Page 8, second paragraph, 10th line after bottom support plate add "and allows for water draining". Last paragraph, The storage baskets structural component may be fabricated from 304 also as there is no structural welding now. (Also applies to Page 21 third line from end) Last sentence add "head" before screws?		Corrected – Concur: correction mod.	Inc

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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
7	Page 9, you indicate a nominal 2.75 OD for the central tube--on the prints it is 2.83 inches. Is 304 also OK for the Mark IV baskets as there is no structural welding? Same OD comment on page 10.		Per drawing – direction was to use 304L. Post diameter change to 2.84 inches in both drawings and report	Inc
8	Will you be adding a section 2.13 for the SPR baskets?	Direct ion	Section 2.13 will be added to incorporate design and weights as TBD.	Inc
9	Page 15, top line add Division "1," to the list ahead of 11.		Corrected.	Inc
10	Second line from bottom of table, add to structural component "on a made up/assembled MCO". to the end of the sentence.		Please clarify as to where your comment should be added. No changes appear to be necessary Comment Added to Action Item List for Further Evaluation	Not Inc
17	Page 17, top bullet, add "fabricator" before required, last bulled add "½ inch thick" before word shell. Fifth line from bottom add (immediately) after tasted, as the MCO will be tested at the CVD after drying. Also applies to page 20, 1st full paragraph.		- "Fabricator," not required. - Will add	Inc Inc
18	Page 18, Section 3.9.3, the weights should all agree in this report. The scrap baskets weigh more but the scrap payload will be less than whole fuel. May want to discuss this.		Will investigate and make sure weights are consistent. Comment Added to Action Item List for Further Evaluation	Not Inc
19	Page 21, third paragraph from end, the ending needs work.	?	Quote from Performance Specification 4.12 however, rewording may still be necessary for clarification. Comment Added to Action Item List for Further Evaluation	Not Inc
20	Page 25, section 3.12.6, halfway through man should be "may" and at the end of should be "or".		Corrected.	Inc
21	Page 26, the formal conceptual design info on the SPR baskets should be in here in several months (end of March 1999) and we should indicate this in this text (pending release of funds by the BCR process).	Direct ion	See comment Item 8 above. Concur: Reference added reword 3.12.7 regarding future CDR and funding. (It needs a small correction to make 2 sentences of last sentence)	Inc
22	Page 46, requirement column, two N/As at the bottom, 575 KGs for Mark IA		- The N/A's will be replaced with the appropriate weights	Inc

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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
	scrap and 980 Kgs for Mark IV scrap are the limits. Page 48 line 21 the weights have to be corrected. Line 26 requirements, except the 2 field closure welds which are called out on the prints. We will use the code case to justify these.		when received from L. Goldmann. - Weights will be corrected. - Last sentence – Code Case will be N-595.	

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
HNF-SD-SNF-DR-003 draft rev 2D	MCO Project	L H Goldmann	SNF Storage Projects	MO-285 373-6371

17. Comment Submittal Approval:

Organization Manager (Optional) Date

MCOrv2lhgrcr2.doc 1/18/99

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact Date

Author/Originator

11. CLOSED

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
23	Appendix 2, page 11, it might not hurt to add that these hydrogen calculations are based on no consumption or acquisition of the H2 gas by the uranium metal. Also ref. 21 is rev. 5 now.		Will correct Ref. 21. Do Not Concur: Text is sufficient as is.	Inc Not Inc
24	Appendix 3, page 5 we should put in a space for the SPR baskets below MKIV storage baskets and the weights as TBD.		Comment Added to Action Item List for Further Evaluation	Not Inc
25	Appendix 5, page 19, section 10.1, The 28 Gs applies to the shield plug compression limiter seeing the 28 Gs. In the case of the cover capped MCO the whole 35 Gs or 679,000 pounds force is put upon the cover cap. We have an analyst looking at ways to stiffen up the cover cap.		Noted – waiting for L. Goldmann clarification. Comment Added to Action Item List for Further Evaluation	Not Inc
26	Appendix 6, page 1, Rev "5" is the proper revision for the performance specification now.		Will Correct.	Inc
27	Appendix 7, page 9 the figure shows a gap between the center bar and the base plate. Page 10 might want to add to center coupling line "end of central bar" in the component column. Page 43 might want to discuss the SF of three (yield) and five (ultimate) and which one governs the calculation. I.e. Finish the discussion. Page 45, last line the "support plate weld" is it still in the design?		Corrected. Comment Added to Action Item List for Further Evaluation	Not Inc

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
			Will Correct.	
28	Appendix 10, page 10, second paragraph the word intent shows up. We have a great deal of pressure on us to not use this word. Also, by the code EBW welds have to be UT examined also, might want to add this in the last paragraph. Page 13, The cover plates may be made of 304 no need to use 304L unless it is readily available.		Will change to, "designed to the requirements of..." NB 5277 304/304L if you want	Inc Inc Inc
29	Appendix 11, Please reference revision 5 of the performance specification. Page 16, section material properties, may want to add the materials of the locking & lifting ring, collar, with the shield plug.		These material properties are listed on page 7 of App 11. However, Parsons will review for clarity. Comment Added to Action Item List for Further Evaluation	Not Inc
30	On the vendor cut sheets and graphs etc. can we get better reproducibles from the vendors? This comment applies to appendices 13 and 14.		Will provide better reproducibles	Inc

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
HNF-SD-SNF-DR-003 rev. 2D	MCO Project	L H Goldmann	SNF Storage Projects	MO-285 373-6371

17. Comment Submittal Approval:

Organization Manager (Optional) _____ Date _____

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact _____ Date _____

Author/Originator _____

11. CLOSED

Reviewer/Point of Contact _____ Date _____

Author/Originator _____

mcorv2lhgrcr3.doc 1/19/99

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
31	Drawings from here on out, H-2-828041, sheet 1, The cover cap weld should have 3 dye (root, mid, and final passes) penetrant examinations of the cover cap attachment field weld. The cover cap weld and the installed penetration plug should be leakage rate tested to agree with code case ASME N-595. Is code case LT info put on prints? The base plate bottom went convex at OIW (warped out) about .07 inches when the 6 support plates were welded up. So, the 1.13 dimension of the 044 print may need some tolerance adjustment such as 1.13 +0.010 and –0.080 so the part may be manufactured without a hassle.		Concur: Drawings changed Concur: Leakage test requirements are covered in the specifications. *Will investigate.* Comment Added to Action Item List for Further Evaluation	Inc Inc Not Inc
32	041, sheet 2, item number 39 the short draw tube screen assembly should be called out to (1) not collapse under some condition greater than 150 psi or (2) not exceed some allowable stress at 150 psi external pressures. This will assure the assembly will not collapse in service with a rupture disk actuation. May be a new note will take care of this as we are not designing the screen assembly.		Will add note to reflect comment. Parsons is revisiting the short draw tube design. Comment Added to Action Item List for Further Evaluation	Not Inc
33	041, sheet 2, with such a large penetration in the cover cap (1-3/4'–12 thread)		1-5/16" standard socket requires a 1.9 in. diameter penetration.	Inc

A-6400-090.1 (03/92) WEF011

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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
	do we need the 7/8 hex socket in the part 1 and 2 appliances? Earlier, the assumption was the penetration was on the order of 1 inch diameter and a hex socket was needed in the appliance. Would a standard 1-5/16' socket go through the 1-3/4'-12 threaded hole?		7/8" socket is needed for torque requirements. For seating of plugs – 1.75 in. thread requires a 1.66 inches minor diameter opening – per Duke's agreement, a 1.5 in. penetration was preferable with a 1 inch minimum.	
34	045, sheet 3, The cold vacuum drying (CVD) facility has analyzed the "bolt-on" appliance operators for use on the ports. Attached is a copy of their analyses to assist in their reliable operation at CVD. They would like to have our tolerances tightened up on the port geometry and the 1-7/8-12 threads. Please look at the December 10, 1998 write up by Merrick I am sending down to you. I would like to implement their ideas if you agree it is worthwhile.		No "attached" copies were received – cannot resolve comment. Concur: Tolerances can be tightened per review by Bruce Dixon somewhat but not totally to comply with Merrick. This needs to be looked at. Comment Added to Action Item List for Further Evaluation	Not Inc
35	051, the chamfer around the section A-A hex I not correct on the longitudinal view. They should appear as scallops. This is an artwork comment, but it will confuse the machinist.		Will make view accurate.	Inc
36	052, when the bottom plat of the MCO was thickened 1/4 inch, the height of the screen or cone was not adjusted accordingly. The cone should probably be counter bored from the bottom 1/4 inch to let in the 2 mm screen. There may be a better solution.		See Scott Pierce's comment # 7.	Inc
37	070, sheet 2, in view C a thinning of the wall is shown for .5 inches. Why doesn't the 2.44 bore extend all the way through to the end of the hole at 2.58 depth? Zone F-7 the call out should be item 13 not 8. The OD of the tube is not well defined. Does it have a step in it near the bottom, 3 inches from the flare? What is the 3.00 dimension (view C) for? Is the intention to make this 13 from a welded assembly or one piece? Also applies to 075 sheet 2.		- 2.44 in. diameter bore extends entire 2.58 in. depth – the cutout has been eliminated. Will change Item 8 to Item 13. - There was a step in the diameter but was resolved. - The 3.00 in. dimension was inadvertantly left on drawing and will be removed. - The intention is to fabricate item 13 in one piece.	Inc
38	Warpage of the MCO Shell bottom occurs when the support bars are welded and joined at the guide cone. This warpage also causes the plate bottom dimension of 2.01 to be less (by about 0.07) at the center (near the guide cone) after the bottom plate is finished machined flat on the outside. We should		Will investigate the possibility of relaxing tolerances and reducing weld thickness.	Inc

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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
	make allowances for welding distortion in the dimensioning.			

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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
MCO DESIGN REPORT HNF-SD-SNF-DR-003, REV 2D, DRAFT 1-07-99	99-003E SNF	GR Wagenblast	FDNW CIVIL STRUCTURAL ENG	1200 Jadwin 2-64 E6-46 376-5736

17. Comment Submittal Approval:

_____

Organization Manager (Optional)
Reviewer/Point of Contact

Gary R Wagenblast 2-8-99

Author/Originator

10. Agreement with indicated comment disposition(s)

_____

Date

_____

Reviewer/Point of Contact

_____

Author/Originator

11. CLOSED

Gary R Wagenblast 2-8-99

_____

Date

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.	The analysis does not show the adequacy of the Canister Cover Assembly test plug, part number H-2-828042-006, item 8. The analysis does not show the adequacy of the Canister Cover Assembly seal, H-2-828042, item 12. The analysis does not show the torquing requirements for the Canister Cover Assembly test plug, part number H-2-828042-006, item 8.		- Will provide analysis to show adequacy. - Will provide analysis to show adequacy. - Torquing requirements will be added to the analysis and the drawings.	Accepted. However, revised calcs have not been provided for review.

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S.R. Wagenblast 7-8-99

2.	The analysis does not show the adequacy of the Canister Cover Assembly cover plate, part number H-2-828042-007, item 9. The analysis does not show the adequacy of the Canister Cover Assembly cover plate weld, shown on drawing H-2-828041, zone 8B. The way I interpret the performance specification, the cover plate and weld would be part of the "complete welded closure" referred to in Section 2.1 of the Design Report. According to the performance specification, Section 4.3, the MCO when sealed by welding shall have a maximum leak rate of 1E-7 scc/sec. According to the design report, Section 3.3, the mechanical seals provide leak tightness of 1E-5 ssc/sec. Therefor, the cover plate and weld must be designed for 450 psi and leak tightness criteria. The cover plate should be added to the safety class component list in Section 3.9 of the design report.		Cover plate and cover plate weld are not part of pressure boundary. The Code boundary is the threaded plug. The performance specification HNF-S-0426 section 4.3 intent is toward the attachment girth weld around the 25.31 inch diameter, where the cover cap joins the collar. This is the "sealed by welding" reference weld. This weld is capable of being inspected to the 10-7 leakage rate. As to the mechanical seal of the test plug installed into the cover cap penetration, these type of seals have routinely sealed to the 10-9 to 10-11 range on their first use, which is two to four orders of magnitude better than the 10-7 leakage rate permissible. These numbers are based on our testing program conducted by Ed Ruff. There should be no difficulty achieving the 10-7 leakage rate requirement for the cover cap penetration. The 10-5 rate refers also to the minimum for the 24 inch diameter "helicoflex" main seal. This is the minimum acceptable leakage rate for this main seal. In practice, this main seal is routinely in the 10-6 to 10-8 range for leakage rate. As to the plug or the cover plate being safety class, they are safety significant. These two barriers are redundant in the cover cap penetration (the plug and the plate are in the same release path) and we still have the boundary created by the shield plug assembly below. The risk of release via this path is low in the assembled condition. Parsons will add clarifying text to the design report in section 3.3 indicating the cover cap penetration plug and seal is capable of meeting the 10-7 leakage rate requirement.	Accepted. Although I think that an all welded closure would be more appropriate for the 75 year interim storage design life configuration for the MCO in the CSB, I agree that the performance specification does not Specifically require such an all welded closure. As such, I can accept your disposition using the mechanical plug for the pressure seal, making the cover plate and weld not safety class components.

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R. Wagenblast 2-8-99

3.	Drawing H-2-828041, the drawing and parts list are not consistent in the specification of part numbers and quantities of process valves and rupture discs. H-2-828041, item 31, part number -001 is correct for port 1 H-2-828041, item 6, should be part number H-2-828047-004 port 2 H-2-828041, item 16, should be part number H-2-828047-003 port 3 H-2-828041, item 17, part number H-2-828047-010 is correct for port 4 On the face of H-2-828041, sheet 2, Shield Plug Subassembly 4, drawing zone 8C, process valve callout should be 1#6, 1#16, and 1#17, NOT 2#16 and 1#17.		Will correct.	Accepted.
4.	It is not clear how the shield plug ports 1 and 2 are accessed through the cover penetration unless the shield plug cover plates are permanently omitted when the cover is welded in place. Explain in the design report or the performance specification, the purpose of the shield plug cover plates, when they are required, and when they may be permanently omitted for valve access through the cover.		The cover plate for either part will be resolved prior to final welding - will clarify in Design Report, i.e., cover plate of port #2 will likely be left off when cover cap is installed on MCO.	Accepted.
5.	The performance specification and the design report both address the installation of a 1 inch thick cover plate, having a 1 inch diameter orifice, to protect the safety class rupture disc at port 4. The drawings do not include the cover plate with orifice, nor do the calculations address the adequacy of the plate to protect the rupture disc.		Option for orifice is on DWG H2-828048 Sheet 1, Zone E4 and also Flag note 5. No design loads designated in Performance Specification for cover plate/orifice, beyond the 150 psig rating of all cover plates. A separate analysis by DESH shows the orificed cover plate will withstand an overhead strike from dropping the cask lid.	Accepted. However, the analysis of the cover plate to protect the rupture disk from an overhead strike must be included in an appendix or referenced in the design report.
6.	Revise the material callout, drawing H-2-828042-001, item 4, to be SA-182 F304/F304L to reflect changes in the calculations, Appendix 6.		Will correct.	Accepted.

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S.L. Wagenblast 2-8-99

7.	MARK 1A Storage and Scrap Baskets Appendix 7, section 8.2, Support Rod: 7a. The analysis does not show the capacity of the cap screw at the base of the support rod to provide a fixed base for the support rod as was assumed in the analysis. The screw capacity, the thread pullout capacity, the moment capacity, and the stiffness of the connection must be considered in order to confirm the assumption of fixed base. 7b. Thread stripping capacity for the support rod cap screw must be confirmed for specified bolt preload/torque.		Evaluations will be added to demonstrate adequate fixity.	Accepted. However, revised calcs have not been provided for review.
8.	MARK IV Storage and Scrap Baskets Appendix 8, section 8.2, Support Rod: 8a. The analysis does not show the capacity of the cap screw at the base of the support rod to provide a fixed base for the support rod as was assumed in the analysis. The screw capacity, the thread pullout capacity, the moment capacity, and the stiffness of the connection must be considered in order to confirm the assumption of fixed base. 8b. Thread stripping capacity for the support rod cap screw must be confirmed for specified bolt preload/torque.		Evaluations will be added to demonstrate adequate fixity.	Accepted. However, revised calcs have not been provided for review.
9.	MARK 1A and MARK IV Baskets (drawings H-2-828060 sheet 2, H-2-828065 sheet 2, H-2-828070 sheet 2, and H-2-828075 sheet 2) the welding of the center posts to the base plates are not consistent and confusing. Why are the welds required? I recommend omitting the welds. The torque on the post-to-plate connection is adequate to ensure permanence. Tack welds are not ASME approved welds. Welds, when required, should be specified as 1/8 inch deep penetration butt welds, not fillet welds, of sufficient length for compliance with ASME minimum requirements.		Welds have been eliminated and replaced by a pin.	Accepted.

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10.	MARK 1A SCRAP BASKET H-2-828065, item 15, and MARK IV SCRAP BASKET H-2-828075 item 14, and APPENDIX 7 Section 8.4.1: Revise shroud attaching screws to type F thread cutting screws. Type AB self tapping screws have thread tapping/forming capabilities for sheet materials up to 0.2 inches thick. For tapping into holes drilled into solid steel up to 0.5 inches thick, type F thread cutting screws are appropriate.		Will revise to type F threads.	Accepted
11.	Design Report, editorial comments : Section 2.3: second sentence, replace "expected" with "accidental". Even though you are designing for the occurrence of a drop, a drop is not expected or planned, but would be the result of an accident. Section 2.12: last sentence, delete "except for the criticality control". Criticality control is neither part of the Mark IV scrap basket nor the Mark IV storage basket. Section 3.9.1: last paragraph, third from last sentence, delete sentence "The Mark 1A baskets are assembled with spring pins that are unobtainable with all the Code material requirements." Pins are no longer used.		- Will correct. - Will correct. - Will correct.	Accepted.
12.	Design Report, Section 3.19.3, compliance paragraph: It should be noted that the configuration control for criticality requires that a full complement of six Mark 1A baskets be installed in the MCO. No partial loading of the MCO is allowed. Empty Mark 1A baskets are acceptable for structural configuration control.		A statement will be inserted to make sure that no partial loading of the MCO is allowed.	Accepted

File: 99RCR.GRW

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
HNF-SD-SNF-DR-003 Rev. 2	MCO	D. M. Chenault	Technical Integration	MO-285/376-6230

17. Comment Submittal Approval:

Organization Manager (Optional)

Date

10. Agreement with indicated comment disposition(s)

D M Chenault

Reviewer/Point of Contact

Author/Originator

11. CLOSED

2-12-99

Date

D M Chenault

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-DR	Section 3.2, pg 11 of Design Report states "with the intent". This should be removed.	Y	Corrected.	C
2-DR	Section 4.0 Compliance Matrix, items 15 and 16, page 45 shows 1.0 inch thermal expansion. This was changed to 0.65 inches.	N	Corrected.	C
3-DR	The Compliance Matrix, page 48 of the Design Report shows in Item 21 that the weights (incorrect in table..See next RCR comment) exceed the spec. requirements. This needs rewording and state that the goal weight was 16,082 and 19,242 not the required weight.	Y	Will Correct.	C
4-DR	The Compliance Matrix, page 48 of the Design Report lists the weights incorrectly. The required wts. should be 16,082 and 19,242 while the compliance weights should be 17,749 and 19572.	Y	See # 4.	C
5-App 3	Table 1 page 5 of Appendix 3 should have a footnote explaining why the shield plug weights are not consistent.	Y	Will clarify weights with footnote.	C
6-App 5	Parsons analysis, page 22, section 11.2.2 and 12. implies that the lifting cap is adequate. However the analysis od FDNW shows the lifting cap prone to buckling. Is Parsons missing something here or do we need a different "G" case for this condition?	N	Parsons analysis for load cases given shows no tendency of the cover/lifting cap to buckle.	Open
7-App 6	Table 5, Appendix 6, page 17, quotes ANSI N14.6 whereas the Spec. does not. Please explain.	N	Will delete Reference to ANSI N14.6. The criteria of $S_y/3$ and $S_u/5$ still applies.	C

C = closed

Open means to be resolved at this time

2/12/99

REVIEW COMMENT RECORD (RCR)	1. Date 01/15/99	2. Review No. Ed S. Ruff
	3. Project No. W-442, SNF MCO	4. Page 1 of 7

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Mulit-Canister Overpack Design Package, distributed 01/11/99	SNF-MCO/W-442 212H	ES Ruff	Mechanisms Engineering	376-1943 E6-15 TCPC/1200/129

17. Comment Submittal Approval:

Organization Manager (Optional) Contact

Date

10. Agreement with indicated comment disposition(s)

ES Ruff Feb 9, 1999

Reviewer/Point of Contact

Date

Author/Originator

11. CLOSED

Reviewer/Point of

Date

** ES Ruff Nov. 29, 1999.

Author/Originator

** Comments 1 & 8 STILL OPEN.

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 comments pertain to HNF-SD-SNF-DR-003, Rev 2D, (DRAFT), 10:41 AM 01/07/99. "Multi-Canister Overpack Design Report":			
1	page 15, Sec. 3.9.1: Suggest that the table include a listing for the safety classification of the MCO shield plug seals. E.g. - process valve seals, flange cover seals, pressure relief valves seals.		Will list the seals as following: Main shield plug seal SS Process valve, plug, and cover plate seals GS	OPEN
2	page 21, Sec. 3.12.3, first sentence. Typo: need a space between "5"		Will correct.	C

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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
	and "on".			
3	page 22, Sec. 3.12.3, third sentence. Typo: need a space between "1/2" and "inch".		Will correct.	C
4	page 48, Item 21, column 2 and 4. Dry weight for MKIA MCO is shown to be 16,082,175 lbs, and dry weight for MKIV MCO is shown to be 19,242,378 lbs. This weight figure could possibly be exaggerated somewhat.		Will correct.	C
	The following comments pertain to:HNF-S-0453, Rev 3, DRAFT, dated January 1999, "Multi-Canister Overpack Fabrication Specification": (Note: Per cc:Mail instructions from Lou Goldmann on 01/13/99, the Fabrication Specification is not fully ready for review. However, the following comments which were already prepared, are submitted for early consideration by the Design Authority and Design Agent.)			
5	page 38, Sec. 11.1.1, first para., last sentence. Suggest it be changed to read: "(AutoCAD Release 14 .DWG format files are preferred. If vendor does not use AutoCAD 14, then AutoCAD 14-compatible files (i.e. .DXF format) are required.)		Will specify Autocad 14.	C
6	page 39, Sec. 11.1.2.C - this is a trivial point, but here goes: Minimum spacing between lines of characters: height of characters.			C

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	Looking at the existing drawing general notes, the spacing between lines of characters seems to be about 1/2 height of characters. Suggest that item C be changed to read: Minimum spacing between lines of characters: 1/2 height of characters, minimum spacing.		Will revise Note: Parsons did not revise. Accept as-is. ESRuff 1/29/99	C
7	page 38, Sec. 11.1.1, para 4, 2nd sentence: suggest sentence be changed to read: "The Buyer's approval of shop drawings shall not be construed by the Seller as a complete check. Buyer's approval of shop drawings shall not relieve the Seller of the responsibility for any error which may exist on the shop drawings. Buyer's approval of the shop drawings does not relieve the Seller of the responsibility for meeting the Buyer's design drawing requierments which are part of this specification."		Agree. Sentences will be reworded.	C
8	page 38, Sec. 11.1.1 consider adding the following requirement: The electronic geometry database (lines, circles, arcs, and splines) in CAD files shall be drawn using exact nominal-size dimension of parts to accurately represent the physical layout of components. Intersecting lines, arcs, splines, and circles used to draw parts shall be trimmed to exact intersections and/or endpoints at terminations.		Will add.	REV
	The following comments pertain to the "Multi-Canister Overpack" drawing package, distributed with the draft Design Report.			
9	H-2-828045, Sht 1, is missing from the drawing package. Could not provide any review comments on this drawing sheet.		Drawing was not revised. Sent separately after the Design Report was sent.	C

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10	~~H-2-828041, Sht 2. Detail F and Zone B-5 show incorrect details for the MCO seal attachment. Are the seal attacment details on Sht. 3, Zone 2-E correct as well ?~~ COMMENT RETRACTED 01/15/99. Reason For Retraction: Detail shows the seal at a section different from that where a seal retainer is located.		No Action.	C
11	H-2-828051, Sht. 1, Zone D-7: Why is the thread relief 2" long ? Is this necessary ? Is a much shorter thread relief all that is needed ?		~~The 2" thread relief is called out as a reasonable practice to improve the stress transition if the assembled shield plug and process tube are mishandled.~~ – Was shortened to 0.187" – EBL 11/29/99	C
12	H-2-828042, Sht 1, Zone F-1, Materials List, Item No. 4: According to letter, LH Goldmann, dated Jan. 7, 1999, page 1, para 4, XM-19 material for the collar has been deleted.		Collar will be dual certified 304/304L.	C
13	H-2-828042, Sht 1, Zone A-3: Revision Block 2 does not contain the ECN number.		Will correct.	C
14	H-2-828047, Sht 1. Zone A-3: ECN number is missing from the rev. block. Zone D-1, General note 5: states that fabrication is according to NG. However, the MCO Design Report, Rev. 2 Draft, page 15, Section 3.9.1 states that Safety Significant items (SS) shall be fabricated according to NB. Which do you require: NG or NB ?		Will correct. Will correct General Note 5 to NB. Note: Was changed to NB. EBluff 11/29/99.	C
15	H-2-828047, Sht. 1, Zone D-1, Tolerancing: For this drawing, strongly recommend changing the tolerance for the seal register diameter (1.771" nominal) on Items 4, 6, and 7 to be +/-.005.		Will correct. Note: Was changed to ±.005. EBluff 11/29/99.	C

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	Using a tolerance of +/-.015, especially on the seal register diameter of 1.771", would permit too much slop for the seal retaining device, and possibly allow the seal to fall off the threads. Since the process valves and pressure relief valves will be manufactured by CNC turning centers, +/-.005 will be readily acheivable. Note: The prototype process valves and simulated pressure relief valves used in the seal testing program were machined to tolerances of +/-.005.			C
16	H-2-828052 and H-2-828053, Zone A-3, Revision block: is missing the revision ECN number.		Will correct.	C
17	H-2-828041, sht 2, Zone E-2, Part/Dash Number: The part number for Item 40, Seal is incorrectly shown as EG&G Pressure Science number 13632. This is an gold-plated seal designation. The gold plated seal was intended for high temperature service during Hot Conditioning. The expensive gold plating became unecessary when Hot Conditioning of the fuel was discarded in favor of Cold Vacuum Drying only. At the direction/concurrence of the MCO Project/Design Authority, a silver-plated seal (having the same OD/ID/height dimensions as the gold plated seal) was tested, and found to provide satisfactory sealing for use in Cold Vacuum Drying: EG&G Pressure Science seal (number 13806).		Will specify silver plated seal with option for gold plated seal per MCO Design Authority. Note: Per MCO design authority LH. Goldmann seals are to be gold plated. EG&G pt 13632 is therefor the correct number per DA. EBH 1/29/99	C

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	See CAUTIONARY NOTE, below:			
18	CAUTIONARY NOTE: While the c-seal performed well, the seal retainer for the Process Valve seal (EG&G Pressure Science silver-plated seal 13806) was found to have too-large of an ID to stay located above the 1 7/8-12 UN-2A threads of the process valve. In other words, the seal retainer ID is too big, which allows the seal to fall out of position, down onto the threads of the process valve. This could occur when the process valve is open during Cold Vacuum drying. When attempting to reclose the process valve with the seal ajar, the seal could possibly be damaged, or the valve could jam in the open position.		Noted. Will contact EG&G and adjust the seal ID as required. Note: On H-2-828041 Sheet 2, Rev 4, Detail B and Flag Note #22 specify orientation of seal retainer ring for best retention. ESRuff 11/29/99	C
18	18 CAUTIONARY NOTE, Continued: During testing, it was also positively established that the 13806 seal retainer would fall down onto the threads of the process valve even under the "best possible conditions" i.e : 1. Even when the process valve threads were machined at Maximum Material Condition allowed by the UN thread specification 2. Even when the smallest ID seal retainer of the lot was used. 3. Even after the seal had been crush seated into it's MCO cavity.		Note: Parsons and EG&G never changed seal retainer I.D. H-2-828047 Sht 1,2,3 Rev 4, Flag Note 5, specifies threads at max. material condition to assist retention of seals. ESR 11/29/99.	

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18	18 CAUTIONARY NOTE Continued: Suggested Resolution: EG&G must be persuaded to revise the seal retainer ID dimension and/or seal retainer thickness, in order to assure positive retention of the 13806 silver-plated process valve seal in it's proper location above the 1 7/8-12 UN-2A threads.		Note: Not Done. See previous comments for palliative measures.	
19	H-2-828042, Sht 1 and 3, Item No.12, Boss C-Seal, Custom Part, EG&G 14119: CAUTIONARY NOTE: This is a new seal callout. The seal has not been tested (at least not here at Hanford) for sealing performance, or ability of the seal retainer to keep the seal from falling down onto the threads (1 3/4-12 UN-2A) of the Test Plug (Item 8). SUGGESTION/QUESTION: Would it make sense to change the threads on the Test Plug (Item 8) to be the same as the Process Valve threads (1 7/8-12 UN-2A) ? If so, the same seals could be used for the process valve and the test plug. This would reduce parts count. Torque testing, and leak testing results already accomplished for the process valve, could be applied toward qualification of the Test Plug component. Ring gages and plug gages used to inspect the process valves, could also be used to inspect the Test Plug threads.		Agree. This will be picked up in the next change notice. Note: This was done. ESRuff 1/29/99.	C

2/11/99 Closed Charles Griffin

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Document Number/Title	Program/Project	Reviewer	Organization	Location/Phone
MULTI-CANISTER OVERPACK DESIGN REPORT, HNF-SD-SNF-DR-003, REV 2D, and Other parts of the MCO Design Package	SFD	R P Denise	RL/SFD/GSSC	200 E/MO277 (919) 778-7246

Item	Question/Comment	Hold	Disposition	Status
1	Section 2.1. The end of the first paragraph states that there are three processing ports. The rest of the document generally refers to four ports, so the same language should be used for consistency.	N	The sentence should read, "...with four ports and a locking ring..."	C
2	Section 2.4. This indicates that the cover cap can be over either port 1 or port 2, and the rest of the document is consistent with this. The document does not make clear how this decision of which port to is made, nor how the cover cap is positioned and aligned properly by any markings to ensure the correct position..	N	The decision as to which port the penetration rests with availability of the Number 1 port for gas sampling. It currently appears that the number 1 port of the shield plug will be used for the pressure monitoring of the MCOs at the CSB. With the #1 port taken, the alignment of the cover cap penetration will likely be above the number 2 port of the shield plug. When the cover cap is put on the MCO for welding we will be using index marks and then installing a test wrench through the cover cap penetration to the port appliance below to assure alignment and thereby check the rotational alignment. This will all be clarified when the monitoring plan is solidified and all parties are in agreement with the plan. This design report supports the directed capability to locate the penetration above either port, which is requested in the performance specification, HNF-S-0426, for the MCO.	C

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Item	Question/Comment	Hold	Disposition	Status
3	Section 2.6. The description of the Ports uses the words " cover cap". The rest of the document and drawings generally refers to these covers as "cover plate".	N	For discussion on Ports 1 and 2, the reference to cover cap refers to the final cap welded over the MCO. The cover caps mentioned under discussion of Ports 2 and 3 should be changed to cover plates.	C
4	Section 3.2. The quoted reference to section 4, item 2, makes reference to ASME Section III exceptions discussed in appendix 18. All such statements should be cleansed from the document., since there are no exceptions to the code..		Agree. The Exception report will be deleted and pertinent text describing the path forward for full Code compliance will be moved to the Design Report narrative.	C
5	Section 3.11. The reference to Section 4, item 17, states that plug threads into a one inch clear opening that can be aligned with either port 1 or port 2. With opening aligned over either one of these ports, the pork may be operated through the opening. Drawing H-2-828042 (sheet 2) appears to indicate a hole diameter of 17/8 inches. It should also be clarified that the cover plate must have been removed from the port before it can be operated.		The text in italics is the response to the requirements in the performance specification. What is needed is a one-inch clear opening for a 7/8 inch hex bar wrench. The opening chosen by the Design agent was a 1 7/8"-12 threaded hole which provided the necessary 1 inch clear opening to use the wrench. Yes, the cover cap's penetration cover plate can not be in place to remove the test plug. And the test plug has to be removed to operate the port valve below. As to the recommended clarifications, the detailed steps to support the production fuel removal campaigns will be appropriately put into the MCO topical report and operating procedures.	C
6	Section 3.13 (page 30 of 53). The paragraph in the middle of the page indicates that the entire MC0 when assembled can be leak tested in accordance with ANSI N14.5 by filling it through one of the process ports with an inert gas and then placing it in a chamber where a vacuum can be pulled and the gas can be detected. If this test is planned for the CSB, it should be so stated.		This is a design report document and the inspection capability is presented. The MCOs are not planned for leakage rate testing at the CSB in the indicated manner. At the CSB, the capability will exist to leakage rate test the mechanical seals and the cover cap attachment weld. What is planned or not for CSB should not be discussed in the design report as that sort of discussion is beyond the design agent's responsibility.	C
7	4.0 Compliance Matrix. Entry 3 indicates that the field closure weld is leak tested providing a redundant seal to the mechanical seal. Since the		Agreed – will be augmented.	C

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	mechanical seal is not redundant to the weld closure at the 450 psig pressure, this explanation should be augmented.			
8	4.0 Compliance Matrix. Entry 21 indicates values for weight that are in error.		Will correct.	C
9	The Fabrication Specification (HNF-S- 0453), section 7.5.1, indicates that the seller may make one test to the 562.5 psig requirement and fulfill the requirements of both tests. It is not clear that this single test will test the mechanical closure at 150 psig. It is therefore not clear how the seller can obtain ASME Code stamps for both tests. This should be further explained and clarified.		Pressure test is now Section 7.4. If the MCO assembly, with shield plug and collar restraint is tested to 562.5 psig and the test is satisfactory, then the mechanical seal will be accepted under 150 psi – Code stamps will be obtained because the mechanical closure will have been tested at or in excess of the 1.25 x DP (150 psi) (or 187.5 psig) and the shell and collar assembly will have been tested to 1.25 x DP (450 psi) or 562.5 psig.	C

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5. Document Number(s)/Title(s)	5. Program/Project/ Building Number	5. Reviewer	5. Organization/Group	5. Location/Phone
MCO Design Report, Rev. 2, Draft		Walt Alaconis		

17. Comment Submittal Approval:

Organization Manager (Optional) Contact

Date

10. Agreement with indicated comment disposition(X)

2/8/99 Walter C Alaconis

Reviewer/Point of Contact

Date

Author/Originator

11. CLOSED

2/8/99 Walter C Alaconis

Reviewer/Point of

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
	Design Report			
1	Section 2.2 Interfaces; add Pail, Pail Lid and CSB Sample Equipment.		Section 2.2 [redacted] Adding [redacted] Pail, [redacted] [redacted] Pail Lid [redacted] CSB sample equipment [redacted] will add to confusion. Will not be added.	
2	Page 16, forth row: Delete this row since it is empty.		Will be replaced with [redacted] Aluminum Fuel Rack [redacted] .	
3	Page 17, first paragraph: Delete reference to spring pins since they are deleted.		Will correct.	

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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
4	Page 28, third paragraph: Add that HPs have also review design for ALARA.		Will add [redacted] and Health Physics[redacted] after [redacted] Opertions[redacted] .	
5	Page 36, first bullet: Delete reference to HCS.		Will correct.	
6	Label added by Lou G.		Will correct.	
	Material Evaluation			
1	Page 6, paragraph #2, fourth line: Delete [redacted] Only one scrap basket is loaded into each MCO[redacted] or add words that allow up to two scrap baskets per MCO.		Will correct.	