General Information

RSI-1: Provide the application in the proper electronic format as described on the NRC website for docketing (both the proprietary and non-proprietary versions).

The PDF requirements are listed in Section 2.9 of http://www.nrc.gov/site-help/e-submittals/guide-electronic-sub-r5.pdf. Reference Materials for Electronic Submissions can be found at http://www.nrc.gov/site-help/electronic-sub-ref-mat.html.

- It is recommended that the Applicants download the Adobe Distiller Profile (base on the version of their Acrobat Pro), and use it to convert documents into PDF. Also, Download Adobe Preflight Profile (base on the version of their Acrobat Pro), so you can verify whether your PDF(s) met NRC's requirements or not. Detailed instructions on how to download/install the Profile, and how to convert documents to PDFs are in the "Desk Reference Guide for PDF Generation" at http://adamswebsearch2.nrc.gov/idmws/doccontent.dll?library=PU_ADAMS^PBNTAD01&ID=062020192.

- In the finalizing phase, prior to submitting the documents to the NRC, the Applicants should follow the examples in "Simplified Checklist Document Submittal Checklist" to ensure their PDFs complied to NRC's requirements.

This information is required by the staff to verify the compliance with 10 CFR Part 2, Subpart J and Subpart C, Part 13, and Part 110

Response to General Information RSI-1

The reference material discussed in the RSI has been reviewed. Based on that review, the two associated Transnuclear, Inc. submittals (TN E-29032 of 2/24/10 and TN E-29369 of 4/30/10), and this submittal, have been processed into the proper electronic format, as follows:

- *The files are pdfs in version 9.3 of Adobe 9, with optical character recognition (OCR) applied, except for calculational input/output files, which must stay in the format of the computer application in which the NRC staff will use them.*
- *All file names are less than or equal to 49 characters.*
- *No files are larger than 50MB.*
- *There are no passwords or security settings.*

- *Transmittal letters, with explanatory information, are provided.*
- *The resolution of scanned pages is 300 ppi.*
- *Color is minimized but is sometimes needed for graphical clarity.*
- *The files do not contain oversized pages*
- *Hyperlinks (bookmarks) have been created in the larger documents.*
- *The files are believed to be free of viruses and free of macros.*
- *In the case of the safety analysis reports, which are living documents, the entire document is provided.*

Thermal

RSI-1: Validate the TRUMP thermal code using experimental data obtained for similar geometries as those requested, which include similar heat transfer characteristics. In lieu of the validation, the staff would accept for review a thermal evaluation based on a more commercially available code (ANSYS, SINDA/FLUINT, FLUENT, etc.).

The thermal evaluation under hypothetical accident conditions (HAC) of transport are based on the TRUMP thermal code. As stated in the application, TRUMP is a heat transfer calculation program which was developed by Lawrence Radiation Laboratory in 1968. The staff is not familiar with this code.

This information is required by the staff to verify compliance with IAEA Regulations TS-R-1, 2005 Edition.

Response to Thermal RSI-1

In order to confirm the adequacy (conservativeness) of the thermal analysis by TRUMP code in the event of HAC described in chapter II-B of safety analysis report, the analysis result is compared with the thermal test result using prototype container(full scale model) accommodating dummy fuel assembly (described in the chapter II-F of safety analysis report).

According to SAR, the maximum temperature of fuel rod in the thermal test is 115 degree C (shown in page II-F-43), on the other hand, the result in thermal analysis in chapter II-B is 440 degree C (shown in page II-B-21).

The reason why the result has such redundant conservativeness is modeling of deformation for both outer and inner surface of outer shell due to 9m horizontal (side)

drop. Although deformations of both inner and outer are partial, the residual wall (balsa-wood) thickness of the outer shell is only 23 mm (119.3 mm = thickness without deformation = ref. Table I-C-1 in page I-C-27) shown in Fig-II-B.2.

Proprietary Information Withheld
Pursuant to 10 CFR 2.390

Materials

RSI-MI Provide specific alloy designations (SA-, or UNS number.) or copies of the references for the material properties for tables II-A, Fig II-A.2,3, Table II-B.3 and tables in Sec III. Designations such as SS400 are insufficient)

The materials designations are either too broad ,such as SS400, or are Japanese designations (Sec Section III tables) . In order to verify the chemical and mechanical characteristics of these materials, the US designations (SA-, or UNS number.) or copies of the references for the material properties are needed.

This information is needed to determine compliance with TS-R-1 Section 646.

Response to Materials RSI-MI

The specific alloy designations corresponding to the Japanese standards are shown in Table 1.
The chemical components and mechanical properties for each material are shown in Table 2 and Table 3, respectively.
Inspection certificates and material test reports are also included.

Table 1 Correspondence Table for American / Japanese Standards

Material	Japanese Standard		American Standard			
	Designation	JIS No.	ASTM	ASME	AISI、SAE	UNS code
Carbon steel	SS400	G3101	A 36/A36M	SA-36/SA-36M	-	-
	SM490A	G3106	A 283/A283M Grade B	SA-283/SA-283M Grade B	-	-
	SPCC	G3141	A109/A109M Temper4,5, A1008/A1008M	SA-1008/SA-1008M	-	-
	S25C	G4051	-	-	1025	-
	STK400	G3444	A500/A500M Grade B, A501	-	-	-
Low-alloy steel	SCM435	G4053 (G4105)	-	-	4137	-
Stainless alloy	SUS304	G4304	A276 Type304	SA-276 Type304	-	S30400
Mild steel	SPHC	G3131	A1011/A1011M CS Type A,B, DS Type A,B	SA-1011/SA-1011M CS Type A,B, DS Type A,B	-	-

Table 2 Chemical components*

Designation	JIS No.	Chemical components							
		Carbon, max	Silicon, max	Manganese, max	Phosphorus, max	Sulfur, max	Nickel, max	Chromium, max	Molybdenum, max
SS400	G3101	-	-	-	0.050	0.050	-	-	-
SM490A	G3106	0.20	0.55	1.65	0.035	0.035	-	-	-
SPCC	G3141	0.15	-	0.60	0.100	0.050	-	-	-
S25C	G4051	0.22 ~ 0.28	0.15 ~ 0.35	0.30 ~ 0.60	0.030	0.035	-	-	-
STK400	G3444	0.25	-	-	0.040	0.040	-	-	-
SCM435	G4053 (G4105)	0.33 ~ 0.38	0.15 ~ 0.35	0.60 ~ 0.90	0.030	0.030	0.25	0.90 ~ 1.2	0.15 ~ 0.30
SUS304	G4304	0.08	1.00	2.00	0.045	0.030	8.00 ~ 10.50	18.00 ~ 20.00	-
SPHC	G3131	0.15	-	0.60	0.050	0.050	-	-	-

*JIS (Japanese Industrial Standard)

Table 3 Mechanical properties**

Designation	JIS No.	Sy			Su			E
		T= - 30 ~ 40	T=75	T=100	T= - 30 ~ 40	T=75	T=100	T=20
SS400	G3101	245	231	220	402	381	372	2.06
SCM435	G4053 (G4105)	784	711	685	931	847	847	2.06

T: Temperature (□)

S_y: Design yield stress (N/mm^2)

S_u: Design tensile stress (N/mm^2)

E: Young's modulus($\times 10^5$ N/mm^2)

** Technical standards on structures, etc. Related to nuclear facilities for power generation (Notification No. 501, 1980)

SS400

検査証明書
INSPECTION CERTIFICATE

NKK 日本鋼管株式会社 NKK CORPORATION

2. 3. 2

本社：〒100 東京都千代田区大手町1丁目1番2号
Head Office : 1-1-2, MARUNOUCHI, CHIYODA-KU, TOKYO 100 JAPAN

需要家 Purchaser	: MITSUBISHI HEAVY INDUSTRIES, LTD.-KOBE	証明書番号 Certificate No.	: A5-2732 -001 (M)
需要家管理番号 Purchaser's Order No.	: 2930478	日付 Date	: 1992-03-16
注文者 Trading Co.	: MITSUBISHI CORPORATION.	船番 Ship's No.	:
注文者照合番号 Reference No.	: ABA -180171N	工事番号 Construction No.	: 0A067182
品名 Commodity	HOT ROLLED STEEL PLATE	契約番号 Contract No.	: AD2M146
規格 Specification	: JIS G3101 SS400		

合格 藤巻管 合注

D4 DDA84000

製造番号 Roll No. / 鋼番 Heat No.	行番 Item No.	寸法 Size (MM) T X W X L	員数 Quantity	質量 Mass CAL	C (x100)	Si (x100)	Mn (x100)	P (x1000)	S (x1000)	Cu	Ni	Cr	Mo (x100)	V	Nb	T.Al	Ceq	Y.P N/MM2	T.S N/MM2	El %	YR %	MUSV	TEST NO.
		PURCHASER'S ORDER NO : 0A067182 05 SC																					
4 JK412-8 7813	001	6.00 X 1524 X 6096	1	438	12	21	66	13	2									340	450	28 A	G	G	13294B
		PURCHASER'S ORDER NO : 0A067182 05 SC																					
4 JK412-6 7813	001	6.00 X 1524 X 6096	1	438	12	21	66	13	2													G	13294B
		PURCHASER'S ORDER NO : 0A067182 05 SC																					
4 JK412-5 7813	001	6.00 X 1524 X 6096	1	438	12	21	66	13	2													G	13294B
		PURCHASER'S ORDER NO : 0A067182 05 SC																					
4 JK412-4 7813	001	6.00 X 1524 X 6096	1	438	12	21	66	13	2													G	13294B
		PURCHASER'S ORDER NO : 0A067182 05 SC																					
4 JK412-3 7813	001	6.00 X 1524 X 6096	1	438	12	21	66	13	2													G	13294B
		PURCHASER'S ORDER NO : 0A067182 05 SC																					
4 JK412-2 7813	001	6.00 X 1524 X 6096	1	438	12	21	66	13	2													G	13294B

(注1)
(Note1) Size of Impact Test Piece: Gauge Length A:GL=200MM(RECTAN.)
Position T:Top B:Bottom F:Flange W:Web Direction L:Longi. C:Trans. Z:Through-thick. RA:Reduction of Area.
Heat Treatment N:Normalizing Q:Quenching T:Tempering SR:Stress relieving CR:Controlled Rolling U·S·T:Ultrasonic Test.
S.P.T:Sulphur Print Test. V.&D.:Visual & Dimensions G:Good Y.P:降伏 Y.S:耐力 T.S:引張 El:伸び YR:降伏比

上記製品は検査の結果指定の規格に合格していることを証明いたします。

WE HEREBY CERTIFY THAT THE MATERIAL DESCRIBED HEREIN HAS BEEN TESTED AND INSPECTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE SPEGIFICATION.

D.NO. 2930478-0100. N.F.T.S.
MTG.No. L5-95(E004-105)-10基分 L5-95(E005-105)~10基分 (008)~10枚
L5-95(E011-105)-10基分 L5-95(E012-(01)(16) ~10基分

K. Hirata
MANAGER OF INSPECTION SEC.
FUKUYAMA WORKS

福山製鉄所検査室

福山製鉄所：〒721 広島県福山市鋼管町1番地 FUKUYAMA WORKS: 1, KOKAN-CHO, FUKUYAMA 721 JAPAN

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検査証明書
INSPECTION CERTIFICATE

NKK 日本鋼管株式会社 NKK CORPORATION

合格 検品者 今井

本社：〒100 東京都千代田区丸の内1丁目1番2号
Head Office：1-1-2, MARUNOUCHI, CHIYODA-KU, TOKYO 100 JAPAN

需要家 Purchaser	5113 : MITSUBISHI HEAVY INDUSTRIES, LTD.-KOBE
需要家管理番号 Purchaser's Order No.	: 2930478
注文者 Trading Co.	: MITSUBISHI CORPORATION.
注文者照合番号 Reference No.	: KBF -1B01730
品名 Commodity	HOT ROLLED STEEL SHEET
規格 Specification	: JIS G3101 SS400
証明書番号 Certificate No.	: D3-47-006-01/01
日付 Date	: 1992-04-07
船番 Ship's No.	:
工事番号 Construction No.	: 0A067182
契約番号 Contract No.	: DD3M004

管理コードCODE	製品番号 Roll No. / 鋼番 Heat No.	什番 Item No.	寸法 Size T X W X L(MM)	員数 LOT Quantity	質量 CAL Mass	化学成分 Chemical Composition % C (x100)	Si	Mn	P (x1000)	S	Cu	Ni	Cr	Mo (x100)	V	Nb	T.Al (sol.Al x1000)	Ceq (x100)	引張試験 Tensile test Y.P N/MM2	T.S N/MM2	El %	YR %	曲げ Bend	U.T	S.P.T	V.D.T	TEST NO.
			PURCHASER'S ORDER NO :0A067182207 SC																								
4	32601401 8250	001	4.50X 1524 X 6096	2 14	45921 6	6	8	11	4										291	444	39 D		G		G		3EW4 A 01
			TOTAL	2 14	4592KGS																						
	SPECIFIED VALUE																		(N/MM2)								
	STANDARD			LADLE	MIN				-	-									245	400	21						
					MAX				50	50									-	510	-						
			BEND TEST			R:1.50T																					

(注1)
(Note1) Size of Impact Test Piece: Gauge Length D: GL=50MM(RECTAN.)
Position. T:Top. B:Bottom. F:Flange. W:Web. Direction. L:Longi. C:Trans. Z:Through-thick. PA:Reduction of Area.
Heat Treatment. N:Normalizing. Q:Quenching. T:Tempering. SR:Stress relieving. CR:Controlled Rolling. U.S.T:Ultrasonic Test.
S.P.T:Sulphur Print Test. V.SD.:Visual & Dimensions: G:Good. Decarburized. Y.P:降伏. Y.S:降伏. T.S:引張強さ. El:伸び. YR:降伏比

上記製品は検査の結果指定の規格に合格していることを証明いたします。

WE HEREBY CERTIFY THAT THE MATERIAL DESCRIBED HEREIN HAS BEEN TESTED AND INSPECTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE SPECIFICATION.

O.No. 2930478-0100 N.F.T.S
LS-95CE008-(22),(29) LS-95CE005-(02),(04),(06),(16)
LS-95CE011-(06),(43) LS-95CE012-(02),(30) } ~10基分

K. Hirata
MANAGER OF INSPECTION SEC.
FUKUYAMA WORKS
福山製鉄所検査室

福山製鉄所：〒721 広島県福山市鋼管町1番地 FUKUYAMA WORKS: 1, KOKAN-CHO, FUKUYAMA 721 JAPAN

SCM435

Purchaser (需要者): 三菱重工業㈱神戸造船所

MATERIAL TEST REPORT
(材料試験成績書)

合格 購品管 今井

Oct, T 八角チ

Date (発行年月日): Sept. 3rd 1992
Report No. (成績書番号): 57B1

TAKENAKA SEISAKUSHO CO., LTD.
(株式会社 竹中製作所)
Head Office: 178 Hishio, Higashi-Osaka.
本社 東大阪市長瀬178番地

P. O. No. (客先注文番号): 293047B ØA387191-01 SC

Material Spec. (鋼種規格): JIS G4105(1979) SCM435

Heat No. (鋼番): 05510

Lot No. (ロット番号): —

Arr. No. (整理番号):

Steel Works (製鋼所)	Dimension (寸法)	Chemical Composition (化学成分) (%×100 Except P, S)													
	ジャッキスクリュー (M24x2)	Elements (成分)	C%	Si%	Mn%	P% (%×1000)	S% (%×1000)	Cu%	Ni%	Cr%	Mo%	V%	Ni+Cr%		
		Specification (規格)	33 -38	15 -35	60 -85	max 30	max 30	max 30	max 25	90 -120	15 -30	—	—		
AS	25 mm	Results (成績)	36	25	78	17	21	11	6	109	16	—	—		

Items (項目)	Test Temp. (試験温度)	Test Piece (試験片寸法)	Yield Point (降伏点) kgf/mm²	Tensile Strength (引張強さ) kgf/mm²	Elongation (伸び) %	Reduction of Area (絞り) %	Impact Test (衝撃試験) JIS Z2202 3号試験片 20°C U,2mm(10x10) kgfm/cm²			Hardness (硬さ) HB	Heat Treatment (熱処理) Normalizing (焼ならし)	Quenching (焼入) °C	Tempering (焼戻) °C	
Specification (規格)	°C	JIS Z2201 4号試験片 mm	min 80	min 95	min 15	min 50	min 8		Avg min —	269 -331	—	830 -880	530 -630	
Results (成績)	22	14x50	96	105	19	60	16	15	15	321	—	870	600	
												1.17Hr O.Q	2.12Hr W.C	

We hereby certify that the material described herein has been manufactured and tested satisfactorily in accordance with the requirements of the above specification.
(上記の通り検査の結果、指定の規格に合格していることを証明致します。)

Certified by 岡府 清
Inspection Section (検査部門)

Steel Works (製鋼所)
KSL: Kobe Steel, Ltd. (株式会社 神戸製鋼所)
NS: Nippon Steel Corporation (新日本製鐵株式会社)
SM: Sumitomo Metal Industries Ltd. (住友金属工業株式会社)
KSC: Kawasaki Steel Corporation. (川崎製鉄株式会社)
AS: Aichi Steel Works, Ltd. (愛知製鋼株式会社)
DS: Daido Steel Co., Ltd. (大同特殊鋼株式会社)
SS: Sanyo Special Co., Ltd. (山陽特殊製鋼株式会社)
TS: Toa Steel Co., Ltd. (トーア・スチール株式会社)

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SM490A

4. 4. 16

検査証明書
INSPECTION CERTIFICATE

NKK 日本鋼管株式会社 NKK CORPORATION

本社：〒100 東京都千代田区丸の内1丁目1番2号
Head Office : 1-1-2, MARUNOUCHI, CHIYODA-KU, TOKYO 100 JAPAN

需要家 Purchaser	: MITSUBISHI HEAVY INDUSTRIES, LTD.-KOBE
需要家管理番号 Purchaser's Order No.	: 2930478
注文者 Trading Co.,	: MITSUBISHI CORPORATION.
注文番照合番号 Reference No.	: ABA -IB0172N
品名 Commodity	HOT ROLLED STEEL PLATE
規格 Specification	: JIS G3106 SM490A
証明書番号 Certificate No.	: A5-3785 -001 (M)
日付 Date	: 1992-03-23
船番 Ship's No.	:
工事番号 Construction No.	: 0A067183
契約番号 Contract No.	: AD2M147

D4

DDA84000

受理コード Code	製品番号 Roll No. / 鋼番 Heat No.	行番 Item No.	寸法 Size (MM) T X W X L	員数 Quantity	質量 Mass CAL	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	T.Al	Ceq	引張試験 Tensile test Y.P N/MM2	T.S N/MM2	El %	YR %	MUSV	TEST NO.
						x100			x1000					x100			x1000	x100	KXXXXK2	KXXXK2				
			PURCHASER'S ORDER NO : 0A067183 01 SC																					
4	KA813-4 8022	001	6.00 X 3048 X 5000	1	7181	5	24	146	16	3									371	528	A 27		G	15443B
			PURCHASER'S ORDER NO : 0A067183 01 SC																					
4	KA813-3 8022	001	6.00 X 3048 X 5000	1	7181	5	24	146	16	3													G	15443B
			PURCHASER'S ORDER NO : 0A067183 01 SC																					
4	KA813-2 8022	001	6.00 X 3048 X 5000	1	7181	5	24	146	16	3													G	15443B
			TOTAL	3	2154KGS																			
	SPECIFIED VALUE																		(N/MM2)					
	STANDARD			LADLE	MIN	-	-	-	-	-									325	490	17			
					MAX	20	55	160	35	35									-	610	-			

(注1)
(Note1) Size of Impact Test Piece: Gauge Length A:GL=200MM(RECTAN.)
Position T:Top, B:Bottom, F:Flange, W:web, Direction L:Longi., C:Trans., Z:Through-thick, RA:Reduction of Area.
Heat Treatment N:Normalizing, Q:Quenching, T:Tempering, SR:Stress relieving, CR:Controlled Rolling, U.S.T:Ultrasonic Test,
S.P. T:Sulphur Print Test, V. &D. :Visual & Dimensions G:Good, *:Decarburized, Y. P:降伏, Y. S:降伏, T. S:引張, El:伸び, YR:降伏比

上記製品は検査の結果指定の規格に合格していることを証明いたします。

WE HEREBY CERTIFY THAT THE MATERIAL DESCRIBED HEREIN HAS BEEN TESTED AND INSPECTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE SPECIFICATION.

K. Hirata
MANAGER OF INSPECTION SEC.
FUKUYAMA WORKS

福山製鉄所検査室

L5-95CE031 サドルバー
01, 02

福山製鉄所：〒721 広島県福山市鋼管町1番地 FUKUYAMA WORKS: 1, KOKAN-CHO, FUKUYAMA 721 JAPAN

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Boron stainless steel (Skin)

ORDER No 製番 OA-A-02-4127 INVOICE No 出荷案内書番号 06-6004

CUSTOMER ORDER No 契約番号 29304780A027174-01SC

CUSTOMER 注文元 アサヒスティール（株）

DESTINATION 納入先 三菱重工業（株） 神戸造船所

仕様書番号 OAE-6822 Rev. 0

INSPECTION CERTIFICATE
検査証明書

NIPPON METAL INDUSTRY CO., LTD.
日本金属工業株式会社

WORKS 製造所 相模原製造所 TEL 0427(79)1813

DATE 発行日 1992. 6. 3

SPECIFICATION 規格

TYPE 種類	NTK304Bo	FINISH 仕上	#80-2	SIZE 寸法	4.5 X 980.0 X 4,280.0

No.	HEAT NO.	CHARGE NO.	QUANTITY 数量	MASS 質量 Kg	PLATE NO.
1	2294203	0S0076	1	146	233975

TEST DETAIL(試験項目)

CHEMICAL COMPOSITION 化学成分 (%)

No.	C	Si	Mn	P	S	Ni	Cr	B				
Max	0.030	1.00	2.00	0.045	0.030	13.00	20.00					
Min						9.00	18.00	1.00				
1L	0.013	0.61	1.76	0.019	0.001	9.45	18.53	1.11				
1C	0.012	0.61	1.75	0.019	0.002	9.48	18.58	1.13	ハラ			
1C	0.012	0.62	1.76	0.019	0.002	9.48	18.57	1.13	チュウオウ			

	寸法及び外観	Yield Strength 降伏力 0.2% kgf/mm2	Tensile Strength 引張強さ kgf/mm2	Elongation 伸び %	Hardness 硬さ HRB		比重
Max					99		
Min		25	55	14			7.75
1	リョウ	33	67	20	94	チョッカク	7.90
		37	69	20	94	ヘイコウ	

NOTE(記事)
固溶化熱処理・・・1140℃ X 5.5 分 水冷
T.P JIS Z 2201 13B号
プラント名・・・MFC-1型 新燃料輸送容器

H4. 6. 3
三菱重工 神戸 小栗洋光

合格 購品管 今井

Certificate No. (ミルシートNo.) 92060021503 A *

We hereby certify that the material herein described has been manufactured and tested in accordance with the standards and specification specified by the customer and satisfies those requirements. 上記の注文品は、御指定の規格又は仕様に従って製造され試験されたものであり、その要求事項を満足していることを証明します。

L. Monma
MANAGER OF Q.A.DEPARTMENT

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