NAC INTERNATIONAL

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June 1, 2001

U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852-2738

Attn: Document Control Desk

Subject: Docket No. 71-9270

Request for an Amendment of the UMS® Universal Transport Cask Certificate of Compliance (Approval Pending) to incorporate Maine Yankee Site Specific Spent Fuel, High Burnup Fuel and Damaged Fuel as Allowable Contents

References:
1. Submittal of the NAC Responses to the NRC Request for Additional Information, not including Chapter 2 Structural Evaluation, Revision UMST-01A, NAC International, March 14, 2001
2. Submittal of the NAC Responses to the NRC Request for Additional Information, Chapter 2 Structural Evaluation, Revision UMST-01B, NAC International, March 30, 2001

NAC International (NAC) herewith requests that the UMS® Universal Transport Cask Certificate of Compliance (approval pending) be amended to incorporate as approved contents: Maine Yankee (MY) site specific spent fuel assemblies, high burnup fuel assemblies, damaged fuel and fuel assemblies with start-up sources or other non-fuel components inserted in guide tubes. These contents are included in the Certificate of Compliance, Amendment 1, and Amendment 2 (approval pending), for the UMS® Universal Storage System. Also, included in this amendment request are some revised licensing drawings that incorporate minor changes for improved fabricability, a component name change to eliminate a conflict with ASME Code terminology, and design enhancements of the upper impact limiter. This amendment is being requested to implement a "full pool solution," i.e., licensed storage and transport cask systems, for the Maine Yankee Decommissioning Project.

This submittal includes 10 copies of the request for the amendment and the Revision UMST-01C changed pages, which incorporate the amendment into the UMS® Universal Transport Cask Safety Analysis Report (SAR), Revision UMST-01B (approval pending). Included in this submittal are: (1) a current List of Effective Pages and an updated Master Table of Contents; (2) a set of changed pages, including revised drawings, for the SAR; and (3) a separate enclosure containing NAC Proprietary Information, i.e., the detailed impact limiter drawing, 790-506, Revision 2, Impact Limiter Assembly – Upper, Cask, NAC-UMS®. Please note that consistent with NAC's standard procedure, 3 copies of the proprietary information are provided. The appropriate Affidavit requesting that the proprietary information be withheld from public disclosure is included with this submittal. A non-proprietary version of the impact limiter drawing, 790-209, Revision 1, was previously submitted and is included in the SAR currently in final review.

ED20010793

Attachment A provides a detailed listing of the changes included in this submittal. The changed pages have been prepared in accordance with the following conventions:

- Revision indicators (shading and revision bars) are used to highlight changes. Shading indicates any revision from the SAR Revision 0, while a revision bar beside shaded text indicates a change from a previous revision, other than Revision 0. A revision bar is also used to identify a change in text flow from one page to another.

- The changed pages for this submittal are designated as Revision UMST-01C to provide a unique identification of the pages and changes.

- The List of Effective Pages are all designated as the current revision, UMST-01C, and no revision bars are used, except to show a change in the number of drawings.

This submittal includes revisions to the UMS® Universal Transport Cask Licensing Drawings. The drawing changes do not affect the form, fit, or function of the components and they do not change the component designs, as analyzed in the SAR. The detailed description, purpose, and basis for the drawing revisions are provided in Attachment B.

As noted previously, approval of this amendment request will support the implementation of a "full pool solution" for the Maine Yankee Decommissioning Project. NAC requests that review and approval of this submittal commence upon issuance of the UMS® Universal Transport Cask Certificate of Compliance, Revision 0 (Approval pending).

If you have any comments or questions, please contact me on my direct line at (678) 328-1321.

Sincerely,

T. C. Thompson

Thomas C. Thompson
Director, Licensing
Engineering Services & Product Development

Attachments

Enclosures

cc: T. Williamson (MY)
P. Plante (MY)

ATTACHMENT A

LIST OF CHANGES

for

REVISION UMST-01C

of the

UMS® UNIVERSAL TRANSPORT CASK SAR

NAC INTERNATIONAL

UMST-01C List of Changes

Page/Section	Change
LOEP	Updated to reflect changes
MTOC	Updated to reflect changes
Chapter 1, Page 1-2	In "Package" definition, added the words "exclusive" and "use"
Chapter 1, Page 1-4	Word "plate" added to second sentence of "bottom plate" definition
Chapter 1, Page 1-4	Revision bar on "seal test port" and "port coverplates" is for text flow
Chapter 1, Page 1-5	Revision bar on "structural lid" is for text flow
Chapter 1, Page 1-6	Revision bar on "split spacer" is for text flow
Chapter 1, Page 1-7	Added definitions "Maine Yankee Fuel Can" and "High Burnup Fuel"
Chapter 1, Page 1.2-22	Table 1.2-4, 11th and 15th lines, modification in numbers under Min. Clad Thick and Max. Pellet Dia.
Chapter 1, Page 1.3.1-2	In 4th paragraph, "Zircaloy" replaced by "stainless steel"
Chapter 1, Page 1.3.1-2	Original 5th paragraph has been deleted
Chapter 1, Page 1.3.1-2	Revision bar for text flow and 3rd and 4th sentences revised in last paragraph
Chapter 1, Page 1.3.1-3	New figure "Preferential Loading Diagram for Maine Yankee Site Specific Spent Fuel"
Chapter 1, Page 1.3.1-3	Revision bar in 2nd paragraph for text flow and "Maine Yankee" added before "site specific" and "are" is replaced with "include"
Chapter 1, Page 1.3.1-3	Added "High burnup fuel assemblies," "fuel assemblies with start-up sources and other non-fuel items inserted in guide tubes," and "damaged fuel" to bulleted list
Chapter 1, Page 1.3.1-4	Revision bar on 1st and 2nd paragraphs is for text flow
Chapter 1, Page 1.3.1-4	1st paragraph, CEA acronym added, added "CEA flow plug, or thimble plug"
Chapter 1, Page 1.3.1-4	3rd paragraph is new
Chapter 1, Page 1.3.1-4	Section 7.5.2.1 changed to Section 7.5.2 in last sentence of 4th paragraph
Chapter 1, Page 1.3.1-5	Table 1.3.1-1, "Standard" number of assemblies revised, "Consolidated Fuel" canister loading position revised, "Burnable Poison Rod Replaced by Hollow Zircaloy Rod" canister loading position and canister class revised; Added "Burnup between 45,000 and 50,000 MWD/MTU," "Maine Yankee Fuel Can," "Inserted Start-up Source," and "Inserted CEA Fingertips or ICI String Segment"
Chapter 1, Page 1.3.1-6	2nd paragraph, 3rd and 4th sentences, revised to add GTCC
Chapter 1, Page 1.3.1-6	Weights table at bottom of page, "waste" taken out of 2nd line
Chapter 1, Page 1.3.1-8	Table title replaced "Maine Yankee" with "Design Basis"
Chapter 1, Page 1.3.4-2	Revised drawing revisions for 790-584, 790-585, 790-591, 790-592, 790-595, 790-611, 790-612 and added drawings 412-501 and 412-502
Chapter 2, TOC	Updated
Chapter 2, Page 2.6-120	4th paragraph, 8th sentence, "backing ring" revised to "spacer ring"
Chapter 2, Page 2.6-121	6th line from top, "backing ring" revised to "spacer ring"

UMST-01C List of Changes

Page/Section	Change
Chapter 2, Page 2.6-128	Table 2.6.12.2-1, 8th line starting with "Axial Gaps," "backing ring" revised to "spacer ring"
Chapter 2, Page 2.6-253	Table 2.6.14.2-1, 12th line (Real Constant Set 700), "backing ring" revised to "spacer ring"
Chapter 2, Page 2.7-2	Item 4, 3rd sentence starting with, "The actual predicted accelerations. . .," deleted
Chapter 2, Page 2.9-1	Section title revised
Chapter 2, Page 2.9-1	2nd paragraph new
Chapter 2, Page 2.9-1	Section 2.9.1 moved to next page
Chapter 2, Page 2.9.1-1	New page numbering throughout section
Chapter 2, Page 2.9.1-1	Section 2.9.1 title revised (note this information was previously 2.9.1.1)
Chapter 2, Page 2.9.1-2	Section 2.9.1.1 title revised (note this information was previously 2.9.1)
Chapter 2, Page 2.9.1-2	1st equation, erroneous minus sign deleted
Chapter 2, Page 2.9.1-2	2nd paragraph, absolute sign added to DLF
Chapter 2, Page 2.9.1-3	2nd paragraph, 1st sentence, "as shown" replaced with "as described" (note this information was previously 2.9.1.2)
Chapter 2, Page 2.9.1-3	2nd paragraph, 8th sentence, E_x value changed from "11.5 x 10^6 psi" to "10.47 x 10^6 psi" with reference "[60]" instead of "[48]"
Chapter 2, Page 2.9.1-3	2nd and 3rd paragraphs, Figure and Table numbers revised to reflect new page numbering
Chapter 2, Page 2.9.1-3	Section 2.9.1.2 title revised (note this information was previously 2.9.2)
Chapter 2, Page 2.9.1-4	2nd and 3rd paragraphs, Figure and Table numbers revised to reflect new page numbering
Chapter 2, Pages 2.9.1-5 to 2.9.1-9	Figure and Table numbers revised to reflect new page numbering
Chapter 2, Page 2.9.2-1	New page numbering throughout section
Chapter 2, Page 2.9.2-1	Section 2.9.2 title revised
Chapter 2, Pages 2.9.2-1 to 2.9.2-12	All new information
Chapter 2, Page 2.11.1-1	1st paragraph, 2nd sentence, Table 1.2-5 revised to Table 1.2-4
Chapter 2, Page 2.11.1-1	2nd paragraph, 4th sentence, revised/added "CEA fingertips or neutron sources placed in the center guide tube positions"
Chapter 2, Page 2.11.1-1	2nd paragraph, 4th sentence, revised, "weighs less than the standard assembly with the control element assembly installed. Consequently, this configuration is also bounded by the weight of the design basis fuel assembly," to "weighs less than the design basis PWR fuel assembly"
Chapter 2, Page 2.11.1-1	3rd paragraph new
Chapter 2, Page 2.11.1-1	Added Section title and numbering 2.11.1.1.1
Chapter 2, Page 2.11.1-2	1st paragraph, revision bar is text flow

UMST-01C List of Changes

Page/Section	Change
Chapter 2, Page 2.11.1-3	Table, revision bar is text flow
Chapter 2, Page 2.11.1-4	Top two lines, 1st 1/2 of 2nd paragraph is text flow
Chapter 2, Page 2.11.1-4	1st paragraph, last sentence, added "(Table 2.11.1.1-4)"
Chapter 2, Page 2.11.1-4	Revised Section number to 2.11.1.1.2
Chapter 2, Pages 2.11.1-5 to 2.11.1-9	Revision bar is text flow
Chapter 2, Pages 2.11.1-14 to 2.11.1-16	All information under "Normal Conditions" is new
Chapter 2, Pages 2.11.1-16 to 2.11.1-22	Revision bar is text flow
Chapter 2, Pages 2.11.1-23 to 2.11.1-25	Tables 2.11.1.1-4 to 2.11.1.1-6 are new
Chapter 2, Pages 2.12-5 to 2.12-6	Added references 60 to 65
Chapter 3, Page 3.6-2	Revised No. 8 and added No. 9
Chapter 3, Page 3.6-2	1st paragraph, 2nd sentence, added "listed in the foregoing"
Chapter 3, Page 3.6-2	2nd paragraph, 3rd sentence, changed "fuel pins" to "fuel rods"
Chapter 3, Page 3.6-8	No. 9 information is new
Chapter 5, TOC	Updated
Chapter 5, Page 5-1	Bulleted list, added 1st bullet
Chapter 5, Page 5-1	Bulleted list, 2nd bullet, added "a vertical plane at the lateral," added "s" in "surfaces," and added "railcar"
Chapter 5, Page 5-1	Bulleted list, 3rd bullet, added "vertical"
Chapter 5, Page 5.1-4	2nd paragraph under Section 5.1.3, 1st sentence, added "intact fuel"
Chapter 5, Page 5.1-4	2nd paragraph under Section 5.1.3, added two sentences "Computed dose rates . . . evaluation," and, "Dose rates for . . . personnel barrier"
Chapter 5, Page 5.1-5	1st sentence under Section 5.1.3.1, added "for intact fuel"
Chapter 5, Page 5.1-5	2nd paragraph, 1st sentence under Section 5.1.3.1, added "intact fuel"
Chapter 5, Page 5.1-5	2nd paragraph under Section 5.1.3.1, added two sentences, "Axial shifting. . . forging)," and, "Dose rates. . . personnel barrier"
Chapter 5, Pages 5.1-7 to 5.1-8	Figure titles added "Intact Fuel"
Chapter 5, Pages 5.1-9 to 5.1-10	Tables 5.1-1 to 5.1-4, added "for Intact Fuel" and deleted "[mrem/hr]"
Chapter 5, Page 5.5.1-1	1st paragraph, 1st sentence, under Section 5.5.1.1 added "and other non-fuel material, including start-up neutron sources"
Chapter 5, Pages 5.5.1-12 to 5.5.1-16	All new information

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Page/Section	Change
Chapter 5, Pages 5.5.1-17 to 5.5.1-28	Revision bar is text flow
Chapter 5, Pages 5.5.1-29 to 5.5.1-35	Tables 5.5.1.1-19 to 5.5.1.1-27 are new
Chapter 5, Pages 5.5.1-36 to 5.5.1-42	Revision bar is text flow
Chapter 6, TOC	Updated
Chapter 6, Page 6.2-2	Table 6.2-1, 4th and 23rd, 24th, 25th lines modified under Clad Thick and Pellet Dia.
Chapter 6, Page 6.4-24	Table 6.4-1, 4th line, modified under Dry Gap - k_{eff}, Wet Gap - k_{eff}, and Δk_{eff} Wet-Dry
Chapter 6, Page 6.5-10	1st paragraph, 2nd sentence, changed, "Section 6.5.1 contains detail on the implementation," to "Section 6.5.4 presents the implementation"
Chapter 6, Page 6.5-10	4th paragraph, revised 2nd sentence completely
Chapter 6, Page 6.5-33	Tables 6.5-2 and 6.5-3, added "Scale 4.3" to title
Chapter 6, Page 6.5-34	Table 6.5-4, added "MONK8A" to title
Chapter 6, Page 6.6.1-1	1st paragraph, 1st sentence, revised, "describes fuel assembly characteristics and configurations, or waste configurations, which are unique," to "presents the criticality evaluation for the fuel assembly types or configurations that are unique"
Chapter 6, Page 6.6.1-1	1st paragraph after Section 6.6.1.1, 2nd sentence, added, "fuel assemblies with an inserted start-up source, or other non-fuel items or components . . . damaged fuel and fuel debris"
Chapter 6, Page 6.6.1-4	2nd paragraph, 3rd sentence starting with, "Flooding the annulus. . ." is new
Chapter 6, Page 6.6.1-5	Revision bar in 1st line is text flow
Chapter 6, Page 6.6.1-5	1st full paragraph, 9th sentence, Table number corrected from "6.6.1.1-8" to "6.6.1.1-6"
Chapter 6, Page 6.6.1-6	Revision bar in 1st line is text flow
Chapter 6, Page 6.6.1-6	Last paragraph, 1st sentence is new
Chapter 6, Page 6.6.1-7	1st three lines, revision bar is text flow
Chapter 6, Page 6.6.1-7	Section 6.6.1.1.8 title is revised
Chapter 6, Pages 6.6.1-7 to 6.6.1-9	All Section 6.6.1.1.8 information is new
Chapter 6, Pages 6.6.1-9 to 6.6.1-10	All Section 6.6.1.1.9 information is new
Chapter 6, Page 6.6.1-10	All Section 6.6.1.1.10 information is new
Chapter 6, Page 6.6.1-10	Section 6.6.1.1.11 title is new
Chapter 6, Page 6.6.1-10	Note all information in Section 6.6.1.1.11 used to be 6.6.1.1.8 (Conclusions), revision bar is text flow

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Chapter 6, Page 6.6.1-11	Revision bar is text flow
Chapter 6, Page 6.6.1-11	All information starting with, "The CEA fingertips and ICI segment. . ." is new
Chapter 6, Pages 6.6.1-12 to 6.6.1-13	Figures 6.6.1.1-1 and 6.6.1.1-2, revision bar is text flow
Chapter 6, Pages 6.6.1-14 to 6.6.1-19	Tables 6.6.1.1-1 to 6.6.1.1-8, revision bar is text flow
Chapter 6, Pages 6.6.1-20 to 6.6.1-23	Tables 6.6.1.1-9 to 6.6.1.1-12 are new
Chapter 7, Page 7.5-6	Items 52 and 53, "backing ring" revised to "spacer ring"

ATTACHMENT B

UMS® Universal Transport Cask Drawing Changes

UMS® UNIVERSAL TRANSPORT CASK DRAWING CHANGES

Drawing 790-506, Revision 2 — Impact Limiter Assy-Upper, Cask, NAC-UMS®
(NAC Proprietary Information)

- Modify limiter for a recess area to fit around the cask trunnions.
- Update Title Block and Borders.
- Add an additional sheet for details.

Provides design enhancement based on results of initial scale model side drop test. Change validated by successful March 2001 test. Administrative improvements.

Drawing 790-584, Revision 12 — Details, Canister, NAC-UMS®

- Add Delta Note 11 as follows: Tool marks and other marks are acceptable on all unspecified machined surfaces as long as required thickness/diameter of items are met.
- Revise BOM, Item 7 Name to read: Spacer Ring.
- Sheet 3, Zone C4, Revise name of Item 7 to read Spacer Ring.

Provides flexibility in fabrication; design, fit, form, and function requirements are maintained. Component name changed to eliminate conflict with ASME Code terminology.

Drawing 790-585, Revision 9 — Transportable Storage Canister (TSC), NAC-UMS®

- Revise Delta Note 6 to read: At the option of the user, stainless steel shims (ASME SA240/479, Type 304L) of appropriate thickness may be used in the welding of the structural lid (Item 19) to the shell weldment (Item 1 – 5) Also add Delta Note 6 callout at Zone F6, next to structural lid to shell weld callout.
- Revise Item 20 Name to Spacer Ring.

Provides improved weldability of structural lid to shell based on full-scale weld mock-up testing; no change in component or weld design. Component name changed to eliminate conflict with ASME Code terminology.

Drawing 790-591, Revision 3 — Bottom Weldment, Fuel Basket, 24 Element PWR, NAC-UMS®

- Add Delta Note 5 as follows: The 3X ∅ 1.3 holes may be replaced with holes of ∅2.0. Also add Delta Note callout in Zone E7, to 3X ∅ 1.3.

Provides flexibility in fabrication by permitting larger drain holes; improves canister/basket draining with no significant structural effects.

UMS® UNIVERSAL TRANSPORT CASK DRAWING CHANGES

Drawing 790-592, Revision 6 — Top Weldment, Fuel Basket, 24 Element PWR, NAC-UMS®

- Add Note 5 as follows: Tolerance for fuel tube openings, dimensions 5.39, 15.66, 16.16, and 25.81 is ± .04.
- Add Note 6 as follows: Minimum thickness of Item 2 may be reduced to .355 for a length of up to 31 inches measured along the outer circumference.

Provides flexibility in fabrication by increasing tolerance on fuel tube locations and outer ring thickness with no significant structural effects on the top weldment.

Drawing 790-595, Revision 6 — Fuel Basket Assembly, 24 Element PWR, NAC-UMS®

- Modify Delta Note 4 to read: Item 4 length to extend beyond Item 1 surface by .25 + .02, -.25
- Sheet 1, Zone C6, delete the fillet weld symbol.
- Sheet 2, Zone C4, delete TYP near .25 in detail C-C.

Clarifies proper drain tube installation; no change in design.

Drawing 790-611, Revision 4 — GTCC Waste Basket, Maine Yankee, NAC-UMS®

- Sheet 1, Zone E3, was: ∅48.3; is: ∅48.3 + .20/-.35

Provides flexibility in fabrication by increasing tolerance on upper weldment; no effect on fit, form, or function.

Drawing 790-612, Revision 4 — GTCC Canister, Maine Yankee, NAC-UMS®

- Add Delta Note 16 to read: At the option of the user, stainless steel shims (ASME SA240/479, Type 304L) may be used in the welding of the structural lid (Item 11) to the shell (Item 3). Also add Delta Note 16 callout at Zone E6, next to structural lid to shell weld callout.
- Revise Item 12 Name to: Spacer Ring.

Provides improved weldability of structural lid to shell based on full-scale weld mock-up testing; no change in component or weld design. Component name changed to eliminate conflict with ASME Code terminology.

NAC INTERNATIONAL

AFFIDAVIT

IN SUPPORT OF PROPRIETARY INFORMATION CONTAINED IN A DESIGN DRAWING SUBMITTED IN SUPPORT OF THE NAC INTERNATIONAL REQUEST FOR AN AMENDMENT OF THE NAC-UMS® UNIVERSAL TRANSPORT CASK CERTIFICATE OF COMPLIANCE (Pending)

State of Georgia, County of Gwinnett

Charles W. Pennington (Affiant), Senior Vice President of NAC International, hereinafter referred to as NAC, at 655 Engineering Drive, Norcross, Georgia 30092, being duly sworn, deposes and says that:

1. Affiant is personally familiar with the trade secrets and privileged information contained in the design drawing being submitted in support of the NAC International Request for an Amendment of the NAC-UMS® Universal Transport Cask Certificate of Compliance (Pending). Affiant requests that the Nuclear Regulatory Commission, pursuant to Chapter 10 of the Code of Federal Regulations, Part 2.790 (10 CFR 2.790) "Public Inspections, Exemptions, Request for Withholding," withhold the information contained within the drawing being submitted as part of the subject application, hereafter referred to as the Proprietary Material, from public disclosure.

2. This information has been and is held in confidence by NAC.

3. The information contained within the proprietary material is the result of design calculations including component design details and critical dimensions that were developed by NAC. This type of information is held in confidence based on the significant commercial investment of time and money expended in its development.

4. The Proprietary material being transmitted to the Nuclear Regulatory Commission in confidence is NAC Drawing 790-506, Revision 2.

5. The information that is being claimed as trade secret and privileged information has not been and is not available in public sources.

NAC INTERNATIONAL

AFFIDAVIT
(continued)

6. NAC has invested a considerable amount of time, engineering labor, and money in the development of this drawing and the design details. Public disclosure of this information would cause substantial harm to the competitive position of NAC. Others seeking to develop a similar design drawing would have to make similar investments to develop the information on their own, as long as the information is not disclosed to the public.

Charles W. Pennington
Senior Vice President
Engineering Services & Product Development
NAC International

Subscribed and sworn to before me this 1st day of June 2001.

Katherine M. DeLay

Notary Public in and for the
County of Forsyth
State of Georgia

My commission expires the 15th day of May, 2005

EA790-SAR-001

DOCKET NO. 71-9270

UMS®

UNIVERSAL MPC SYSTEM®

SAFETY ANALYSIS REPORT

for the

UMS® Universal Transport Cask

MAY 2001 UMST-01C

VOLUME 1 OF 2

NAC INTERNATIONAL

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34 drawings
Revised as shown in Chapter 1

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1.0 GENERAL INFORMATION

NAC International (NAC) has designed a canister-based system for the storage and transportation of spent nuclear fuel. The system is designated the Universal MPC System®. Its design is based on the dual-licensed, patented, and proven technology of the NAC Storable Transport Cask (NAC-STC, Docket No. 71-9235) and its basket and other licensed NAC cask designs. The transportation component of the UMS®, designated the Universal Transportation System, consists of a Universal Transport Cask loaded with a Transportable Storage Canister containing either spent fuel or Greater Than Class C (GTCC) waste. This Safety Analysis Report (SAR) demonstrates the ability of the Universal Transport Cask to satisfy the requirements of the U.S. Nuclear Regulatory Commission (NRC) for the transport of spent fuel as defined in the 10 CFR 71 [1]. In addition to these requirements, the cask also satisfies the requirements of IAEA Safety Series No. 6 [2] for the international transport of radioactive material.

The value of the transport index for nuclear criticality control for the cask containing Pressurized Water Reactor (PWR) or Boiling Water Reactor (BWR) spent fuel is determined to be zero (0) in accordance with 10 CFR 71.59. Therefore, an infinite number of packages with optimum internal and external moderation remain subcritical. The transport index based on dose rate evaluations at 1 meter from the external surface of the package is determined to be eighteen (18) in accordance with 10 CFR 71.4 (Transport Index).

This Safety Analysis Report is formatted in accordance with U.S. NRC Regulatory Guide 7.9 [3] and NUREG-1617 [6]. This chapter presents a general introduction to the Universal Transport Cask and a detailed description of its design features. The terminology used throughout this report is summarized in Table 1-1.

Table 1 -1 Terminology

Universal Transport Cask	The packaging, consisting of a Universal Transport Cask body with a closure lid and energy-absorbing impact limiters. The Universal Transport Cask is used to transport a Transportable Storage Canister containing spent fuel or GTCC waste. The cask body provides the primary containment boundary during transport.
Packaging	The assembly of components necessary to ensure compliance with the packaging requirements of 10 CFR 71. Within this report, the packaging is denoted as the Universal Transport Cask.
Package	The packaging with its radioactive contents (spent fuel or GTCC waste), as presented for exclusive transport use (10 CFR 71.4). Within this report, the package is denoted as the Universal Transport Cask, the transport cask, or, simply, the cask.
Contents	Twenty-four PWR fuel assemblies, fifty-six BWR fuel assemblies or Greater Than Class C (GTCC) waste. The fuel assemblies may be configured as site specific fuel. The fuel assemblies or waste is contained in a Transportable Storage Canister.
Standard fuel	Irradiated fuel assemblies having the same configuration as when originally fabricated consisting generally of the end fittings, fuel rods, guide tubes, and integral hardware. For BWR fuel, the channel is considered to be integral hardware. The design basis fuel characteristics and analysis are based on Zircaloy clad fuel rods in a standard fuel configuration.
Intact fuel assembly	Irradiated fuel that does not show evidence of greater than pinhole leaks or hairline cracks in the fuel rod cladding.
Intact fuel rod	A fuel rod without known or suspected cladding defects greater than a pinhole leak or a hairline crack.

Table 1[ ]-1 Terminology (continued)

Site specific fuel	Spent fuel configurations that are unique to a site or reactor due to the addition of other components or reconfiguration of the fuel assembly at the site. It includes fuel assemblies which hold nonfuel-bearing components, such as control components or instrument and plug thimbles, or which are reconfigured as required by expediency in reactor operations, research and development or testing. Reconfiguration may consist of individual fuel rod removal, fuel rod replacement of similar or dissimilar material or enrichment, or the installation, removal or replacement of burnable poison rods. Site specific fuel includes irradiated fuel assemblies designed with variable enrichments or axial blankets and fuel that is consolidated.
Consolidated fuel	A nonstandard fuel configuration in which the individual fuel rods from one or more fuel assemblies are placed in a single container or a lattice structure that is similar to a fuel assembly.
	[ ]
	[ ]
Greater than Class C waste	Activated and surface contaminated metal, usually stainless steel, whose disposal is controlled by 10 CFR 61 due to the presence of very long-lived isotopes, including ^{59}Ni, ^{94}Nb and ^{14}C.
Containment system	The components of the packaging that retain the radioactive material and gases during transport.

Table 1.1-1 Terminology (continued)

Cask cavity	The volume of space within the containment boundary.
Cask body	
- multiwall body	Consists of concentric layers of the inner shell, gamma shielding, outer shell, and neutron shielding material.
- neutron shield	Consists of a stainless steel outer shell, and end plates; copper stainless steel (Cu/SS) fins; and solid NS-4-FR neutron shielding material.
Cask lid	A 6.5 in.-thick steel disk used to close the Universal Transport Cask. The lid is attached to the top forging by 48 bolts.
Top forging	The component that forms the top of the Universal Transport Cask cavity and to which the cask lid is bolted.
Cask bottom	
- Bottom forging	The cup-shaped component that forms the bottom of the Universal Transport Cask cavity.
- Bottom plate	The plate welded to the outer shell to form the bottom of the cask. The bottom plate encloses the neutron shielding material in the bottom of the cask.
Drain port	Penetration through the bottom forging and the bottom ring that may be used to drain the cask cavity if necessary.
Vent port	Penetration used to access the cask cavity to backfill and leak-test the cask cavity prior to transport. The vent port is recessed in the cask lid.
Seal test port	The port used to test the containment seal. The test port is closed by a threaded plug fitted with an O-ring. The seal test port is recessed in the cask lid.
Port coverplates	The sealed covers that protect the quick disconnect located in the ports.

Table 1-1 Terminology (continued)

Quick disconnect	The valved nipple used to operate the ports.
Lifting trunnions	Four high-strength stainless steel components located at the top forging that are used in pairs for lifting and handling the Universal Transport Cask. The two primary lifting trunnions are welded to the top forging and the two secondary lifting trunnions are bolted to the top forging.
Rotation pocket	Two stainless steel blocks, each provided with a deep machined groove to accept the rear cask support. These pockets are welded onto the outer shell near the bottom of the cask.
NS-4-FR	A solid, synthetic polymer; a borated hydrogenous material with neutron absorption capabilities similar to those of borated water. Developed by BISCO Products, Inc. and previously supplied by Genden Engineering Services & Construction Company, NS-4-FR is now supplied by the Japan Atomic Power Company and its product licensees. Genden Engineering Services & Construction Company is a former subsidiary of Japan Atomic Power.
Transport impact limiters (upper and lower)	Impact limiters designed for use during transport of the Universal Transport Cask. They protect the cask by limiting impact loads during the 1-ft free drop (normal conditions of transport) and the 30-ft free drop (hypothetical accident conditions).
Transportable Storage Canister	The stainless steel cylindrical shell, bottom end plate, shield lid, and structural lid that contains the fuel or GTCC waste basket structure and the contents.
Shield lid	A 7 in.-thick stainless steel disk that is the inner component of a double-welded closure system for the Transportable Storage Canister. The shield lid provides a containment/confinement boundary (for storage only) and shielding for the contents.
Structural lid	A 3 in.-thick stainless steel disk that is the outer component of a double-welded closure system for the Transportable Storage Canister. Positioned on top of the shield lid and welded to the canister, the structural lid provides a confinement boundary (for storage) shielding for the contents, and canister lifting/handling capability.

Table 1-1 Terminology (continued)

Basket	The structure located within the Transportable Storage Canister that provides structural support, criticality control, and primary heat transfer paths for the fuel assemblies or GTCC waste.
- support disk	A circular steel plate with 24 (PWR basket) or 56 (BWR basket) square holes machined in a symmetrical pattern. The support disk is the primary lateral load-bearing component of the basket. Each square hole in the support disk is a location for a fuel tube. For GTCC waste, the support disk design is modified to accommodate the GTCC basket configuration.
- heat transfer disk	A circular aluminum plate with 24 (PWR basket) or 56 (BWR basket) square holes machined in a symmetrical pattern. The heat transfer disks are the primary heat transfer component in the PWR and BWR fuel baskets.
- fuel tube	A stainless steel tube with a square cross-section that encases BORAL neutron poison material on its exterior surfaces. One fuel tube is inserted through each square hole in the support disks and heat transfer disks of the PWR and BWR baskets. Fuel assemblies are loaded into the fuel tube.
- tie rod	Aligns, retains and supports the support disks and the heat transfer disks in the PWR and BWR fuel basket. The tie rods extend from the top weldment to the bottom weldment of the fuel basket.
-spacer	Installed on the tie rod between the support disks (BWR only) or between the support disks and upper and lower weldments (BWR and PWR) to properly position the disks and provide axial support for the support disks.
- split spacer	Installed on the tie rod between the support and heat transfer disks to properly position the disks and provide axial support for the support disks and heat transfer disks in the PWR and BWR baskets.

Table 1-1 Terminology (continued)

Canister spacer	Stainless steel or aluminum components that position the canister in the Universal Transport Cask cavity during transport. Spacers are used for canisters containing fuel of Classes 1, 2, 4, or 5.
Transfer cask	A shielded lifting device used for handling of the Transportable Storage Canister during loading of spent fuel or GTCC waste, canister closure operations, and transfer of the canister into or out of the Universal Transport Cask, or into or out of the vertical concrete cask during storage operations. The Transfer Cask is described in the Safety Analysis Report for the onsite storage (10 CFR 72) components of the UMS®, Docket No. 72-1015.
Vertical concrete cask	The cask used to store the Transportable Storage Canister containing spent fuel or GTCC waste. The Vertical Concrete Cask is described in the Safety Analysis Report for the on-site storage (10 CFR 72) components of the UMS®, Docket No. 72-1015.
Maine Yankee Fuel Can	A specially designed stainless steel screened can sized to hold an intact fuel assembly, consolidated fuel or damaged fuel. The can screens permit draining and drying, while precluding the release of gross particulates into the canister cavity. The Maine Yankee Fuel Can may only be loaded into a Class 1 Canister.
High Burnup Fuel	A Maine Yankee fuel assembly having a burnup between 45,000 and 50,000 MWD/MTU, which must be preferentially loaded in periphery positions in the basket. An intact high burnup fuel assembly in which no more than 1% of the fuel rods in the assembly have a peak cladding oxide thickness greater than 80 microns, and in which no more than 3% of the fuel rods in the assembly have a peak oxide layer thickness greater than 70 microns, as determined by measurement and statistical analysis, may be stored as intact fuel. High burnup fuel not meeting these criteria is classified as damaged fuel.

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Table 1.2-3 Basket Assembly Design Parameters

Basket Parameter	Value
Basket Assembly Length (in.)	
Class 1 (PWR)	162.8
Class 2 (PWR)	171.9
Class 3 (PWR)	179.5
Class 4 (BWR)	173.3
Class 5 (BWR)	178.1
Basket Assembly Diameter (in.)	65.5
No. of support disks	
Class 1 (PWR)	30
Class 2 (PWR)	32
Class 3 (PWR)	34
Class 4 (BWR)	40
Class 5 (BWR)	41
No. of heat transfer disks	
Class 1 (PWR)	29
Class 2 (PWR)	31
Class 3 (PWR)	33
Class 4 (BWR)	17
Class 5 (BWR)	17
No. of fuel tubes	
Classes 1 - 3 (PWR)	24 (BORAL on all four sides)
Classes 4 - 5 (BWR)	56 (42 with BORAL on two sides; 11 with BORAL on one side; and 3 with no BORAL)
No. of tie rods	
Classes 1 - 3 (PWR)	8
Classes 4 - 5 (BWR)	6

Table 1.2-4 PWR Fuel Assembly Characteristics

Canister Class[1]	Vendor[2]	Array	Max. Length (in)	Max. Width (in)	Max. Assembly Weight (lb)	Max. MTU	No of Fuel Rods	Max. Pitch (in)	Min. Rod Dia. (in)	Min. Clad Thick (in)	Max. Pellet Dia.(in)	Max. Active Length (in)	Min. Guide Tube Thick (in)
1	CE	14x14	157.3	8.11	1292	0.404	176	0.590	0.438	0.024	0.380	137.0	0.040
1	Ex/ANF	14x14	160.2	7.76	1271	0.369	179	0.556	0.424	0.030	0.351	142.0	0.034
1	WE	14x14	159.8	7.76	1177	0.362	179	0.556	0.400	0.024	0.345	144.0	0.034
1	WE	14x14	159.8	7.76	1302	0.415	179	0.556	0.422	0.022	0.368	145.2	0.034
1	WE, Ex/ANF	15x15	159.8	8.43	1472	0.465	204	0.563	0.422	0.024	0.366	144.0	0.015
1	Ex/ANF	17x17	159.8	8.43	1348	0.413	264	0.496	0.360	0.025	0.303	144.0	0.016
1	WE	17x17	159.8	8.43	1482	0.468	264	0.496	0.374	0.022	0.323	144.0	0.016
1	WE	17x17	160.1	8.43	1373	0.429	264	0.496	0.360	0.022	0.309	144.0	0.016
2	B&W	15x15	165.7	8.54	1515	0.481	208	0.568	0.430	0.026	0.369	144.0	0.016
2	B&W	17x17	165.8	8.54	1505	0.466	264	0.502	0.379	0.024	0.324	143.0	0.017
3	CE	16x16	178.3	8.10	1430	0.442	236	0.506	0.382	0.023	0.3255	150.0	0.035
1	Ex/ANF[3]	14x14	160.2	7.76	1215	0.375	179	0.556	0.417	0.030	0.351	144.0	0.036
1	CE[3]	15x15	147.5	8.20	1360	0.432	216	0.550	0.418	0.026	0.358	132.0	----
1	Ex/ANF[3]	15x15	148.9	8.25	1339	0.431	216	0.550	0.417	0.030	0.358	131.8	----
1	CE[3]	16x16	158.2	8.10	1300	0.403	236	0.506	0.382	0.023	0.3255	136.7	0.035

1. Minimum and maximum initial enrichments are 1.9 wt % ^{235}U and 4.2 wt % ^{235}U, respectively. All fuel rods are Zircaloy clad.
2. Vendor ID indicates the source of assembly base parameters. Loading of assemblies meeting dimensional limits is not restricted to the vendor(s) listed.
3. 14x14, 15x15 and 16x16 fuel manufactured for Prairie Island, Palisades and St. Lucie 2 cores, respectively. These are not generic fuel assemblies provided to multiple reactors.

1.3.1 Site Specific Contents

This section describes fuel assembly characteristics and configurations, or waste configurations, which are unique to specific reactor sites. These site specific content configurations result from conditions that occurred during reactor operations, participation in research and development programs, testing programs intended to improve reactor operations, from decommissioning activities, and from the placement of control components or other items within the fuel assembly.

Site specific fuel assembly configurations are either shown to be bounded by the analysis of the standard design basis fuel assembly configuration of the same type (PWR or BWR), or are shown to be acceptable contents by specific evaluation of the configuration.

Site specific Greater Than Class C (GTCC) waste configurations are shown to be acceptable by specific evaluation.

In general, the evaluations of site specific contents are presented in the Appendix section of the appropriate SAR Chapter. This enables the site specific fuel assembly configuration evaluations, which encompasses a wide range of configurations, to be separated from the evaluations performed for the standard fuel assembly configurations.

1.3.1.1 Maine Yankee Site Specific Contents

This section describes Transportable Storage Canister spent fuel contents which differ from the standard design basis 14x14 fuel assembly by virtue of reconfiguration of individual fuel assemblies during the course of reactor operations. It also describes the GTCC waste placed in the GTCC waste canister and basket, Drawings 790-612 and 790-611, respectively. The design basis fuel assembly (Westinghouse 17x17 as described in Section 1.2.3 and Table 1.2-4) bounds most of the Maine Yankee site specific fuel configurations. However, as appropriate to the configuration, additional analysis is provided in the Appendix to the appropriate Chapter.

1.3.1.1.1 Maine Yankee Site Specific Spent Fuel Configurations

The standard Maine Yankee reactor fuel assembly is the Combustion Engineering (CE) 14x14. The principal characteristics of this fuel are shown in Table 1.2-4. Fuel of the same design has also been supplied by Westinghouse and by Exxon. The evaluation of this standard fuel is

bounded by the evaluation of the Westinghouse 17x17 spent fuel assembly, which is the design basis PWR fuel assembly for the NAC-UMS® Universal Transport Cask.

In the course of reactor operations, certain of the 14x14 fuel assemblies were modified to change the standard configuration. The principal modifications are of three general types:

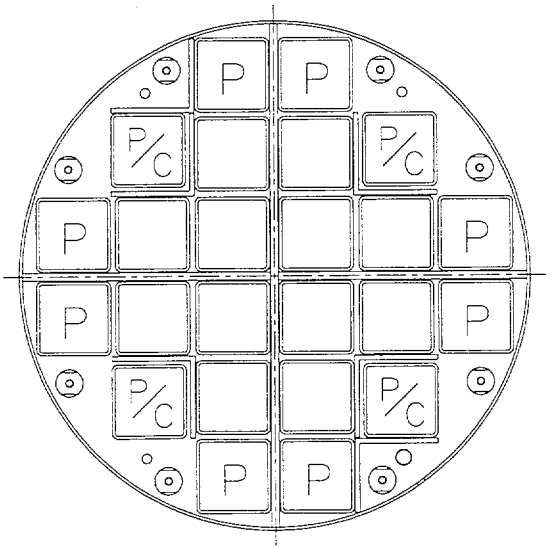
- The removal of fuel rods without replacement;
- The replacement of removed fuel rods or burnable poison rods with rods of another material, such as stainless steel, or with fuel rods of a different enrichment; and,
- The insertion of control elements, or instrument or plug thimbles, in guide tube positions.

In addition to the modified fuel assemblies, there are fuel assemblies that were designed with variable enrichment and axial blankets. These fuel assemblies are not modified, but differ from the cask design basis fuel assemblies.

As part of a research and development program, Maine Yankee removed the fuel rods from several fuel assemblies and installed those fuel rods in two lattice structures that are similar to a 17x17 fuel assembly. This fuel is referred to as consolidated fuel. The lattice structures are constructed of stainless steel 17x17 grids that are equally spaced on 4 stainless steel support rods. Stainless steel end plates are attached to the ends of the support rods to hold the spent fuel rods within the grids. The upper end plate conforms to the fuel assembly upper end fitting design so that the consolidated fuel rod holder can be lifted with the fuel assembly grapple. One consolidated fuel lattice has 283 fuel rods with 2 empty fuel rod positions. The second lattice has 172 fuel rods with the remaining fuel rod positions either unused or holding stainless steel dummy rods.

A fuel assembly with removed fuel rods, poison rods or a consolidated fuel lattice shall be loaded in one of the four corner positions of the PWR fuel basket. Additionally, only one consolidated fuel lattice may be loaded in any single basket. These corner positions, designated "P/C" in the following figure, are separated from the other fuel positions by slightly larger flux traps, which results in these positions having less reactive interaction with the remaining fuel positions. The corner positions are also peripheral positions designated by the letter "P."

Preferential Loading Diagram for Maine Yankee Site Specific Spent Fuel



The canister loading procedures will indicate that the loading of a fuel assembly with removed fuel or poison rods, or a consolidated fuel lattice, is administratively controlled to ensure the correct loading in one of the corner positions and that only one consolidated fuel lattice is loaded in any single canister.

The configurations of the Maine Yankee site specific fuel assemblies that have been evaluated and found to be acceptable contents include:

- Fuel assemblies with up to 176 fuel rods removed from the assembly lattice.
- Fuel assemblies with fuel rods replaced with either stainless steel rods, solid Zircaloy rods or fuel rods enriched to 1.95 wt %.
- Fuel assemblies with burnable poison rods replaced with hollow Zircaloy tubes.
- Fuel assemblies that are variably enriched.
- Fuel assemblies with annular axial blankets.
- Fuel assemblies with a control element inserted.
- Fuel assemblies with an instrument thimble inserted in the center guide tube.
- Fuel assemblies with up to two fuel rods inserted in any or all of the guide tubes.
- Consolidated fuel lattices.
- High burnup fuel assemblies.
- Fuel assemblies with start-up sources and other non-fuel items inserted in guide tubes.
- Damaged fuel.

A fuel assembly, with a Control Element Assembly (CEA), CEA flow plug, or thimble plug inserted, will be loaded in a Class 2 canister and basket for storage and transport due to the increased length of the assembly with the control element installed; however, such an assembly is not restricted to any specific location within the basket.

A fuel assembly having fuel rods replaced by solid stainless steel or Zircaloy rods may be loaded in any location in the basket.

Intact fuel assemblies may have non-fuel items inserted in the guide tubes. The non-fuel items are irradiated and unirradiated start-up sources, CEA fingertips and a segment of an in-core instrument (ICI) thimble. Start-up sources are inserted in a center guide tube position. The remaining items must be installed in corner guide tube positions. These guide tubes are closed on the bottom end by the assembly end plate and are closed on the top end by a CEA flow plug. Only one start-up source may be loaded in any fuel assembly; however, a fuel assembly with a start-up source may also hold all of the remaining non-fuel items. Any fuel assembly with a start-up source must be loaded in one of the corner fuel positions of the basket.

The structural evaluation of the Maine Yankee site specific fuel configurations is provided in Section 2.11.1. The thermal, containment, shielding and criticality evaluations are provided in Sections 3.6.1, 4.5.1.1, 5.5.1.1 and 6.6.1.1, respectively. As shown in those evaluations, the design basis spent fuel assembly analyses generally bound the loading of the Maine Yankee spent fuel. Where the design basis analysis is not bounding, preferential loading, as previously discussed, is required. The preferential loading procedure is described in Sections 7.5.1 and 7.5.2.

Table 1.3.1-1 shows the currently known population of Maine Yankee fuel assemblies. This table also shows the proposed loading scheme for those fuel assemblies in the Transportable Storage Canister.

Table 1.3.1-1 Maine Yankee Spent Fuel Population

Spent Fuel Configuration	Number of Assemblies	Canister Loading Position	Canister Class
Standard	1,434	Any	1
Inserted Control Component	168	Any	2
Inserted Instrument Thimble	138	Any	1
Consolidated Fuel	2	P/C[1]	1
Fuel Rod Replaced by Rod Enriched to 1.95 wt %	3	Any	1
Fuel Rod Replaced by Stainless Steel Rod or Zircaloy Rod	18	Any	1
Fuel Rods Removed	10	P/C	1
Variable Enrichment	72	Any	1
Axial Blanket	68	Any	1
Burnable Poison Rod Replaced by Hollow Zircaloy Rod	80	P/C	1 or 2
Burnup between 45,000 and 50,000 MWD/MTU	90	Any	1
Maine Yankee Fuel Can	As Required	P/C	1
Inserted Start-up Source	5	P/C	1
Inserted CEA Fingertips or ICI String Segment	1	Any	2

1. Only one consolidated fuel lattice may be loaded in any Transportable Storage Canister.

1.3.1.1.2 Maine Yankee Greater Than Class C Waste

The disposal of Greater Than Class C (GTCC) waste is controlled by 10 CFR 61 [7]. GTCC is defined in 10 CFR 61.55(a)(3) and (4) by the concentration of long-lived radionuclides, i.e., ^{14}C, ^{59}Ni, and ^{94}Nb, and/or short-lived radionuclides, i.e., ^{3}H, ^{60}Co, and ^{63}Ni.

GTCC waste consists of radiation activated and surface contaminated steel. Stainless steel core baffle structure, which is located adjacent to the reactor vessel in a high neutron flux field, is the major component of GTCC waste. The core baffle structure is cut underwater into pieces that are loaded into a GTCC basket. The GTCC basket is installed in a GTCC canister that has the same external dimensions as a Class 1 fuel canister.

The principle isotopic constituents of typical GTCC waste are presented in Table 1.3.1-2. The radionuclide composition of the waste was determined based on radiochemical assay of samples and dose rate measurements of the waste containers. The isotopes that primarily contribute to the radiological source term are ^{54}Mn, ^{55}Fe, ^{60}Co, and ^{63}Ni. The source terms applied in the evaluation of the GTCC waste are presented in Table 5.5.1.2-1. There is no combustible gas generation from the GTCC waste and there are no chemical or galvanic corrosion reactions with the stainless steel canister.

The design of the GTCC canister and basket is shown in Drawings 790-612 and 790-611, respectively. This basket is designed to fit the Class 1 Transportable Storage Canister. The structural evaluation of the basket for Maine Yankee waste is shown in Section 2.11.2. The thermal evaluation is shown in Section 3.6.1. The containment and shielding evaluations are shown in Sections 4.5.1.1 and 5.5.1.2, respectively. Since the GTCC waste does not contain any significant fissionable material, no criticality analysis is required.

The calculated weight of the loaded and sealed GTCC waste canister is:

	Pounds
GTCC waste canister (with both lids):	18,140
Weight of GTCC basket:	32,320
Weight of GTCC waste	20,000
Total	70,460

This weight is less than the weight of the Class 1 Transportable Storage Canister containing spent fuel.

The GTCC waste canister is essentially identical to the UMS® Class 1 Transportable Storage Canister, except for the placement of lifting lugs and the placement of a keyway within the canister. Consequently, the interior and exterior dimensions and the materials of fabrication of the GTCC waste canister and lids are the same as those for the Class 1 canister. The GTCC basket is constructed of Type 304 stainless steel and consists primarily of a cylinder with a 3-inch thick wall closed at the bottom end with a 3-inch thick stainless steel plate. The cylinder is centered in the GTCC waste canister by 14 Type 304 stainless steel support plates along its length. The support plates are 1-inch thick and 65.3 inches in diameter. The interior diameter of the basket cavity is 48.8 inches and its interior length is 157 inches. A 3-inch thick stainless steel separator fixture divides the cylinder into two vertically stacked compartments, each 77 inches deep. The separator fixture restricts the diameter of the upper compartment to 47.8-inches.

Since the GTCC waste canister has the same external dimensions as the UMS® Class 1 Transportable Storage Canister, one 16.75-inch canister spacer is required during transport of the GTCC waste canister. Transport spacers are described in Section 1.2.1.2.9.

Table 1.3.1-2 Isotopic Constituents of the Design Basis GTCC Waste

Radionuclide	Curie Inventory (Ci)/Canister
^{3}H	3.00E+02
^{14}C	1.50E+02
^{54}Mn	3.50E+02
^{55}Fe	2.00E+05
^{58}Co	1.00E+01
^{60}Co	2.90E+05
^{59}Ni	8.20E+02
^{63}Ni	9.00E+04
^{94}Nb	1.00E+01
^{99}Tc	1.00E+01
Total	5.82E+05

1.3.4 License Drawings

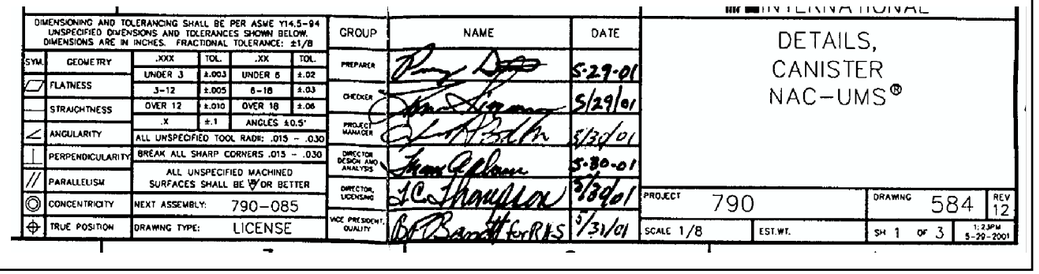
This section contains the License Drawings pertinent to the Universal Transport Cask. The dimensions indicated on the drawings are generally limited to one significant digit past the decimal point. Note that analysis of systems or components may present dimensions with additional significant digits based on more detailed engineering drawings.

Drawing No.	Rev. No.	Title
790-209	1	Impact Limiter Assembly-Upper, Cask, NAC-UMS®
790-210	1	Impact Limiter Assembly-Lower, Cask, NAC-UMS®
790-500	2	Assembly, Universal Transport Cask, Overpack, NAC-UMS®
790-501	3	Canister/Basket Assembly Table, NAC-UMS®
790-502	4	Cask Body, Transport Cask, NAC-UMS®
790-503	1	Lid Assembly, NAC-UMS® Cask
790-504	1	Port Coverplate Assembly, NAC-UMS®
790-505	1	Lifting Trunnion, NAC-UMS®
790-508	2	Misc. Details, Transport Cask, NAC-UMS®
790-509	2	Nameplates - NAC-UMS®
790-516	1	Package Assembly, Universal Transport Cask (UTC), NAC-UMS®
790-519	0	Package Assembly, Transport, Universal Transport Cask (UTC), NAC-UMS®
790-520	2	Spacers, Universal Transport Cask, NAC-UMS®
790-570	3	Fuel Basket Assembly, 56 Element BWR, NAC-UMS®
790-571	2	Bottom Weldment, Fuel Basket, 56 Element BWR, NAC-UMS®

Licensed Drawings (Continued)

Drawing No.	Rev. No.	Title
790-572	4	Top Weldment, Fuel Basket, 56 Element BWR, NAC-UMS®
790-573	7	Support Disk and Misc. Basket Details, 56 Element BWR, NAC-UMS®
790-574	3	Heat Transfer Disk Fuel Basket, 56 Element BWR, NAC-UMS®
790-575	4	BWR Fuel Tube, NAC-UMS®
790-581	5	PWR Fuel Tube, NAC-UMS®
790-582	7	Shell Weldment, Canister, NAC-UMS®
790-583	4	Assembly, Drain Tube, Canister, NAC-UMS®
790-584	12	Details, Canister, NAC-UMS®
790-585	9	Transportable Storage Canister (TSC), NAC-UMS®
790-591	3	Bottom Weldment, Fuel Basket, 24 Element PWR, NAC-UMS®
790-592	6	Top Weldment, Fuel Basket, 24 Element PWR, NAC-UMS®
790-593	4	Support Disk and Misc. Basket Details, 24 Element PWR, NAC-UMS®
790-594	2	Heat Transfer Disk, Fuel Basket, 24 Element PWR, NAC-UMS®
790-595	6	Fuel Basket Assembly, 24 Element PWR, NAC-UMS®
790-605	5	BWR Fuel Tube, Over-Sized Fuel, NAC-UMS®
790-611	4	GTCC Waste Basket, Maine Yankee, NAC-UMS®
790-612	4	GTCC Waste Canister, Maine Yankee, NAC-UMS®
412-501	2	Spent Fuel Can Assembly, Maine Yankee (MY), NAC-UMS®
412-502	2	Fuel Can Details, Maine Yankee (MY), NAC-UMS®

FIGURE WITHHELD UNDER 10 CFR 2.390



DIMENSIONING AND TOLERANCING SHALL BE PER ASME Y14.5-94 UNSPECIFIED DIMENSIONS AND TOLERANCES SHOWN BELOW. DIMENSIONS ARE IN INCHES. FRACTIONAL TOLERANCE: ±1/8					
SYM.	GEOMETRY	.XXX	TOL.	.XX	TOL.
	FLATNESS	UNDER 3	±.003	UNDER 6	±.02
		3-12	±.005	6-18	±.03
	STRAIGHTNESS	OVER 12	±.010	OVER 18	±.06
	ANGULARITY	.X	±.1	ANGLES ±0.5°	
	PERPENDICULARITY	ALL UNSPECIFIED TOOL RADII: .015 - .030			
	PARALLELISM	BREAK ALL SHARP CORNERS .015 - .030			
	CONCENTRICITY	ALL UNSPECIFIED MACHINED SURFACES SHALL BE ▽ OR BETTER			
	TRUE POSITION	NEXT ASSEMBLY: 790-085			
		DRAWING TYPE: LICENSE			

GROUP	NAME	DATE
PREPARER		5-29-01
CHECKER		5/29/01
PROJECT MANAGER		5/30/01
DIRECTOR DESIGN AND ANALYSIS		5-30-01
DIRECTOR, LICENSING		5/30/01
VICE PRESIDENT, QUALITY	for RHS	5/31/01

INTERNATIONAL

DETAILS,
CANISTER
NAC-UMS®

PROJECT	790	DRAWING	584	REV 12
SCALE 1/8	EST.WT.	SH 1 OF 3	1:23PM 5-29-2001	

FIGURE WITHHELD UNDER 10 CFR 2.390

NAC INTERNATIONAL

DETAILS,
CANISTER
NAC-UMS®

PROJECT	790	DRAWING	584	REV 12
SCALE 1/8	EST WT.	SH 2 OF 3	1:15PM 5-29-2001	

1

FIGURE WITHHELD UNDER 10 CFR 2.390

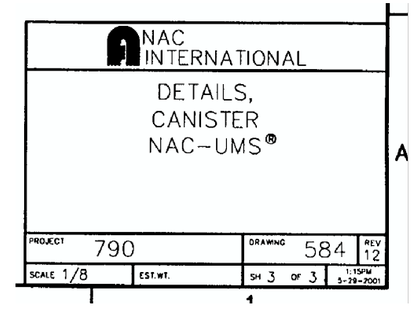
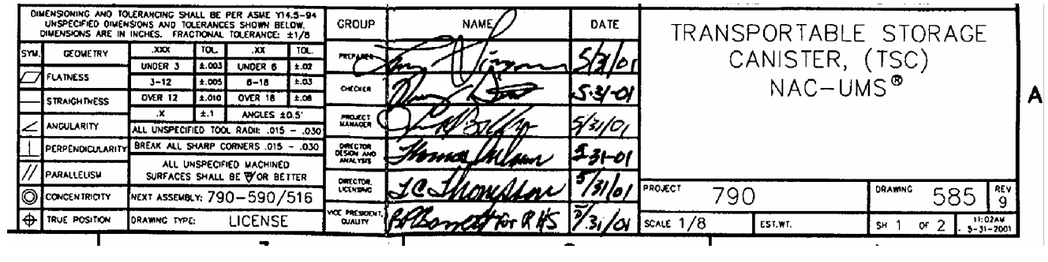


FIGURE WITHHELD UNDER 10 CFR 2.390



DIMENSIONING AND TOLERANCING SHALL BE PER ASME Y14.5-94 UNSPECIFIED DIMENSIONS AND TOLERANCES SHOWN BELOW. DIMENSIONS ARE IN INCHES. FRACTIONAL TOLERANCE: ±1/8					
SYM	GEOMETRY	.XXX	TOL.	.XX	TOL.
	FLATNESS	UNDER 3	±.003	UNDER 6	±.02
		3-12	±.005	6-18	±.03
	STRAIGHTNESS	OVER 12	±.010	OVER 18	±.08
	ANGULARITY	.X	±.1	ANGLES ±0.5°	
		ALL UNSPECIFIED TOOL RADII .015 - .030			
	PERPENDICULARITY	BREAK ALL SHARP CORNERS .015 - .030			
//	PARALLELISM	ALL UNSPECIFIED MACHINED SURFACES SHALL BE ▽ OR BETTER			
	CONCENTRICITY	NEXT ASSEMBLY: 790-590/516			
	TRUE POSITION	DRAWING TYPE: LICENSE			

GROUP	NAME	DATE
PREPARER		5/31/01
CHECKER		5-31-01
PROJECT MANAGER		5/31/01
DIRECTOR DESIGN AND ANALYSIS		5-31-01
DIRECTOR LICENSING		5/31/01
VICE PRESIDENT, QUALITY	for R.H.S	5/31/01

TRANSPORTABLE STORAGE CANISTER, (TSC)
NAC-UMS®

A

PROJECT	790	DRAWING	585	REV 9
SCALE 1/8	EST.WT.	SH 1 OF 2	11:02AM 5-31-2001	

FIGURE WITHHELD UNDER 10 CFR 2.390

NAC INTERNATIONAL

TRANSPORTABLE STORAGE CANISTER, (TSC)
NAC-UMS®

PROJECT 790		DRAWING 585	REV 9
SCALE 1/8	EST.WT.	SH 2 OF 2	4:54AM 5-25-2001

FIGURE WITHHELD UNDER 10 CFR 2.390

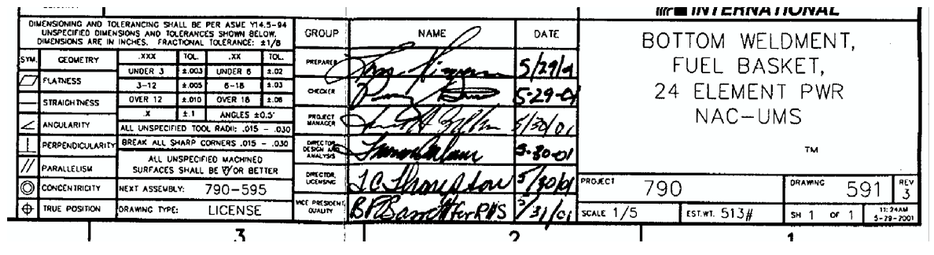


FIGURE WITHHELD UNDER 10 CFR 2.390

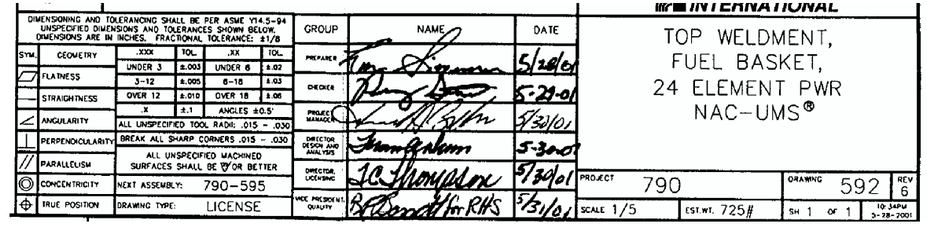
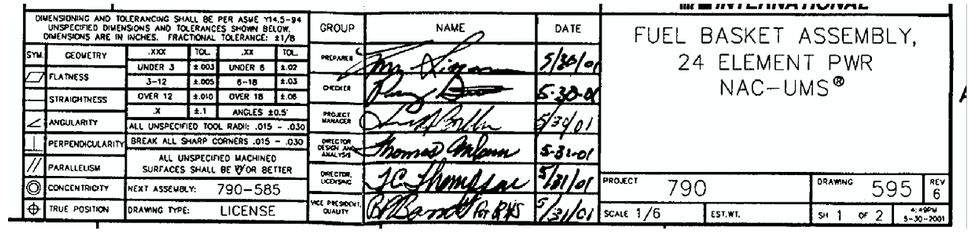


FIGURE WITHHELD UNDER 10 CFR 2.390



DIMENSIONING AND TOLERANCING SHALL BE PER ASME Y14.5-94 UNSPECIFIED DIMENSIONS AND TOLERANCES SHOWN BELOW. DIMENSIONS ARE IN INCHES. FRACTIONAL TOLERANCE: ±1/8					
SYM.	GEOMETRY	.XXX	TOL.	.XX	TOL.
	FLATNESS	UNDER 3	±.003	UNDER 6	±.07
	STRAIGHTNESS	3-12	±.005	6-18	±.03
	ANGULARITY	OVER 12	±.010	OVER 18	±.05
	PERPENDICULARITY	.X	±.1	ANGLES ±0.5°	
	PARALLELISM	ALL UNSPECIFIED TOOL RADII: .015 - .030			
	CONCENTRICITY	BREAK ALL SHARP CORNERS .015 - .030			
	TRUE POSITION	ALL UNSPECIFIED MACHINED SURFACES SHALL BE ▽ OR BETTER			
		NEXT ASSEMBLY: 790-585			
		DRAWING TYPE: LICENSE			

GROUP	NAME	DATE
PREPARER		5/30/01
CHECKER		5-30-01
PROJECT MANAGER		5/31/01
DIRECTOR DESIGN AND ANALYSIS		5-31-01
DIRECTOR, LICENSING		5/31/01
VICE PRESIDENT, QUALITY	for RHS	5/31/01

INTERNATIONAL

FUEL BASKET ASSEMBLY,
24 ELEMENT PWR
NAC-UMS®

PROJECT	790	DRAWING	595	REV 6
SCALE 1/6	EST. WT.	SH 1 OF 2	4:49PM 5-30-2001	

FIGURE WITHHELD UNDER 10 CFR 2.390

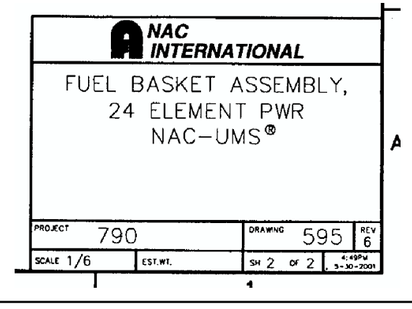


FIGURE WITHHELD UNDER 10 CFR 2.390

DIMENSIONING AND TOLERANCING SHALL BE PER ANSI Y14.5-82 UNSPECIFIED DIMENSIONS AND TOLERANCES SHOWN BELOW. DIMENSIONS ARE IN INCHES. FRACTIONAL TOLERANCE: ±1/8					
SYM.	GEOMETRY	.XXX	TOL.	.XX	TOL.
	FLATNESS	UNDER 3		UNDER 6	±.04
	STRAIGHTNESS	3-12		6-18	±.06
	ANGULARITY	OVER 12		OVER 18	±.09
	PERPENDICULARITY	.X	±.1	ANGLES ±.5°	
	PARALLELISM	ALL UNSPECIFIED TOOL RADII: .01 - .03			
	CONCENTRICITY	BREAK ALL SHARP CORNERS .01 - .03			
	TRUE POSITION	ALL UNSPECIFIED MACHINED SURFACES SHALL BE ▽ OR BETTER			
		NEXT ASSEMBLY: 790-612			
		DRAWING TYPE: LICENSE			

GROUP	NAME	DATE
PREPARER	[signature]	5-29-01
CHECKER	[signature]	5/29/01
PROJECT MANAGER	[signature]	5/30/01
DIRECTOR DESIGN AND ANALYSIS	[signature]	5-30-01
DIRECTOR, LICENSING	J.C. Thompson	5/31/01
VICE PRESIDENT, QUALITY	B.P. Barrett for G.H.S	5/31/01

INTERNATIONAL

GTCC WASTE BASKET,
MAINE YANKEE,
NAC-UMS®

PROJECT	790	DRAWING	611	REV 4
SCALE 1/10	EST.WT.	SH 1 OF 2	9:57AM 5-29-2001	

FIGURE WITHHELD UNDER 10 CFR 2.390

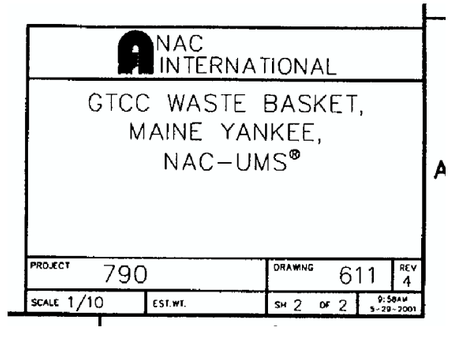
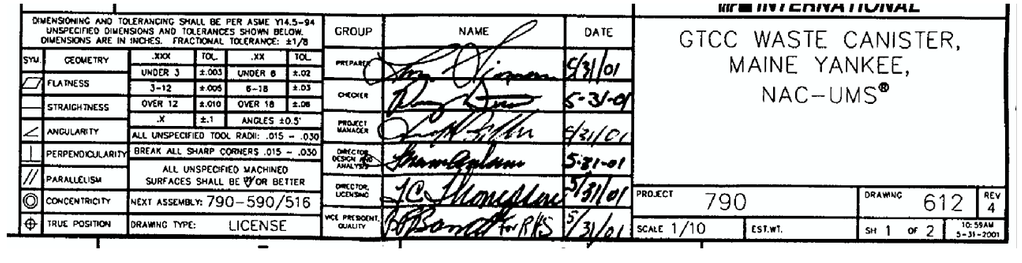


FIGURE WITHHELD UNDER 10 CFR 2.390



DIMENSIONING AND TOLERANCING SHALL BE PER ASME Y14.5-94
UNSPECIFIED DIMENSIONS AND TOLERANCES SHOWN BELOW.
DIMENSIONS ARE IN INCHES. FRACTIONAL TOLERANCE: ±1/8

SYM.	GEOMETRY
	FLATNESS
	STRAIGHTNESS
∠	ANGULARITY
⊥	PERPENDICULARITY
//	PARALLELISM
◎	CONCENTRICITY
⊕	TRUE POSITION

.XXX	TOL.	.XX	TOL.
UNDER 3	±.003	UNDER 6	±.02
3-12	±.005	6-18	±.03
OVER 12	±.010	OVER 18	±.08
.X	±.1	ANGLES ±0.5°	

ALL UNSPECIFIED TOOL RADII: .015 - .030
BREAK ALL SHARP CORNERS .015 - .030
ALL UNSPECIFIED MACHINED SURFACES SHALL BE ▽ OR BETTER
NEXT ASSEMBLY: 790-590/516
DRAWING TYPE: LICENSE

GROUP	NAME	DATE
PREPARED		5/31/01
CHECKER		5-31-01
PROJECT MANAGER		5/31/01
DIRECTOR, DESIGN & ANALYSIS		5-31-01
DIRECTOR, LICENSING		5/31/01
VICE PRESIDENT, QUALITY	for R.K.S.	5/31/01

INTERNATIONAL

GTCC WASTE CANISTER,
MAINE YANKEE,
NAC-UMS®

PROJECT	790	DRAWING	612	REV 4
SCALE 1/10	EST.WT.	SH 1 OF 2	10:59AM 5-31-2001	

FIGURE WITHHELD UNDER 10 CFR 2.390

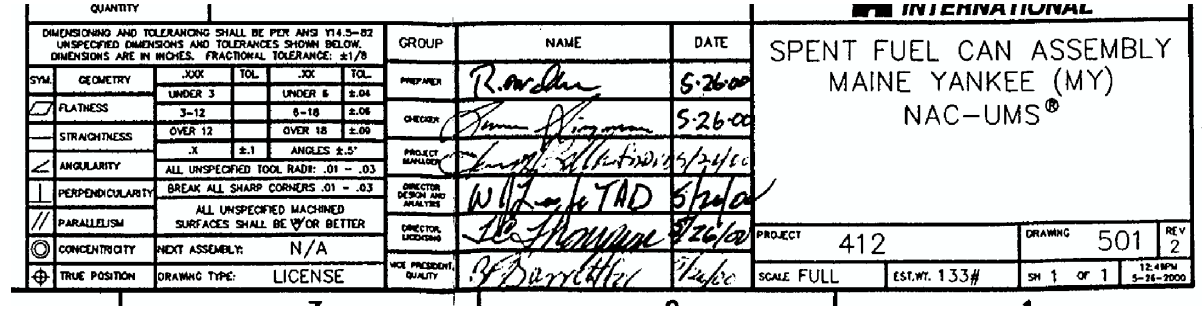
NAC INTERNATIONAL

GTCC WASTE CANISTER,
MAINE YANKEE,
NAC-UMS®

A

PROJECT 790		DRAWING 612	REV 4
SCALE 1/10	EST. WT.	SH 2 OF 2	2:58PM 5-29-2001

FIGURE WITHHELD UNDER 10 CFR 2.390



QUANTITY

DIMENSIONING AND TOLERANCING SHALL BE PER ANSI Y14.5-82
UNSPECIFIED DIMENSIONS AND TOLERANCES SHOWN BELOW.
DIMENSIONS ARE IN INCHES. FRACTIONAL TOLERANCE: ±1/8

SYM.	GEOMETRY	.XXX	TOL.	.XX	TOL.
	FLATNESS	UNDER 3		UNDER 6	±.04
		3-12		6-18	±.06
	STRAIGHTNESS	OVER 12		OVER 18	±.09
	ANGULARITY	.X	±.1	ANGLES ±.5°	
	PERPENDICULARITY	ALL UNSPECIFIED TOOL RADII: .01 - .03			
	PARALLELISM	BREAK ALL SHARP CORNERS .01 - .03			
	CONCENTRICITY	ALL UNSPECIFIED MACHINED SURFACES SHALL BE ∇ OR BETTER			
	TRUE POSITION	NEXT ASSEMBLY: N/A			
		DRAWING TYPE: LICENSE			

GROUP	NAME	DATE
PREPARER	R. Walker	5-26-00
CHECKER	Tom Higgins	5-26-00
PROJECT MANAGER	[illegible]	5/24/00
DIRECTOR DESIGN AND ANALYSIS	W. Lake TAD	5/26/00
DIRECTOR, LICENSING	[illegible]	5/26/00
VICE PRESIDENT, QUALITY	J. Barrettler	5/26/00

INTERNATIONAL

SPENT FUEL CAN ASSEMBLY
MAINE YANKEE (MY)
NAC-UMS®

PROJECT	412	DRAWING	501	REV 2
SCALE FULL	EST.WT. 133#	SH 1 OF 1	12:49PM 5-26-2000	

FIGURE WITHHELD UNDER 10 CFR 2.390

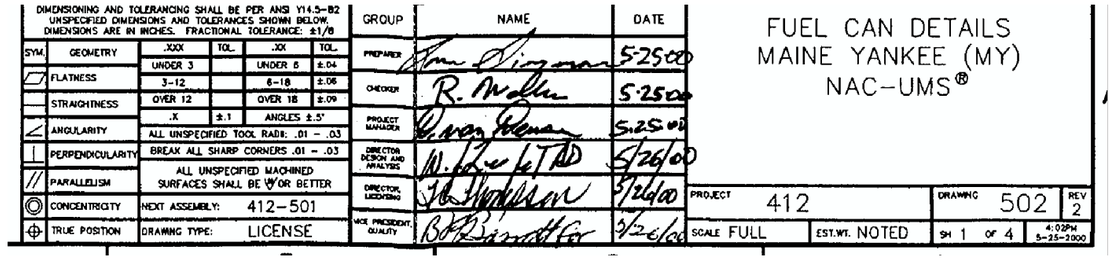


FIGURE WITHHELD UNDER 10 CFR 2.390

NAC INTERNATIONAL

FUEL CAN DETAILS
MAINE YANKEE (MY)
NAC-UMS®

PROJECT 412		DRAWING 502	REV 2
SCALE FULL	EST.WT. NOTED	SH 2 OF 4	4:08PM 5-25-2000

FIGURE WITHHELD UNDER 10 CFR 2.390

NAC INTERNATIONAL

FUEL CAN DETAILS
MAINE YANKEE (MY)
NAC-UMS®

PROJECT 412		DRAWING 502	REV 2
SCALE FULL	EST.WT. NOTED	SH 3 OF 4	4:07PM 5-25-2000

FIGURE WITHHELD UNDER 10 CFR 2.390

NAC INTERNATIONAL

FUEL CAN DETAILS
MAINE YANKEE (MY)
NAC–UMS®

PROJECT 412		DRAWING 502	REV 2
SCALE FULL	EST.WT. NOTED	SH 4 OF 4	4:08PM 5-25-2000