WOLF CREEK
NUCLEAR OPERATING CORPORATION

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ET 01-0006

U. S. Nuclear Regulatory Commission
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References:
1. NRC Generic Letter 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," dated September 30, 1996
2. WCNOC Letter ET 97-0004, dated January 29, 1997, from R. Muench to USNRC
3. WCNOC Letter WM 98-0100, dated September 28, 1998, from O. Maynard to USNRC
4. WCNOC Letter WM 99-0042, dated June 29, 1999, from O. Maynard to USNRC
5. WCNOC Letter ET 00-0010, dated February 29, 2000, from R. Muench to USNRC

Subject: Docket No. 50-482: Second Supplemental Response to Generic Letter 96-06 (TAC No. M96887)

Gentlemen:

This letter provides the results of recently completed analyses that serve to clarify and correct information provided to the NRC concerning Wolf Creek's actions relative to Generic Letter 96-06 (Reference 1).

Reference 1 was issued identifying Nuclear Regulatory Commission (NRC) concerns with equipment operability and containment integrity during design basis accident conditions. It requested that all addressees submit information relative to these issues and required that all addressees submit written responses to the NRC relative to actions taken to address these issues.

Reference 2 provided Wolf Creek Nuclear Operating Corporation's (WCNOC's) required 120 day response to Reference 1 and provided analyses and actions related to: 1) waterhammer in the containment cooler water system; 2) flashing or two-phase flow in the containment cooler water system; and 3) potential overpressurization of isolated water filled sections of piping. In response to the NRC's Request for Additional Information (RAI) related to these issues, Wolf

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Creek provided Reference 3. Reference 4 notified the NRC that WCNOC had completed the analyses and modifications to address concerns identified in Reference 1.

Subsequent to issuing Reference 4, telephone conversations between WCNOC and NRC staff members from November, 1999 to February, 2000 resulted in the NRC requesting additional information. Reference 5 provided this requested supplemental information. Further telephone conversations with NRC staff on June 8, 2000 and August 2, 2000 revealed the NRC had additional questions regarding the information provided by Wolf Creek. As a result, WCNOC agreed to:

1. review the analyses previously performed concerning the waterhammer issue,
2. revise the analyses as necessary, and
3. provide the results of those analyses to the NRC.

WCNOC has reviewed the previous waterhammer analyses and has requested Altran to revise the analyses to address the questions asked by the NRC. Altran revised the analyses to improve the discussion of sonic velocity in the Wolf Creek Essential Service Water (ESW) System and to change the allowable American Society of Mechanical Engineers (ASME) stress limits from emergency condition limits to accident condition limits. Altran provided revised waterhammer analyses consisting of Technical Reports 96227-TR-01, Rev. 4 and 96227-TR-03, Rev. 1, including clarification of Table 4 (presented as Table 3 in 96227-TR-03, Rev. 1), describing the bases for the limiting waterhammer loading. Note that THERM ACCD (Thermal Accident Condition) loading is provided as a reference only and not as a stress requirement for pressure boundary components (see discussion under paragraph 2.3, "Acceptance Criteria", on page 11 of Technical Report 96227-TR-03). New tables, providing support stress margins for trains A and B respectively, are included in Attachment B as Table B-3.0 on page B-46 and Table B-5.0 on page B-173 of Technical Report 96227-TR-03. The revised waterhammer analyses, including test results, are enclosed.

During an August 2, 2000, phone conversation, the NRC staff requested three specific items to assist in the evaluation of the WCNOC response to Generic Letter 96-06. These items are:

1. The NRC requested a copy of a reference paper used as a basis for determining air release in the draining fluid. This paper was identified as: W Zielke and H-D Perko,"Gas Release in Transient Pipe Flow."

2. The NRC requested the calculated stresses given in Table 4 of Technical Report 96227-TR-03, Rev. 0, be identified as being based on the limiting waterhammer (condensation-induced or column closure waterhammer). The NRC also requested that a similar table showing the stress margins for supports be provided.

3. The NRC inquired about the uncertainty of test data relied on for the determination of several pressure pulse characteristics (such as rise time) provided in response to Reference 1. WCNOC explained that the most conservative data of several tests were used. WCNOC was asked to provide a copy of the test data.

In response to the above request , the following enclosures are provided:

1. W Zielke and H-D Perko, "Gas Release in Transient Pipe Flow" © BHRA Fluid Engineering Proceedings of the 6th International Conference on Pressure Surges, 1990, pages 3-14.

2. The revised waterhammer analysis, Technical Reports 96227-TR-01, Rev. 4, and 96227-TR-03, Rev. 1, including clarification of Table 4 describing the bases for the limiting waterhammer loading.

3. Test data as requested is provided as Appendix E to Technical Report 96227-TR-01, Rev. 4. A copy of the test data was previously provided to the NRC as Appendix E to Technical Report 96227-TR-01, Rev. 3.

During telephone conversations between WCNOC and the NRC on June 8, 2000 and August 2, 2000, WCNOC identified several errors in Reference 5. A paragraph in the cover letter for Reference 5 contained incorrect information. On page two of Reference 5, in the next to last paragraph of the letter, Wolf Creek incorrectly indicated that the WCNOC contractor, Altran, did not explicitly consider condensation-induced waterhammer in the analysis. Altran considered condensation-induced waterhammer in sections 5.4 and 5.5 on pages 21 through 26 of Altran technical report 96227-TR-01, Revision 3. This report was provided to the NRC as part of Reference 3.

Additionally, the previously mentioned paragraph incorrectly referenced a draft EPRI Technical Basis Report, TR-113594. The analyses did not rely on this draft EPRI report in the WCNOC waterhammer analysis. The attachment to the letter in Reference 5 also refers to the EPRI report. This is incorrect. No reference to the EPRI effort is needed in the justification of the analysis of waterhammer stresses for WCNOC pursuant to Generic Letter 96-06.

This submittal contains no additional regulatory commitments.

If you have any questions concerning this matter, please contact me at (316) 364-4034, or Mr. Tony Harris at (316) 364-4038.

Very truly yours,

RAMuench

Richard A. Muench

RAM/rlr

Attachment: I - Affidavit

Enclosures

cc: J. N. Donohew (NRC), w/a, w/e
W. D. Johnson (NRC), w/a
E. W. Merschoff (NRC), w/a
Senior Resident Inspector (NRC), w/a

STATE OF KANSAS)
) SS
COUNTY OF COFFEY)

Richard A. Muench, of lawful age, being first duly sworn upon oath says that he is Vice President Engineering and Information Services of Wolf Creek Nuclear Operating Corporation; that he has read the foregoing document and knows the contents thereof; that he has executed the same for and on behalf of said Corporation with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By RAMuench
Richard A. Muench
Vice President Engineering
and Information Services

SUBSCRIBED and sworn to before me this 12th day of Feb. , 2001.

Cindy Novinger
Notary Public

NOTARY PUBLIC STATE OF KANSAS CINDY NOVINGER My Appt. Exp. 7/8/2002

Expiration Date 7/8/2002

GENERIC LETTER 96-06

SUPPLEMENT PAPER - "GAS RELEASE IN TRANSIENT PIPE FLOW"

W. Zielke and H-D Perko

WOLF CREEK NUCLEAR OPERATING CORP.

Chapter 1

GAS RELEASE IN TRANSIENT PIPE FLOW

W Zielke and H-D Perko (University of Hannover, F R Germany),
A Keller (Technical University of Munich, F R Germany)

Summary

Gas release occurs in a pipe system with non-degassed fluid if the pressure drops to a value below the saturation pressure. Due to the formation of free gas, the wave propagation speed can decrease significantly and become pressure-dependent.

The results of experimental studies in which supersaturation was caused by a sudden system pressure drop in a water-conveying pipe are presented here. The number and size of the gas bubbles was determined using an optical device. The gas release due to the change of the speed of pressure wave propagation was determined acoustically. The tests show that the quantity of gas release is dominated by the behaviour of the wall nuclei. An "incubation time" ranging up to several seconds is followed by a nearly constant increase of the free gas content. Eventually a stable value is reached.

The results are quantified by means of an empirical equation which makes it possible to take into account the gas release when calculating pressure transients in pipes.

1 Introduction

If a liquid is subjected to a pressure drop and if the pressure falls below the dissolved gas saturation pressure, a continuous release of dissolved gases begins. This can occur under steady state conditions when a section of a pipe forms a siphon; for example, condensers of large cooling water systems contain vacuum pumps which continuously extract released air. Pipes, however, are also subjected to pressure transients. The most significant transients resulting in low pressures occur after pump stoppage. Here one can distinguish between two cases :

1. The pressure drops below the saturation pressure but stays above the vapour pressure. If this lasts long enough for gas release to occur, i. e. more than a few seconds, the resulting pressure variation will be strongly dependent on the amount of free gas. It is well known that even small amounts of free gas significantly decrease the pressure wave propagation speed. The wave speed is then pressure-dependent and, under certain conditions, makes the wave propagation non-linear and can even lead to shock waves in the liquid. Thus, while the resulting pressure may not be larger than that without air release, the dynamic load in the structure can be more severe.
2. The pressure drops below the vapour pressure. This is frequently a critical design case for pipe systems due to the high pressures which can occur during recondensation of

Pressure Surges—Proceedings of the 6th International Conference, pp. 3-14

concentrated vapour pockets (column separation). The subsequent pressure rise can be significantly less with gas release than without. This is especially true if the vapour pressure extends over a significant portion of the pipe (distributed cavitation) and if it lasts for more than several seconds.

The literature contains only limited experimental data on gas release in turbulent pipe flow and its dependency on physical parameters such as flow velocity, gas saturation level, nuclei size and distribution, turbulence level, etc. The subject of this paper is the dynamics of gas desorption in turbulent water flow in pipes under various conditions of supersaturation and flow velocity.

Gas supersaturation was achieved by a sudden pressure drop in the pipe system. The concentration of the free gas was measured using two techniques: with an optical system which registered directly the size and number of the developing bubbles, and with an acoustic method whereby the free gas content was determined by measuring the change in the propagation speed of pressure pulses.

2 The test loop

Experiments were carried out at the Hydraulic Laboratory of the Technical University of Munich. For the optical technique these tests were performed in a 32 m long, 125 mm diameter horizontal pipe, and in a 46 m long section for the acoustical method. The pipe was bent into a rectangular circuit, thus bypassing the closed-off test section of a cavitation tunnel. The cavitation tunnel served as a propulsion system and also as a $12m^3$ reservoir for the test water (Fig. 1).

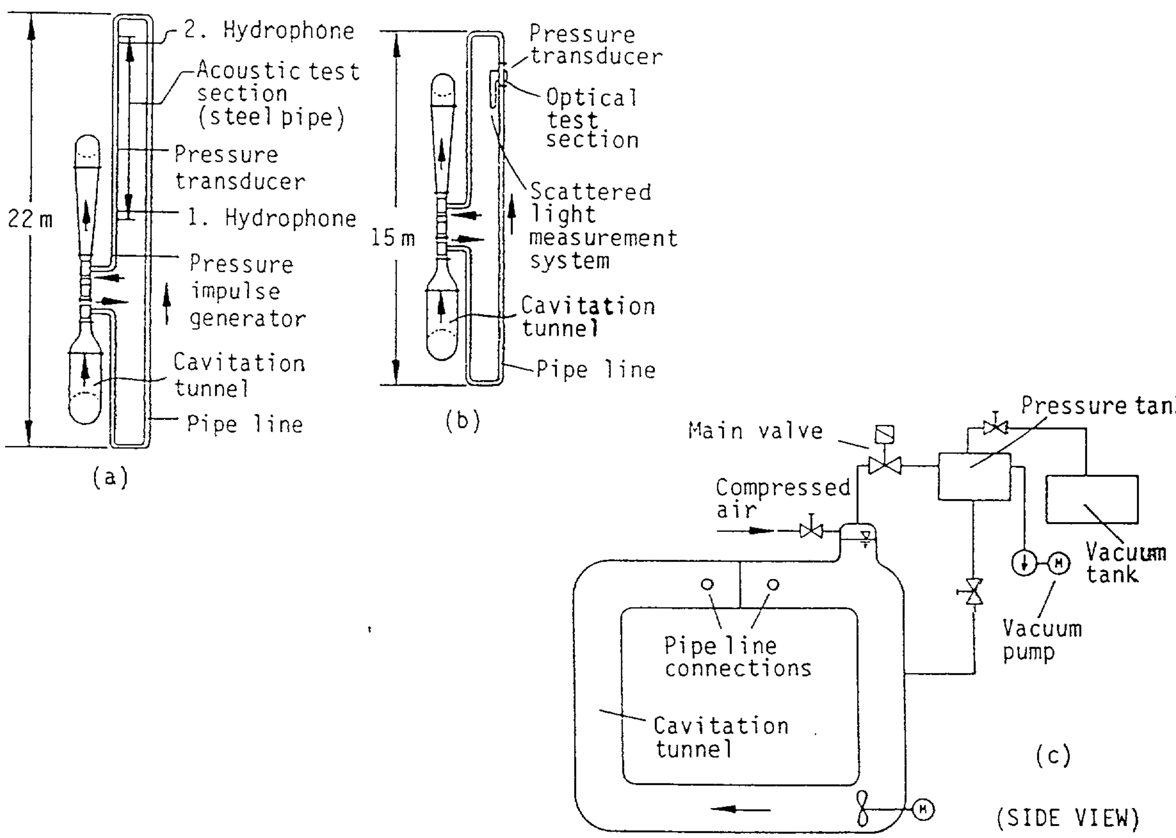

Fig. 1: Schematic of the test loop
(a) view of the loop with the acoustical measuring technique
(b) view of the loop with the optical measuring technique
(c) side view of the cavitation tunnel

In the pipe section, flow velocities of up to $4.5 m/s$ in the short circuit and $3.3 m/s$ in the long circuit could be generated. The flow in the pipe was fully turbulent even at low velocities (i.e. at V=0.6 m/s, Re= 75000). The water flow rate was measured by a Prandtl-tube.
The achievable system pressures ranged from 2.0 bar to 0.1 bar (absolute); the pipe pressure was monitored by a piezoresistive pressure transducer, positioned in the wall of the test section. The total gas content of the water was measured by a van Slyke apparatus.

3 The depressurization system

The gas release in the loop was caused by a sudden drop of the system pressure resulting from the opening of a valve between the tunnel and a vacuum tank. The initial pressure in the tank was controlled in order to reach the desired pressure level for the respective test. The absolute pressure in the loop was set before the test at values up to 200 kPa. The possible pressure drop was to a value of 10 kPa and was reached in less than 1 s. The small air vessel of the cavitation tunnel was supplemented by an air vessel of $2.1 m^3$(see Fig. 1) in order to maintain the low pressure during the tests.

4 The optical method for measuring the free gas content

The optical method for measuring the free gas content subsequent to gas release was based on a scattered light counting technique. This was originally developed at the Hydraulic Laboratory of the Technical University of Munich for the measurement of so-called cavitation nuclei (Keller, 1970). The method is based on the scattering behaviour of gas bubbles passing through a laser beam. The intensity of the scattered light is directly related to the size of the bubbles. The scattered light is transmitted by a system of lenses to a photomultiplier, whose output signal is proportional to the light intensity. The signals are counted and sorted according to their magnitude and time of occurrence, thus providing quasi-unsteady bubble size distributions.

Fig. 2 shows bubble size distributions in the form of histograms before and after a sudden pressure drop. The height of one column is proportional to the number of measured bubbles in one bubble diameter class per unit of liquid volume. The parameter ε represents the total volumetric free gas content. The parameter N gives the total number of bubbles per unit volume. The range of the measured nuclei diameter in this case is 16 to 114 μm.

The first histogram of Fig. 2 (upper left) shows the bubble size distribution just before a sudden pressure drop from 3200 kPa to 12 kPa, the other 5 histograms show the dynamics of gas release within the first 5 seconds. This example is for high gas content ($42.1 g/m^3$) and flow velocity (4.1 m/s).

Fig. 3 displays a typical diagram for the number of bubbles per unit volume as a function of time following the pressure drop, and
Fig. 4 gives typical time variations of the volumetric free gas content following a pressure drop. The parameters are:

v = flow velocity (m/s)
cl= density of dissolved gas (g/m^3)
p = system pressure after pressure drop (bar)
D = upper limit of the measured bubble diameter (μm)

Behaviour of the gas release is apparent in both types of plots and will be discussed further below.

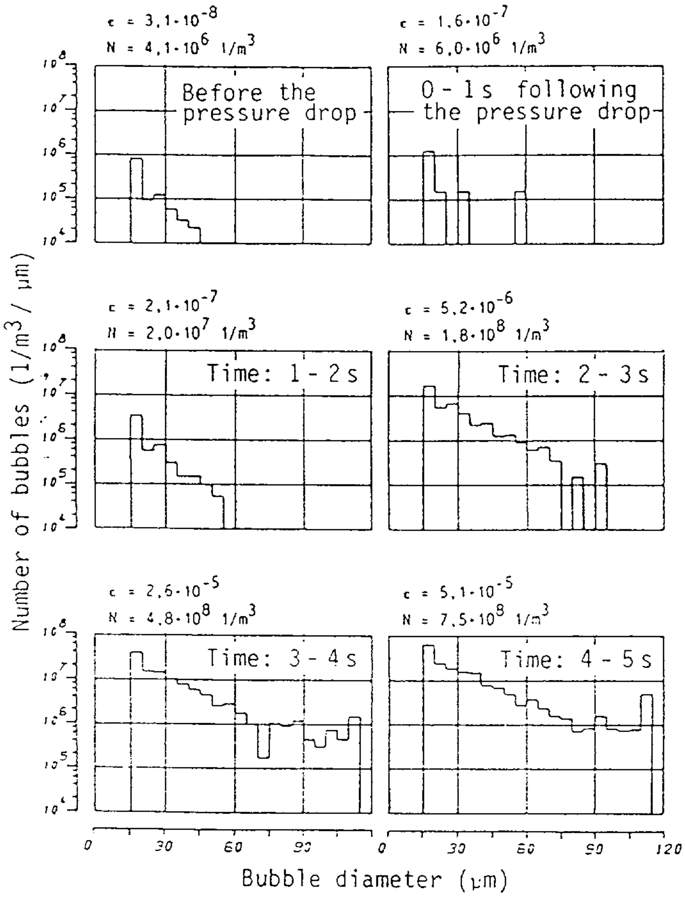

Fig. 2: Bubble size histograms before and after a sudden pressure drop.

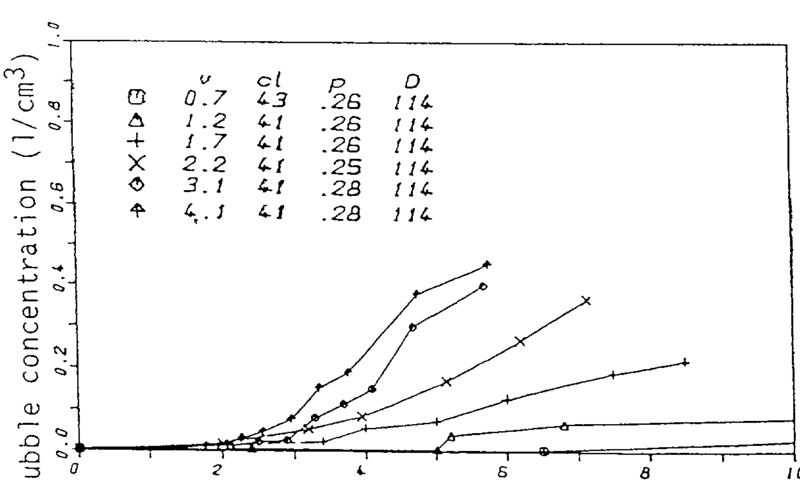

Fig. 3: Development of the number of bubbles after a sudden pressure drop.

5 The acoustical method for measuring the free gas content

A pressure pulse technique was used as a second and complementary method for determining the amount of gas release. It is based on the dependency of the acoustic velocity of pressure pulses upon the undissolved gas content. Pressure pulses were generated periodically by blowing compressed air into the pipe before and during the pressure drop. The travel time between two hydrophones was measured.

A small solenoid valve was used to open the connection between the high pressure reservoir and the pipe for a few milliseconds. The valve was located about 1 m from the downstream end of the pipe; hydrophones were installed 2.2 and 7.2 m upstream of the valve (see Fig. 1a). The transmitted signals from the hydrophones were stored on a two channel HF-wave-memory system with a time discretization between 0.1 and 1.6 ms, depending on the test conditions.

The acoustic velocity was evaluated from the distance between the two hydrophones and the recorded travel time of a pressure wave. The free gas content was then be determined by comparing the experimental results and the theoretically evaluated acoustic velocities of water-bubble mixtures.

The PVC-pipe was replaced by a tinned steel pipe in the vicinity of the acoustic test section in order to extend the measuring range in the direction of small free gas contents. The acoustic wave speed of pure water in a steel pipe is about 1250 m/s, in a PVC-pipe only about 400 m/s. Supposing that a decrease of wave speed of 10 % is barely measurable, then the minimum measurable gas content with the acoustic method in the PVC-pipe is about $\varepsilon = 5 \cdot 10^{-5}$, and in the steel pipe $\varepsilon = 1 \cdot 10^{-6}$.

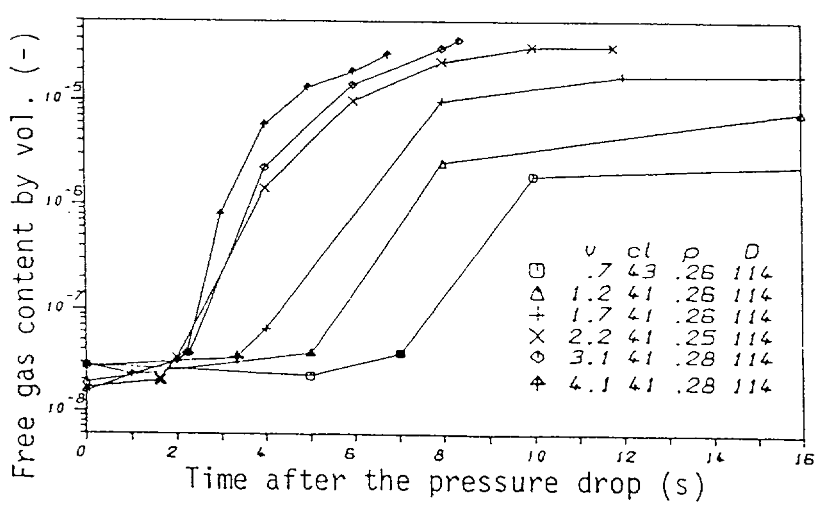

Fig. 4: Development of the free gas content after a sudden pressure drop, derived from the measured bubble spectrum.

Fig. 5 shows some typical plots of hydrophone signals from which the travel time of the pressure pulse can be determined. Fig. 5a is an example of pulse propagation before the pressure drop. The other graphs were recorded about 7 seconds following the pressure drop.

In the tests shown in Fig. 5b the gas release is fairly negligible; there is almost no change in the travel time compared with Fig. 5a (travel time about 4 ms, i.e. 1250 m/s acoustic velocity).

Figs. 5c and 5d relate to tests with substantial gas release; the travel time is increased to about 70 ms. The steepening of the wave into a shock wave is apparent. The damping in the

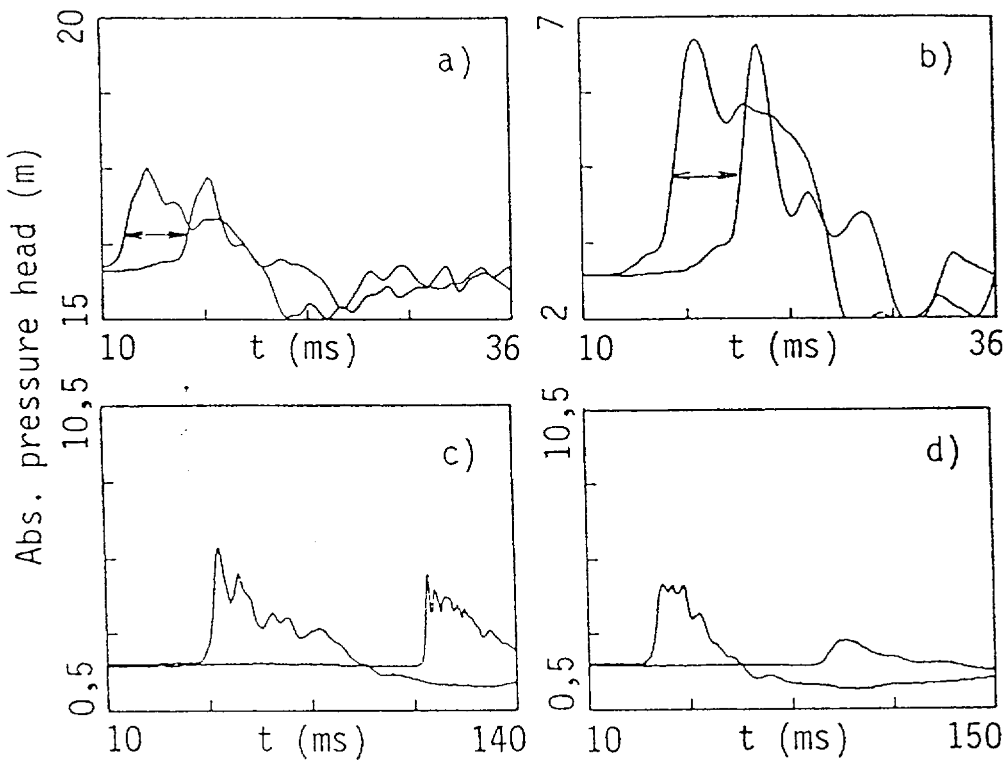

Fig. 5: Propagation of pressure waves before (a) and 7s after a sudden pressure drop (b,c,d), for three different values of free gas.

test according to Fig. 5d is so great that the wave could barely be detected by the second transducer.

In other tests, travel times of up to 135 ms were registered, which means that the wave speed was decreased to 35 m/s.

The recorded waves were used to calculate the free gas content using an iterative procedure which includes the formation of shock waves. The measured wave at the first hydrophone is used as a boundary condition for a pressure wave analysis, applying the method of characteristics with concentrated gas bubbles at the grid points. The calculated and measured pressure traces at the second hydrophone are repeatedly compared for various chosen values of free gas content until the best agreement is found, minimizing the squared deviations. In this manner the free gas content can be calculated for each pressure propagation and the change of free gas content with time for one test found from the evaluation of successively produced pressure pulses (interval between 1 and 2 s). In Fig. 6, the changes of the thus determined free gas contents are shown for a series of tests with different flow velocities.

6 Discussion of the test results

A comparison of the two methods for measuring the gas release rate in turbulent pipe flow shows that the scattered light technique is more reliable for the onset of gas release. The error becomes intolerable at higher free gas content. The acoustic technique shows the best accuracy at large free gas contents, whereas its relative error is significant at the onset of gas release. A combination of both techniques leads to the best results.

Figs. 4 and 6 show typical developments of the free gas content after a pressure drop in a turbulent pipe flow. The gas desorption is characterised by three phases :

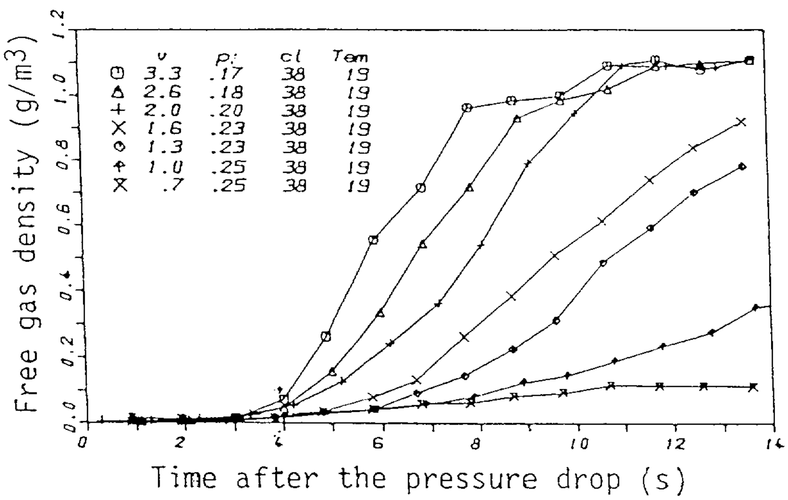

Fig. 6: Free gas content after a sudden pressure drop for several velocities, derived from wave speed measurements.

- The first few seconds after the pressure drop can be regarded as an incubation time, during which no change in the number of bubbles and free gas content can be detected. The duration of this phase was found to be greater than 1.5 s. The incubation period is longer for lower flow velocities and consequently lower gas release occurs. Values of more than 7 s could not be measured due to the smooth transition into low gas release.
- The second phase, the "activity-time", is characterized by a rapid rise in bubble density and a nearly constant rate of increase in the free gas content.
- In the third phase, the "bubble growth period", the rate of gas release slows down in such a way, that nearly no further change in the free gas content can be detected. This phase lasted up to 16 s after the pressure drop, i.e. the extent of the measurement period.

The standard assumption for non-equilibrium dissolved gas conditions is that the rate of gas release is proportional to the supersaturation pressure. Gas transfer rates are characterized by

$$\frac{dm}{dt} = \beta(c_s - c) \tag{1}$$

(in which c_s is the dissolved gas concentration per unit volume at saturation , c is the observed dissolved gas concentration per unit volume, β is the gas transfer coefficient which includes the diffusion coefficient and the interfacial area for gas transfer per unit volume of liquid).

or the gas release rate is related to the degree of underpressurization

$$\frac{dm}{dt} = \dot{m} = \beta S \frac{(p_s - p)}{RT} V_l \tag{2}$$

(S is Henry's constant, R is the gas constant, T is the absolute temperature and V_l is the unit volume of liquid).

The development of the free gas content as it results from theory under stationary mass transfer and typical pressure fluctuations under the experimental conditions is shown in Fig. 7.

The differences between the theoretical increase of free gas and the measured release in a turbulent pipe flow can be explained by the fact that the desorption of gas is mainly governed by the nucleus behaviour.

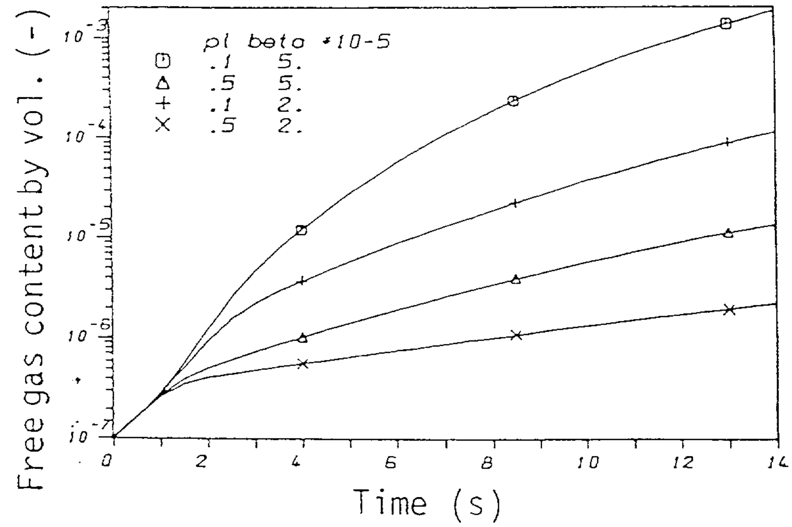

Fig. 7: Theoretical calculation of the free gas concentration.

The nuclei, i.e. the tiny gas-filled bubbles or particles where the phase changes take place, are initially so small, that their slow growth by expansion and diffusion cannot be detected with the two measurement systems. Moreover, only a relatively small part of the nucleus spectrum registered with the optical technique can consist of gas, since no volume increase could be detected, although the pressure was reduced by a factor of 20. The low expansion of the gas-filled cavities ($d < 30\,\mu m$) and the slow initial growth at the non-equilibrium is obviously below the threshold of the measurement techniques. This explains the incubation phase.

Tests with different nuclei contents but similar gas contents and flow velocities show nearly no differences in degassation. This suggests that the nuclei content in free flow plays only an insignificant role in the desorption process; it is primarily governed by the behaviour of the wall-nuclei (pores in the flow boundary).

The nuclei in the free flow can only grow slowly by diffusion. On the other hand, the nuclei at the pipe wall can grow much faster due to the additional convective influence on diffusion. The mass transfer rate for a wall-nucleus is therefore much higher than that of a nucleus located in the flow. Moreover, the wall nucleus grows and is then eventually swept off the wall. A new bubble then forms at the original location of the nucleus. In this manner bubbles are created at regular intervals. The mass transfer is also dependent on the formation frequency of new bubbles. The desorption process is governed during the "activity-time" by the behaviour of the wall nuclei. It is clear that the rate of free gas increase is dependent on the shear forces in the boundary layer and on the transport of fresh water towards the nuclei, i.e. on the flow velocity. This is confirmed by the test results.

As degassation continues, the vicinity around the nuclei becomes low in dissolved gas, thus reducing the mass transfer rate. Contrary to the theory, the free gas concentration approaches a limiting value a few seconds after the pressure drop. Even in tests with strong degassation, only a maximum of 10 % of the dissolved gas came out of solution. The measurements show that only the area close to the pipe wall was degased effectively. This limit is independent of the flow velocity, i.e., the mass transport from the flow core to the wall is small in comparison to the mass transfer at the wall-nuclei. An increase of the flow velocity results in a faster degassation to the limiting value, but it is not effective in supplying the area close to the wall with sufficient fresh water. This explains the third phase of degassation, "the bubble growth time".

The measured degassation phenomena show that the theory of stationary diffusion kinetics is not sufficent to describe the actual desorption mechanisms in a pipe flow. An explanation of the physical processes must include consideration of the nuclei concentration as well as their activation behaviour.

7 Quantification of the test results

The wave propagation speed in water with a low free gas content has been intensely investigated. The reduction of the general equation for the case of free gas concentration less than 5 % by volume yields

$$a = \frac{a_w}{\sqrt{1 + e\,r\,\frac{a_w^2}{p^2}}} \qquad (m/s) \tag{3}$$

with

$$e = \frac{m\,R\,T}{p} \tag{4}$$

The time increase of free gas m has been determined by curve fitting to the experimental results. The rate of gas release during the activity time can be described by

$$\dot{m}_e = k_1\,(\frac{p_s - p}{p_0})^{3.32}\ exp^{-9.2\frac{p}{p_s}}\ Re^{0.86} \tag{5}$$

with $k_1 = \frac{7.1\,10^{-11}}{D^2}$ in $\frac{kg}{m^3\,s}$ and:

$p_s =$ saturation pressure of the dissolved gas
$p =$ system pressure after the drop
$D =$ pipe diameter
$Re =$ Reynolds number (including v)

The free gas concentration reached after the activity phase can be described by

$$m_{max} = k_2\,(\frac{p_s - p}{p_0})^{2.59}\,exp^{-9.3\frac{p}{p_s}} \tag{6}$$

with the constant $k_2 = \frac{1.8\,10^{-4}}{D}$ in $\frac{kg}{m^3}$.

Comparisons between the calculated and measured values of $\dot{m}_e$ and m_{max} are shown in Figs. 8 and 9.

These formulae are at least valid for the test conditions in which the total gas concentration varies between 17 and 50 g/m^3, the pipe flow velocity between 0.7 and 3.3 m/s and the pressure level after the drop between 0.08 and 0.6 bar.

A simple formula for the determination of the incubation time could not be found. One can roughly assume that it is one third of the activity phase. For high gas release this will be accurate enough and for low gas release an error will not have a significant effect on the pressure transient calculations.

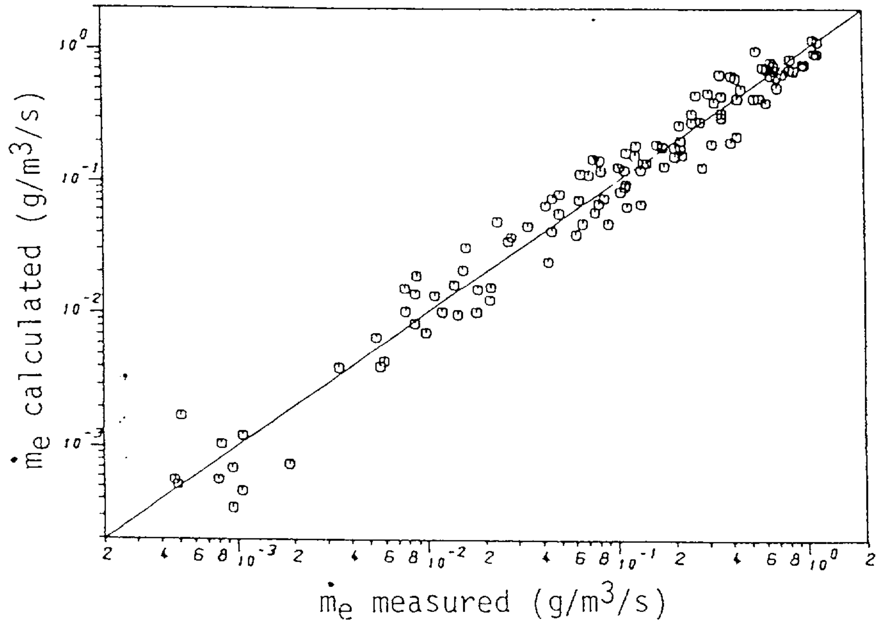

Fig. 8: Comparison between measured and calculated gas release rates.

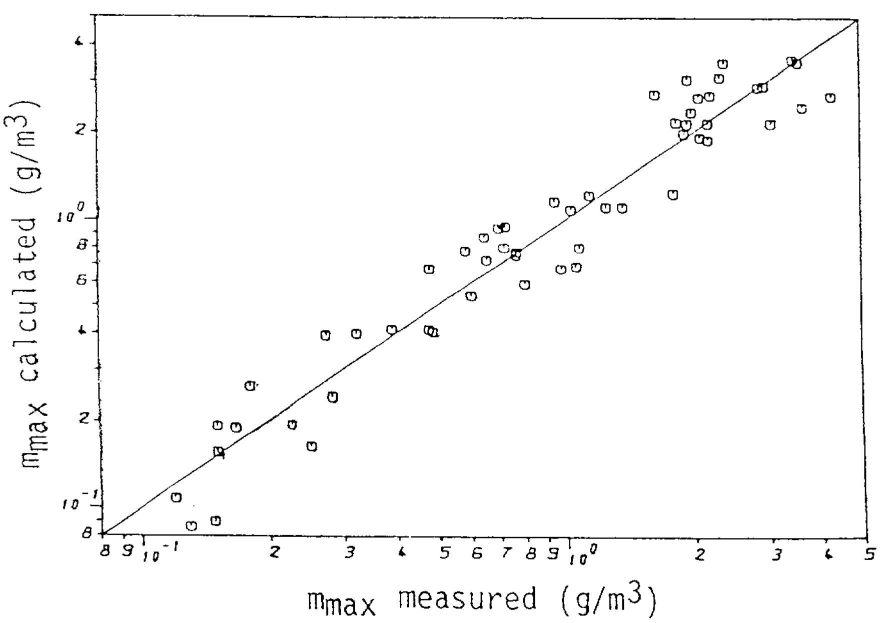

Fig. 9: Comparison between measured and calculated maximum free gas concentrations.

8 References

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2. Kranenburg, C.: *Transient Cavitation in Pipelines*, Report No. 73-2, Communications on Hydraulics, Dept. of Civil Engineering, Delft University of Technology, Delft, The Netherlands

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GENERIC LETTER 96-06
CALLCULATION 96227-TR-03
STRESS ANALYSIS

Wolf Creek Nuclear Operating Corporation

STRUCTURAL DYNAMIC ANALYSIS OF CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "A" AND TRAIN "B" SUPPLY AND RETURN PIPING

Calculation No. 96227-TR-003
Revision 1
Volume 1 of 1

Prepared for:

Wolf Creek Nuclear Plant

Wolf Creek Operating Corporation

December, 2000

altran

Boston • Charlotte • San Francisco • Toronto • Chicago

altran

Report Record

REPORT No.: 96227-TR-03 Rev. No.: 1 Sheet No.: 2

QA Related: Yes ☒ No ☐ App. B ☒ ISO 9000 CGMP ☐ Total Sheets: (Includes Att. A, B, C, D, E, F, G, H) 622

TITLE: Structural Dynamic Analysis Of Containment Cooling System Reactor Building Train "A" And Train "B" Supply and Return Piping

CLIENT: Wolf Creek Nuclear Operating Corporation FACILITY: Wolf Creek Nuclear Plant

REV. DESCRIPTION: Revision 1: (See Revision Description Sheet for details)
Added Pages: (See Revision Description Sheet for details)
Revised Pages: (See Revision Description Sheet for details)

COMPUTER RUNS: **(Identified on Computer File Index):** Yes ☒ N/A ☐
Error reports evaluated by: D. Gusso / G. Brem **Date:** 12/22/00

Impacted by error reports: **No** ☒ **Yes** ☐ **(if Yes, attach explanation)**

Originator(s)	Date	Verifier(s)	Date
D. Gusso	12/22/00	P. Streeter	12/22/00
D. Van Duyne	12/22/00	G. Brem	12/22/00
G. Brem	12/22/00	D. Gusso	12/22/00
		L. Semprucci	12-22-00

Verification: Verification is performed in accordance with EOP 3.4 as indicated below.

☒ Design review as documented on ~~the following~~ sheet ~~or~~ 3

☐ Alternate calculation as documented in attachment or

☐ Qualification testing as documented in attachment or

APPROVED FOR RELEASE

PROJECT MANAGER: Bahaa Elwidi FOR P. Bruck **Date:** 12/29/00

ENGINEERING MANAGER: Bahaa Elwidi FOR P. Bruck **Date:** 12/29/00

Report Record

altran

Document No.: 96227-TR-03 Rev. No.: 0

Nuclear Safety Related Yes X No ___ No. of Sheets (Includes Att. A, B, C, D, E, F, G, H) 542

SUBJECT: Structural Dynamic Analysis of Containment Cooling System Reactor Building Train "A" and Train "B" Supply and Return Piping Wolf Creek Nuclear Plant

REV. DESCRIPTION: Revision 0: Original Issue

SUPERSEDED

COMPUTER RUNS (identified on Computer File Index): Yes X N/A ___

Error reports evaluated by: D. Gusso Date: 2/27/98

Impacted by error reports: No X Yes ___ (if yes, attach explanation)

Originator(s)	Date	Checker(s)	Date
A. Chock	3/3/98	M. Zweigle (for)	3/3/98
D. Gusso	2/27/98	C. Johnson (for S. Gupta)	3/3/98
A. Patel	2/27/98	~~S. Gupta~~	3/3/98
C. Johnson	3/3/98	N. Patel	2-27-98
N. Patel	2-27-98	A. Patel	2-27-98

DESIGN VERIFICATION: Required X Not Required ___

Performed by: S. Greer Date: 3-4-98

Method of design verification: X Design Review ___ Alternate Calculations (Attached)

___ Qualification Test (Data/Results Attd.)

Comments resolved by: D. Gusso Date: 3-4-98

Design verifier concurrence: Date: 3-4-98

APPROVED FOR RELEASE

PROJECT MANAGER: for P. Bruck Date: 3-4-98

ENGINEERING MANAGER: for M. Eissa Date: 3-10-98

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Verification

Report No. 96227-TR-03 Rev.: 1 Sheet: 3

Verification Considerations (in accordance with EOP 3.4)

		Initials
1.	The inputs come from an appropriate and controlled source, and are clearly referenced.	[initials]
2.	The inputs from uncontrolled sources or assumptions are properly justified and documented.	[initials]
3.	The inputs or assumptions that are not adequately justified are identified for later confirmation.	[initials]
4.	Design, analysis, testing, examination, and acceptance criteria are specified and complied with.	[initials]
5.	Appropriate interface control was administered during the process of this report.	[initials]
6.	The computer programs used are authorized for use and/or properly verified.	[initials]
7.	Applicable codes, standards, or regulatory requirements are properly specified and complied with.	[initials]
8.	The specified tests and examinations were performed by personnel with appropriate qualifications.	N/A
9.	All tests and examinations were performed in accordance with written procedures.	N/A
10.	Specimens are controlled by identification number and their traceability is maintained.	N/A
11.	The calibration of instrumentation is acceptable and properly recorded.	N/A
12.	The instruments that are used are recorded by name and identification number.	N/A
13.	The report is neat and legible and suitable for reproduction.	[initials]
14.	The formatting and technical requirements of applicable procedures are complied with.	[initials]
15.	Critical numerical computations have been checked in detail.	[initials]
16.	The endorsements of all originators and verifiers have been properly recorded.	[initials]
17.	Appropriate construction, operation, and/or maintenance considerations have been considered.	[initials]
18.	The conclusions satisfy stated objectives, and they are consistent with the input.	[initials]
19.	All material specified are compatible with their service environment.	[initials]
20.	Procedural requirements for report revisions and subsequent reviews are complied with.	[initials]

Clarify significant comments: ALL COMMENTS ADDRESSED ACCEPTABLY

All comments are resolved and incorporated into the report except as noted here:

[signature] 12/22/00 [signature] 12/22/00

Originator's concurrence Date Verifier's concurrence Date

Rev. No.	Revision Description
0	Original Issue
1	Revised input forcing functions for Column Closure Waterhammer event and Condensation Induced Waterhammer event on Train A and Train B; revised direction cosines on Train A and Train B; revised pipe support stiffnesses to agree with the ME-101 input data; corrected pipe support orientation on Train A for hanger C008 at Data Point 1455; included in Train A Z-direction snubber R013 at Data Point 1275; included in Train B Z-direction rigid support R001 at Data Point 65; Z-direction snubber R013 and Z-direction rigid support R001 were excluded from the original analysis models; Added Pages: Verification Sheet 3, Revision Description Sheet 4, PDSTRUDL Computer File Index Sheet 5a, B46A, AND B173A. Deleted Page: Figure 3.0 Revised Pages: 1, 2, 5 through 29, A1 through A58, B1 through B363, C1 through C34, D1 through D36, F1 through F9, G1 through G29, H1 through H61.

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Report No. 96227-TR-03 Rev.: 1 Sheet: 5

By: D. Gusso Date: 12/13/00 Chk: J. Bru... Date: 12/13/00

For PAUL STREETER

PROGRAM NAME: ADLPIPE **VERSION NO.:** 3F9.3

USERNAME: N/A **PROJECT MANAGER:** P. Bruck

QA Status ☒ yes, ☐ no (App. B ☒, ISO 9000 ☐, CGMP ☐)

PROGRAM USE DESCRIPTION:

PC Version of ADLPIPE; Location Computer No. 00273

KEY WORDS: ASME, Cl.2, 1974 DEADWEIGHT, THERMAL AND VIBRATION

Run No.	Description	Input File Name	Output File Name	Run Date::Time
1.	Train "A" Return Deadweight, Thermal, Thermal Accident and Water Hammer (Column Closure)	acc41sni.adi	acc41sni.adi	7/18/00 09:10:02 AM
2.	Train "B" Return Deadweight, Thermal, Thermal Accident Column Closure Time History and Condensation Induced Time History	bcci41ri.adi	bcci41ri.adi	7/18/00 15:22:29 PM
3.	Train "A" Return Deadweight, Thermal, Thermal Accident, Water Hammer (Condensation Induced)	aci41sni.adi	aci41sni.adi	7/18/00 11:59:46 AM

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Report No. 96227-TR-03 Rev.: 1 Sheet: 5a

By: D. Gusso Date: 12/13/00 Chk: J. Bru Date: 12/13/00

PROGRAM NAME: PD STRUDL **VERSION NO.:** V0496 & V0700

USERNAME: N/A **PROJECT MANAGER:** P. Bruck

QA Status ☒ yes, ☐ no (App. B ☒, ISO 9000 ☐, CGMP ☐)

PROGRAM USE DESCRIPTION:

PC Version of PD STRUDL

KEY WORDS: Frame, Steel Design, Base Plate, Weld, Static, Dynamic, General

Run No.	Description	Input File Name	Output File Name	Run Date::Time
1.	Train 'A' Pipe Support Evaluation for Support 1-GN01-R013/231Q (V0700)	R013.inp *	R013.out	Job No. 531 10/02/00 10:56:45 (ALTRAN P.C. # 00286)
2.	Train 'B' Pipe Support Evaluation for Support C011 (V0496)	N/A *	N/A	Job No. 420 02/11/98 18:09:52
3.	Train 'B' Pipe Support Evaluation for Support C021 (V0496)	N/A *	N/A	Job No. 423 02/12/98 13:00:32

* SEE Appendix B

TABLE OF CONTENTS

LIST OF TABLES & FIGURES

1.0 OBJECTIVE AND SCOPE

1.1 Objective

The purpose of this evaluation is to perform a structural analysis of the Containment Cooling system, Reactor Building Train "A" and Train "B" Return lines and Supply lines at the Wolf Creek Nuclear Plant. The Train "A" and Train "B" Return lines structural dynamic analysis is based on elastic principles using the ADLPIPE computer code [8][1]. From the results of the Train "A" and Train "B" Return lines, a qualitative assessment of the Train "A" and Train "B" Supply lines was made.

A waterhammer event has been postulated to occur due to the simultaneous occurrences of a Loss of Coolant Accident (LOCA) with Loss of Offsite Power (LOOP). This scenario as described in USNRC Generic Letter 96-06, Ref. 1, results in steam formation in the coolers.

During this event, two possible waterhammers have been postulated to occur due to 1) condensate void collapse and 2) column closure. Both of these result in a column closure waterhammer, which occurs after resumption of flow from pump restart. The moving flow impacts the stationary water resulting in a column closure waterhammer. This loading results in a transient pressure wave, which travels through the system. Altran has performed a structural assessment of the subject piping system to determine the ability of the piping system (pipe, supports, equipment nozzles, and penetrations) to withstand such loading, maintain the integrity of the pressure boundary, and ensure the piping will continue to pass flow.

1.2 Scope

Train "A"

The Supply line piping of Train "A" starts at Reactor Building Penetration P-71 and terminates at the inlet nozzles to Containment Coolers SGN01A and SGN01C.

The Return line piping of Train "A" starts at Containment Coolers SGN01A and SGN01C and exits the Reactor Building through Penetration P-73.

Train "B"

The Supply line piping of Train "B" starts at Reactor Building Penetration P-28 and terminates at Containment Coolers SGN01B and SGN01D.

[1] [ ] Indicates reference number from Section 6.0

The Return line piping of Train "B" starts at Containment Coolers SGN01B and SGN01D and exits the Reactor Building through Penetration P-29.

The piping and support configuration for the containment cooling system Train "A" Return line and Train "B" Return line are shown in Figure 1 and Figure 2, respectively. The piping consists of 14", 10", 8" and 6" Schedule 40 carbon steel pipe.

2.0 EVALUATION METHODOLOGY & ACCEPTANCE CRITERIA

This section of the report discusses the analytical modeling details, applied loadings, and acceptance criteria.

2.1 Method of Analysis

The structural dynamic analysis is performed using the commercially available code ADLPIPE, Ref. 8. It is a general purpose piping analysis code used widely by the nuclear industry.

Once the time-history unbalanced wave forces are determined for each straight run of piping, they are applied to a structural model of the piping system using the ADLPIPE program.

The piping system structural model constructed for this analysis is represented by an ordered set of data, which numerically describes the physical systems.

Node point coordinates and incremental lengths of the members are determined from spatial geometric drawings. The geometrical properties along with the modulus of elasticity, E, are specified for each element. The supports are represented by stiffness matrices, which define restraint characteristics of the supports. The well-known equations of motion can be written in matrix form as:

$$M\{\ddot{x}\} + C\{\underline{x}\} + K\{x\} = \{f(t)\} \quad (3.1)$$

Where:

C = damping matrix		$\{x\}$	= displacement vector
M = mass matrix		$\{\underline{x}\}$	= velocity vector
K = stiffness matrix		$\{\ddot{x}\}$	= acceleration vector
	$\{f(t)\}$	= vector of applied forces	

The natural frequencies and associated mode shapes can be obtained by solving the characteristic equation:

$$\det. \left| \lambda I - M^{-1} K \right| = 0 \tag{3.2}$$

Where: M^{-1} = inverse of the mass matrix
I = identify matrix
λ = scalar eigenvalue

Each eigenvalue $\lambda_S = \omega_a^2$ of Equation (3.2) determines a natural frequency, and the associated eigenfunction $\{\varphi_a\}$ is the mode shape. The matrix φ whose columns are the eigenvectors $\{\varphi_a)$ is called the modal matrix.

Matrix Equation (3.1) represents the dynamic equilibrium of the masses of a three-dimensional structure with applied forces in any or all of the coordinate directions. Equation (3.1) can now be transformed into modal coordinates by defining the following linear transformation:

$$\{x\} = \varphi\{q\} \tag{3.3}$$

Where: $\{q\}$ = modal coordinates
φ = modal matrix

$$\{\underline{x}\} = \varphi\,\{\ddot{q}\} \tag{3.4}$$

Applying Equations 3.3 and 3.4 and normal mode theory, the actual time responses of the structure for the ith mass direction are:

$$x_i\,(t) = \sum_a \varphi_{1,a} q_a\,(t) \tag{3.5}$$

$$\underline{x}_i\,(t) = \sum_a \varphi_{1,a} \underline{q}_a\,(t) \tag{3.6}$$

$$\ddot{x}_i\,(t) = \sum_a \varphi_{1,a} \ddot{q}_a\,(t) \tag{3.7}$$

The solution is conducted in two parts. The first part is to find the frequencies and mode shapes of a three-dimensional structure. The second part takes the modal data, generates and solves the modal differential equations, which result from time varying applied internal forces.

The time-history internal forces and displacements are then input into a series of post-processing programs used to determine the maximum forces, moments, and displacements that exist at each end of the piping elements and the maximum loads for the piping supports. The results are saved on magnetic media for future use in piping stress analysis and support load evaluation.

2.2 Analytical Model

2.2.1 Piping Model

The piping systems were coded in the ADLPIPE computer code, Ref. 8. The piping was subjected to the loading of Deadweight (D), maximum operating pressure (P), column closure waterhammer (CCWH), condensation induced waterhammer pulse (CIWH), together with thermal normal (THERM NORM) and thermal accident (THERM ACCD), where the accident temperature used was 244°F [12]. The waterhammer event was evaluated as a time history dynamic analysis. The technique used to qualify the waterhammer is based on determination of the piping system response to known time dependent forces to calculate resulting stresses and loading. The response of the piping system is computed by normal mode superposition technique. For the time history dynamic analysis, a modal damping value of 2% was used. The coding of the piping system was in accordance with the as-built isometrics of Ref. 3.

2.2.2 Support Details

Piping supports were included in the model, based on the support function shown on the support drawings [3]. Table 6.0 and 7.0 provide the hanger numbers, ADLPIPE node point and pipe support function for Train "A" and Train "B" return lines, respectively. Stiffness values used were in general agreement with values from the Wolf Creek ME-101 input models.

2.3 Acceptance Criteria

The piping and pipe support systems were evaluated in accordance with the Wolf Creek Design Criteria for UFSAR Design Basis and Functionality acceptance [2]. Since the concurrent combination of seismic and LOOP/LOCA is not included in the UFSAR design basis and the seismic event will not cause the waterhammer, they are not combined in this analysis.

The loading combinations used for the evaluation of the Train "A" and Train "B" Return lines are as outlined in Table 1. The thermal case, under the LOCA ambient condition, denoted as Thermal Accident (THERM ACCD) is considered a faulted event. In accordance with the requirements of the ASME III, Appendix F Code, thermal loading for one time faulted events need not be evaluated for pressure boundary components. However, as a point of reference only, stresses were calculated and compared to normal condition ASME acceptance criteria. The pipe support acceptance criteria is based on the evaluation of all loading, including THERM ACCD. The design basis acceptance criteria is based on meeting AISC

Code [4], stress allowables, with consideration of the 1.33 stress increase considered for occasional loading. The pipe support - design basis - acceptance criteria are shown in Table 2.0.

3.0 RESULTS & DISCUSSION

The results of the piping qualification for the containment cooling system Reactor Building Train "A" and Train "B" are outlined below.

3.1 Discussion

The Train "A" Return line was qualified for the condensation induced waterhammer event and for the column closure waterhammer event in this report. The results of the two analyses are included in the appropriate attachments at the end of this report. The results of the Train "A" Return line loading conditions analyzed here supersede the results from Altran Report 96227-TR-02 [13].

The Train "B" Return line evaluation for the column closure waterhammer event and the condensation induced waterhammer event were qualified in this report with the results provided in the attachments section at the end of this report. The results of the Train "B" Return line loading conditions analyzed here supersede the results from Altran Calculation 94100-C-02 [11].

The two waterhammer pressure pulses are applied to a structural model of the piping system. The ADLPIPE [8] computer code is used, and the pressure pulse is applied as a time history load in a dynamic evaluation. The analytical technique computes the piping system response to the time dependent forcing functions. The response of the piping system is computed by the normal mode superposition technique. The piping models are shown in Figure 1 and Figure 2. The segment loading is determined by assuming that the pulse is initiated at the elbow at the end of the horizontal run and that the load propagates in each direction from this location. Forces will offset at opposing changes in direction when the pressure wave reaches the opposite ends of a segment. The pressure pulse will reflect off the free surface at the water to steam interface. The resulting segment forcing functions are shown in Attachment C.

3.2 Piping

The piping system structural evaluation was performed in accordance with the requirements of the ASME III, Subsection NC Code [9] and in accordance with the FSAR requirements for WCNP [2] as outlined in Section 2.2 and 2.3. A piping stress results summary table for the highest loaded location in the Train "A" Return line and the Train "B" Return line models are shown in Table 3.0. The Table 3.0 pipe stress summary also indicates which waterhammer event controlled in the Faulted load combination. All piping stresses are within the Code allowables and meet the acceptance criteria of WCNP FSAR requirement stress limits. A summary of the Train "A" and Train "B" Return lines pipe stresses for each Code equation are

included in Attachment A. The assessment of the Train "A" and "B" Supply lines is included in Attachment F.

All pipe supports were included in the Train "A" return line model as well as the Train "B" return line model.

3.3 Pipe Supports

The resulting pipe support loads for deadweight (D), thermal accident (THERM ACCD), column closure waterhammer (CCWH) and condensation waterhammer (CIWH) were obtained from the ADLPIPE evaluation. A combination of these loads is considered as the faulted loading condition and the pipe supports were qualified for this combined loading. Qualification was based on load ratings to previously qualified loads and ensuring that the support component interaction ratios are within the acceptable limits. Detailed evaluations of the supports are found in Attachment B. The interaction ratios for the Train "A" pipe supports are located in Attachment B, Table B-3.0. The Train "B" pipe support interaction ratios are provided in Attachment B, Table B-5.0. In addition, several pipe supports from Train "A" and Train "B" were welded to the pipe pressure boundary, commonly known as integral welded attachment. The evaluations of the integral welded attachments are provided in Attachment H. The integral welded attachments' calculated stresses are summarized in Table 5.0.

3.4 Fan Cooler Nozzles

All stresses of attached piping at the nozzle are well below allowables and the integrity of the nozzle is still maintained. A comparison of the calculated nozzle loads to allowable loads is provided in Attachment G. In addition, the cooling coilings have been reviewed in Attachment G for the one time loading event and found acceptable.

3.5 Containment Penetrations

The stresses for the different loading conditions for the piping attached to the Reactor Building penetrations inside containment are shown in Table 4.0. In general, penetrations are more rigid and stronger than the attached piping, and therefore, the integrity of the penetration is not compromised.

4.0 INPUT DATA

The ADLPIPE piping models of the containment cooling system piping for Train "A" and Train "B" Return lines were developed based on the isometric drawings provided by Wolf Creek [3]. The computer model of the Train "A" Return line piping geometry is shown in

5.0 CONCLUSION

The results of the ADLPIPE computer analyses have demonstrated that the Wolf Creek Nuclear Plant Containment Cooling system Reactor Building Train "A" and Train "B" piping which are illustrated in Figure 1 and Figure 2, respectively are adequately designed to withstand both waterhammer pressure pulse events postulated to occur. The piping, pipe supports, penetration, and cooler nozzles have each been satisfactorily evaluated for these waterhammer events. In addition, the Train "A" and Train "B" Supply lines, supports, penetration and cooler nozzles are acceptable based on a comparison to the Return lines.

For the Train "A" and Train "B" Supply and Return lines, the piping stresses meet the Wolf Creek acceptance criteria for a faulted condition. All pipe supports meet the design basis acceptance criteria for this loading condition. These results for the piping and associated supports address satisfactorily the first issue of concern described in GL 96-06 [1], that is, that the cooling water systems serving the containment air coolers are designed to withstand the hydrodynamic effects of waterhammer resulting from design basis accident conditions.

6.0 REFERENCES

1. USNRC Generic Letter No. 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," September 19, 1996; including Supplement 1 issued 11/13/97.

2. Updated Final Safety Analysis Report (UFSAR), Wolf Creek

3. Wolf Creek Drawings

   A. Piping Isometrics

   Train "B"

   M-13GN02 (Q) Rev.03 Containment Cooling System Reactor Building Train "B" (Supply and Return Lines)

   M-15GN02 (Q) Rev. 5 Hanger Location Dwg. Containment Cooling System Reactor Building Train "B" (Supply and Return Lines)

   Train "A"

   M-13GN01 (Q) Rev.03 Containment Cooling System Reactor Building Train "A" (Supply and Return Lines)

   M-15GN01 (Q) Rev.5 Hanger Location Dwg. Containment Cooling System Reactor Building Train "A" (Supply and Return Lines).

   B. Hanger Drawings

   M-16GN01 Rev.29, hanger index drawing for Train "A"

   M-16GN02 Rev.28, hanger index drawing for Train "B"

Train "A' Supply Line

Tag. No.	Hanger No.	Drawing No.
C002	1-GN01-C002/231 (Q)	M-16GN01 Rev. 1
H002	0-GN01-H002/232 (Q)	M-06GN01 Rev. 1
C003	1-GN01-C003/232 (Q)	M-16GN01 Rev. 2
C016 (Calc. GN-01-35 Rev.4)	1-GN01-C016/242 (Q)	M-16GN01 Rev. 5
R002	0-GN01-R002/242 (Q)	M-06GN01 Rev. 0
R003	1-GN01-R003/252 (Q)	M-16GN01 Rev. 5

Train "A' Return Line

Tag No.	Hanger No.	Drawing No.
R011	1-GN01-R011/251 (Q)	M-16GN01 Rev. 5
R012	1-GN01-R012/251 (Q)	M-16GN01 Rev. 3
C015	1-GN01-C015/251 (Q)	M-16GN01 Rev. 3
R010	1-GN01-R010/252 (Q)	M-16GN01 Rev. 6
H005	1-GN01-H005/252 (Q)	M-16GN01 Rev. 4
C018	1-GN01-C018/252 (Q)	M-16GN01 Rev. 4
H007	1-GN01-H007/252 (Q)	M-16GN01 Rev. 3
R009	1-GN01-R009/252 (Q)	M-16GN01 Rev. 2
R014	1-GN01-R014/252 (Q)	M-16GN01 Rev. 5
H006	1-GN01-H006/252 (Q)	M-16GN01 Rev. 2
C019	1-GN01-C019/252 (Q)	M-16GN01 Rev. 5
R005	1-GN01-R005/252 (Q)	M-16GN01 Rev. 3
R004	1-GN01-R004/242 (Q)	M-16GN01 Rev. 5
C017	1-GN01-C017/242 (Q)	M-16GN01 Rev. 2
C008	1-GN01-C008/232 (Q)	M-16GN01 Rev. 6
C007	1-GN01-C007/232 (Q)	M-16GN01 Rev. 4
H003	1-GN01-H003/232 (Q)	M-16GN01 Rev. 2
C006	1-GN01-C006/231 (Q)	M-16GN01 Rev. 6
C005	1-GN01-C005/231 (Q)	M-16GN01 Rev. 2
R013	1-GN01-R013/231 (Q)	M-16GN01 Rev. 7

Train "B" Supply Line

Tag No.	Hanger No.	Drawing No.
C024	1-GN02-C024/241 (Q)	M-16GN02 Rev. 4
R014	0-GN02-R014/251 (Q)	M-06GN02 Rev. 1
R012	0-GN02-R012/251 (Q)	M-06GN02 Rev. 1
R010	0-GN02-R010/241 (Q)	M-06GN02 Rev. 1
C027	0-GN02-C027/251 (Q)	M-06GN02 Rev. 1
C026	0-GN02-C026/251 (Q)	M-06GN02 Rev. 1
C022	0-GN02-C022/231 (Q)	M-06GN02 Rev. 1
C010	0-GN02-C010/241 (Q)	M-06GN02 Rev. 2
C002	1-GN02-C002/231 (Q)	M-16GN02 Rev. 2
R008	1-GN02-R008/242 (Q)	M-16GN02 Rev. 3
C006	1-GN02-C006/231 (Q)	M-16GN02 Rev. 3
C008	1-GN02-C008/232 (Q)	M-16GN02 Rev. 3
R006	0-GN02-R006/252 (Q)	M-06GN02 Rev. 1
R004	1-GN02-R004/242 (Q)	M-16GN02 Rev. 3
C020	0-GN02-C020/252 (Q)	M-06GN02 Rev. 1
C018	0-GN02-C018/252 (Q)	M-06GN02 Rev. 1
C014	0-GN02-C014/242 (Q)	M-06GN02 Rev. 1
C012	0-GN02-C012/242 (Q)	M-06GN02 Rev. 1
R002	0-GN02-R002/231 (Q)	M-06GN02 Rev. 2
C004	1-GN02-C004/231 (Q)	M-16GN02 Rev. 4
C016	1-GN02-C016/252 (Q)	M-16GN02 Rev. 2

Train "B" Return Line

Tag No.	Hanger No.	Drawing No.
C001	1-GN02-C001/231 (Q)	M-16GN02 Rev. 4
C003	1-GN02-C003/231 (Q)	M-16GN02 Rev. 5
R001	1-GN02-R001/231 (Q)	M-16GN02 Rev. 3
C005	1-GN02-C005/231 (Q)	M-16GN02 Rev. 3
C007	1-GN02-C007/232 (Q)	M-16GN02 Rev. 2
C009	0-GN02-C009/242 (Q)	M-06GN02 Rev. 4
C011	1-GN02-C011/242 (Q)	M-16GN02 Rev. 3
C013	1-GN02-C013/242 (Q)	M-16GN02 Rev. 6
R003	1-GN02-R003/242 (Q)	M-16GN02 Rev. 3
R005	1-GN02-R005/252 (Q)	M-16GN02 Rev. 2
H001	1-GN02-H001/252 (Q)	M-16GN02 Rev. 2
R007	1-GN02-R007/252 (Q)	M-16GN02 Rev. 4

Tag No.	Hanger No.	Drawing No.
C015	1-GN02-C015/252 (Q)	M-16GN02 Rev. 4
C017	1-GN02-C017/252 (Q)	M-16GN02 Rev. 3
C019	1-GN02-C019/231 (Q)	M-16GN02 Rev. 7
R009	1-GN02-R009/241 (Q)	M-16GN02 Rev. 2
C021	1-GN02-C021/241 (Q)	M-16GN02 Rev. 3
R015	1-GN02-R015/251 (Q)	M-16GN02 Rev. 2
C028	1-GN02-C028/251 (Q)	M-16GN02 Rev. 2
C025	1-GN02-C025/251 (Q)	M-16GN02 Rev. 2
R013	1-GN02-R013/251 (Q)	M-16GN02 Rev. 7

4. American Institute of Steel Construction, "Manual of Steel Construction," Eighth Edition, 1980, AISC Chicago.

5. USNRC IN95-09: "Use of Inappropriate Guidelines & Criteria for Nuclear Piping and Support Evaluation & Design."

6. USNRC GL91-18, "Information to Licensees Regarding Two NRC Inspection Manual Sections on Resolution of Degraded & Nonconforming Conditions and Operability."

7. ASME Boiler & Pressure Vessel Code (B&PVC), Section III, Appendices. 1989.

8. ADLPIPE Version 3F9.3, Research Engineers, Yorba Linda, CA.

9. ASME B&PVC, Section III, Subsection NC, Div. 1, 1974 with Addendum through 1976.

10. WCNOC Station Procedure CN-3.01

11. Altran Corporation Calculation No. 94100-C-02, "Structural Dynamic Analysis of ESW System Waterhammer," Rev. 1, June 1995.

12. Altran Corporation Technical Report No. 96227-TR-01, "Containment Fan Cooler Response to a Simultaneous LOCA and LOOP Event," Rev. 4, August, 2000.

13. Altran Technical Report No. 96227-TR-02, "Structural Dynamic Analysis of Containment Cooling System Reactor Building Train "A", Rev 0, April, 1997.

14. Bechtel Calculations for Wolf Creek Nuclear Plant.

a. Calc. No. GN01-3 Rev. 0	Hgr. 0-GN01-H002-232 (Q)	Train A Supply
b. Calc. No. GN01-35 Rev. 4	Hgr. 0-GN01-C016/242 (Q)	Train A Supply
	Hgr. 0-GN01-C007/242 (Q)	
c. Calc. No. GN01-1 Rev. 3	Hgr. 0-GN01-C003/232 (Q)	Train A Supply
	Hgr. 0-GN01-C006/231 (Q)	Train A Return
	Hgr. 0-GN01-H003/232 (Q)	Train A Return
	Hgr. 0-GN01-C007/232 (Q)	Train A Return
	Hgr. 0-GN01-C002/231 (Q)	Train A Supply
	Hgr. 0-GN01-H002/232 (Q)	Train A Supply
d. Calc. No. GN01-12 Rev. 4	Hgr. 0-GN01-R003/252 (Q)	Train A Supply
	Hgr. 0-GN01-R005/252 (Q)	Train A Return
	Hgr. 0-GN01-R002/252 (Q)	Train A Supply
	Hgr. 0-GN01-R004/252 (Q)	Train A Return
e. Calc No. GN01-2 Rev. 0	Hgr. 0-GN01-R002/242 (Q)	Train A Supply
f. Calc No. GN01-14 Rev. 1	Hgr. 0-GN01-H005/252 (Q)	Train A Return
g. Calc No. GN01-28 Rev. 4	Hgr. 0-GN01-R010/252 (Q)	Train A Return
h. Calc No. GN01-27 Rev. 1	Hgr. 0-GN01-C015/251 (Q)	Train A Return
i. Calc No. GN01-38 Rev. 1	Hgr. 0-GN01-R012/251 (Q)	Train A Return
j. Calc No. GN01-32 Rev. 2	Hgr. 0-GN01-R011/251 (Q)	Train A Return
k. Calc No. GN01-39 Rev. 1	Hgr. 0-GN01-H006/252 (Q)	Train A Return
l. Calc No. GN01-40 Rev. 2	Hgr. 0-GN01-R014/252 (Q)	Train A Return
m. Calc No. GN01-30 Rev. 1	Hgr. 0-GN01-R009/252 (Q)	Train A Return
n. Calc No. GN01-22 Rev. 2	Hgr. 0-GN01-H007/252 (Q)	Train A Return
o. Calc No. GN02-1 Rev. 2	Hgr. 0-GN02-C001/231 (Q)	Train B Return
p. Calc No. GN02-3 Rev. 1	Hgr. 0-GN02-R001/231 (Q)	Train B Return
	Hgr. 0-GN02-R002/231 (Q)	Train B Supply
q. Calc No. GN02-6 Rev. 3	Hgr. 0-GN02-R003/242 (Q)	Train B Return
r. Calc No. GN02-8 Rev. 4	Hgr. 0-GN02-C005/231 (Q)	Train B Return
s. Calc No. GN02-8-W Rev. 0	Hgr. 0-GN02-C005/231 (Q)	Train B Return
t. Calc No. GN02-8-W-A Rev. 0	Hgr. 0-GN02-C005/231 (Q)	Train B Return
u. Calc No. GN02-12 Rev. 1	Hgr. 0-GN02-C007/232 (Q)	Train B Return
v. Calc No. GN02-12-W Rev. 4	Hgr. 0-GN02-C007/232 (Q)	Train B Return
w. Calc No. P-GN02-14 Rev. 4	Hgr. 1-GN02-C015/252 (Q)	Train B Return
x. Calc No. P-GN02-19 Rev. 5	Hgr. 1-GN02-R005/252 (Q)	Train B Return
y Calc No. GN02-10 Rev. 3	Hgr. 0-GN02-C003/231 (Q)	Train B Return
z. Calc No. GN02-10-W Rev. 0	Hgr. 0-GN02-C003/231 (Q)	Train B Return
aa. Calc No. GN02-25 Rev. 1	Hgr. 0-GN02-R009/241 (Q)	Train B Return
	Hgr. 0-GN02-R010/241 (Q)	Train B Supply
ab. Calc No. GN02-25-W Rev. 0	Hgr. 0-GN02-R009/241 (Q)	Train B Return
ac. Calc No. GN02-27 Rev. 2	Hgr. 0-GN02-C019/231 (Q)	Train B Return
	Hgr. 0-GN02-C022/231 (Q)	Train B Supply

ad. Calc No. GN02-27W Rev.0	Hgr. 1-GN02-C019/231 (Q)	Train B Return
ae. Calc No. GN02-29 Rev. 2	Hgr. 0-GN02-H001/252 (Q)	Train B Return
af. Calc No. GN02-32 Rev. 3	Hgr. 0-GN02-C011/242 (Q)	Train B Return
	Hgr. 0-GN02-C012/242 (Q)	Train B Supply
ag. Calc No. GN02-34 Rev. 4	Hgr. 0-GN02-C013/242 (Q)	Train B Return
	Hgr. 0-GN02-C014/242 (Q)	Train B Supply
ah. Calc No. GN02-34-W Rev. 0	Hgr. 0-GN02-C013/242 (Q)	Train B Return
ai. Calc No. P-GN02-39 Rev. 5	Hgr. 1-GN02-C009/242 (Q)	Train B Return
aj. Calc No. GN02-41 Rev. 3	Hgr. 0-GN02-C021/241 (Q)	Train B Return
ak. Calc No. GN02-41-W Rev. 0	Hgr. 1-GN02-C021/241 (Q)	Train B Return
al. Calc No. P-GN02-43 Rev. 3	Hgr. 1-GN02-R007/252 (Q)	Train B Return
am. Calc No. GN02-45 Rev. 1	Hgr. 0-GN02-R015/251 (Q)	Train B Return
an. Calc No. GN02-45-W Rev. 0	Hgr. 0-GN02-R015/251 (Q)	Train B Return
ao. Calc No. GN02-45-W-A Rev.0	Hgr. 0-GN02-R015/251 (Q)	Train B Return

15. Wolf Creek Nuclear Operating Corporation, Piping Class Summary, MS-01, Rev. 40, plus Design Document Change Notice dated 2/3/97.

16. Wolf Creek Nuclear Operating Corporation, Piping Class Sheets, MS-02, Rev. 42 plus Plant Modification Package Change Notice, PMP No. M-753-W-MS-02-40_01.

17. "Design of Welded Structures," by Omer W. Blodgett, The James F. Lincoln Arc Welding Foundation, 1982.

18. Bergen-Paterson Pipe Support Corp., Catalog No. 77NFR1 for Nuclear Service ASME Section III Subsection NF.

19. Grinnell Corporation DRS/LCD Package Rev. 15.

20. ALTRALUG, "A Program for the Design and Analysis of Welded Piping Attachments," Altran Document No. 92117-UM-02, Version 1, Users Manual, May 1992.

21. ASME Section III, Division 1, Nuclear Code Case N-318-3, "Procedures for Evaluation of the Design of Rectangular Cross Section Attachments on Class 2 or 3 Piping," Approval Date: September 5, 1985.

22. < Not Used >

23. AISC, "Manual of Steel Construction," Seventh Edition, 1970.

24. PD STRUDL Version 0496.

25. PIPE SMASH Version 1.0, "Waterhammer Forcing Function Generation Application", Altran Document No. 97115-UM-01, User Manual, Version 1.0.

26. PD STRUDL, Pipe Stress and Support Design Program, Version 0700.

27. Wolf Creek Nuclear Operating Corporation, Purchase Order O709547/Rev.0, dated 09/06/00.

Table 1.0 - Piping Load Combinations/Acceptance Criteria

Load Condition	**Load Combination**	**Stress Allowable**	**ASME Section III**
Normal	Dwt + P	1.0Sh	EQ 8
Faulted	Dwt + P + WH	2.4Sh	EQ 9
Thermal	Thermal or THERM ACCD	Sa	EQ 10
Thermal + Normal	Dwt + P + (Thermal or THERM ACCD)	Sa +1.0Sh	EQ.11

Where: Dwt = Pipe self-weight
P = Pressure
THERM ACCD = Thermal Accident from LOCA
Sa = f (1.25Sc + 0.25Sh)

WH = LOOP/LOCA waterhammer (Column Closure or Condensation Induced)
Thermal = Thermal Normal

Table 2.0
Pipe Support Load Combination/Design Basis Acceptance Criteria

Load Condition	**Load Combination**	**Stress Allowable**	**Stress Criteria**
Faulted	Dwt+WH+THERM ACCD	1.33S	S is AISC Code allowable

Table 3.0
Pipe Stress Summary

	Load Condition	Load Combination	Data Point	Calc. Stress (psi)	Stress Criteria	Allow Stress (psi)	Int. Ratio
Train "A" Return Line	Normal	Dwt + P	1000	6,881	1.0Sh	15,000	0.46
	Faulted	Dwt + P + WH	1290	11,898 [1]	2.4 Sh	36,000	0.33
	Thermal	THERM ACCD	2690	19,816	Sa	22,500	0.88
Train "B" Return Line	Normal	Dwt + P	215	6,715	1.0 Sh	15,000	0.45
	Faulted	Dwt +P+WH	215	11,859 [2]	2.4 Sh	36,000	0.33
	Thermal	THERM ACCD	75	12,749	Sa	22,500	0.57

Table 4.0
Containment Penetration Stress Summary

	Penetration No.	Dwt Stress (psi)	Pressure Stress (psi)	WH Stress (psi)	THERM ACCD Stress (psi)	Stress Summation (psi)	Allow. Stress (psi) [4.]	Int. Ratio
Train "A" Return Line	P-73 (N.P. 1000)	5,279	1,602	4,357 [1.]	4,897	16,135 [3.]	31,000	0.52
Train "B" Return Line	P-29 (N.P. 5)	2,090	1,598	7,469 [1.]	1,208	12,365 [3.]	31,000	0.40

Notes:
1. Stress resulting from Condensation Induced Waterhammer Event.
2. Stress resulting from Column Closure Waterhammer Event.
3. Stresses reported are from the loads from inside containment only.
4. Penetration allowable stress is Sy = 31,000 psi at 300°F for SA-106B material.

Table 5.0
Integral Welded Attachment Local Pipe Stress Summary

	Hanger Number & Data Point	Load Condition	Load Combination	Calc. Stress (psi)	Stress Criteria	Allow Stress (psi)	Int. Ratio
Train "A" Return Line	C017	Normal	Dwt + P	7,744	1.0Sh	15,000	0.52
	N.P. 1540	Faulted	Dwt + P + WH	18,645 [2.]	2.4 Sh	36,000	0.52
		Thermal	THERM ACCD	6,785	Sa	22,500	0.30
Train "B" Return Line	C009 N.P. 117	Normal	Dwt + P	2,414	1.0Sh	15,000	0.16
		Faulted	Dwt + P + WH	9,813 [1.]	2.4 Sh	36,000	0.27
		Thermal	THERM ACCD	1,562	Sa	22,500	0.07
	C021 N.P. 347	Normal	Dwt + P	6,381	1.0Sh	15,000	0.43
		Faulted	Dwt + P + WH	~~10,086~~ [2.] 13,050	2.4 Sh	36,000	~~0.28~~ 0.36 * DRV 12/28/00
		Thermal	THERM ACCD	14,089	Sa	22,500	0.63
	R013 N.P. 409	Normal	Dwt + P	1,808	1.0Sh	15,000	0.12
		Faulted	Dwt + P + WH	~~6,286~~ [2.] 9,868	2.4 Sh	36,000	~~0.18~~ 0.27 * DRV 12/28/00
		Thermal	THERM ACCD	1,535	Sa	22,500	0.07
	R007 N.P. 217	Normal	Dwt + P	4,731	1.0Sh	15,000	0.32
		Faulted	Dwt + P + WH	11,712 [2.]	2.4 Sh	36,000	0.33
		Thermal	THERM ACCD	711	Sa	22,500	0.03

Notes:
1. Stress resulting from Condensation Induced Waterhammer Event.
2. Stress resulting from Column Closure Waterhammer Event.
3. Integral Welded Attachment Stresses from Attachment H.

* COL. CLOSURE STRESSES INCREASED BY 1.8 TO ACCOUNT FOR ATTENUATION FACTOR NOTED FOR THIS REGION ON SHEETS C18, C19.
18050 = 1.8 (10086 - 6381) + 6381
9868 = 1.8 (6286 - 1808) + 1808

Table 6.0 Train "A" Return Line Pipe Support Function

Pipe Support Hanger No.	Node Point (NP)	Pipe Support Function R= Rigid
C005	1200	RX and RY
R013	1275	Snubber
C006	1340	RX and RY
H003	1380	RY
C007	1420	RX and RY
C008	1455	Lateral Rigid
C008	1460	RY
C017 (1)	1540	RX, RY, RZ
R004	1570	RX and RZ
R005	1630	RX and RZ
C019	1710	RY
C019	1715	Lateral Snubber
C018	1775	RY
C018	1780	Lateral Snubber
H005	1900	RY
R010	1980	RX
R010	1985	Z Snubber
C015	2040	RX and RY
R012	2070	X Snubber and Y Snubber
R011	2110	Z Snubber
H006	2570	RY
R014	2610	RX
R014	2615	Z Snubber
R009	2720	RX
H007	2740	RY

NOTE: (1) Integral Welded Attachment (IWA)

Table 7.0 Train "B" Return Line Pipe Support Function

Pipe Support Hanger No.	Node Point (NP)	Pipe Support Function R = Rigid
C001	40	RX and RY
C003	57	RX and RY
R001	65	RZ
C005	85	RX and RY
C007	100	RX and RY
C009 (1)	117	RX, RY, RZ
C011	140	RY, Lateral
C013	160	RY, Lateral
R003	172	Lateral
R005	187	RX and RZ
H001	215	RY
R007 (1)	217	X Snubber
C015	223	RY and RZ
C017	240	RY and RZ
C019	320	RY and RZ
R009	335	RZ
C021 (1)	347	RX, RY, RZ
R015	390	RX
C028	399	RY and RZ
C025	407	RY and RZ
R013 (1)	409	X Snubber

NOTE: (1) Integral Welded Attachment (IWA)

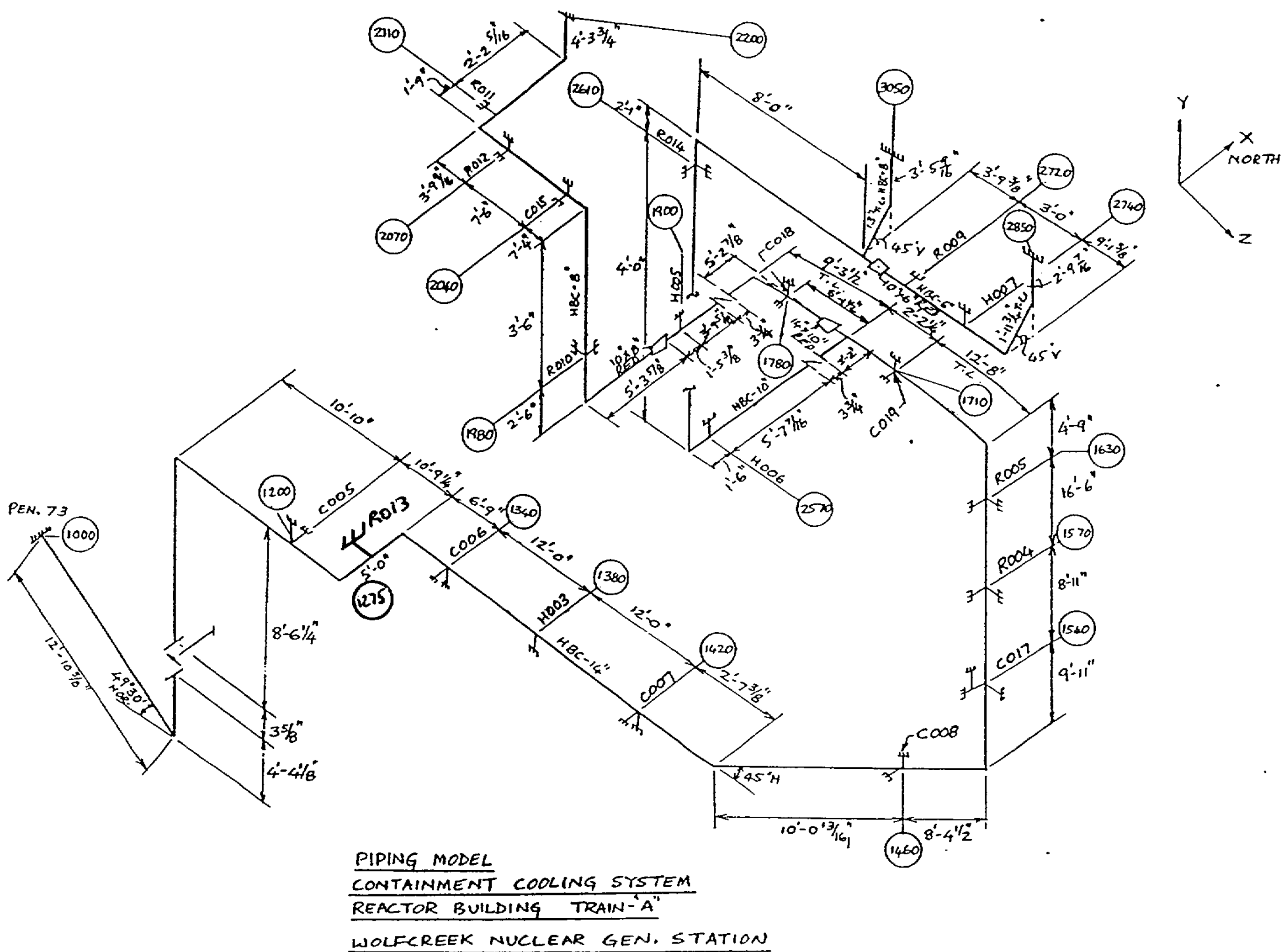

Figure 1
Stress Isometric Train "A' Return Line

Altran Corporation
Technical Report No. 96227-TR-03
Revision 1

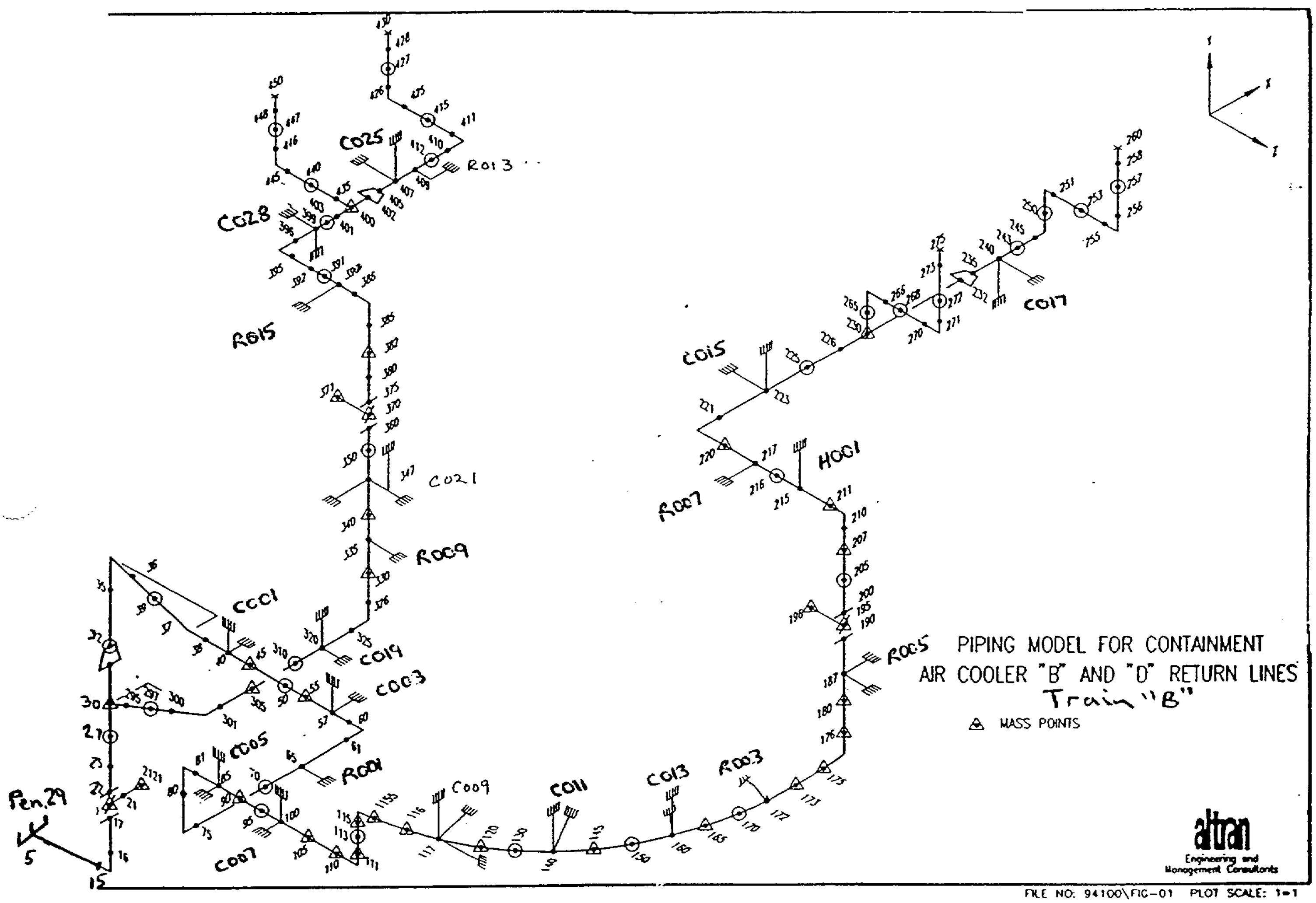

Figure 2
Stress Isometric Train "B" Return Line

ATTACHMENT A

PIPE STRESS SUMMARIES FOR TRAIN "A" AND TRAIN "B" RETURN LINES

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS

```
EXECUTION *** NORMAL/UPSET CODE STRESS SUMMATIONS    9/20/00
XPRINT        25     *            *            *            *            *            *            *
EQ             8     * .1000E+02* .0000E+00* .0000E+00* .0000E+00* .0000E+00* .0000E+00*
EQ             9     * .1000E+02* .4000E+02* .0000E+00* .0000E+00* .0000E+00* .0000E+00*
EQ            10     * .0000E+00* .2000E+02* .0000E+00* .0000E+00* .0000E+00* .0000E+00*
EQ            10     * .0000E+00* .2100E+02* .0000E+00* .0000E+00* .0000E+00* .0000E+00*
EN                   * .0000E+00* .0000E+00* .0000E+00* .0000E+00* .0000E+00* .0000E+00*
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Disregard the notation of Normal/Upset Code Stress Summations on Sheets A2 through A14. This is the analysis for the Column Closure Waterhammer Event, which is considered as a Faulted condition. 9/20/2000

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96227-TR-03 Rev. 1
Att./Appx. A Sh A2

Train B "CCWH"

ADLPIPE ... 636 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANALYS... WINDOWS 3F9.3 7/18/ 0 15:22:29

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS.. TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** ~~NORMAL/UPSET CODE STRESS SUMMATIONS~~ DSB 9/20/00

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.
1	1	5	BEG	3688.	.25	4836.	.27	1208.	.05	4896.	.13
1	1	10	END	2776.	.19	3656.	.20	1222.	.05	3998.	.11
1	2	10	BEG	2776.	.19	3656.	.20	1222.	.05	3998.	.11
1	2	12	END	2589.	.17	3414.	.19	1239.	.06	3829.	.10
1	3	12	BEG	2589.	.17	3414.	.19	1239.	.06	3829.	.10
1	3	15	END	2405.	.16	3178.	.18	1262.	.06	3667.	.10
1	4	15	BEG	3190.	.21	4716.	.26	3321.	.15	6511.	.17
1	4	16	END	2246.	.15	3030.	.17	3250.	.14	5496.	.15
1	5	16	BEG	1926.	.13	2324.	.13	1235.	.05	3161.	.08
1	5	17	END	1815.	.12	2454.	.14	1492.	.07	3306.	.09
1	6	17	BEG	1815.	.12	2454.	.14	1492.	.07	3306.	.09
1	6	20	END	1743.	.12	2303.	.13	831.	.04	2573.	.07
2	1	20	BEG	1745.	.12	1851.	.10	0.	.00	1745.	.05
2	1	21	END	1714.	.11	1813.	.10	0.	.00	1714.	.05
2	2	21	BEG	1714.	.11	1813.	.10	0.	.00	1714.	.05
2	2	2121	END	1598.	.11	1598.	.09	0.	.00	1598.	.04
3	1	20	BEG	1854.	.12	2410.	.13	831.	.04	2685.	.07
3	1	22	END	1838.	.12	2386.	.13	798.	.04	2635.	.07
3	2	22	BEG	2142.	.14	2774.	.15	919.	.04	3062.	.08
3	2	25	END	2074.	.14	2685.	.15	785.	.03	2859.	.08
3	3	25	BEG	2074.	.14	2685.	.15	785.	.03	2859.	.08
3	3	27	END	2014.	.13	2793.	.16	669.	.03	2683.	.07
3	4	27	BEG	2014.	.13	2793.	.16	669.	.03	2683.	.07
3	4	30	END	2605.	.17	4987.	.28	2752.	.12	5357.	.14
4	1	30	BEG	2568.	.17	4870.	.27	2218.	.10	4786.	.13
4	1	31	END	2139.	.14	3040.	.17	1108.	.05	3247.	.09
4	2	31	BEG	2351.	.16	3956.	.22	2490.	.11	4841.	.13
4	2	32	END	2274.	.15	3744.	.21	3212.	.14	5486.	.15

ADDITIONAL INFORMATION

NOTE: THERE IS SOME POTENTIAL FOR A SLIGHT INCREASE IN STRESS DUE TO WATERHAMMER AT THE PENETRATIONS BECAUSE OF THE NEARBY INCREASE IN ATTENUATION FACTORS NOTED ON SHEETS C18, C19. HOWEVER, STRESSES AT PEN 29 -- AS REPORTED IN TABLE 1.0 -- ARE CLEARLY CONTROLLED BY THE CIWH EVENT. THEREFORE, NO ADJUSTMENT IS MADE TO ANY PENETRATION STRESSES IN TABLE 1.0.

DAV 12/28/00

Altran Report 96227-TR-03 Rev. 1
Att./Appx. A Sh A3

Train B "CCWH"

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** ~~NORMAL/UPSET CODE STRESS SUMMATIONS~~ 9/20/00

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
4	3	32	BEG	1880.	.13	3350.	.19	2546.	.11	4426.	.12	
4	3	35	END	1857.	.12	3280.	.18	2837.	.13	4694.	.13	
4	4	35	BEG	2224.	.15	5003.	.28	7391.	.33	9615.	.26	
4	4	36	END	1894.	.13	3923.	.22	6313.	.28	8207.	.22	
4	5	36	BEG	1688.	.11	2727.	.15	2423.	.11	4111.	.11	
4	5	39	END	1595.	.11	2440.	.14	1760.	.08	3355.	.09	
4	6	39	BEG	1595.	.11	2440.	.14	1760.	.08	3355.	.09	
4	6	37	END	1701.	.11	2210.	.12	588.	.03	2288.	.06	
4	7	37	BEG	1918.	.13	2914.	.16	1531.	.07	3449.	.09	
4	7	38	END	2282.	.15	4013.	.22	1114.	.05	3396.	.09	
5	1	38	BEG	1887.	.13	2773.	.15	428.	.02	2315.	.06	
5	1	40	END	2465.	.16	4231.	.24	2790.	.12	5255.	.14	
6	1	40	BEG	2465.	.16	4231.	.24	2790.	.12	5255.	.14	
6	1	45	END	2185.	.15	4125.	.23	1774.	.08	3959.	.11	
6	2	45	BEG	2185.	.15	4125.	.23	1774.	.08	3959.	.11	
6	2	50	END	2291.	.15	3941.	.22	1124.	.05	3415.	.09	
6	3	50	BEG	2291.	.15	3941.	.22	1124.	.05	3415.	.09	
6	3	55	END	1714.	.11	2694.	.15	754.	.03	2467.	.07	
7	1	55	BEG	1714.	.11	2694.	.15	754.	.03	2467.	.07	
7	1	57	END	2258.	.15	3587.	.20	872.	.04	3130.	.08	
8	1	57	BEG	2258.	.15	3587.	.20	872.	.04	3130.	.08	
8	1	60	END	1947.	.13	2768.	.15	1522.	.07	3470.	.09	
8	2	60	BEG	2400.	.16	4004.	.22	3966.	.18	6366.	.17	
8	2	61	END	1870.	.12	5042.	.28	9156.	.41	11026.	.29	
9	1	61	BEG	1676.	.11	3299.	.18	3515.	.16	5191.	.14	
9	1	65	END	2218.	.15	6759.	.38	2695.	.12	4913.	.13	
10	1	65	BEG	2218.	.15	6759.	.38	2695.	.12	4913.	.13	
10	1	70	END	2037.	.14	3642.	.20	3278.	.15	5315.	.14	
10	2	70	BEG	2037.	.14	3642.	.20	3278.	.15	5315.	.14	
10	2	75	END	1641.	.11	2309.	.13	4894.	.22	6535.	.17	

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Att./Appx. A Sh A4

Train B "CCWA"

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** ~~NORMAL/UPSET CODE STRESS SUMMATIONS~~ TSB 9/12/00

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
10	3	75	BEG	1802.	.12	3107.	.17	12749.	.57	14551.	.39	
10	3	80	END	1751.	.12	4049.	.22	10857.	.48	12608.	.34	
10	4	80	BEG	1751.	.12	4049.	.22	10857.	.48	12608.	.34	
10	4	81	END	2208.	.15	4812.	.27	4262.	.19	6470.	.17	
11	1	81	BEG	1849.	.12	3182.	.18	1636.	.07	3485.	.09	
11	1	85	END	2121.	.14	3500.	.19	765.	.03	2886.	.08	
12	1	85	BEG	2121.	.14	3500.	.19	765.	.03	2886.	.08	
12	1	90	END	2469.	.16	3918.	.22	953.	.04	3422.	.09	
12	2	90	BEG	2469.	.16	3918.	.22	953.	.04	3422.	.09	
12	2	95	END	2062.	.14	3605.	.20	1216.	.05	3277.	.09	
13	1	95	BEG	2062.	.14	3605.	.20	1216.	.05	3277.	.09	
13	1	100	END	2963.	.20	4922.	.27	1481.	.07	4444.	.12	
14	1	100	BEG	2963.	.20	4922.	.27	1481.	.07	4444.	.12	
14	1	105	END	1622.	.11	3388.	.19	870.	.04	2492.	.07	
14	2	105	BEG	1622.	.11	3388.	.19	870.	.04	2492.	.07	
14	2	110	END	1606.	.11	4960.	.28	1968.	.09	3573.	.10	
14	3	110	BEG	1733.	.12	8286.	.46	5126.	.23	6859.	.18	
14	3	111	END	1506.	.10	5799.	.32	3875.	.17	5381.	.14	
14	4	111	BEG	1490.	.10	3687.	.20	1487.	.07	2977.	.08	
14	4	113	END	1539.	.10	2795.	.16	1011.	.04	2550.	.07	
14	5	113	BEG	1539.	.10	2795.	.16	1011.	.04	2550.	.07	
14	5	115	END	1591.	.11	2917.	.16	800.	.04	2391.	.06	
14	6	115	BEG	1705.	.11	4295.	.24	2083.	.09	3788.	.10	
14	6	1155	END	1875.	.12	5474.	.30	2405.	.11	4280.	.11	
14	7	1155	BEG	1679.	.11	3521.	.20	923.	.04	2602.	.07	
14	7	116	END	1783.	.12	3523.	.20	867.	.04	2650.	.07	
15	1	116	BEG	1783.	.12	3523.	.20	867.	.04	2650.	.07	
15	1	117	END	2337.	.16	4243.	.24	621.	.03	2958.	.08	
16	1	117	BEG	2337.	.16	4243.	.24	621.	.03	2958.	.08	
16	1	120	END	1758.	.12	3917.	.22	675.	.03	2433.	.06	

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Train B "CCWR"

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** ~~NORMAL/UPSET CODE STRESS SUMMATIONS~~ Faulted

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
16	2	120	BEG	1758.	.12	3917.	.22	675.	.03	2433.	.06	
16	2	130	END	1843.	.12	3780.	.21	995.	.04	2838.	.08	
17	1	130	BEG	1843.	.12	3780.	.21	995.	.04	2838.	.08	
17	1	140	END	2083.	.14	4039.	.22	1438.	.06	3521.	.09	
18	1	140	BEG	2083.	.14	4039.	.22	1438.	.06	3521.	.09	
18	1	145	END	1800.	.12	3088.	.17	391.	.02	2190.	.06	
18	2	145	BEG	1800.	.12	3088.	.17	391.	.02	2190.	.06	
18	2	150	END	1638.	.11	2766.	.15	1034.	.05	2672.	.07	
19	1	150	BEG	1638.	.11	2766.	.15	1034.	.05	2672.	.07	
19	1	160	END	3540.	.24	4918.	.27	2183.	.10	5723.	.15	
20	1	160	BEG	3540.	.24	4918.	.27	2183.	.10	5723.	.15	
20	1	165	END	1648.	.11	2810.	.16	874.	.04	2522.	.07	
20	2	165	BEG	1648.	.11	2810.	.16	874.	.04	2522.	.07	
20	2	170	END	2426.	.16	3648.	.20	1001.	.04	3427.	.09	
21	1	170	BEG	2426.	.16	3648.	.20	1001.	.04	3427.	.09	
21	1	172	END	2091.	.14	3133.	.17	2353.	.10	4443.	.12	
22	1	172	BEG	2091.	.14	3133.	.17	2353.	.10	4443.	.12	
22	1	173	END	1830.	.12	2985.	.17	2701.	.12	4531.	.12	
22	2	173	BEG	1830.	.12	2985.	.17	2701.	.12	4531.	.12	
22	2	175	END	1781.	.12	2950.	.16	2759.	.12	4540.	.12	
22	3	175	BEG	2075.	.14	4360.	.24	7188.	.32	9263.	.25	
22	3	176	END	1641.	.11	3259.	.18	7207.	.32	8848.	.24	
22	4	176	BEG	1559.	.10	2387.	.13	2767.	.12	4325.	.12	
22	4	180	END	1709.	.11	4654.	.26	1147.	.05	2857.	.08	
23	1	180	BEG	1709.	.11	4654.	.26	1147.	.05	2857.	.08	
23	1	187	END	1982.	.13	4842.	.27	2587.	.11	4570.	.12	
24	1	187	BEG	1982.	.13	4842.	.27	2587.	.11	4570.	.12	
24	1	190	END	1870.	.12	3766.	.21	1750.	.08	3620.	.10	
24	2	190	BEG	1870.	.12	3766.	.21	1750.	.08	3620.	.10	
24	2	195	END	1900.	.13	3784.	.21	1715.	.08	3615.	.10	

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Train B "CCWH"

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** ~~NORMAL/UPSET CODE STRESS SUMMATIONS~~

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
25	1	195	BEG	1504.	.10	1559.	.09	0.	.00	1504.	.04	
25	1	196	END	1473.	.10	1473.	.08	0.	.00	1473.	.04	
26	1	195	BEG	1926.	.13	3865.	.21	1715.	.08	3641.	.10	
26	1	200	END	1946.	.13	3873.	.22	1693.	.08	3639.	.10	
26	2	200	BEG	1946.	.13	3873.	.22	1693.	.08	3639.	.10	
26	2	205	END	2199.	.15	4011.	.22	1433.	.06	3633.	.10	
26	3	205	BEG	2199.	.15	4011.	.22	1433.	.06	3633.	.10	
26	3	207	END	2376.	.16	4145.	.23	1276.	.06	3652.	.10	
26	4	207	BEG	2376.	.16	4145.	.23	1276.	.06	3652.	.10	
26	4	210	END	3579.	.24	5574.	.31	1063.	.05	4642.	.12	
26	5	210	BEG	5588.	.37	9486.	.53	2769.	.12	8357.	.22	
26	5	211	END	2549.	.17	4155.	.23	2581.	.11	5130.	.14	
27	1	211	BEG	2023.	.13	2845.	.16	991.	.04	3014.	.08	
27	1	215	END	6715.	.45	11859.	.66	713.	.03	7428.	.20	
28	1	215	BEG	6715.	.45	11859.	.66	713.	.03	7428.	.20	
28	1	216	END	6190.	.41	10852.	.60	710.	.03	6901.	.18	
29	1	216	BEG	6190.	.41	10852.	.60	710.	.03	6901.	.18	
29	1	217	END	4731.	.32	8006.	.44	711.	.03	5442.	.15	
30	1	217	BEG	4731.	.32	8006.	.44	711.	.03	5442.	.15	
30	1	220	END	2670.	.18	4266.	.24	731.	.03	3401.	.09	
30	2	220	BEG	3812.	.25	6931.	.39	1905.	.08	5716.	.15	
30	2	221	END	2780.	.19	7407.	.41	2366.	.11	5146.	.14	
31	1	221	BEG	2142.	.14	4510.	.25	908.	.04	3050.	.08	
31	1	223	END	2600.	.17	5461.	.30	1003.	.04	3603.	.10	
32	1	223	BEG	2600.	.17	5461.	.30	1003.	.04	3603.	.10	
32	1	225	END	2883.	.19	5018.	.28	588.	.03	3471.	.09	
32	2	225	BEG	2883.	.19	5018.	.28	588.	.03	3471.	.09	
32	2	226	END	2584.	.17	3229.	.18	331.	.01	2915.	.08	
32	3	226	BEG	2584.	.17	3229.	.18	331.	.01	2915.	.08	
32	3	230	END	3269.	.22	4163.	.23	995.	.04	4264.	.11	

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Train B "CCWH"

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** ~~NORMAL/UPSET CODE STRESS SUMMATIONS~~ [initials] 9/20/00

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
33	1	230	BEG	3255.	.22	4878.	.27	2604.	.12	5859.	.16	
33	1	232	END	2366.	.16	3155.	.18	891.	.04	3257.	.09	
33	2	232	BEG	3111.	.21	4557.	.25	2178.	.10	5289.	.14	
33	2	235	END	2935.	.20	4202.	.23	1774.	.08	4709.	.13	
34	1	235	BEG	2758.	.18	3988.	.22	1291.	.06	4049.	.11	
34	1	240	END	2837.	.19	3601.	.20	2099.	.09	4935.	.13	
35	1	240	BEG	2837.	.19	3601.	.20	2099.	.09	4935.	.13	
35	1	243	END	1968.	.13	2934.	.16	1014.	.05	2982.	.08	
35	2	243	BEG	1968.	.13	2934.	.16	1014.	.05	2982.	.08	
35	2	245	END	1463.	.10	2797.	.16	445.	.02	1907.	.05	
35	3	245	BEG	1565.	.10	4005.	.22	1085.	.05	2650.	.07	
35	3	250	END	1599.	.11	4098.	.23	1908.	.08	3507.	.09	
35	4	250	BEG	1599.	.11	4098.	.23	1908.	.08	3507.	.09	
35	4	251	END	1567.	.10	3386.	.19	1505.	.07	3072.	.08	
35	5	251	BEG	1464.	.10	2458.	.14	617.	.03	2081.	.06	
35	5	253	END	1389.	.09	1751.	.10	245.	.01	1634.	.04	
35	6	253	BEG	1389.	.09	1751.	.10	245.	.01	1634.	.04	
35	6	255	END	1466.	.10	1770.	.10	283.	.01	1749.	.05	
35	7	255	BEG	1571.	.10	2127.	.12	690.	.03	2261.	.06	
35	7	256	END	1829.	.12	3327.	.18	540.	.02	2369.	.06	
35	8	256	BEG	1607.	.11	2426.	.13	222.	.01	1829.	.05	
35	8	257	END	1588.	.11	2919.	.16	322.	.01	1910.	.05	
35	9	257	BEG	1588.	.11	2919.	.16	322.	.01	1910.	.05	
35	9	258	END	1573.	.10	3381.	.19	662.	.03	2235.	.06	
35	10	258	BEG	1573.	.10	3381.	.19	662.	.03	2235.	.06	
35	10	260	END	1571.	.10	3456.	.19	715.	.03	2286.	.06	
37	1	230	BEG	1737.	.12	4906.	.27	5904.	.26	7641.	.20	
37	1	265	END	2042.	.14	4258.	.24	4437.	.20	6479.	.17	
37	2	265	BEG	2264.	.15	5053.	.28	5585.	.25	7849.	.21	
37	2	266	END	2315.	.15	4622.	.26	4916.	.22	7231.	.19	

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Train B "CCWH"

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** ~~NORMAL/UPSET CODE STRESS SUMMATIONS~~ 8/9/00

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
37	3	266	BEG	2082.	.14	3915.	.22	3906.	.17	5988.	.16	
37	3	268	END	1325.	.09	2116.	.12	912.	.04	2236.	.06	
37	4	268	BEG	1325.	.09	2116.	.12	912.	.04	2236.	.06	
37	4	270	END	1918.	.13	3189.	.18	3754.	.17	5673.	.15	
37	5	270	BEG	2109.	.14	3708.	.21	4725.	.21	6834.	.18	
37	5	271	END	2333.	.16	3750.	.21	4382.	.19	6714.	.18	
37	6	271	BEG	2096.	.14	3223.	.18	3481.	.15	5578.	.15	
37	6	272	END	1493.	.10	2069.	.11	846.	.04	2339.	.06	
37	7	272	BEG	1493.	.10	2069.	.11	846.	.04	2339.	.06	
37	7	273	END	1231.	.08	2665.	.15	3235.	.14	4466.	.12	
37	8	273	BEG	1231.	.08	2665.	.15	3235.	.14	4466.	.12	
37	8	275	END	1250.	.08	2405.	.13	1985.	.09	3235.	.09	
39	1	30	BEG	3670.	.24	6905.	.38	4247.	.19	7917.	.21	
39	1	295	END	2252.	.15	3530.	.20	1209.	.05	3461.	.09	
39	2	295	BEG	2252.	.15	3530.	.20	1209.	.05	3461.	.09	
39	2	297	END	2095.	.14	3210.	.18	1020.	.05	3115.	.08	
39	3	297	BEG	2095.	.14	3210.	.18	1020.	.05	3115.	.08	
39	3	300	END	1669.	.11	2212.	.12	522.	.02	2191.	.06	
39	4	300	BEG	1856.	.12	2917.	.16	1360.	.06	3216.	.09	
39	4	301	END	1929.	.13	2974.	.17	1506.	.07	3435.	.09	
39	5	301	BEG	1706.	.11	2241.	.12	578.	.03	2284.	.06	
39	5	305	END	2151.	.14	2798.	.16	1804.	.08	3955.	.11	
39	6	305	BEG	2151.	.14	2798.	.16	1804.	.08	3955.	.11	
39	6	310	END	1977.	.13	2737.	.15	3457.	.15	5434.	.14	
40	1	310	BEG	1977.	.13	2737.	.15	3457.	.15	5434.	.14	
40	1	320	END	2924.	.19	3569.	.20	6161.	.27	9085.	.24	
41	1	320	BEG	2924.	.19	3569.	.20	6161.	.27	9085.	.24	
41	1	325	END	1560.	.10	1892.	.11	1966.	.09	3526.	.09	
41	2	325	BEG	1643.	.11	2293.	.13	5122.	.23	6766.	.18	
41	2	326	END	1942.	.13	2356.	.13	10597.	.47	12539.	.33	

SEE SHEET A12

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Att./Appx. A Sh A9

Train B "CCWH"

OAV 12/28/00

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** ~~NORMAL/UPSET CODE STRESS SUMMATIONS~~ DSB 12/14/00

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
41	3	326	BEG	1713.	.11	1925.	.11	4068.	.18	5781.	.15	
41	3	330	END	1648.	.11	2788.	.15	2866.	.13	4513.	.12	
42	1	330	BEG	1648.	.11	2788.	.15	2866.	.13	4513.	.12	
42	1	335	END	1560.	.10	2239.	.12	1014.	.05	2574.	.07	
43	1	335	BEG	1560.	.10	2239.	.12	1014.	.05	2574.	.07	
43	1	340	END	1521.	.10	1950.	.11	914.	.04	2435.	.06	
44	1	340	BEG	1521.	.10	1950.	.11	914.	.04	2435.	.06	
44	1	347	END	1609.	.11	2542.	.14	2528.	.11	4137.	.11	
45	1	347	BEG	1609.	.11	2542.	.14	2528.	.11	4137.	.11	
45	1	350	END	1558.	.10	2174.	.12	1950.	.09	3508.	.09	
45	2	350	BEG	1558.	.10	2174.	.12	1950.	.09	3508.	.09	
45	2	360	END	1510.	.10	2045.	.11	1289.	.06	2799.	.07	
45	3	360	BEG	1510.	.10	2045.	.11	1289.	.06	2799.	.07	
45	3	370	END	1511.	.10	2058.	.11	1278.	.06	2789.	.07	
46	1	370	BEG	1504.	.10	1523.	.08	0.	.00	1504.	.04	
46	1	371	END	1473.	.10	1473.	.08	0.	.00	1473.	.04	
47	1	370	BEG	1519.	.10	2057.	.11	1278.	.06	2797.	.07	
47	1	375	END	1519.	.10	2056.	.11	1271.	.06	2790.	.07	
47	2	375	BEG	1519.	.10	2056.	.11	1271.	.06	2790.	.07	
47	2	380	END	1516.	.10	2048.	.11	1220.	.05	2736.	.07	
47	3	380	BEG	1516.	.10	2048.	.11	1220.	.05	2736.	.07	
47	3	382	END	1519.	.10	2050.	.11	1215.	.05	2734.	.07	
47	4	382	BEG	1519.	.10	2050.	.11	1215.	.05	2734.	.07	
47	4	385	END	1588.	.11	1744.	.10	1703.	.08	3292.	.09	
47	5	385	BEG	1699.	.11	2002.	.11	4437.	.20	6136.	.16	
47	5	386	END	1762.	.12	2052.	.11	4189.	.19	5951.	.16	
48	1	386	BEG	1621.	.11	1769.	.10	1608.	.07	3229.	.09	
48	1	390	END	1645.	.11	1781.	.10	1560.	.07	3206.	.09	
49	1	390	BEG	1645.	.11	1781.	.10	1560.	.07	3206.	.09	
49	1	391	END	1851.	.12	2173.	.12	789.	.04	2640.	.07	

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Train B "CCWH"

See Sheet A12

DQV 12/28/00

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** ~~NORMAL/UPSET CODE STRESS SUMMATIONS~~

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
49	2	391	BEG	1851.	.12	2173.	.12	789.	.04	2640.	.07	
49	2	392	END	1855.	.12	2112.	.12	628.	.03	2483.	.07	
49	3	392	BEG	1855.	.12	2112.	.12	628.	.03	2483.	.07	
49	3	395	END	1686.	.11	1865.	.10	1072.	.05	2758.	.07	
49	4	395	BEG	1889.	.13	2239.	.12	2794.	.12	4683.	.12	
49	4	396	END	1651.	.11	1862.	.10	3249.	.14	4901.	.13	
50	1	396	BEG	1564.	.10	1672.	.09	1247.	.06	2811.	.07	
50	1	399	END	2291.	.15	2871.	.16	1231.	.05	3522.	.09	
51	1	399	BEG	2291.	.15	2871.	.16	1231.	.05	3522.	.09	
51	1	403	END	1864.	.12	2346.	.13	1046.	.05	2910.	.08	
51	2	403	BEG	1864.	.12	2346.	.13	1046.	.05	2910.	.08	
51	2	401	END	1602.	.11	1912.	.11	1219.	.05	2821.	.08	
51	3	401	BEG	1602.	.11	1912.	.11	1219.	.05	2821.	.08	
51	3	400	END	1687.	.11	2106.	.12	2496.	.11	4183.	.11	
52	1	400	BEG	1666.	.11	1873.	.10	1870.	.08	3536.	.09	
52	1	402	END	1612.	.11	1739.	.10	842.	.04	2454.	.07	
52	2	402	BEG	2203.	.15	2869.	.16	5882.	.26	8085.	.22	
52	2	405	END	2178.	.15	2765.	.15	5075.	.23	7252.	.19	
53	1	405	BEG	1657.	.11	2052.	.11	2558.	.11	4215.	.11	
53	1	407	END	2091.	.14	2383.	.13	2098.	.09	4190.	.11	
54	1	407	BEG	2091.	.14	2383.	.13	2098.	.09	4190.	.11	
54	1	409	END	1808.	.12	2065.	.11	1535.	.07	3343.	.09	
55	1	409	BEG	1808.	.12	2065.	.11	1535.	.07	3343.	.09	
55	1	412	END	1351.	.09	1620.	.09	157.	.01	1508.	.04	
55	2	412	BEG	1351.	.09	1620.	.09	157.	.01	1508.	.04	
55	2	410	END	1401.	.09	1642.	.09	3251.	.14	4651.	.12	
55	3	410	BEG	1457.	.10	1761.	.10	4092.	.18	5549.	.15	
55	3	411	END	1353.	.09	1569.	.09	4503.	.20	5856.	.16	
55	4	411	BEG	1318.	.09	1489.	.08	3578.	.16	4896.	.13	
55	4	415	END	1254.	.08	1387.	.08	1900.	.08	3154.	.08	

SEE SHEET A12

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Att./Appx. A Sh A11

Train B "CCWH"

DAV 12/28/00

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-RR-
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** ~~NORMAL/UPSET CODE STRESS SUMMATIONS~~ RR 9/12/00

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
55	5	415	BEG	1254.	.08	1387.	.08	1900.	.08	3154.	.08	
55	5	425	END	1528.	.10	1722.	.10	3659.	.16	5187.	.14	
55	6	425	BEG	1618.	.11	1862.	.10	4605.	.20	6223.	.17	
55	6	426	END	1840.	.12	2096.	.12	4106.	.18	5947.	.16	
55	7	426	BEG	1705.	.11	1908.	.11	3262.	.14	4968.	.13	
55	7	427	END	1476.	.10	1692.	.09	632.	.03	2108.	.06	
55	8	427	BEG	1476.	.10	1692.	.09	632.	.03	2108.	.06	
55	8	428	END	1462.	.10	1890.	.10	2646.	.12	4108.	.11	
55	9	428	BEG	1462.	.10	1890.	.10	2646.	.12	4108.	.11	
55	9	430	END	1384.	.09	1717.	.10	1570.	.07	2953.	.08	
57	1	400	BEG	1391.	.09	1963.	.11	1741.	.08	3132.	.08	
57	1	435	END	1394.	.09	1753.	.10	1165.	.05	2558.	.07	
57	2	435	BEG	1394.	.09	1753.	.10	1165.	.05	2558.	.07	
57	2	440	END	1408.	.09	1722.	.10	1235.	.05	2643.	.07	
57	3	440	BEG	1408.	.09	1722.	.10	1235.	.05	2643.	.07	
57	3	445	END	1481.	.10	1709.	.09	1448.	.06	2930.	.08	
57	4	445	BEG	1599.	.11	2015.	.11	3532.	.16	5131.	.14	
57	4	446	END	1716.	.11	1966.	.11	2509.	.11	4225.	.11	
57	5	446	BEG	1545.	.10	1682.	.09	1029.	.05	2574.	.07	
57	5	447	END	1431.	.10	1753.	.10	436.	.02	1867.	.05	
57	6	447	BEG	1431.	.10	1753.	.10	436.	.02	1867.	.05	
57	6	448	END	1393.	.09	2081.	.12	1788.	.08	3181.	.08	
57	7	448	BEG	1393.	.09	2081.	.12	1788.	.08	3181.	.08	
57	7	450	END	1399.	.09	2119.	.12	1895.	.08	3294.	.09	

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Train B "CCWH"

CCWH STRESSES SHOULD BE INCREASED BY ≈ 1.8* BASED ON INCREASED ATTENUATION NOTED ON SHEETS C18, C19 FOR THESE SEGMENTS. FOR SIMPLICITY, THE LARGEST EQN 9 STRESS IN THIS REGION -- 3569 psi AT NODE 320 -- IS MULTIPLIED BY 1.8 TO GET 6,424 psi.** THIS IS LESS THAN THE MAX STRESS REPORTED ON SHT A13 AND, THUS, THE STRESS SUMMARY OF TABLE 3.0 IS UNCHANGED.

RRV 12/28/00

* $\frac{1}{.566} \approx 1.8$

** CONSERVATIVE SINCE ONLY THE DIFFERENCE BETWEEN EQN 9 AND EQN 8 RESULTS NEED BE INCREASED BY 1.8.

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** ~~NORMAL/UPSET CODE STRESS SUMMATIONS~~ DB 9/12/00

CLASS 2,LEVEL A SUMMARY OF 10 HIGHEST STRESSES FOR EACH EQUATION

*****EQUATION 8 *****

	SEC	MEM	SEQ	POS	STRESS (PSI)	TOTAL/ ALLOWABLE
1.	27	1	215	END	6715.	.45
2.	28	1	215	BEG	6715.	.45
3.	28	1	216	END	6190.	.41
4.	29	1	216	BEG	6190.	.41
5.	26	5	210	BEG	5588.	.37
6.	29	1	217	END	4731.	.32
7.	30	1	217	BEG	4731.	.32
8.	30	2	220	BEG	3812.	.25
9.	1	1	5	BEG	3688.	.25
10.	39	1	30	BEG	3670.	.24

*****EQUATION 9 ***** (Results for Column Closure Waterhammer Event)

	SEC	MEM	SEQ	POS	STRESS (PSI)	TOTAL/ ALLOWABLE
1.	27	1	215	END	11859.	.66
2.	28	1	215	BEG	11859.	.66
3.	28	1	216	END	10852.	.60
4.	29	1	216	BEG	10852.	.60
5.	26	5	210	BEG	9486.	.53
6.	14	3	110	BEG	8286.	.46
7.	29	1	217	END	8006.	.44
8.	30	1	217	BEG	8006.	.44
9.	30	2	221	END	7407.	.41
10.	30	2	220	BEG	6931.	.39

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(Train B "CCWH")

*****EQUATION 10 *****

	SEC	MEM	SEQ	POS	STRESS (PSI)	TOTAL/ ALLOWABLE
1.	10	3	75	BEG	12749.	.57
2.	10	3	80	END	10857.	.48
3.	10	4	80	BEG	10857.	.48
4.	41	2	326	END	10597.	.47
5.	8	2	61	END	9156.	.41
6.	4	4	35	BEG	7391.	.33
7.	22	3	176	END	7207.	.32
8.	22	3	175	BEG	7188.	.32
9.	4	4	36	END	6313.	.28
10.	40	1	320	END	6161.	.27

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** ~~NORMAL/UPSET CODE STRESS SUMMATIONS~~ ESB 9/12/00

CLASS 2,LEVEL A SUMMARY OF 10 HIGHEST STRESSES FOR EACH EQUATION

*****EQUATION 11 *****

	SEC	MEM	SEQ	POS	STRESS (PSI)	TOTAL/ ALLOWABLE
1.	10	3	75	BEG	14551.	.39
2.	10	3	80	END	12608.	.34
3.	10	4	80	BEG	12608.	.34
4.	41	2	326	END	12539.	.33
5.	8	2	61	END	11026.	.29
6.	4	4	35	BEG	9615.	.26
7.	22	3	175	BEG	9263.	.25
8.	40	1	320	END	9085.	.24
9.	41	1	320	BEG	9085.	.24
10.	22	3	176	END	8848.	.24

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Train B "CCWH"

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS

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EXECUTION *** FAULTED CODE STRESS SUMMATIONS
CLASS                  *          2*       1974*           *           *           *           *
XPRINT        25       *           *           *           *           *           *           *
EQ             9       * .1000E+02* .3000E+02* .0000E+00* .0000E+00* .0000E+00* .0000E+00*
EN                     * .0000E+00* .0000E+00* .0000E+00* .0000E+00* .0000E+00* .0000E+00*
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Condensation Induced Waterhammer Event summary of stresses
DB 9/20/2000

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Train B
CIWH

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** FAULTED CODE STRESS SUMMATIONS

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
1	1	5	BEG	0.	.00	11157.	.62	0.	.00	0.	.00	
1	1	10	END	0.	.00	7278.	.40	0.	.00	0.	.00	
1	2	10	BEG	0.	.00	7278.	.40	0.	.00	0.	.00	
1	2	12	END	0.	.00	6501.	.36	0.	.00	0.	.00	
1	3	12	BEG	0.	.00	6501.	.36	0.	.00	0.	.00	
1	3	15	END	0.	.00	5776.	.32	0.	.00	0.	.00	
1	4	15	BEG	0.	.00	9844.	.55	0.	.00	0.	.00	
1	4	16	END	0.	.00	5878.	.33	0.	.00	0.	.00	
1	5	16	BEG	0.	.00	3767.	.21	0.	.00	0.	.00	
1	5	17	END	0.	.00	6875.	.38	0.	.00	0.	.00	
1	6	17	BEG	0.	.00	6875.	.38	0.	.00	0.	.00	
1	6	20	END	0.	.00	6319.	.35	0.	.00	0.	.00	
2	1	20	BEG	0.	.00	2456.	.14	0.	.00	0.	.00	
2	1	21	END	0.	.00	2379.	.13	0.	.00	0.	.00	
2	2	21	BEG	0.	.00	2379.	.13	0.	.00	0.	.00	
2	2	2121	END	0.	.00	1598.	.09	0.	.00	0.	.00	
3	1	20	BEG	0.	.00	6524.	.36	0.	.00	0.	.00	
3	1	22	END	0.	.00	6431.	.36	0.	.00	0.	.00	
3	2	22	BEG	0.	.00	7435.	.41	0.	.00	0.	.00	
3	2	25	END	0.	.00	7018.	.39	0.	.00	0.	.00	
3	3	25	BEG	0.	.00	7018.	.39	0.	.00	0.	.00	
3	3	27	END	0.	.00	6523.	.36	0.	.00	0.	.00	
3	4	27	BEG	0.	.00	6523.	.36	0.	.00	0.	.00	
3	4	30	END	0.	.00	7556.	.42	0.	.00	0.	.00	
4	1	30	BEG	0.	.00	8231.	.46	0.	.00	0.	.00	
4	1	31	END	0.	.00	3815.	.21	0.	.00	0.	.00	
4	2	31	BEG	0.	.00	5337.	.30	0.	.00	0.	.00	
4	2	32	END	0.	.00	4157.	.23	0.	.00	0.	.00	

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Train B
CIWA

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** FAULTED CODE STRESS SUMMATIONS

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
4	3	32	BEG	0.	.00	3763.	.21	0.	.00	0.	.00	
4	3	35	END	0.	.00	3278.	.18	0.	.00	0.	.00	
4	4	35	BEG	0.	.00	4999.	.28	0.	.00	0.	.00	
4	4	36	END	0.	.00	4899.	.27	0.	.00	0.	.00	
4	5	36	BEG	0.	.00	3227.	.18	0.	.00	0.	.00	
4	5	39	END	0.	.00	3650.	.20	0.	.00	0.	.00	
4	6	39	BEG	0.	.00	3650.	.20	0.	.00	0.	.00	
4	6	37	END	0.	.00	3399.	.19	0.	.00	0.	.00	
4	7	37	BEG	0.	.00	5236.	.29	0.	.00	0.	.00	
4	7	38	END	0.	.00	4841.	.27	0.	.00	0.	.00	
5	1	38	BEG	0.	.00	3197.	.18	0.	.00	0.	.00	
5	1	40	END	0.	.00	3975.	.22	0.	.00	0.	.00	
6	1	40	BEG	0.	.00	3975.	.22	0.	.00	0.	.00	
6	1	45	END	0.	.00	3641.	.20	0.	.00	0.	.00	
6	2	45	BEG	0.	.00	3641.	.20	0.	.00	0.	.00	
6	2	50	END	0.	.00	3845.	.21	0.	.00	0.	.00	
6	3	50	BEG	0.	.00	3845.	.21	0.	.00	0.	.00	
6	3	55	END	0.	.00	3468.	.19	0.	.00	0.	.00	
7	1	55	BEG	0.	.00	3468.	.19	0.	.00	0.	.00	
7	1	57	END	0.	.00	6097.	.34	0.	.00	0.	.00	
8	1	57	BEG	0.	.00	6097.	.34	0.	.00	0.	.00	
8	1	60	END	0.	.00	3212.	.18	0.	.00	0.	.00	
8	2	60	BEG	0.	.00	4871.	.27	0.	.00	0.	.00	
8	2	61	END	0.	.00	5847.	.32	0.	.00	0.	.00	
9	1	61	BEG	0.	.00	3712.	.21	0.	.00	0.	.00	
9	1	65	END	0.	.00	8958.	.50	0.	.00	0.	.00	
10	1	65	BEG	0.	.00	8958.	.50	0.	.00	0.	.00	
10	1	70	END	0.	.00	4476.	.25	0.	.00	0.	.00	
10	2	70	BEG	0.	.00	4476.	.25	0.	.00	0.	.00	
10	2	75	END	0.	.00	2825.	.16	0.	.00	0.	.00	

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Train B
CIWH

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** FAULTED CODE STRESS SUMMATIONS

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
10	3	75	BEG	0.	.00	4115.	.23	0.	.00	0.	.00	
10	3	80	END	0.	.00	5978.	.33	0.	.00	0.	.00	
10	4	80	BEG	0.	.00	5978.	.33	0.	.00	0.	.00	
10	4	81	END	0.	.00	5072.	.28	0.	.00	0.	.00	
11	1	81	BEG	0.	.00	3315.	.18	0.	.00	0.	.00	
11	1	85	END	0.	.00	4544.	.25	0.	.00	0.	.00	
12	1	85	BEG	0.	.00	4544.	.25	0.	.00	0.	.00	
12	1	90	END	0.	.00	3544.	.20	0.	.00	0.	.00	
12	2	90	BEG	0.	.00	3544.	.20	0.	.00	0.	.00	
12	2	95	END	0.	.00	4395.	.24	0.	.00	0.	.00	
13	1	95	BEG	0.	.00	4395.	.24	0.	.00	0.	.00	
13	1	100	END	0.	.00	6904.	.38	0.	.00	0.	.00	
14	1	100	BEG	0.	.00	6904.	.38	0.	.00	0.	.00	
14	1	105	END	0.	.00	7206.	.40	0.	.00	0.	.00	
14	2	105	BEG	0.	.00	7206.	.40	0.	.00	0.	.00	
14	2	110	END	0.	.00	4883.	.27	0.	.00	0.	.00	
14	3	110	BEG	0.	.00	8136.	.45	0.	.00	0.	.00	
14	3	111	END	0.	.00	5822.	.32	0.	.00	0.	.00	
14	4	111	BEG	0.	.00	3699.	.21	0.	.00	0.	.00	
14	4	113	END	0.	.00	2661.	.15	0.	.00	0.	.00	
14	5	113	BEG	0.	.00	2661.	.15	0.	.00	0.	.00	
14	5	115	END	0.	.00	2954.	.16	0.	.00	0.	.00	
14	6	115	BEG	0.	.00	4367.	.24	0.	.00	0.	.00	
14	6	1155	END	0.	.00	6518.	.36	0.	.00	0.	.00	
14	7	1155	BEG	0.	.00	4055.	.23	0.	.00	0.	.00	
14	7	116	END	0.	.00	4160.	.23	0.	.00	0.	.00	
15	1	116	BEG	0.	.00	4160.	.23	0.	.00	0.	.00	
15	1	117	END	0.	.00	6238.	.35	0.	.00	0.	.00	
16	1	117	BEG	0.	.00	6238.	.35	0.	.00	0.	.00	
16	1	120	END	0.	.00	5894.	.33	0.	.00	0.	.00	

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Train B
CIWH

ADLPIPE E 655 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANAL. WINDOWS 3F9.3 7/18/ 0 15:22:29

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** FAULTED CODE STRESS SUMMATIONS

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
16	2	120	BEG	0.	.00	5894.	.33	0.	.00	0.	.00	
16	2	130	END	0.	.00	4763.	.26	0.	.00	0.	.00	
17	1	130	BEG	0.	.00	4763.	.26	0.	.00	0.	.00	
17	1	140	END	0.	.00	4946.	.27	0.	.00	0.	.00	
18	1	140	BEG	0.	.00	4946.	.27	0.	.00	0.	.00	
18	1	145	END	0.	.00	2872.	.16	0.	.00	0.	.00	
18	2	145	BEG	0.	.00	2872.	.16	0.	.00	0.	.00	
18	2	150	END	0.	.00	2361.	.13	0.	.00	0.	.00	
19	1	150	BEG	0.	.00	2361.	.13	0.	.00	0.	.00	
19	1	160	END	0.	.00	4579.	.25	0.	.00	0.	.00	
20	1	160	BEG	0.	.00	4579.	.25	0.	.00	0.	.00	
20	1	165	END	0.	.00	2334.	.13	0.	.00	0.	.00	
20	2	165	BEG	0.	.00	2334.	.13	0.	.00	0.	.00	
20	2	170	END	0.	.00	3602.	.20	0.	.00	0.	.00	
21	1	170	BEG	0.	.00	3602.	.20	0.	.00	0.	.00	
21	1	172	END	0.	.00	2778.	.15	0.	.00	0.	.00	
22	1	172	BEG	0.	.00	2778.	.15	0.	.00	0.	.00	
22	1	173	END	0.	.00	2421.	.13	0.	.00	0.	.00	
22	2	173	BEG	0.	.00	2421.	.13	0.	.00	0.	.00	
22	2	175	END	0.	.00	2366.	.13	0.	.00	0.	.00	
22	3	175	BEG	0.	.00	3218.	.18	0.	.00	0.	.00	
22	3	176	END	0.	.00	2933.	.16	0.	.00	0.	.00	
22	4	176	BEG	0.	.00	2220.	.12	0.	.00	0.	.00	
22	4	180	END	0.	.00	3294.	.18	0.	.00	0.	.00	
23	1	180	BEG	0.	.00	3294.	.18	0.	.00	0.	.00	
23	1	187	END	0.	.00	2845.	.16	0.	.00	0.	.00	
24	1	187	BEG	0.	.00	2845.	.16	0.	.00	0.	.00	
24	1	190	END	0.	.00	2275.	.13	0.	.00	0.	.00	
24	2	190	BEG	0.	.00	2275.	.13	0.	.00	0.	.00	
24	2	195	END	0.	.00	2307.	.13	0.	.00	0.	.00	

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Train B
CIWH

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** FAULTED CODE STRESS SUMMATIONS

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
25	1	195	BEG	0.	.00	1516.	.08	0.	.00	0.	.00	
25	1	196	END	0.	.00	1473.	.08	0.	.00	0.	.00	
26	1	195	BEG	0.	.00	2333.	.13	0.	.00	0.	.00	
26	1	200	END	0.	.00	2349.	.13	0.	.00	0.	.00	
26	2	200	BEG	0.	.00	2349.	.13	0.	.00	0.	.00	
26	2	205	END	0.	.00	2557.	.14	0.	.00	0.	.00	
26	3	205	BEG	0.	.00	2557.	.14	0.	.00	0.	.00	
26	3	207	END	0.	.00	2715.	.15	0.	.00	0.	.00	
26	4	207	BEG	0.	.00	2715.	.15	0.	.00	0.	.00	
26	4	210	END	0.	.00	3727.	.21	0.	.00	0.	.00	
26	5	210	BEG	0.	.00	5877.	.33	0.	.00	0.	.00	
26	5	211	END	0.	.00	2898.	.16	0.	.00	0.	.00	
27	1	211	BEG	0.	.00	2202.	.12	0.	.00	0.	.00	
27	1	215	END	0.	.00	6965.	.39	0.	.00	0.	.00	
28	1	215	BEG	0.	.00	6965.	.39	0.	.00	0.	.00	
28	1	216	END	0.	.00	6471.	.36	0.	.00	0.	.00	
29	1	216	BEG	0.	.00	6471.	.36	0.	.00	0.	.00	
29	1	217	END	0.	.00	5087.	.28	0.	.00	0.	.00	
30	1	217	BEG	0.	.00	5087.	.28	0.	.00	0.	.00	
30	1	220	END	0.	.00	2832.	.16	0.	.00	0.	.00	
30	2	220	BEG	0.	.00	4128.	.23	0.	.00	0.	.00	
30	2	221	END	0.	.00	2927.	.16	0.	.00	0.	.00	
31	1	221	BEG	0.	.00	2217.	.12	0.	.00	0.	.00	
31	1	223	END	0.	.00	2659.	.15	0.	.00	0.	.00	
32	1	223	BEG	0.	.00	2659.	.15	0.	.00	0.	.00	
32	1	225	END	0.	.00	2919.	.16	0.	.00	0.	.00	
32	2	225	BEG	0.	.00	2919.	.16	0.	.00	0.	.00	
32	2	226	END	0.	.00	2614.	.15	0.	.00	0.	.00	
32	3	226	BEG	0.	.00	2614.	.15	0.	.00	0.	.00	
32	3	230	END	0.	.00	3330.	.18	0.	.00	0.	.00	

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Train B
CI-WH

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** FAULTED CODE STRESS SUMMATIONS

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
33	1	230	BEG	0.	.00	3288.	.18	0.	.00	0.	.00	
33	1	232	END	0.	.00	2382.	.13	0.	.00	0.	.00	
33	2	232	BEG	0.	.00	3140.	.17	0.	.00	0.	.00	
33	2	235	END	0.	.00	2961.	.16	0.	.00	0.	.00	
34	1	235	BEG	0.	.00	2783.	.15	0.	.00	0.	.00	
34	1	240	END	0.	.00	2850.	.16	0.	.00	0.	.00	
35	1	240	BEG	0.	.00	2850.	.16	0.	.00	0.	.00	
35	1	243	END	0.	.00	1977.	.11	0.	.00	0.	.00	
35	2	243	BEG	0.	.00	1977.	.11	0.	.00	0.	.00	
35	2	245	END	0.	.00	1502.	.08	0.	.00	0.	.00	
35	3	245	BEG	0.	.00	1637.	.09	0.	.00	0.	.00	
35	3	250	END	0.	.00	1677.	.09	0.	.00	0.	.00	
35	4	250	BEG	0.	.00	1677.	.09	0.	.00	0.	.00	
35	4	251	END	0.	.00	1625.	.09	0.	.00	0.	.00	
35	5	251	BEG	0.	.00	1496.	.08	0.	.00	0.	.00	
35	5	253	END	0.	.00	1404.	.08	0.	.00	0.	.00	
35	6	253	BEG	0.	.00	1404.	.08	0.	.00	0.	.00	
35	6	255	END	0.	.00	1482.	.08	0.	.00	0.	.00	
35	7	255	BEG	0.	.00	1600.	.09	0.	.00	0.	.00	
35	7	256	END	0.	.00	1878.	.10	0.	.00	0.	.00	
35	8	256	BEG	0.	.00	1634.	.09	0.	.00	0.	.00	
35	8	257	END	0.	.00	1624.	.09	0.	.00	0.	.00	
35	9	257	BEG	0.	.00	1624.	.09	0.	.00	0.	.00	
35	9	258	END	0.	.00	1619.	.09	0.	.00	0.	.00	
35	10	258	BEG	0.	.00	1619.	.09	0.	.00	0.	.00	
35	10	260	END	0.	.00	1618.	.09	0.	.00	0.	.00	
37	1	230	BEG	0.	.00	1855.	.10	0.	.00	0.	.00	
37	1	265	END	0.	.00	2114.	.12	0.	.00	0.	.00	
37	2	265	BEG	0.	.00	2355.	.13	0.	.00	0.	.00	
37	2	266	END	0.	.00	2381.	.13	0.	.00	0.	.00	

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Train B
CIWH

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** FAULTED CODE STRESS SUMMATIONS

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
37	3	266	BEG	0.	.00	2135.	.12	0.	.00	0.	.00	
37	3	268	END	0.	.00	1345.	.07	0.	.00	0.	.00	
37	4	268	BEG	0.	.00	1345.	.07	0.	.00	0.	.00	
37	4	270	END	0.	.00	1941.	.11	0.	.00	0.	.00	
37	5	270	BEG	0.	.00	2137.	.12	0.	.00	0.	.00	
37	5	271	END	0.	.00	2367.	.13	0.	.00	0.	.00	
37	6	271	BEG	0.	.00	2123.	.12	0.	.00	0.	.00	
37	6	272	END	0.	.00	1517.	.08	0.	.00	0.	.00	
37	7	272	BEG	0.	.00	1517.	.08	0.	.00	0.	.00	
37	7	273	END	0.	.00	1263.	.07	0.	.00	0.	.00	
37	8	273	BEG	0.	.00	1263.	.07	0.	.00	0.	.00	
37	8	275	END	0.	.00	1275.	.07	0.	.00	0.	.00	
39	1	30	BEG	0.	.00	8227.	.46	0.	.00	0.	.00	
39	1	295	END	0.	.00	3911.	.22	0.	.00	0.	.00	
39	2	295	BEG	0.	.00	3911.	.22	0.	.00	0.	.00	
39	2	297	END	0.	.00	3511.	.20	0.	.00	0.	.00	
39	3	297	BEG	0.	.00	3511.	.20	0.	.00	0.	.00	
39	3	300	END	0.	.00	2398.	.13	0.	.00	0.	.00	
39	4	300	BEG	0.	.00	3282.	.18	0.	.00	0.	.00	
39	4	301	END	0.	.00	3473.	.19	0.	.00	0.	.00	
39	5	301	BEG	0.	.00	2496.	.14	0.	.00	0.	.00	
39	5	305	END	0.	.00	2965.	.16	0.	.00	0.	.00	
39	6	305	BEG	0.	.00	2965.	.16	0.	.00	0.	.00	
39	6	310	END	0.	.00	3607.	.20	0.	.00	0.	.00	
40	1	310	BEG	0.	.00	3607.	.20	0.	.00	0.	.00	
40	1	320	END	0.	.00	3820.	.21	0.	.00	0.	.00	
41	1	320	BEG	0.	.00	3820.	.21	0.	.00	0.	.00	
41	1	325	END	0.	.00	2235.	.12	0.	.00	0.	.00	
41	2	325	BEG	0.	.00	2961.	.16	0.	.00	0.	.00	
41	2	326	END	0.	.00	2763.	.15	0.	.00	0.	.00	

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Train B
CIWA

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** FAULTED CODE STRESS SUMMATIONS

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
41	3	326	BEG	0.	.00	2133.	.12	0.	.00	0.	.00	
41	3	330	END	0.	.00	3824.	.21	0.	.00	0.	.00	
42	1	330	BEG	0.	.00	3824.	.21	0.	.00	0.	.00	
42	1	335	END	0.	.00	2213.	.12	0.	.00	0.	.00	
43	1	335	BEG	0.	.00	2213.	.12	0.	.00	0.	.00	
43	1	340	END	0.	.00	3166.	.18	0.	.00	0.	.00	
44	1	340	BEG	0.	.00	3166.	.18	0.	.00	0.	.00	
44	1	347	END	0.	.00	2034.	.11	0.	.00	0.	.00	
45	1	347	BEG	0.	.00	2034.	.11	0.	.00	0.	.00	
45	1	350	END	0.	.00	1865.	.10	0.	.00	0.	.00	
45	2	350	BEG	0.	.00	1865.	.10	0.	.00	0.	.00	
45	2	360	END	0.	.00	1622.	.09	0.	.00	0.	.00	
45	3	360	BEG	0.	.00	1622.	.09	0.	.00	0.	.00	
45	3	370	END	0.	.00	1620.	.09	0.	.00	0.	.00	
46	1	370	BEG	0.	.00	1510.	.08	0.	.00	0.	.00	
46	1	371	END	0.	.00	1473.	.08	0.	.00	0.	.00	
47	1	370	BEG	0.	.00	1636.	.09	0.	.00	0.	.00	
47	1	375	END	0.	.00	1633.	.09	0.	.00	0.	.00	
47	2	375	BEG	0.	.00	1633.	.09	0.	.00	0.	.00	
47	2	380	END	0.	.00	1601.	.09	0.	.00	0.	.00	
47	3	380	BEG	0.	.00	1601.	.09	0.	.00	0.	.00	
47	3	382	END	0.	.00	1588.	.09	0.	.00	0.	.00	
47	4	382	BEG	0.	.00	1588.	.09	0.	.00	0.	.00	
47	4	385	END	0.	.00	1622.	.09	0.	.00	0.	.00	
47	5	385	BEG	0.	.00	1764.	.10	0.	.00	0.	.00	
47	5	386	END	0.	.00	1823.	.10	0.	.00	0.	.00	
48	1	386	BEG	0.	.00	1652.	.09	0.	.00	0.	.00	
48	1	390	END	0.	.00	1679.	.09	0.	.00	0.	.00	
49	1	390	BEG	0.	.00	1679.	.09	0.	.00	0.	.00	
49	1	391	END	0.	.00	1934.	.11	0.	.00	0.	.00	

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Train B

C IWH

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** FAULTED CODE STRESS SUMMATIONS

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
49	2	391	BEG	0.	.00	1934.	.11	0.	.00	0.	.00	
49	2	392	END	0.	.00	1915.	.11	0.	.00	0.	.00	
49	3	392	BEG	0.	.00	1915.	.11	0.	.00	0.	.00	
49	3	395	END	0.	.00	1715.	.10	0.	.00	0.	.00	
49	4	395	BEG	0.	.00	1947.	.11	0.	.00	0.	.00	
49	4	396	END	0.	.00	1686.	.09	0.	.00	0.	.00	
50	1	396	BEG	0.	.00	1582.	.09	0.	.00	0.	.00	
50	1	399	END	0.	.00	2342.	.13	0.	.00	0.	.00	
51	1	399	BEG	0.	.00	2342.	.13	0.	.00	0.	.00	
51	1	403	END	0.	.00	1899.	.11	0.	.00	0.	.00	
51	2	403	BEG	0.	.00	1899.	.11	0.	.00	0.	.00	
51	2	401	END	0.	.00	1619.	.09	0.	.00	0.	.00	
51	3	401	BEG	0.	.00	1619.	.09	0.	.00	0.	.00	
51	3	400	END	0.	.00	1716.	.10	0.	.00	0.	.00	
52	1	400	BEG	0.	.00	1681.	.09	0.	.00	0.	.00	
52	1	402	END	0.	.00	1622.	.09	0.	.00	0.	.00	
52	2	402	BEG	0.	.00	2254.	.13	0.	.00	0.	.00	
52	2	405	END	0.	.00	2223.	.12	0.	.00	0.	.00	
53	1	405	BEG	0.	.00	1687.	.09	0.	.00	0.	.00	
53	1	407	END	0.	.00	2105.	.12	0.	.00	0.	.00	
54	1	407	BEG	0.	.00	2105.	.12	0.	.00	0.	.00	
54	1	409	END	0.	.00	1821.	.10	0.	.00	0.	.00	
55	1	409	BEG	0.	.00	1821.	.10	0.	.00	0.	.00	
55	1	412	END	0.	.00	1361.	.08	0.	.00	0.	.00	
55	2	412	BEG	0.	.00	1361.	.08	0.	.00	0.	.00	
55	2	410	END	0.	.00	1410.	.08	0.	.00	0.	.00	
55	3	410	BEG	0.	.00	1469.	.08	0.	.00	0.	.00	
55	3	411	END	0.	.00	1361.	.08	0.	.00	0.	.00	
55	4	411	BEG	0.	.00	1325.	.07	0.	.00	0.	.00	
55	4	415	END	0.	.00	1258.	.07	0.	.00	0.	.00	

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Train B
CIWH

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** FAULTED CODE STRESS SUMMATIONS

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
55	5	415	BEG	0.	.00	1258.	.07	0.	.00	0.	.00	
55	5	425	END	0.	.00	1530.	.09	0.	.00	0.	.00	
55	6	425	BEG	0.	.00	1620.	.09	0.	.00	0.	.00	
55	6	426	END	0.	.00	1843.	.10	0.	.00	0.	.00	
55	7	426	BEG	0.	.00	1708.	.09	0.	.00	0.	.00	
55	7	427	END	0.	.00	1479.	.08	0.	.00	0.	.00	
55	8	427	BEG	0.	.00	1479.	.08	0.	.00	0.	.00	
55	8	428	END	0.	.00	1465.	.08	0.	.00	0.	.00	
55	9	428	BEG	0.	.00	1465.	.08	0.	.00	0.	.00	
55	9	430	END	0.	.00	1386.	.08	0.	.00	0.	.00	
57	1	400	BEG	0.	.00	1424.	.08	0.	.00	0.	.00	
57	1	435	END	0.	.00	1415.	.08	0.	.00	0.	.00	
57	2	435	BEG	0.	.00	1415.	.08	0.	.00	0.	.00	
57	2	440	END	0.	.00	1427.	.08	0.	.00	0.	.00	
57	3	440	BEG	0.	.00	1427.	.08	0.	.00	0.	.00	
57	3	445	END	0.	.00	1495.	.08	0.	.00	0.	.00	
57	4	445	BEG	0.	.00	1623.	.09	0.	.00	0.	.00	
57	4	446	END	0.	.00	1730.	.10	0.	.00	0.	.00	
57	5	446	BEG	0.	.00	1553.	.09	0.	.00	0.	.00	
57	5	447	END	0.	.00	1437.	.08	0.	.00	0.	.00	
57	6	447	BEG	0.	.00	1437.	.08	0.	.00	0.	.00	
57	6	448	END	0.	.00	1401.	.08	0.	.00	0.	.00	
57	7	448	BEG	0.	.00	1401.	.08	0.	.00	0.	.00	
57	7	450	END	0.	.00	1407.	.08	0.	.00	0.	.00	

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Train B
CIWA

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
*** FAULTED CODE STRESS SUMMATIONS

CLASS 2,LEVEL A SUMMARY OF 10 HIGHEST STRESSES FOR EACH EQUATION

*****EQUATION 8 *****

	SEC	MEM	SEQ	POS	STRESS (PSI)	TOTAL/ ALLOWABLE

*****EQUATION 9 *****

	SEC	MEM	SEQ	POS	STRESS (PSI)	TOTAL/ ALLOWABLE
1.	1	1	5	BEG	11157.	.62
2.	1	4	15	BEG	9844.	.55
3.	9	1	65	END	8958.	.50
4.	10	1	65	BEG	8958.	.50
5.	4	1	30	BEG	8231.	.46
6.	39	1	30	BEG	8227.	.46
7.	14	3	110	BEG	8136.	.45
8.	3	4	30	END	7556.	.42
9.	3	2	22	BEG	7435.	.41
10.	1	1	10	END	7278.	.40

*****EQUATION 10 *****

	SEC	MEM	SEQ	POS	STRESS (PSI)	TOTAL/ ALLOWABLE

*****EQUATION 11 *****

	SEC	MEM	SEQ	POS	STRESS (PSI)	TOTAL/ ALLOWABLE

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Train B
CSWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179

EXECUTION	** CODE STRESS SUMMATIONS **						
EQ	8	* .1000E+02*	.0000E+00*	.0000E+00*	.0000E+00*	.0000E+00*	.0000E+00*
EQ	9	* .1000E+02*	.3000E+02*	.0000E+00*	.0000E+00*	.0000E+00*	.0000E+00*
EQ	10	* .0000E+00*	.2000E+02*	.0000E+00*	.0000E+00*	.0000E+00*	.0000E+00*
EQ	10	* .0000E+00*	.2100E+02*	.0000E+00*	.0000E+00*	.0000E+00*	.0000E+00*
EN		* .0000E+00*	.0000E+00*	.0000E+00*	.0000E+00*	.0000E+00*	.0000E+00*

Condensation Induced Waterhammer Event Stress Results
DSB 9/20/2000

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Train A
CIWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
1	1	1000	BEG	6881.	.46	11238.	.62	4897.	.22	11777.	.31	
1	1	1010	END	4759.	.32	6967.	.39	3087.	.14	7846.	.21	
1	2	1010	BEG	4759.	.32	6967.	.39	3087.	.14	7846.	.21	
1	2	1020	END	2930.	.20	4545.	.25	2122.	.09	5053.	.13	
1	3	1020	BEG	2930.	.20	4545.	.25	2122.	.09	5053.	.13	
1	3	1030	END	1765.	.12	3298.	.18	2936.	.13	4701.	.13	
1	4	1030	BEG	1765.	.12	3298.	.18	2936.	.13	4701.	.13	
1	4	1040	END	2057.	.14	3593.	.20	3275.	.15	5332.	.14	
1	5	1040	BEG	2502.	.17	5538.	.31	8631.	.38	11133.	.30	
1	5	1050	END	3703.	.25	6361.	.35	8331.	.37	12034.	.32	
1	6	1050	BEG	2665.	.18	4010.	.22	3161.	.14	5826.	.16	
1	6	1060	END	2662.	.18	4046.	.22	3020.	.13	5682.	.15	
1	7	1060	BEG	2662.	.18	4046.	.22	3020.	.13	5682.	.15	
1	7	1070	END	2637.	.18	4591.	.26	1746.	.08	4383.	.12	
1	8	1070	BEG	2637.	.18	4591.	.26	1746.	.08	4383.	.12	
1	8	1080	END	2635.	.18	4652.	.26	1670.	.07	4306.	.11	
2	1	1080	BEG	2356.	.16	4205.	.23	1670.	.07	4026.	.11	
2	1	1090	END	2355.	.16	4193.	.23	1595.	.07	3950.	.11	
3	1	1080	BEG	2075.	.14	3757.	.21	0.	.00	2075.	.06	
3	1	1100	END	1602.	.11	1602.	.09	0.	.00	1602.	.04	
4	1	1090	BEG	2732.	.18	4846.	.27	1835.	.08	4567.	.12	
4	1	1110	END	2726.	.18	4773.	.27	1326.	.06	4051.	.11	
4	2	1110	BEG	2726.	.18	4773.	.27	1326.	.06	4051.	.11	
4	2	1120	END	2716.	.18	4803.	.27	1034.	.05	3750.	.10	
4	3	1120	BEG	2716.	.18	4803.	.27	1034.	.05	3750.	.10	
4	3	1130	END	2697.	.18	4336.	.24	2442.	.11	5140.	.14	
4	4	1130	BEG	2697.	.18	4336.	.24	2442.	.11	5140.	.14	
4	4	1140	END	2691.	.18	3979.	.22	3232.	.14	5922.	.16	

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Train A
CIWA

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
4	5	1140	BEG	3681.	.25	6519.	.36	9490.	.42	13171.	.35	
4	5	1150	END	2934.	.20	5529.	.31	9605.	.43	12539.	.33	
4	6	1150	BEG	2351.	.16	3529.	.20	3271.	.15	5622.	.15	
4	6	1160	END	2249.	.15	3347.	.19	2961.	.13	5210.	.14	
4	7	1160	BEG	2249.	.15	3347.	.19	2961.	.13	5210.	.14	
4	7	1170	END	2226.	.15	3092.	.17	1643.	.07	3869.	.10	
4	8	1170	BEG	2226.	.15	3092.	.17	1643.	.07	3869.	.10	
4	8	1180	END	2928.	.20	4032.	.22	965.	.04	3893.	.10	
4	9	1180	BEG	2928.	.20	4032.	.22	965.	.04	3893.	.10	
4	9	1190	END	3805.	.25	5504.	.31	1860.	.08	5665.	.15	
5	1	1190	BEG	3805.	.25	5504.	.31	1860.	.08	5665.	.15	
5	1	1200	END	4626.	.31	6890.	.38	2949.	.13	7575.	.20	
6	1	1200	BEG	4626.	.31	6890.	.38	2949.	.13	7575.	.20	
6	1	1210	END	3536.	.24	5709.	.32	2102.	.09	5638.	.15	
6	2	1210	BEG	3536.	.24	5709.	.32	2102.	.09	5638.	.15	
6	2	1220	END	2820.	.19	4725.	.26	1604.	.07	4424.	.12	
6	3	1220	BEG	2820.	.19	4725.	.26	1604.	.07	4424.	.12	
6	3	1230	END	2294.	.15	4100.	.23	1514.	.07	3808.	.10	
6	4	1230	BEG	2294.	.15	4100.	.23	1514.	.07	3808.	.10	
6	4	1240	END	2150.	.14	4237.	.24	1621.	.07	3772.	.10	
6	5	1240	BEG	2492.	.17	7086.	.39	4761.	.21	7253.	.19	
6	5	1250	END	1959.	.13	6346.	.35	2410.	.11	4368.	.12	
6	6	1250	BEG	1908.	.13	3901.	.22	821.	.04	2729.	.07	
6	6	1270	END	1911.	.13	4541.	.25	674.	.03	2585.	.07	
7	1	1270	BEG	1911.	.13	4541.	.25	674.	.03	2585.	.07	
7	1	1275	END	1953.	.13	7046.	.39	379.	.02	2332.	.06	
7	2	1275	BEG	1953.	.13	7046.	.39	379.	.02	2332.	.06	
7	2	1280	END	1957.	.13	6883.	.38	392.	.02	2349.	.06	
7	3	1280	BEG	1957.	.13	6883.	.38	392.	.02	2349.	.06	
7	3	1290	END	1967.	.13	6422.	.36	471.	.02	2438.	.07	

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Train A
SIW

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
7	4	1290	BEG	2088.	.14	11898.	.66	1383.	.06	3472.	.09	
7	4	1300	END	2144.	.14	4970.	.28	2934.	.13	5078.	.14	
7	5	1300	BEG	1993.	.13	3276.	.18	999.	.04	2992.	.08	
7	5	1320	END	1990.	.13	3174.	.18	875.	.04	2864.	.08	
7	6	1320	BEG	1990.	.13	3174.	.18	875.	.04	2864.	.08	
7	6	1330	END	2068.	.14	4274.	.24	701.	.03	2769.	.07	
8	1	1330	BEG	2068.	.14	4274.	.24	701.	.03	2769.	.07	
8	1	1340	END	2349.	.16	6340.	.35	1219.	.05	3567.	.10	
8	2	1340	BEG	2349.	.16	6340.	.35	1219.	.05	3567.	.10	
8	2	1350	END	2016.	.13	4642.	.26	897.	.04	2912.	.08	
8	3	1350	BEG	2016.	.13	4642.	.26	897.	.04	2912.	.08	
8	3	1360	END	2030.	.14	3516.	.20	582.	.03	2612.	.07	
8	4	1360	BEG	2030.	.14	3516.	.20	582.	.03	2612.	.07	
8	4	1370	END	1994.	.13	3918.	.22	300.	.01	2294.	.06	
9	1	1370	BEG	1994.	.13	3918.	.22	300.	.01	2294.	.06	
9	1	1380	END	2217.	.15	4215.	.23	239.	.01	2456.	.07	
9	2	1380	BEG	2217.	.15	4215.	.23	239.	.01	2456.	.07	
9	2	1390	END	2018.	.13	4159.	.23	400.	.02	2418.	.06	
9	3	1390	BEG	2018.	.13	4159.	.23	400.	.02	2418.	.06	
9	3	1400	END	2155.	.14	3429.	.19	602.	.03	2757.	.07	
9	4	1400	BEG	2155.	.14	3429.	.19	602.	.03	2757.	.07	
9	4	1410	END	2091.	.14	3151.	.18	816.	.04	2907.	.08	
10	1	1410	BEG	2091.	.14	3151.	.18	816.	.04	2907.	.08	
10	1	1420	END	2046.	.14	4809.	.27	1033.	.05	3079.	.08	
11	1	1420	BEG	2046.	.14	4809.	.27	1033.	.05	3079.	.08	
11	1	1430	END	1991.	.13	3163.	.18	338.	.02	2328.	.06	
11	2	1430	BEG	2140.	.14	4722.	.26	991.	.04	3131.	.08	
11	2	1440	END	2169.	.14	4380.	.24	2490.	.11	4660.	.12	
11	3	1440	BEG	2004.	.13	3008.	.17	848.	.04	2852.	.08	
11	3	1450	END	1940.	.13	2710.	.15	2054.	.09	3994.	.11	

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Train A
CIWA

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
12	1	1450	BEG	1940.	.13	2710.	.15	2054.	.09	3994.	.11	
12	1	1455	END	2332.	.16	3770.	.21	3527.	.16	5859.	.16	
13	1	1455	BEG	2332.	.16	3770.	.21	3527.	.16	5859.	.16	
13	1	1460	END	2379.	.16	3759.	.21	3637.	.16	6017.	.16	
13	2	1460	BEG	2379.	.16	3759.	.21	3637.	.16	6017.	.16	
13	2	1470	END	2039.	.14	2893.	.16	1762.	.08	3801.	.10	
13	3	1470	BEG	2039.	.14	2893.	.16	1762.	.08	3801.	.10	
13	3	1480	END	1963.	.13	2319.	.13	667.	.03	2630.	.07	
13	4	1480	BEG	1963.	.13	2319.	.13	667.	.03	2630.	.07	
13	4	1490	END	1978.	.13	2355.	.13	1635.	.07	3613.	.10	
13	5	1490	BEG	2112.	.14	2943.	.16	4802.	.21	6914.	.18	
13	5	1500	END	2029.	.14	3297.	.18	4805.	.21	6833.	.18	
13	6	1500	BEG	1940.	.13	2516.	.14	1636.	.07	3576.	.10	
13	6	1510	END	1938.	.13	2363.	.13	1047.	.05	2984.	.08	
13	7	1510	BEG	1938.	.13	2363.	.13	1047.	.05	2984.	.08	
13	7	1520	END	1930.	.13	2274.	.13	942.	.04	2872.	.08	
13	8	1520	BEG	1930.	.13	2274.	.13	942.	.04	2872.	.08	
13	8	1530	END	1922.	.13	2851.	.16	2779.	.12	4702.	.13	
14	1	1530	BEG	1922.	.13	2851.	.16	2779.	.12	4702.	.13	
14	1	1540	END	1914.	.13	3776.	.21	4818.	.21	6732.	.18	
14	2	1540	BEG	1914.	.13	3776.	.21	4818.	.21	6732.	.18	
14	2	1550	END	1898.	.13	3105.	.17	3190.	.14	5088.	.14	
14	3	1550	BEG	1898.	.13	3105.	.17	3190.	.14	5088.	.14	
14	3	1560	END	1883.	.13	2488.	.14	1529.	.07	3412.	.09	
15	1	1560	BEG	1883.	.13	2488.	.14	1529.	.07	3412.	.09	
15	1	1570	END	1876.	.13	2004.	.11	390.	.02	2266.	.06	
16	1	1570	BEG	1876.	.13	2004.	.11	390.	.02	2266.	.06	
16	1	1580	END	1871.	.12	1968.	.11	246.	.01	2117.	.06	
16	2	1580	BEG	1871.	.12	1968.	.11	246.	.01	2117.	.06	
16	2	1590	END	1874.	.12	1969.	.11	311.	.01	2185.	.06	

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Train A
CIWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
16	3	1590	BEG	1874.	.12	1969.	.11	311.	.01	2185.	.06	
16	3	1600	END	1881.	.13	1975.	.11	541.	.02	2422.	.06	
16	4	1600	BEG	1881.	.13	1975.	.11	541.	.02	2422.	.06	
16	4	1610	END	1887.	.13	1969.	.11	760.	.03	2648.	.07	
16	5	1610	BEG	1887.	.13	1969.	.11	760.	.03	2648.	.07	
16	5	1620	END	1894.	.13	2005.	.11	987.	.04	2881.	.08	
17	1	1620	BEG	1894.	.13	2005.	.11	987.	.04	2881.	.08	
17	1	1630	END	1902.	.13	1961.	.11	1263.	.06	3165.	.08	
17	2	1630	BEG	1902.	.13	1961.	.11	1263.	.06	3165.	.08	
17	2	1640	END	1910.	.13	1968.	.11	1549.	.07	3459.	.09	
17	3	1640	BEG	1910.	.13	1968.	.11	1549.	.07	3459.	.09	
17	3	1650	END	1914.	.13	1972.	.11	1694.	.08	3608.	.10	
17	4	1650	BEG	1970.	.13	2099.	.12	4975.	.22	6945.	.19	
17	4	1660	END	2199.	.15	2319.	.13	2618.	.12	4817.	.13	
17	5	1660	BEG	2018.	.13	2072.	.12	892.	.04	2909.	.08	
17	5	1670	END	2103.	.14	2153.	.12	157.	.01	2259.	.06	
17	6	1670	BEG	2103.	.14	2153.	.12	157.	.01	2259.	.06	
17	6	1680	END	2141.	.14	2200.	.12	1645.	.07	3786.	.10	
17	7	1680	BEG	2141.	.14	2200.	.12	1645.	.07	3786.	.10	
17	7	1690	END	1950.	.13	1983.	.11	3441.	.15	5391.	.14	
17	8	1690	BEG	1950.	.13	1983.	.11	3441.	.15	5391.	.14	
17	8	1700	END	2245.	.15	2297.	.13	5234.	.23	7479.	.20	
18	1	1700	BEG	2245.	.15	2297.	.13	5234.	.23	7479.	.20	
18	1	1710	END	2394.	.16	2439.	.14	5684.	.25	8077.	.22	
19	1	1710	BEG	2394.	.16	2439.	.14	5684.	.25	8077.	.22	
19	1	1715	END	2364.	.16	2409.	.13	5589.	.25	7952.	.21	
19	2	1715	BEG	2364.	.16	2409.	.13	5589.	.25	7952.	.21	
19	2	1720	END	2180.	.15	2212.	.12	4940.	.22	7120.	.19	
20	1	1720	BEG	2180.	.15	2212.	.12	4940.	.22	7120.	.19	
20	1	1750	END	2191.	.15	2252.	.13	9975.	.44	12166.	.32	

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Train A
CIWA

ADLPIPE /E 436 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANAL WINDOWS 3F9.3 7/18/ 0 11:59:46

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
21	1	1750	BEG	2192.	.15	2236.	.12	8308.	.37	10501.	.28	
21	1	1760	END	2048.	.14	2086.	.12	3117.	.14	5165.	.14	
21	2	1760	BEG	2352.	.16	2452.	.14	11100.	.49	13452.	.36	
21	2	1765	END	2389.	.16	2468.	.14	8730.	.39	11120.	.30	
21	3	1765	BEG	1821.	.12	1873.	.10	4365.	.19	6186.	.16	
21	3	1770	END	1919.	.13	1952.	.11	2819.	.13	4737.	.13	
22	1	1770	BEG	1919.	.13	1952.	.11	2819.	.13	4737.	.13	
22	1	1775	END	2212.	.15	2221.	.12	912.	.04	3125.	.08	
23	1	1775	BEG	2212.	.15	2221.	.12	912.	.04	3125.	.08	
23	1	1780	END	2157.	.14	2166.	.12	955.	.04	3113.	.08	
23	2	1780	BEG	2157.	.14	2166.	.12	955.	.04	3113.	.08	
23	2	1790	END	1662.	.11	1674.	.09	1432.	.06	3094.	.08	
23	3	1790	BEG	1662.	.11	1674.	.09	1432.	.06	3094.	.08	
23	3	1800	END	1524.	.10	1533.	.09	1654.	.07	3178.	.08	
23	4	1800	BEG	1573.	.10	1590.	.09	4310.	.19	5882.	.16	
23	4	1810	END	1875.	.12	1887.	.10	4467.	.20	6342.	.17	
23	5	1810	BEG	1678.	.11	1685.	.09	1715.	.08	3393.	.09	
23	5	1820	END	1738.	.12	1755.	.10	1393.	.06	3132.	.08	
23	6	1820	BEG	1738.	.12	1755.	.10	1393.	.06	3132.	.08	
23	6	1830	END	1726.	.12	1740.	.10	1254.	.06	2979.	.08	
23	7	1830	BEG	1726.	.12	1740.	.10	1254.	.06	2979.	.08	
23	7	1840	END	1719.	.11	1732.	.10	1230.	.05	2949.	.08	
24	1	1840	BEG	1704.	.11	1718.	.10	1230.	.05	2935.	.08	
24	1	1850	END	1685.	.11	1697.	.09	1207.	.05	2892.	.08	
25	1	1840	BEG	1503.	.10	1504.	.08	0.	.00	1503.	.04	
25	1	1860	END	1473.	.10	1473.	.08	0.	.00	1473.	.04	
26	1	1850	BEG	1685.	.11	1697.	.09	1207.	.05	2892.	.08	
26	1	1870	END	1609.	.11	1618.	.09	989.	.04	2598.	.07	
26	2	1870	BEG	1609.	.11	1618.	.09	989.	.04	2598.	.07	
26	2	1880	END	1932.	.13	1951.	.11	782.	.03	2714.	.07	

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Train A
CIWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
26	3	1880	BEG	1932.	.13	1951.	.11	782.	.03	2714.	.07	
26	3	1890	END	2318.	.15	2328.	.13	609.	.03	2927.	.08	
27	1	1890	BEG	2318.	.15	2328.	.13	609.	.03	2927.	.08	
27	1	1900	END	2572.	.17	2577.	.14	524.	.02	3096.	.08	
27	2	1900	BEG	2572.	.17	2577.	.14	524.	.02	3096.	.08	
27	2	1910	END	2239.	.15	2247.	.12	273.	.01	2512.	.07	
28	1	1910	BEG	3517.	.23	3540.	.20	972.	.04	4489.	.12	
28	1	1920	END	3209.	.21	3232.	.18	806.	.04	4015.	.11	
28	2	1920	BEG	2497.	.17	2512.	.14	403.	.02	2900.	.08	
28	2	1930	END	1979.	.13	1998.	.11	743.	.03	2722.	.07	
28	3	1930	BEG	1979.	.13	1998.	.11	743.	.03	2722.	.07	
28	3	1940	END	1649.	.11	1657.	.09	1278.	.06	2927.	.08	
28	4	1940	BEG	1649.	.11	1657.	.09	1278.	.06	2927.	.08	
28	4	1950	END	1579.	.11	1583.	.09	1465.	.07	3044.	.08	
28	5	1950	BEG	1778.	.12	1786.	.10	3573.	.16	5350.	.14	
28	5	1960	END	1701.	.11	1712.	.10	3858.	.17	5560.	.15	
28	6	1960	BEG	1537.	.10	1543.	.09	1582.	.07	3119.	.08	
28	6	1970	END	1534.	.10	1540.	.09	1485.	.07	3020.	.08	
29	1	1970	BEG	1534.	.10	1540.	.09	1485.	.07	3020.	.08	
29	1	1980	END	1528.	.10	1531.	.09	1385.	.06	2913.	.08	
30	1	1980	BEG	1528.	.10	1531.	.09	1385.	.06	2913.	.08	
30	1	1985	END	1526.	.10	1529.	.08	1388.	.06	2914.	.08	
30	2	1985	BEG	1526.	.10	1529.	.08	1388.	.06	2914.	.08	
30	2	1990	END	1521.	.10	1523.	.08	1491.	.07	3012.	.08	
30	3	1990	BEG	1521.	.10	1523.	.08	1491.	.07	3012.	.08	
30	3	2000	END	1527.	.10	1530.	.08	1651.	.07	3179.	.08	
30	4	2000	BEG	1683.	.11	1688.	.09	4027.	.18	5710.	.15	
30	4	2010	END	1613.	.11	1616.	.09	3741.	.17	5354.	.14	
30	5	2010	BEG	1489.	.10	1491.	.08	1534.	.07	3023.	.08	
30	5	2020	END	1470.	.10	1476.	.08	1108.	.05	2577.	.07	

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Train A
CIWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
30	6	2020	BEG	1470.	.10	1476.	.08	1108.	.05	2577.	.07	
30	6	2030	END	1874.	.12	1877.	.10	484.	.02	2358.	.06	
31	1	2030	BEG	1874.	.12	1877.	.10	484.	.02	2358.	.06	
31	1	2040	END	2567.	.17	2569.	.14	838.	.04	3405.	.09	
31	2	2040	BEG	2567.	.17	2569.	.14	838.	.04	3405.	.09	
31	2	2050	END	1872.	.12	1875.	.10	724.	.03	2597.	.07	
31	3	2050	BEG	1872.	.12	1875.	.10	724.	.03	2597.	.07	
31	3	2060	END	1501.	.10	1502.	.08	661.	.03	2162.	.06	
32	1	2060	BEG	1501.	.10	1502.	.08	661.	.03	2162.	.06	
32	1	2070	END	1572.	.10	1573.	.09	661.	.03	2233.	.06	
32	2	2070	BEG	1572.	.10	1573.	.09	661.	.03	2233.	.06	
32	2	2080	END	1574.	.10	1575.	.09	702.	.03	2276.	.06	
32	3	2080	BEG	1574.	.10	1575.	.09	702.	.03	2276.	.06	
32	3	2090	END	1531.	.10	1531.	.09	737.	.03	2268.	.06	
32	4	2090	BEG	1690.	.11	1690.	.09	1798.	.08	3488.	.09	
32	4	2100	END	1457.	.10	1458.	.08	1339.	.06	2795.	.07	
33	1	2100	BEG	1404.	.09	1404.	.08	549.	.02	1952.	.05	
33	1	2110	END	1460.	.10	1460.	.08	419.	.02	1879.	.05	
33	2	2110	BEG	1460.	.10	1460.	.08	419.	.02	1879.	.05	
33	2	2120	END	1580.	.11	1580.	.09	374.	.02	1954.	.05	
33	3	2120	BEG	1580.	.11	1580.	.09	374.	.02	1954.	.05	
33	3	2130	END	1665.	.11	1665.	.09	401.	.02	2065.	.06	
33	4	2130	BEG	1934.	.13	1935.	.11	978.	.04	2912.	.08	
33	4	2140	END	2373.	.16	2374.	.13	1171.	.05	3544.	.09	
33	5	2140	BEG	1905.	.13	1905.	.11	480.	.02	2385.	.06	
33	5	2150	END	1913.	.13	1913.	.11	497.	.02	2409.	.06	
33	6	2150	BEG	1913.	.13	1913.	.11	497.	.02	2409.	.06	
33	6	2160	END	1934.	.13	1934.	.11	699.	.03	2633.	.07	
33	7	2160	BEG	1934.	.13	1934.	.11	699.	.03	2633.	.07	
33	7	2200	END	1958.	.13	1959.	.11	1057.	.05	3015.	.08	

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Train A
CIWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
34	1	1750	BEG	1605.	.11	1659.	.09	4120.	.18	5726.	.15	
34	1	2500	END	1606.	.11	1634.	.09	1797.	.08	3403.	.09	
34	2	2500	BEG	1606.	.11	1634.	.09	1797.	.08	3403.	.09	
34	2	2510	END	1757.	.12	1790.	.10	1672.	.07	3429.	.09	
34	3	2510	BEG	1757.	.12	1790.	.10	1672.	.07	3429.	.09	
34	3	2520	END	1769.	.12	1803.	.10	1658.	.07	3427.	.09	
35	1	2520	BEG	1768.	.12	1802.	.10	1658.	.07	3426.	.09	
35	1	2530	END	1767.	.12	1799.	.10	1644.	.07	3411.	.09	
36	1	2520	BEG	1503.	.10	1505.	.08	0.	.00	1503.	.04	
36	1	2540	END	1473.	.10	1473.	.08	0.	.00	1473.	.04	
37	1	2530	BEG	1767.	.12	1799.	.10	1644.	.07	3411.	.09	
37	1	2550	END	1688.	.11	1715.	.10	1518.	.07	3206.	.09	
37	2	2550	BEG	1688.	.11	1715.	.10	1518.	.07	3206.	.09	
37	2	2560	END	1530.	.10	1565.	.09	1376.	.06	2906.	.08	
38	1	2560	BEG	1530.	.10	1565.	.09	1376.	.06	2906.	.08	
38	1	2570	END	1860.	.12	1873.	.10	1270.	.06	3130.	.08	
38	2	2570	BEG	1860.	.12	1873.	.10	1270.	.06	3130.	.08	
38	2	2580	END	1787.	.12	1797.	.10	1235.	.05	3021.	.08	
38	3	2580	BEG	2086.	.14	2107.	.12	3217.	.14	5303.	.14	
38	3	2590	END	1575.	.11	1598.	.09	2402.	.11	3978.	.11	
38	4	2590	BEG	1525.	.10	1537.	.09	922.	.04	2447.	.07	
38	4	2600	END	1526.	.10	1539.	.09	847.	.04	2373.	.06	
39	1	2600	BEG	1526.	.10	1539.	.09	847.	.04	2373.	.06	
39	1	2610	END	1529.	.10	1538.	.09	839.	.04	2368.	.06	
40	1	2610	BEG	1529.	.10	1538.	.09	839.	.04	2368.	.06	
40	1	2615	END	1527.	.10	1536.	.09	823.	.04	2350.	.06	
41	1	2615	BEG	1527.	.10	1536.	.09	823.	.04	2350.	.06	
41	1	2620	END	1522.	.10	1532.	.09	745.	.03	2267.	.06	
41	2	2620	BEG	1568.	.10	1589.	.09	1942.	.09	3510.	.09	
41	2	2630	END	1715.	.11	1731.	.10	1414.	.06	3129.	.08	

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Train A
CJWA

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
41	3	2630	BEG	1597.	.11	1605.	.09	543.	.02	2139.	.06	
41	3	2640	END	1626.	.11	1640.	.09	575.	.03	2201.	.06	
41	4	2640	BEG	1626.	.11	1640.	.09	575.	.03	2201.	.06	
41	4	2650	END	1629.	.11	1640.	.09	897.	.04	2526.	.07	
41	5	2650	BEG	1629.	.11	1640.	.09	897.	.04	2526.	.07	
41	5	2660	END	1581.	.11	1593.	.09	1353.	.06	2934.	.08	
41	6	2660	BEG	1581.	.11	1593.	.09	1353.	.06	2934.	.08	
41	6	2670	END	1675.	.11	1680.	.09	1669.	.07	3344.	.09	
41	7	2670	BEG	1675.	.11	1680.	.09	1669.	.07	3344.	.09	
41	7	2680	END	1899.	.13	1910.	.11	3514.	.16	5413.	.14	
42	1	2680	BEG	1821.	.12	1832.	.10	6314.	.28	8135.	.22	
42	1	2690	END	1659.	.11	1665.	.09	2815.	.13	4474.	.12	
43	1	2690	BEG	2456.	.16	2488.	.14	19816.	.88	22272.	.59	
43	1	2700	END	2249.	.15	2275.	.13	16924.	.75	19173.	.51	
43	2	2700	BEG	1700.	.11	1718.	.10	8462.	.38	10163.	.27	
43	2	2710	END	1507.	.10	1525.	.08	6021.	.27	7528.	.20	
44	1	2710	BEG	1507.	.10	1525.	.08	6021.	.27	7528.	.20	
44	1	2720	END	1380.	.09	1387.	.08	2739.	.12	4119.	.11	
44	2	2720	BEG	1380.	.09	1387.	.08	2739.	.12	4119.	.11	
44	2	2730	END	1368.	.09	1384.	.08	1412.	.06	2779.	.07	
45	1	2730	BEG	1368.	.09	1384.	.08	1412.	.06	2779.	.07	
45	1	2740	END	1457.	.10	1464.	.08	4763.	.21	6220.	.17	
45	2	2740	BEG	1457.	.10	1464.	.08	4763.	.21	6220.	.17	
45	2	2750	END	1249.	.08	1253.	.07	3557.	.16	4806.	.13	
45	3	2750	BEG	1249.	.08	1253.	.07	3557.	.16	4806.	.13	
45	3	2760	END	1430.	.10	1438.	.08	1584.	.07	3013.	.08	
45	4	2760	BEG	1430.	.10	1438.	.08	1584.	.07	3013.	.08	
45	4	2770	END	1507.	.10	1511.	.08	1403.	.06	2910.	.08	
45	5	2770	BEG	1507.	.10	1511.	.08	1403.	.06	2910.	.08	
45	5	2780	END	1397.	.09	1404.	.08	3322.	.15	4720.	.13	

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Train A
CIWA

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
45	6	2780	BEG	1397.	.09	1404.	.08	3322.	.15	4720.	.13	
45	6	2790	END	1241.	.08	1244.	.07	4646.	.21	5887.	.16	
45	7	2790	BEG	1282.	.09	1286.	.07	10525.	.47	11807.	.31	
45	7	2800	END	1370.	.09	1376.	.08	5814.	.26	7184.	.19	
45	8	2800	BEG	1293.	.09	1297.	.07	2566.	.11	3860.	.10	
45	8	2810	END	1319.	.09	1323.	.07	1954.	.09	3273.	.09	
45	9	2810	BEG	1319.	.09	1323.	.07	1954.	.09	3273.	.09	
45	9	2820	END	1415.	.09	1419.	.08	2922.	.13	4337.	.12	
45	10	2820	BEG	1578.	.11	1583.	.09	6619.	.29	8197.	.22	
45	10	2830	END	1664.	.11	1669.	.09	10619.	.47	12283.	.33	
45	11	2830	BEG	1466.	.10	1469.	.08	4687.	.21	6153.	.16	
45	11	2840	END	1454.	.10	1459.	.08	8768.	.39	10222.	.27	
45	12	2840	BEG	1454.	.10	1459.	.08	8768.	.39	10222.	.27	
45	12	2850	END	1441.	.10	1453.	.08	14089.	.63	15530.	.41	
46	1	2680	BEG	1470.	.10	1483.	.08	5501.	.24	6970.	.19	
46	1	3000	END	1501.	.10	1509.	.08	1675.	.07	3176.	.08	
46	2	3000	BEG	1501.	.10	1509.	.08	1675.	.07	3176.	.08	
46	2	3010	END	1553.	.10	1561.	.09	1158.	.05	2711.	.07	
46	3	3010	BEG	1730.	.12	1744.	.10	2824.	.13	4555.	.12	
46	3	3020	END	1822.	.12	1833.	.10	2177.	.10	3999.	.11	
46	4	3020	BEG	1603.	.11	1609.	.09	893.	.04	2496.	.07	
46	4	3030	END	1491.	.10	1496.	.08	3178.	.14	4669.	.12	
46	5	3030	BEG	1491.	.10	1496.	.08	3178.	.14	4669.	.12	
46	5	3040	END	1432.	.10	1441.	.08	5601.	.25	7033.	.19	
47	1	3040	BEG	1432.	.10	1441.	.08	5601.	.25	7033.	.19	
47	1	3050	END	1492.	.10	1506.	.08	8047.	.36	9538.	.25	

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Train A
CIWA

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
** CODE STRESS SUMMATIONS **

CLASS 2,LEVEL A SUMMARY OF 10 HIGHEST STRESSES FOR EACH EQUATION

*****EQUATION 8 *****

	SEC	MEM	SEQ	POS	STRESS (PSI)	TOTAL/ ALLOWABLE
1.	1	1	1000	BEG	6881.	.46
2.	1	1	1010	END	4759.	.32
3.	1	2	1010	BEG	4759.	.32
4.	5	1	1200	END	4626.	.31
5.	6	1	1200	BEG	4626.	.31
6.	4	9	1190	END	3805.	.25
7.	5	1	1190	BEG	3805.	.25
8.	1	5	1050	END	3703.	.25
9.	4	5	1140	BEG	3681.	.25
10.	6	1	1210	END	3536.	.24

*****EQUATION 9 *****

	SEC	MEM	SEQ	POS	STRESS (PSI)	TOTAL/ ALLOWABLE
1.	7	4	1290	BEG	11898.	.66
2.	1	1	1000	BEG	11238.	.62
3.	6	5	1240	BEG	7086.	.39
4.	7	1	1275	END	7046.	.39
5.	7	2	1275	BEG	7046.	.39
6.	1	1	1010	END	6967.	.39
7.	1	2	1010	BEG	6967.	.39
8.	5	1	1200	END	6890.	.38
9.	6	1	1200	BEG	6890.	.38
10.	7	2	1280	END	6883.	.38

*****EQUATION 10 *****

	SEC	MEM	SEQ	POS	STRESS (PSI)	TOTAL/ ALLOWABLE
1.	43	1	2690	BEG	19816.	.88
2.	43	1	2700	END	16924.	.75
3.	45	12	2850	END	14089.	.63
4.	21	2	1760	BEG	11100.	.49
5.	45	10	2830	END	10619.	.47
6.	45	7	2790	BEG	10525.	.47
7.	20	1	1750	END	9975.	.44
8.	4	5	1150	END	9605.	.43
9.	4	5	1140	BEG	9490.	.42
10.	45	11	2840	END	8768.	.39

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Train A
C I1U4

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179

** CODE STRESS SUMMATIONS **

CLASS 2,LEVEL A SUMMARY OF 10 HIGHEST STRESSES FOR EACH EQUATION

*****EQUATION 11 *****

	SEC	MEM	SEQ	POS	STRESS (PSI)	TOTAL/ ALLOWABLE
1.	43	1	2690	BEG	22272.	.59
2.	43	1	2700	END	19173.	.51
3.	45	12	2850	END	15530.	.41
4.	21	2	1760	BEG	13452.	.36
5.	4	5	1140	BEG	13171.	.35
6.	4	5	1150	END	12539.	.33
7.	45	10	2830	END	12283.	.33
8.	20	1	1750	END	12166.	.32
9.	1	5	1050	END	12034.	.32
10.	45	7	2790	BEG	11807.	.31

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Train A
CIWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225

EXECUTION ** CODE STRESS SUMMATIONS **

EQ	8	*	.1000E+02*	.0000E+00*	.0000E+00*	.0000E+00*	.0000E+00*	.0000E+00*
EQ	9	*	.1000E+02*	.3000E+02*	.0000E+00*	.0000E+00*	.0000E+00*	.0000E+00*
EQ	10	*	.0000E+00*	.2000E+02*	.0000E+00*	.0000E+00*	.0000E+00*	.0000E+00*
EQ	10	*	.0000E+00*	.2100E+02*	.0000E+00*	.0000E+00*	.0000E+00*	.0000E+00*
EN		*	.0000E+00*	.0000E+00*	.0000E+00*	.0000E+00*	.0000E+00*	.0000E+00*

Column Closure Waterhammer Event Stress Results
~~DEB~~ 9/20/2000

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Att./Appx. A Sh A41

Train A
CCWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
1	1	500	BEG	910.	.06	1630.	.09	960.	.04	1870.	.05	
1	1	800	END	2997.	.20	4416.	.25	1892.	.08	4889.	.13	
2	1	800	BEG	2997.	.20	4416.	.25	1892.	.08	4889.	.13	
~~2~~	~~1~~	~~1000~~	~~END~~	~~2380433.~~	~~*****~~	~~4881174.~~	~~*****~~	~~3642056.~~	~~*****~~	~~6022488.~~	~~*****~~	(1) See explanation on page A55 EQUATION 8 EXCEEDS SH EQUATION 9 EXCEEDS 1.2 SH EQUATION 10 EXCEEDS SA EQUATION 11 EXCEEDS SH+SA
3	1	1000	BEG	3527.	.24	5553.	.31	2213.	.10	5740.	.15	
3	1	1010	END	2223.	.15	3481.	.19	1436.	.06	3659.	.10	
3	2	1010	BEG	2223.	.15	3481.	.19	1436.	.06	3659.	.10	
3	2	1020	END	2042.	.14	2791.	.16	1982.	.09	4025.	.11	
3	3	1020	BEG	2042.	.14	2791.	.16	1982.	.09	4025.	.11	
3	3	1030	END	2740.	.18	3741.	.21	3196.	.14	5936.	.16	
3	4	1030	BEG	2740.	.18	3741.	.21	3196.	.14	5936.	.16	
3	4	1040	END	2860.	.19	3939.	.22	3493.	.16	6353.	.17	
3	5	1040	BEG	4089.	.27	6218.	.35	9192.	.41	13280.	.35	
3	5	1050	END	4606.	.31	7534.	.42	8825.	.39	13431.	.36	
3	6	1050	BEG	3122.	.21	4606.	.26	3354.	.15	6476.	.17	
3	6	1060	END	3128.	.21	4663.	.26	3234.	.14	6362.	.17	
3	7	1060	BEG	3128.	.21	4663.	.26	3234.	.14	6362.	.17	
3	7	1070	END	3180.	.21	5048.	.28	2170.	.10	5350.	.14	
3	8	1070	BEG	3180.	.21	5048.	.28	2170.	.10	5350.	.14	
3	8	1080	END	3183.	.21	5076.	.28	2107.	.09	5290.	.14	
4	1	1080	BEG	2928.	.20	4621.	.26	2107.	.09	5035.	.13	
4	1	1090	END	2933.	.20	4637.	.26	2045.	.09	4977.	.13	
5	1	1080	BEG	2070.	.14	2552.	.14	0.	.00	2070.	.06	
5	1	1100	END	1598.	.11	1598.	.09	0.	.00	1598.	.04	
6	1	1090	BEG	3404.	.23	5368.	.30	2356.	.10	5760.	.15	
6	1	1110	END	3436.	.23	5489.	.30	1921.	.09	5357.	.14	

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Train A
CCWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
6	2	1110	BEG	3436.	.23	5489.	.30	1921.	.09	5357.	.14	
6	2	1120	END	3485.	.23	5683.	.32	1490.	.07	4975.	.13	
6	3	1120	BEG	3485.	.23	5683.	.32	1490.	.07	4975.	.13	
6	3	1130	END	3584.	.24	5664.	.31	2021.	.09	5606.	.15	
6	4	1130	BEG	3584.	.24	5664.	.31	2021.	.09	5606.	.15	
6	4	1140	END	3626.	.24	5573.	.31	2597.	.12	6223.	.17	
6	5	1140	BEG	5741.	.38	10029.	.56	7626.	.34	13367.	.36	
6	5	1150	END	4271.	.28	7099.	.39	7802.	.35	12073.	.32	
6	6	1150	BEG	2958.	.20	4243.	.24	2657.	.12	5615.	.15	
6	6	1160	END	2766.	.18	3929.	.22	2419.	.11	5185.	.14	
6	7	1160	BEG	2766.	.18	3929.	.22	2419.	.11	5185.	.14	
6	7	1170	END	2710.	.18	3845.	.21	1430.	.06	4140.	.11	
6	8	1170	BEG	2710.	.18	3845.	.21	1430.	.06	4140.	.11	
6	8	1180	END	3874.	.26	5905.	.33	948.	.04	4822.	.13	
6	9	1180	BEG	3874.	.26	5905.	.33	948.	.04	4822.	.13	
6	9	1190	END	5312.	.35	8489.	.47	1554.	.07	6866.	.18	
7	1	1190	BEG	5312.	.35	8489.	.47	1554.	.07	6866.	.18	
7	1	1200	END	6605.	.44	10810.	.60	2370.	.11	8975.	.24	
8	1	1200	BEG	6605.	.44	10810.	.60	2370.	.11	8975.	.24	
8	1	1210	END	5093.	.34	8545.	.47	1598.	.07	6691.	.18	
8	2	1210	BEG	5093.	.34	8545.	.47	1598.	.07	6691.	.18	
8	2	1220	END	4035.	.27	6759.	.38	1158.	.05	5192.	.14	
8	3	1220	BEG	4035.	.27	6759.	.38	1158.	.05	5192.	.14	
8	3	1230	END	3181.	.21	5230.	.29	1162.	.05	4342.	.12	
8	4	1230	BEG	3181.	.21	5230.	.29	1162.	.05	4342.	.12	
8	4	1240	END	2904.	.19	4646.	.26	1306.	.06	4210.	.11	
8	5	1240	BEG	4152.	.28	7988.	.44	3834.	.17	7986.	.21	
8	5	1250	END	2706.	.18	7145.	.40	2224.	.10	4931.	.13	
8	6	1250	BEG	2248.	.15	4263.	.24	758.	.03	3006.	.08	
8	6	1270	END	2227.	.15	4354.	.24	643.	.03	2870.	.08	

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Train A
CCWH

ADLPIPE 2 468 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANAL. WINDOWS 3F9.3 7/18/ 0 09:10:02
WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
9	1	1270	BEG	2227.	.15	4354.	.24	643.	.03	2870.	.08	
9	1	1275	END	2223.	.15	4879.	.27	397.	.02	2620.	.07	
9	2	1275	BEG	2223.	.15	4879.	.27	397.	.02	2620.	.07	
9	2	1280	END	2227.	.15	4753.	.26	401.	.02	2628.	.07	
9	3	1280	BEG	2227.	.15	4753.	.26	401.	.02	2628.	.07	
9	3	1290	END	2245.	.15	4399.	.24	441.	.02	2686.	.07	
9	4	1290	BEG	2699.	.18	7444.	.41	1295.	.06	3994.	.11	
9	4	1300	END	2878.	.19	6903.	.38	2380.	.11	5258.	.14	
9	5	1300	BEG	2326.	.16	4153.	.23	810.	.04	3136.	.08	
9	5	1320	END	2318.	.15	4120.	.23	720.	.03	3039.	.08	
9	6	1320	BEG	2318.	.15	4120.	.23	720.	.03	3039.	.08	
9	6	1330	END	2334.	.16	4206.	.23	710.	.03	3044.	.08	
10	1	1330	BEG	2334.	.16	4206.	.23	710.	.03	3044.	.08	
10	1	1340	END	2343.	.16	4408.	.24	1216.	.05	3559.	.09	
10	2	1340	BEG	2343.	.16	4408.	.24	1216.	.05	3559.	.09	
10	2	1350	END	2445.	.16	4482.	.25	886.	.04	3331.	.09	
10	3	1350	BEG	2445.	.16	4482.	.25	886.	.04	3331.	.09	
10	3	1360	END	2428.	.16	4787.	.27	558.	.02	2986.	.08	
10	4	1360	BEG	2428.	.16	4787.	.27	558.	.02	2986.	.08	
10	4	1370	END	2316.	.15	5044.	.28	237.	.01	2553.	.07	
11	1	1370	BEG	2316.	.15	5044.	.28	237.	.01	2553.	.07	
11	1	1380	END	2490.	.17	4942.	.27	138.	.01	2629.	.07	
11	2	1380	BEG	2490.	.17	4942.	.27	138.	.01	2629.	.07	
11	2	1390	END	2313.	.15	4506.	.25	415.	.02	2728.	.07	
11	3	1390	BEG	2313.	.15	4506.	.25	415.	.02	2728.	.07	
11	3	1400	END	2405.	.16	3908.	.22	706.	.03	3111.	.08	
11	4	1400	BEG	2405.	.16	3908.	.22	706.	.03	3111.	.08	
11	4	1410	END	2410.	.16	3339.	.19	998.	.04	3409.	.09	
12	1	1410	BEG	2410.	.16	3339.	.19	998.	.04	3409.	.09	
12	1	1420	END	2324.	.15	3771.	.21	1291.	.06	3615.	.10	

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Train A
CCWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
13	1	1420	BEG	2324.	.15	3771.	.21	1291.	.06	3615.	.10	
13	1	1430	END	2344.	.16	3348.	.19	166.	.01	2510.	.07	
13	2	1430	BEG	2918.	.19	5130.	.28	488.	.02	3406.	.09	
13	2	1440	END	2897.	.19	5167.	.29	1590.	.07	4487.	.12	
13	3	1440	BEG	2335.	.16	3365.	.19	541.	.02	2876.	.08	
13	3	1450	END	2146.	.14	3724.	.21	1873.	.08	4019.	.11	
14	1	1450	BEG	2146.	.14	3724.	.21	1873.	.08	4019.	.11	
14	1	1455	END	2309.	.15	3887.	.22	3408.	.15	5717.	.15	
15	1	1455	BEG	2309.	.15	3887.	.22	3408.	.15	5717.	.15	
15	1	1460	END	2358.	.16	3867.	.21	3526.	.16	5884.	.16	
15	2	1460	BEG	2358.	.16	3867.	.21	3526.	.16	5884.	.16	
15	2	1470	END	2123.	.14	3001.	.17	1749.	.08	3873.	.10	
15	3	1470	BEG	2123.	.14	3001.	.17	1749.	.08	3873.	.10	
15	3	1480	END	2084.	.14	2600.	.14	542.	.02	2626.	.07	
15	4	1480	BEG	2084.	.14	2600.	.14	542.	.02	2626.	.07	
15	4	1490	END	2084.	.14	2591.	.14	1459.	.06	3544.	.09	
15	5	1490	BEG	2346.	.16	3463.	.19	4286.	.19	6631.	.18	
15	5	1500	END	2338.	.16	3497.	.19	4543.	.20	6881.	.18	
15	6	1500	BEG	2081.	.14	2607.	.14	1547.	.07	3628.	.10	
15	6	1510	END	2080.	.14	2404.	.13	1028.	.05	3108.	.08	
15	7	1510	BEG	2080.	.14	2404.	.13	1028.	.05	3108.	.08	
15	7	1520	END	2098.	.14	2753.	.15	766.	.03	2865.	.08	
15	8	1520	BEG	2098.	.14	2753.	.15	766.	.03	2865.	.08	
15	8	1530	END	2139.	.14	3526.	.20	2383.	.11	4522.	.12	
16	1	1530	BEG	2139.	.14	3526.	.20	2383.	.11	4522.	.12	
16	1	1540	END	2199.	.15	4619.	.26	4189.	.19	6388.	.17	
16	2	1540	BEG	2199.	.15	4619.	.26	4189.	.19	6388.	.17	
16	2	1550	END	2084.	.14	3722.	.21	2774.	.12	4858.	.13	
16	3	1550	BEG	2084.	.14	3722.	.21	2774.	.12	4858.	.13	
16	3	1560	END	1967.	.13	2836.	.16	1330.	.06	3298.	.09	

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Train A
CCWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
17	1	1560	BEG	1967.	.13	2836.	.16	1330.	.06	3298.	.09	
17	1	1570	END	1911.	.13	2461.	.14	319.	.01	2230.	.06	
18	1	1570	BEG	1911.	.13	2461.	.14	319.	.01	2230.	.06	
18	1	1580	END	1908.	.13	2136.	.12	200.	.01	2108.	.06	
18	2	1580	BEG	1908.	.13	2136.	.12	200.	.01	2108.	.06	
18	2	1590	END	1906.	.13	2397.	.13	251.	.01	2158.	.06	
18	3	1590	BEG	1906.	.13	2397.	.13	251.	.01	2158.	.06	
18	3	1600	END	1908.	.13	2878.	.16	438.	.02	2346.	.06	
18	4	1600	BEG	1908.	.13	2878.	.16	438.	.02	2346.	.06	
18	4	1610	END	1912.	.13	3257.	.18	617.	.03	2528.	.07	
18	5	1610	BEG	1912.	.13	3257.	.18	617.	.03	2528.	.07	
18	5	1620	END	1917.	.13	3714.	.21	801.	.04	2718.	.07	
19	1	1620	BEG	1917.	.13	3714.	.21	801.	.04	2718.	.07	
19	1	1630	END	1924.	.13	4267.	.24	1026.	.05	2950.	.08	
19	2	1630	BEG	1924.	.13	4267.	.24	1026.	.05	2950.	.08	
19	2	1640	END	1924.	.13	2867.	.16	1454.	.06	3379.	.09	
19	3	1640	BEG	1924.	.13	2867.	.16	1454.	.06	3379.	.09	
19	3	1650	END	1924.	.13	2177.	.12	1674.	.07	3598.	.10	
19	4	1650	BEG	1993.	.13	2550.	.14	4916.	.22	6910.	.18	
19	4	1660	END	2215.	.15	4058.	.23	2856.	.13	5072.	.14	
19	5	1660	BEG	2025.	.13	2862.	.16	973.	.04	2998.	.08	
19	5	1670	END	2107.	.14	2830.	.16	223.	.01	2330.	.06	
19	6	1670	BEG	2107.	.14	2830.	.16	223.	.01	2330.	.06	
19	6	1680	END	2141.	.14	2640.	.15	1645.	.07	3785.	.10	
19	7	1680	BEG	2141.	.14	2640.	.15	1645.	.07	3785.	.10	
19	7	1690	END	1946.	.13	2352.	.13	3493.	.16	5439.	.15	
19	8	1690	BEG	1946.	.13	2352.	.13	3493.	.16	5439.	.15	
19	8	1700	END	2254.	.15	2605.	.14	5338.	.24	7592.	.20	
20	1	1700	BEG	2254.	.15	2605.	.14	5338.	.24	7592.	.20	
20	1	1710	END	2403.	.16	2908.	.16	5801.	.26	8205.	.22	

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Train A
CCWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
21	1	1710	BEG	2403.	.16	2908.	.16	5801.	.26	8205.	.22	
21	1	1715	END	2372.	.16	2873.	.16	5682.	.25	8054.	.21	
21	2	1715	BEG	2372.	.16	2873.	.16	5682.	.25	8054.	.21	
21	2	1720	END	2178.	.15	2673.	.15	4871.	.22	7049.	.19	
22	1	1720	BEG	2178.	.15	2673.	.15	4871.	.22	7049.	.19	
22	1	1750	END	2175.	.14	3200.	.18	9527.	.42	11701.	.31	
23	1	1750	BEG	2174.	.14	3440.	.19	7881.	.35	10055.	.27	
23	1	1760	END	2028.	.14	2749.	.15	2792.	.12	4821.	.13	
23	2	1760	BEG	2298.	.15	4224.	.23	9945.	.44	12243.	.33	
23	2	1765	END	2306.	.15	4278.	.24	7029.	.31	9336.	.25	
23	3	1765	BEG	1766.	.12	3080.	.17	3515.	.16	5280.	.14	
23	3	1770	END	1837.	.12	3216.	.18	1698.	.08	3536.	.09	
24	1	1770	BEG	1837.	.12	3216.	.18	1698.	.08	3536.	.09	
24	1	1775	END	2089.	.14	3954.	.22	2041.	.09	4130.	.11	
25	1	1775	BEG	2089.	.14	3954.	.22	2041.	.09	4130.	.11	
25	1	1780	END	2035.	.14	3941.	.22	2066.	.09	4101.	.11	
25	2	1780	BEG	2035.	.14	3941.	.22	2066.	.09	4101.	.11	
25	2	1790	END	1551.	.10	2178.	.12	2385.	.11	3935.	.10	
25	3	1790	BEG	1551.	.10	2178.	.12	2385.	.11	3935.	.10	
25	3	1800	END	1573.	.10	1901.	.11	2551.	.11	4124.	.11	
25	4	1800	BEG	1668.	.11	2309.	.13	6647.	.30	8315.	.22	
25	4	1810	END	1989.	.13	2963.	.16	6312.	.28	8301.	.22	
25	5	1810	BEG	1737.	.12	2235.	.12	2423.	.11	4160.	.11	
25	5	1820	END	1773.	.12	2511.	.14	1930.	.09	3703.	.10	
25	6	1820	BEG	1773.	.12	2511.	.14	1930.	.09	3703.	.10	
25	6	1830	END	1762.	.12	2615.	.15	1749.	.08	3510.	.09	
25	7	1830	BEG	1762.	.12	2615.	.15	1749.	.08	3510.	.09	
25	7	1840	END	1756.	.12	2630.	.15	1722.	.08	3478.	.09	
26	1	1840	BEG	1733.	.12	2602.	.14	1722.	.08	3454.	.09	
26	1	1850	END	1719.	.11	2602.	.14	1696.	.08	3415.	.09	

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Train A
CCWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
27	1	1840	BEG	1503.	.10	1532.	.09	0.	.00	1503.	.04	
27	1	1860	END	1473.	.10	1473.	.08	0.	.00	1473.	.04	
28	1	1850	BEG	1719.	.11	2602.	.14	1696.	.08	3415.	.09	
28	1	1870	END	1720.	.11	2770.	.15	1505.	.07	3225.	.09	
28	2	1870	BEG	1720.	.11	2770.	.15	1505.	.07	3225.	.09	
28	2	1880	END	2015.	.13	3244.	.18	1448.	.06	3463.	.09	
28	3	1880	BEG	2015.	.13	3244.	.18	1448.	.06	3463.	.09	
28	3	1890	END	2789.	.19	4761.	.26	2909.	.13	5698.	.15	
29	1	1890	BEG	2703.	.18	4660.	.26	1710.	.08	4413.	.12	
29	1	1900	END	2558.	.17	4064.	.23	700.	.03	3258.	.09	
29	2	1900	BEG	2558.	.17	4064.	.23	700.	.03	3258.	.09	
29	2	1910	END	2221.	.15	3334.	.19	705.	.03	2926.	.08	
30	1	1910	BEG	3470.	.23	6441.	.36	2507.	.11	5978.	.16	
30	1	1920	END	3157.	.21	5762.	.32	2598.	.12	5755.	.15	
30	2	1920	BEG	2462.	.16	4199.	.23	1299.	.06	3761.	.10	
30	2	1930	END	1932.	.13	3025.	.17	1545.	.07	3476.	.09	
30	3	1930	BEG	1932.	.13	3025.	.17	1545.	.07	3476.	.09	
30	3	1940	END	1577.	.11	2318.	.13	1853.	.08	3430.	.09	
30	4	1940	BEG	1577.	.11	2318.	.13	1853.	.08	3430.	.09	
30	4	1950	END	1495.	.10	2198.	.12	1968.	.09	3463.	.09	
30	5	1950	BEG	1624.	.11	2910.	.16	4800.	.21	6424.	.17	
30	5	1960	END	1578.	.11	2407.	.13	4799.	.21	6377.	.17	
30	6	1960	BEG	1470.	.10	1923.	.11	1968.	.09	3438.	.09	
30	6	1970	END	1465.	.10	1871.	.10	1865.	.08	3330.	.09	
31	1	1970	BEG	1465.	.10	1871.	.10	1865.	.08	3330.	.09	
31	1	1980	END	1458.	.10	2071.	.12	1706.	.08	3164.	.08	
32	1	1980	BEG	1458.	.10	2071.	.12	1706.	.08	3164.	.08	
32	1	1985	END	1458.	.10	2092.	.12	1688.	.08	3146.	.08	
32	2	1985	BEG	1458.	.10	2092.	.12	1688.	.08	3146.	.08	
32	2	1990	END	1461.	.10	2112.	.12	1601.	.07	3063.	.08	

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Train A
CC104

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
32	3	1990	BEG	1461.	.10	2112.	.12	1601.	.07	3063.	.08	
32	3	2000	END	1476.	.10	2290.	.13	1603.	.07	3079.	.08	
32	4	2000	BEG	1590.	.11	3079.	.17	3910.	.17	5500.	.15	
32	4	2010	END	1560.	.10	2957.	.16	3561.	.16	5120.	.14	
32	5	2010	BEG	1460.	.10	2224.	.12	1460.	.06	2920.	.08	
32	5	2020	END	1491.	.10	2028.	.11	1238.	.06	2729.	.07	
32	6	2020	BEG	1491.	.10	2028.	.11	1238.	.06	2729.	.07	
32	6	2030	END	1907.	.13	2971.	.17	1083.	.05	2990.	.08	
33	1	2030	BEG	1907.	.13	2971.	.17	1083.	.05	2990.	.08	
33	1	2040	END	2594.	.17	4761.	.26	1345.	.06	3939.	.11	
33	2	2040	BEG	2594.	.17	4761.	.26	1345.	.06	3939.	.11	
33	2	2050	END	1892.	.13	3415.	.19	1139.	.05	3031.	.08	
33	3	2050	BEG	1892.	.13	3415.	.19	1139.	.05	3031.	.08	
33	3	2060	END	1504.	.10	2373.	.13	959.	.04	2464.	.07	
34	1	2060	BEG	1504.	.10	2373.	.13	959.	.04	2464.	.07	
34	1	2070	END	1563.	.10	1946.	.11	825.	.04	2388.	.06	
34	2	2070	BEG	1563.	.10	1946.	.11	825.	.04	2388.	.06	
34	2	2080	END	1567.	.10	2230.	.12	770.	.03	2338.	.06	
34	3	2080	BEG	1567.	.10	2230.	.12	770.	.03	2338.	.06	
34	3	2090	END	1526.	.10	2391.	.13	759.	.03	2285.	.06	
34	4	2090	BEG	1681.	.11	3264.	.18	1850.	.08	3531.	.09	
34	4	2100	END	1454.	.10	2069.	.11	1323.	.06	2777.	.07	
35	1	2100	BEG	1402.	.09	1738.	.10	543.	.02	1944.	.05	
35	1	2110	END	1459.	.10	2328.	.13	403.	.02	1862.	.05	
35	2	2110	BEG	1459.	.10	2328.	.13	403.	.02	1862.	.05	
35	2	2120	END	1578.	.11	2366.	.13	317.	.01	1894.	.05	
35	3	2120	BEG	1578.	.11	2366.	.13	317.	.01	1894.	.05	
35	3	2130	END	1661.	.11	2416.	.13	311.	.01	1972.	.05	
35	4	2130	BEG	1928.	.13	3308.	.18	758.	.03	2687.	.07	
35	4	2140	END	2363.	.16	3565.	.20	939.	.04	3301.	.09	

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Train A
CCWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
35	5	2140	BEG	1899.	.13	2556.	.14	385.	.02	2284.	.06	
35	5	2150	END	1907.	.13	2589.	.14	418.	.02	2324.	.06	
35	6	2150	BEG	1907.	.13	2589.	.14	418.	.02	2324.	.06	
35	6	2160	END	1927.	.13	2775.	.15	611.	.03	2538.	.07	
35	7	2160	BEG	1927.	.13	2775.	.15	611.	.03	2538.	.07	
35	7	2200	END	1950.	.13	3092.	.17	912.	.04	2862.	.08	
36	1	1750	BEG	1589.	.11	3853.	.21	4222.	.19	5812.	.15	
36	1	2500	END	1624.	.11	2903.	.16	1844.	.08	3469.	.09	
36	2	2500	BEG	1624.	.11	2903.	.16	1844.	.08	3469.	.09	
36	2	2510	END	1775.	.12	2910.	.16	1717.	.08	3492.	.09	
36	3	2510	BEG	1775.	.12	2910.	.16	1717.	.08	3492.	.09	
36	3	2520	END	1787.	.12	2895.	.16	1702.	.08	3489.	.09	
37	1	2520	BEG	1786.	.12	2892.	.16	1702.	.08	3488.	.09	
37	1	2530	END	1784.	.12	2855.	.16	1688.	.08	3472.	.09	
38	1	2520	BEG	1503.	.10	1517.	.08	0.	.00	1503.	.04	
38	1	2540	END	1473.	.10	1473.	.08	0.	.00	1473.	.04	
39	1	2530	BEG	1784.	.12	2855.	.16	1688.	.08	3472.	.09	
39	1	2550	END	1700.	.11	2447.	.14	1554.	.07	3254.	.09	
39	2	2550	BEG	1700.	.11	2447.	.14	1554.	.07	3254.	.09	
39	2	2560	END	1526.	.10	2075.	.12	1395.	.06	2921.	.08	
40	1	2560	BEG	1526.	.10	2075.	.12	1395.	.06	2921.	.08	
40	1	2570	END	1861.	.12	2330.	.13	1260.	.06	3122.	.08	
40	2	2570	BEG	1861.	.12	2330.	.13	1260.	.06	3122.	.08	
40	2	2580	END	1787.	.12	2256.	.13	1219.	.05	3006.	.08	
40	3	2580	BEG	2088.	.14	3004.	.17	3175.	.14	5263.	.14	
40	3	2590	END	1571.	.10	2346.	.13	2258.	.10	3829.	.10	
40	4	2590	BEG	1523.	.10	1920.	.11	867.	.04	2390.	.06	
40	4	2600	END	1524.	.10	1872.	.10	807.	.04	2331.	.06	
41	1	2600	BEG	1524.	.10	1872.	.10	807.	.04	2331.	.06	
41	1	2610	END	1526.	.10	2133.	.12	889.	.04	2415.	.06	

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Train A
CCWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
42	1	2610	BEG	1526.	.10	2133.	.12	889.	.04	2415.	.06	
42	1	2615	END	1524.	.10	2184.	.12	874.	.04	2398.	.06	
43	1	2615	BEG	1524.	.10	2184.	.12	874.	.04	2398.	.06	
43	1	2620	END	1519.	.10	2103.	.12	802.	.04	2321.	.06	
43	2	2620	BEG	1563.	.10	2705.	.15	2089.	.09	3652.	.10	
43	2	2630	END	1711.	.11	2530.	.14	1524.	.07	3236.	.09	
43	3	2630	BEG	1595.	.11	2014.	.11	585.	.03	2180.	.06	
43	3	2640	END	1625.	.11	2017.	.11	605.	.03	2229.	.06	
43	4	2640	BEG	1625.	.11	2017.	.11	605.	.03	2229.	.06	
43	4	2650	END	1628.	.11	1980.	.11	913.	.04	2542.	.07	
43	5	2650	BEG	1628.	.11	1980.	.11	913.	.04	2542.	.07	
43	5	2660	END	1580.	.11	1904.	.11	1376.	.06	2956.	.08	
43	6	2660	BEG	1580.	.11	1904.	.11	1376.	.06	2956.	.08	
43	6	2670	END	1674.	.11	2021.	.11	1700.	.08	3374.	.09	
43	7	2670	BEG	1674.	.11	2021.	.11	1700.	.08	3374.	.09	
43	7	2680	END	1898.	.13	2422.	.13	3581.	.16	5479.	.15	
44	1	2680	BEG	1821.	.12	2110.	.12	6283.	.28	8104.	.22	
44	1	2690	END	1658.	.11	1825.	.10	2802.	.12	4460.	.12	
45	1	2690	BEG	2454.	.16	3332.	.19	19723.	.88	22176.	.59	
45	1	2700	END	2247.	.15	3002.	.17	16848.	.75	19095.	.51	
45	2	2700	BEG	1699.	.11	2203.	.12	8424.	.37	10123.	.27	
45	2	2710	END	1506.	.10	1887.	.10	5997.	.27	7502.	.20	
46	1	2710	BEG	1506.	.10	1887.	.10	5997.	.27	7502.	.20	
46	1	2720	END	1380.	.09	1627.	.09	2728.	.12	4108.	.11	
46	2	2720	BEG	1380.	.09	1627.	.09	2728.	.12	4108.	.11	
46	2	2730	END	1368.	.09	1541.	.09	1427.	.06	2795.	.07	
47	1	2730	BEG	1368.	.09	1541.	.09	1427.	.06	2795.	.07	
47	1	2740	END	1458.	.10	1618.	.09	4769.	.21	6227.	.17	
47	2	2740	BEG	1458.	.10	1618.	.09	4769.	.21	6227.	.17	
47	2	2750	END	1249.	.08	1356.	.08	3560.	.16	4809.	.13	

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Train A
CCWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
47	3	2750	BEG	1249.	.08	1356.	.08	3560.	.16	4809.	.13	
47	3	2760	END	1430.	.10	1601.	.09	1582.	.07	3012.	.08	
47	4	2760	BEG	1430.	.10	1601.	.09	1582.	.07	3012.	.08	
47	4	2770	END	1508.	.10	1691.	.09	1413.	.06	2921.	.08	
47	5	2770	BEG	1508.	.10	1691.	.09	1413.	.06	2921.	.08	
47	5	2780	END	1398.	.09	1625.	.09	3340.	.15	4738.	.13	
47	6	2780	BEG	1398.	.09	1625.	.09	3340.	.15	4738.	.13	
47	6	2790	END	1241.	.08	1457.	.08	4668.	.21	5909.	.16	
47	7	2790	BEG	1282.	.09	1649.	.09	10576.	.47	11858.	.32	
47	7	2800	END	1371.	.09	1597.	.09	5837.	.26	7208.	.19	
47	8	2800	BEG	1293.	.09	1427.	.08	2577.	.11	3870.	.10	
47	8	2810	END	1319.	.09	1421.	.08	1961.	.09	3280.	.09	
47	9	2810	BEG	1319.	.09	1421.	.08	1961.	.09	3280.	.09	
47	9	2820	END	1416.	.09	1570.	.09	2933.	.13	4349.	.12	
47	10	2820	BEG	1578.	.11	1841.	.10	6645.	.30	8223.	.22	
47	10	2830	END	1665.	.11	2087.	.12	10665.	.47	12331.	.33	
47	11	2830	BEG	1467.	.10	1715.	.10	4708.	.21	6174.	.16	
47	11	2840	END	1455.	.10	1922.	.11	8809.	.39	10264.	.27	
47	12	2840	BEG	1455.	.10	1922.	.11	8809.	.39	10264.	.27	
47	12	2850	END	1442.	.10	2205.	.12	14156.	.63	15597.	.42	
48	1	2680	BEG	1468.	.10	2371.	.13	5499.	.24	6967.	.19	
48	1	3000	END	1500.	.10	1979.	.11	1668.	.07	3167.	.08	
48	2	3000	BEG	1500.	.10	1979.	.11	1668.	.07	3167.	.08	
48	2	3010	END	1552.	.10	1954.	.11	1138.	.05	2689.	.07	
48	3	3010	BEG	1728.	.12	2464.	.14	2775.	.12	4503.	.12	
48	3	3020	END	1821.	.12	2269.	.13	2088.	.09	3909.	.10	
48	4	3020	BEG	1602.	.11	1848.	.10	856.	.04	2459.	.07	
48	4	3030	END	1492.	.10	1966.	.11	3144.	.14	4636.	.12	
48	5	3030	BEG	1492.	.10	1966.	.11	3144.	.14	4636.	.12	
48	5	3040	END	1433.	.10	2350.	.13	5540.	.25	6973.	.19	

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Train A
CCWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
** CODE STRESS SUMMATIONS **

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC	MEM	SEQ	POS	EQN. 8 (PSI)	TOTAL/ ALLOW.	EQN. 9 (PSI)	TOTAL/ ALLOW.	EQN. 10 (PSI)	TOTAL/ ALLOW.	EQN. 11 (PSI)	TOTAL/ ALLOW.	ADDITIONAL INFORMATION
48	6	3040	BEG	1433.	.10	2350.	.13	5540.	.25	6973.	.19	
48	6	3050	END	1491.	.10	2870.	.16	7956.	.35	9447.	.25	
49	1	1890	BEG	1797.	.12	2873.	.16	10640.	.47	12438.	.33	
49	1	4000	END	1337.	.09	1786.	.10	1999.	.09	3336.	.09	
49	2	4000	BEG	1445.	.10	2208.	.12	4530.	.20	5974.	.16	
49	2	4010	END	1517.	.10	2002.	.11	8547.	.38	10064.	.27	
49	3	4010	BEG	1379.	.09	1665.	.09	3773.	.17	5152.	.14	
49	3	4020	END	1312.	.09	1668.	.09	2275.	.10	3588.	.10	
49	4	4020	BEG	1312.	.09	1668.	.09	2275.	.10	3588.	.10	
49	4	4030	END	1385.	.09	2209.	.12	1682.	.07	3066.	.08	
50	1	4030	BEG	1385.	.09	2209.	.12	1682.	.07	3066.	.08	
50	1	4050	END	1525.	.10	2883.	.16	3173.	.14	4698.	.13	

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Train A
CCWH

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
** CODE STRESS SUMMATIONS **

CLASS 2,LEVEL A SUMMARY OF 10 HIGHEST STRESSES FOR EACH EQUATION

*****EQUATION 8 *****

	SEC	MEM	SEQ	POS	STRESS (PSI)	TOTAL/ ALLOWABLE	
~~1.~~	~~2~~	~~1~~	~~1000~~	~~END~~	~~2380433.~~	~~158.70~~	(1) DGB 9/20/2000
2.	7	1	1200	END	6605.	.44	
3.	8	1	1200	BEG	6605.	.44	
4.	6	5	1140	BEG	5741.	.38	
5.	6	9	1190	END	5312.	.35	
6.	7	1	1190	BEG	5312.	.35	
7.	8	1	1210	END	5093.	.34	
8.	8	2	1210	BEG	5093.	.34	
9.	3	5	1050	END	4606.	.31	
10.	6	5	1150	END	4271.	.28	

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*****EQUATION 9 *****

	SEC	MEM	SEQ	POS	STRESS (PSI)	TOTAL/ ALLOWABLE	
~~1.~~	~~2~~	~~1~~	~~1000~~	~~END~~	~~4001174.~~	~~271.18~~	(1) DGB 9/20/2000
2.	7	1	1200	END	10810.	.60	
3.	8	1	1200	BEG	10810.	.60	
4.	6	5	1140	BEG	10029.	.56	
5.	8	1	1210	END	8545.	.47	
6.	8	2	1210	BEG	8545.	.47	
7.	6	9	1190	END	8489.	.47	
8.	7	1	1190	BEG	8489.	.47	
9.	8	5	1240	BEG	7988.	.44	
10.	3	5	1050	END	7534.	.42	

Train A
CCWH

*****EQUATION 10 *****

	SEC	MEM	SEQ	POS	STRESS (PSI)	TOTAL/ ALLOWABLE	
~~1.~~	~~2~~	~~1~~	~~1000~~	~~END~~	~~3642056.~~	~~161.87~~	(1) DGB 9/20/2000
2.	45	1	2690	BEG	19723.	.88	
3.	45	1	2700	END	16848.	.75	
4.	47	12	2850	END	14156.	.63	
5.	47	10	2830	END	10665.	.47	
6.	49	1	1890	BEG	10640.	.47	
7.	47	7	2790	BEG	10576.	.47	
8.	23	2	1760	BEG	9945.	.44	
9.	22	1	1750	END	9527.	.42	
10.	3	5	1040	BEG	9192.	.41	

(1) See explanation on next page
DGB 9/20/2000

ADLPIPE E 479 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANAL WINDOWS 3F9.3 7/18/ 0 09:10:02

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
** CODE STRESS SUMMATIONS **

CLASS 2,LEVEL A SUMMARY OF 10 HIGHEST STRESSES FOR EACH EQUATION

*****EQUATION 11 *****

	SEC	MEM	SEQ	POS	STRESS (PSI)	TOTAL/ ALLOWABLE
~~1.~~	~~2~~	~~1~~	~~1000~~	~~END~~	~~6022488.~~	~~160.60~~ (1) DSB 9/20/2000
2.	45	1	2690	BEG	22176.	.59
3.	45	1	2700	END	19095.	.51
4.	47	12	2850	END	15597.	.42
5.	3	5	1050	END	13431.	.36
6.	6	5	1140	BEG	13367.	.36
7.	3	5	1040	BEG	13280.	.35
8.	49	1	1890	BEG	12438.	.33
9.	47	10	2830	END	12331.	.33
10.	23	2	1760	BEG	12243.	.33

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Train A
CCWH

(1) Disregard calculated stresses; they are fictitious values based on the properties used in the model.
DSB 9/20/2000

TE.40800
97-01716
1.5.1B

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 15, 1997

Altran Report 96227-TR-03 Rev. 1
Att./Appx. A Sh A56

LICENSEE: Wolf Creek Nuclear Operating Corporation

FACILITY: Wolf Creek Generating Station

SUBJECT: RESPONSE TO GENERIC LETTER 96-06, "ASSURANCE OF EQUIPMENT OPERABILITY AND CONTAINMENT INTEGRITY DURING DESIGN-BASIS ACCIDENT CONDITIONS" (TAC NO. M96887)

Background:

On September 24, 1997, members of the NRC staff met with representatives from Wolf Creek Nuclear Operating Corporation (the licensee) to discuss the results of their evaluations and proposed actions in response to Generic Letter 96-06. This was a followup to the meeting held on June 25, 1997. The meeting was held in the NRC offices in Rockville, Maryland.

Summary:

The focus of this meeting was the licensee's activities in resolving the thermally induced overpressurization of isolated pipe inside containment issue. The licensee identified 33 sections of pipe that may be susceptible to thermal overpressurization. In determining the stress allowables in these isolated piping sections, the licensee determined that the Wolf Creek licensing basis included the use of the ASME Code, Section III, Appendix F, with an allowable stress for faulted conditions for Class 2 and 3 piping to be 2.4 S_h.

Of the 33 sections evaluated, 9 locations were eliminated, 4 because of configuration and 5 by changing the operating procedures associated with these systems. For the remaining 24 locations, the licensee used the following methodology for analyzing the isolated sections:

1. For heat input, various size reactor coolant system line breaks from 2 inches up to the large break LOCA were used and various size main steam line breaks were used.

2. Using the containment pressure and temperature profile for the various line breaks, the time dependent pressure rise inside the pipe section was calculated.

3. The stress in the piping due to internal pressure was then calculated.

4. The calculated stress was compared to the stress allowables in the piping and valve components.

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12/13/00

For the large break LOCA case, the licensee reported the following preliminary results:

1. Seven locations passed criteria with no modification required.
2. Fifteen locations passed criteria when credit is taken for existing insulation.
3. Two locations will require field modifications.

For the small break LOCA case, only 7 of the 24 locations have been analyzed. The preliminary results show that for smaller, uninsulated pipe, the small break containment temperature and pressure profile may be more limiting than the large break LOCA. Enhanced insulation or the modifications required as a result of the large break LOCA analysis would allow the stress criteria to be met.

The licensee still has to complete the evaluations for the remaining small break LOCAs and steam line breaks. It is estimated that about 2 months will be required to complete these evaluations.

The licensee had identified three modifications that would reduce the piping stress (1) a change in the electrical logic to assure access to an existing relief valve, (2) the installation of a thermal relief valve, and (3) enhanced insulation on the residual heat removal (RHR) suction cooling lines. During the meeting, the licensee stated that there was a high probability that during Refuel IX, changes 1 and 2 would be implemented. After the meeting, the licensee notified the staff that after reviewing the impact on safety of the modifications, only modification 3, above, had a high probability of implementation during Refuel IX. The licensee's commitment is to have all evaluations and modifications completed by the end of Refuel X, currently scheduled for the spring of 1999. The licensee has performed an operability evaluation for all sections of the piping in question.

The licensee has done some risk evaluations of the 24 locations and estimated the impact on core damage frequency (CDF). The following results were obtained:

1. None of the 24 sections perform an accident mitigation function.
2. The postulated failure of 22 of the 24 sections has no impact on CDF.
3. The postulated failure of the RHR suction cooling line sections would have an insignificant impact on CDF (<0.016% increase).

From the June 25, 1997, meeting, the licensee felt there were three open issues:

1. Containment cooler pressure measurements.

2. Analysis of Train A waterhammer forces, and

3. Use of emergency condition stress limits for waterhammer.

To resolve these issues, the licensee reported they will install instrumentation to measure containment cooler pressures during the performance of the surveillance test that simulates a loss-of-off-site power. They are currently analyzing Train A and the results to date show that the Train B analysis remains bounding. Concerning use of emergency condition stress limits, the licensee has revised its surveillance testing procedures to eliminate the possibility of a waterhammer event during testing. With this revision, the licensee concluded that the frequency of a waterhammer event would be very low and use of the emergency condition stress limits was justified.

The technical content of the licensee's presentation was well received by the staff.

Enclosed is the handout provided at the meeting by the licensee and the list of participants in the meeting.

Kristine M. Thomas

Kristine M. Thomas, Project Manager
Project Directorate IV-2
Division of Reactor Projects
Office of Nuclear Reactor Regulation

Docket No. 50-482

Enclosures: 1. Handout
2. Attendees

cc w/encls: See next page

Altran Corporation
Technical Report No. 96227-TR-03
Revision 1

Attachment B

Pipe Support Load Summaries for Train 'A' and Train 'B' Return Lines

Reference

Train 'A' Return Line

For Containment Cooling System (Train 'A' Return Line), two separate stress analysis have been performed for two separate Water Hammer (WH) condition.

1) Column Closure Water Hammer (Dated 7/18/00)
2) Condensation Induced Water Hammer (Dated 7/18/00)

For Load Table (Table B-1.0 & Table B-2.0) due to Column Closure and Condensation Induced Water Hammer Condition, see pages B44 and B45, for Load Comparison Summary (Table B-3.0) evaluation of supports see page B46 of this attachment. SEE PAGES B46 AND B46A FOR MAXIMUM I.R. VALUES.

Remaining support loads due to this condition are lower than loads due to Column Closure Water Hammer Condition. Therefore those remaining supports are acceptable by comparison with evaluation due to Column Closure Water Hammer Condition.

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX DEADWEIGHT ANALYSIS XXX

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Attachment: B, Sh: B3

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

SPRING/HANGER SUMMARY
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
2	1	1000	RI	18.	-2136.	158.	5817.	1060.	7876.	-.0001	.0000	.0001	.0876	.0146	.1017
7	1	1200	RI	-38.	-5726.	0.	0.	0.	0.	-.0001	-.0166	-.0257	-.1203	.0058	-.0497
9	1	1275	SN	0.	0.	0.	0.	0.	0.	.0051	.0553	-.0218	.0066	-.0080	-.1072
10	1	1340	RI	62.	-604.	0.	0.	0.	0.	.0002	-.0018	-.0186	.0074	-.0018	-.0874
11	1	1380	RI	0.	-1852.	0.	0.	0.	0.	-.0003	-.0054	-.0185	-.0001	.0006	-.0631
12	1	1420	RI	9.	-820.	0.	0.	0.	0.	.0000	-.0024	-.0185	-.0061	-.0012	-.0388
14	1	1455	RI	52.	0.	-52.	0.	0.	0.	-.0096	-.0047	-.0099	-.0153	-.0082	-.0206
15	1	1460	RI	0.	-1668.	0.	0.	0.	0.	-.0099	-.0048	-.0096	-.0148	-.0082	-.0207
16	1	1540	RI	-273.	-5554.	-141.	0.	0.	0.	-.0008	-.0161	-.0004	.0008	-.0100	-.0041
17	1	1570	RI	181.	0.	46.	0.	0.	0.	.0005	-.0170	.0001	.0002	-.0085	.0006
19	1	1630	RI	-9.	0.	-15.	0.	0.	0.	.0000	-.0179	.0000	-.0008	-.0058	-.0001
20	1	1710	RI	0.	-1781.	0.	0.	0.	0.	.0067	-.0052	.0007	.0036	-.0019	.0054
21	1	1715	SN	0.	0.	0.	0.	0.	0.	.0067	-.0050	.0007	.0033	-.0019	.0053
24	1	1775	RI	0.	-985.	0.	0.	0.	0.	.0097	-.0056	.0011	-.0074	-.0022	.0042
25	1	1780	SN	0.	0.	0.	0.	0.	0.	.0098	-.0060	.0012	-.0080	-.0022	.0042
29	1	1900	RI	0.	-1366.	0.	0.	0.	0.	.0125	-.0078	-.0082	.0073	-.0049	.0038
31	1	1980	RI	18.	0.	0.	0.	0.	0.	.0002	-.0322	-.0103	.0134	-.0091	.0229
32	1	1985	SN	0.	0.	0.	0.	0.	0.	-.0006	-.0322	-.0098	.0135	-.0092	.0228
33	1	2040	RI	-73.	-921.	0.	0.	0.	0.	-.0007	-.0087	.0005	.0022	-.0084	.0308
34	1	2070	SN	0.	0.	0.	0.	0.	0.	.0073	-.0253	.0005	-.0126	-.0027	.0369
35	1	2110	SN	0.	0.	0.	0.	0.	0.	.0089	-.0175	.0007	-.0036	-.0003	.0429
40	1	2570	RI	0.	-1281.	0.	0.	0.	0.	.0075	-.0073	.0000	.0010	.0005	.0020
41	1	2610	RI	63.	0.	0.	0.	0.	0.	.0004	-.0095	.0015	.0013	.0029	.0087
42	1	2615	SN	0.	0.	0.	0.	0.	0.	.0001	-.0095	.0016	.0013	.0029	.0087
46	1	2720	RI	113.	0.	0.	0.	0.	0.	.0019	-.0002	.0019	.0010	-.0009	.0103
47	1	2740	RI	0.	-240.	0.	0.	0.	0.	.0019	-.0020	.0019	.0051	.0007	.0113

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX DEADWEIGHT ANALYSIS XXX

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Attachment: B, Sh: B4

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

SPRING/HANGER SUMMARY IN LOCAL COORDINATES
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
2	1	1000	RI	-131.	90.	-2136.	-9761.	775.	1060.	.0000	.0001	.0000	-.1342	.0005	.0146
14	1	1455	RI	74.	0.	0.	0.	0.	0.	.0002	-.0138	.0047	.0038	-.0254	.0082
21	1	1715	SN	0.	0.	0.	0.	0.	0.	.0068	-.0050	-.0006	.0042	-.0019	.0046
25	1	1780	SN	0.	0.	0.	0.	0.	0.	.0099	-.0060	.0001	-.0075	-.0022	.0050

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX DEADWEIGHT ANALYSIS XXX

Altran Report
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Attachment: B, Sh: B5

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET	PT SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
1	500	-5.	-2.	5.	1.	0.	2.	.0000	.0000	.0000	.0000	.0000	.0000
2	800	0.	0.	0.	0.	0.	0.	-.0003	.0027	-.0002	.0813	.0140	.0944
3	1000	0.	0.	0.	0.	0.	0.	-.0001	.0000	.0001	.0876	.0146	.1017
4	1080	0.	0.	0.	0.	0.	0.	-.0067	-.3791	.0459	-.0070	.0076	.0196
5	1090	0.	0.	0.	0.	0.	0.	-.0073	-.3791	.0457	-.0076	.0075	.0193
6	1100	0.	0.	0.	0.	0.	0.	-.0067	-.3695	.0417	-.0070	.0076	.0174
7	1190	0.	0.	0.	0.	0.	0.	-.0026	-.0688	-.0258	-.1463	.0069	-.0446
8	1200	0.	0.	0.	0.	0.	0.	-.0001	-.0166	-.0257	-.1203	.0058	-.0497
9	1270	0.	0.	0.	0.	0.	0.	.0051	.0760	-.0233	.0052	-.0079	-.1072
10	1330	0.	0.	0.	0.	0.	0.	.0012	.0020	-.0186	.0085	-.0026	-.0920
11	1370	0.	0.	0.	0.	0.	0.	-.0007	-.0066	-.0185	-.0018	.0004	-.0692
12	1410	0.	0.	0.	0.	0.	0.	.0005	-.0058	-.0185	-.0039	-.0003	-.0449
13	1420	0.	0.	0.	0.	0.	0.	.0000	-.0024	-.0185	-.0061	-.0012	-.0388
14	1450	0.	0.	0.	0.	0.	0.	-.0054	-.0030	-.0141	-.0184	-.0080	-.0223
15	1455	0.	0.	0.	0.	0.	0.	-.0096	-.0047	-.0099	-.0153	-.0082	-.0206
16	1530	0.	0.	0.	0.	0.	0.	-.0038	-.0162	-.0009	.0009	-.0104	-.0068
17	1560	0.	0.	0.	0.	0.	0.	.0009	-.0167	.0001	.0002	-.0090	.0003
18	1570	0.	0.	0.	0.	0.	0.	.0005	-.0170	.0001	.0002	-.0085	.0006
19	1620	0.	0.	0.	0.	0.	0.	-.0001	-.0178	.0003	-.0004	-.0063	.0000
20	1700	0.	0.	0.	0.	0.	0.	.0064	-.0061	.0006	.0048	-.0020	.0055
21	1710	0.	0.	0.	0.	0.	0.	.0067	-.0052	.0007	.0036	-.0019	.0054
22	1720	0.	0.	0.	0.	0.	0.	.0072	-.0044	.0008	.0017	-.0017	.0051
23	1750	0.	0.	0.	0.	0.	0.	.0075	-.0040	.0009	.0009	-.0017	.0050
24	1770	0.	0.	0.	0.	0.	0.	.0087	-.0037	.0010	-.0024	-.0019	.0047
25	1775	0.	0.	0.	0.	0.	0.	.0097	-.0056	.0011	-.0074	-.0022	.0042
26	1840	0.	0.	0.	0.	0.	0.	.0125	-.0127	-.0028	.0016	-.0047	-.0062
27	1850	0.	0.	0.	0.	0.	0.	.0125	-.0124	-.0030	.0018	-.0047	-.0063
28	1860	0.	0.	0.	0.	0.	0.	.0121	-.0128	-.0028	.0016	-.0047	-.0062
29	1890	0.	0.	0.	0.	0.	0.	.0125	-.0076	-.0074	.0070	-.0048	.0003
30	1910	0.	0.	0.	0.	0.	0.	.0125	-.0101	-.0097	.0077	-.0052	.0099
31	1970	0.	0.	0.	0.	0.	0.	.0050	-.0322	-.0130	.0129	-.0086	.0230
32	1980	0.	0.	0.	0.	0.	0.	.0002	-.0322	-.0103	.0134	-.0091	.0229
33	2030	0.	0.	0.	0.	0.	0.	-.0057	-.0138	.0005	.0147	-.0105	.0287
34	2060	0.	0.	0.	0.	0.	0.	.0056	-.0181	.0005	-.0138	-.0040	.0348
35	2100	0.	0.	0.	0.	0.	0.	.0089	-.0243	.0007	-.0039	-.0004	.0431
36	2200	22.	-550.	-1.	-79.	-27.	851.	.0000	.0000	.0000	.0000	.0000	.0000
37	2520	0.	0.	0.	0.	0.	0.	.0075	-.0063	.0002	.0011	-.0010	.0033
38	2530	0.	0.	0.	0.	0.	0.	.0075	-.0064	.0002	.0011	-.0009	.0031
39	2540	0.	0.	0.	0.	0.	0.	.0075	-.0064	.0002	.0012	-.0010	.0033
40	2560	0.	0.	0.	0.	0.	0.	.0075	-.0071	-.0001	.0010	.0000	.0002
41	2600	0.	0.	0.	0.	0.	0.	.0038	-.0095	.0010	.0014	.0024	.0090
42	2610	0.	0.	0.	0.	0.	0.	.0004	-.0095	.0015	.0013	.0029	.0087

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX DEADWEIGHT ANALYSIS XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B6

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
43	2615	0.	0.	0.	0.	0.	0.	.0001	-.0095	.0016	.0013	.0029	.0087
44	2680	0.	0.	0.	0.	0.	0.	.0019	-.0019	.0019	-.0050	.0017	.0095
45	2690	0.	0.	0.	0.	0.	0.	.0021	-.0012	.0019	-.0044	.0013	.0095
46	2710	0.	0.	0.	0.	0.	0.	.0023	-.0002	.0019	-.0014	-.0006	.0098
47	2730	0.	0.	0.	0.	0.	0.	.0018	-.0008	.0019	.0028	.0000	.0108
48	2850	-6.	-289.	-6.	-40.	5.	178.	.0000	.0000	.0000	.0000	.0000	.0000
49	3050	-168.	-869.	-2.	-124.	34.	-169.	.0000	.0000	.0000	.0000	.0000	.0000
50	4030	0.	0.	0.	0.	0.	0.	.0025	-.0001	-.0005	.0015	-.0001	.0064
51	4050	33.	-547.	9.	28.	-3.	240.	.0000	.0000	.0000	.0000	.0000	.0000

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX DEADWEIGHT ANALYSIS XXX

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B 7

MOMENTS AT TEES IN LOCAL COORDINATES
UNITS ARE IN-LB
(1 IS LEG AXIS,2 IS BRANCH AXIS)

	LEG 1			LEG 2			BRANCH		
SEQ	M1	M2	M3	M1	M2	M3	M1	M2	M3
1750	-541.9	9572.9	1480.3	643.1	-9621.3	651.4	-101.2	48.4	-2131.7
2680	748.1	2133.8	-8609.4	-281.4	-1305.1	7168.2	-466.7	-828.7	1441.2
1890	-5993.8	-26922.2	-90.5	1528.9	25699.1	-1195.4	4464.9	1223.1	1285.9

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX DEADWEIGHT ANALYSIS XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B 8

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

NETWORK POINT SUMMARY IN THE LOCAL COORDINATES
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
1	500	7.	-2.	0.	0.	0.	-2.	.0000	.0000	.0000	.0000	.0000	.0000
36	2200	-550.	-22.	-1.	-27.	79.	851.	.0000	.0000	.0000	.0000	.0000	.0000
48	2850	-289.	6.	-6.	5.	40.	178.	.0000	.0000	.0000	.0000	.0000	.0000
49	3050	-869.	168.	-2.	34.	124.	-169.	.0000	.0000	.0000	.0000	.0000	.0000
51	4050	-547.	-33.	9.	-3.	-28.	240.	.0000	.0000	.0000	.0000	.0000	.0000

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX THERMAL ANALYSIS NORM. OPER. XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B 9

CONDITION 20
LOADS
THERMAL

SPRING/HANGER SUMMARY
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
2	1	1000	RI	164.	-321.	-369.	-140.	-1301.	1302.	.0003	.0000	-.0002	.0075	-.0179	.0097
7	1	1200	RI	-383.	434.	0.	0.	0.	0.	-.0011	.0013	-.0942	.0040	-.0031	-.0185
9	1	1275	SN	0.	0.	0.	0.	0.	0.	-.0035	-.0042	-.0751	-.0053	.0101	-.0062
10	1	1340	RI	240.	-179.	0.	0.	0.	0.	.0007	-.0005	-.0635	-.0026	-.0012	-.0046
11	1	1380	RI	0.	11.	0.	0.	0.	0.	.0008	.0000	-.0372	.0008	.0004	-.0041
12	1	1420	RI	-372.	379.	0.	0.	0.	0.	-.0011	.0011	-.0108	-.0028	-.0028	-.0036
14	1	1455	RI	-28.	0.	28.	0.	0.	0.	.0075	-.0020	.0077	.0032	-.0009	-.0087
15	1	1460	RI	0.	-866.	0.	0.	0.	0.	.0079	-.0025	.0081	.0036	-.0009	-.0091
16	1	1540	RI	611.	93.	605.	0.	0.	0.	.0018	.0003	.0018	-.0068	-.0032	.0061
17	1	1570	RI	-291.	0.	-204.	0.	0.	0.	-.0008	.0198	-.0006	.0014	-.0038	-.0003
19	1	1630	RI	12.	0.	122.	0.	0.	0.	.0000	.0561	.0004	-.0023	-.0049	-.0016
20	1	1710	RI	0.	970.	0.	0.	0.	0.	.0248	.0028	-.0289	-.0118	-.0042	-.0066
21	1	1715	SN	0.	0.	0.	0.	0.	0.	.0250	.0024	-.0292	-.0113	-.0042	-.0065
24	1	1775	RI	0.	-573.	0.	0.	0.	0.	.0330	-.0033	-.0454	.0000	-.0014	-.0039
25	1	1780	SN	0.	0.	0.	0.	0.	0.	.0331	-.0033	-.0458	-.0002	-.0012	-.0039
29	1	1900	RI	0.	-433.	0.	0.	0.	0.	.0078	-.0025	.0085	-.0230	.0342	-.0039
31	1	1980	RI	-24.	0.	0.	0.	0.	0.	-.0002	.0097	.0468	-.0125	.0219	-.0145
32	1	1985	SN	0.	0.	0.	0.	0.	0.	.0003	.0101	.0464	-.0124	.0216	-.0145
33	1	2040	RI	-57.	66.	0.	0.	0.	0.	-.0005	.0006	.0220	-.0083	.0048	-.0122
34	1	2070	SN	0.	0.	0.	0.	0.	0.	-.0072	-.0068	.0054	-.0021	.0032	-.0075
35	1	2110	SN	0.	0.	0.	0.	0.	0.	-.0049	-.0089	-.0022	.0017	-.0028	-.0020
40	1	2570	RI	0.	-75.	0.	0.	0.	0.	.0097	-.0004	-.0377	.0018	-.0017	.0024
41	1	2610	RI	124.	0.	0.	0.	0.	0.	.0007	.0065	-.0320	.0094	.0002	.0069
42	1	2615	SN	0.	0.	0.	0.	0.	0.	.0005	.0069	-.0316	.0094	.0002	.0068
46	1	2720	RI	-127.	0.	0.	0.	0.	0.	-.0021	-.0098	-.0010	-.0096	-.0012	-.0019
47	1	2740	RI	0.	-399.	0.	0.	0.	0.	-.0040	-.0033	.0055	-.0054	-.0040	-.0034

ADLPIPE P.   108   RESEARCH ENGINEERS INC.   ADLPIPE STRESS ANALYS.   WINDOWS 3F9.3   7/18/ 0   09:10:02

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX THERMAL ANALYSIS NORM. OPER. XXX

CONDITION 20
LOADS
THERMAL

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B10

SPRING/HANGER SUMMARY IN LOCAL COORDINATES
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
2	1	1000	RI	171.	-366.	-321.	-891.	960.	-1301.	.0000	-.0004	.0000	-.0122	.0007	-.0179
14	1	1455	RI	-40.	0.	0.	0.	0.	0.	-.0001	.0108	.0020	.0084	-.0039	.0009
21	1	1715	SN	0.	0.	0.	0.	0.	0.	.0190	.0024	-.0334	-.0123	-.0042	-.0042
25	1	1780	SN	0.	0.	0.	0.	0.	0.	.0280	-.0033	-.0491	-.0006	-.0012	-.0039

ADLPIPE P. 109 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANALYS WINDOWS 3F9.3 7/18/ 0 09:10:02
WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX THERMAL ANALYSIS NORM. OPER. XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B II

CONDITION 20
LOADS
THERMAL

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
1	500	22.	0.	-19.	0.	0.	0.	.0000	.0000	.0000	.0000	.0000	.0000
2	800	0.	0.	0.	0.	0.	0.	.0005	.0002	.0000	.0072	-.0172	.0093
3	1000	0.	0.	0.	0.	0.	0.	.0003	.0000	-.0002	.0075	-.0179	.0097
4	1080	0.	0.	0.	0.	0.	0.	-.0408	-.0127	-.0532	-.0381	-.0146	-.0224
5	1090	0.	0.	0.	0.	0.	0.	-.0401	-.0123	-.0544	-.0382	-.0145	-.0225
6	1100	0.	0.	0.	0.	0.	0.	-.0350	-.0249	-.0452	-.0381	-.0146	-.0224
7	1190	0.	0.	0.	0.	0.	0.	-.0002	.0032	-.0983	.0053	-.0018	-.0196
8	1200	0.	0.	0.	0.	0.	0.	-.0011	.0013	-.0942	.0040	-.0031	-.0185
9	1270	0.	0.	0.	0.	0.	0.	-.0056	-.0030	-.0732	-.0053	.0100	-.0064
10	1330	0.	0.	0.	0.	0.	0.	.0015	-.0021	-.0685	-.0038	-.0016	-.0047
11	1370	0.	0.	0.	0.	0.	0.	.0005	.0006	-.0438	.0007	.0005	-.0042
12	1410	0.	0.	0.	0.	0.	0.	.0002	-.0001	-.0174	-.0013	-.0015	-.0037
13	1420	0.	0.	0.	0.	0.	0.	-.0011	.0011	-.0108	-.0028	-.0028	-.0036
14	1450	0.	0.	0.	0.	0.	0.	.0026	.0018	.0019	-.0008	-.0009	-.0053
15	1455	0.	0.	0.	0.	0.	0.	.0075	-.0020	.0077	.0032	-.0009	-.0087
16	1530	0.	0.	0.	0.	0.	0.	.0062	-.0054	.0066	-.0104	-.0030	.0094
17	1560	0.	0.	0.	0.	0.	0.	-.0011	.0133	-.0013	.0003	-.0036	.0001
18	1570	0.	0.	0.	0.	0.	0.	-.0008	.0198	-.0006	.0014	-.0038	-.0003
19	1620	0.	0.	0.	0.	0.	0.	-.0007	.0495	.0014	-.0010	-.0047	-.0007
20	1700	0.	0.	0.	0.	0.	0.	.0238	.0051	-.0274	-.0141	-.0044	-.0074
21	1710	0.	0.	0.	0.	0.	0.	.0248	.0028	-.0289	-.0118	-.0042	-.0066
22	1720	0.	0.	0.	0.	0.	0.	.0264	.0000	-.0315	-.0080	-.0040	-.0054
23	1750	0.	0.	0.	0.	0.	0.	.0275	-.0014	-.0334	-.0057	-.0038	-.0045
24	1770	0.	0.	0.	0.	0.	0.	.0313	-.0036	-.0405	.0001	-.0032	-.0039
25	1775	0.	0.	0.	0.	0.	0.	.0330	-.0033	-.0454	.0000	-.0014	-.0039
26	1840	0.	0.	0.	0.	0.	0.	.0196	-.0059	-.0298	-.0176	.0331	-.0021
27	1850	0.	0.	0.	0.	0.	0.	.0193	-.0058	-.0287	-.0178	.0333	-.0022
28	1860	0.	0.	0.	0.	0.	0.	.0219	-.0047	-.0290	-.0176	.0331	-.0021
29	1890	0.	0.	0.	0.	0.	0.	.0096	-.0032	.0027	-.0236	.0341	-.0038
30	1910	0.	0.	0.	0.	0.	0.	.0047	-.0013	.0188	-.0221	.0341	-.0038
31	1970	0.	0.	0.	0.	0.	0.	-.0033	.0075	.0495	-.0132	.0238	-.0142
32	1980	0.	0.	0.	0.	0.	0.	-.0002	.0097	.0468	-.0125	.0219	-.0145
33	2030	0.	0.	0.	0.	0.	0.	.0021	.0057	.0275	-.0106	.0056	-.0137
34	2060	0.	0.	0.	0.	0.	0.	-.0053	-.0054	.0109	-.0036	.0040	-.0091
35	2100	0.	0.	0.	0.	0.	0.	-.0066	-.0085	-.0027	.0016	-.0027	-.0023
36	2200	10.	-22.	-53.	191.	-84.	11.	.0000	.0000	.0000	.0000	.0000	.0000
37	2520	0.	0.	0.	0.	0.	0.	.0225	.0000	-.0352	-.0036	-.0028	-.0022
38	2530	0.	0.	0.	0.	0.	0.	.0221	.0001	-.0353	-.0034	-.0027	-.0020
39	2540	0.	0.	0.	0.	0.	0.	.0223	.0002	-.0345	-.0036	-.0028	-.0022
40	2560	0.	0.	0.	0.	0.	0.	.0144	.0004	-.0369	-.0002	-.0018	.0010
41	2600	0.	0.	0.	0.	0.	0.	.0035	.0025	-.0354	.0084	.0005	.0074
42	2610	0.	0.	0.	0.	0.	0.	.0007	.0065	-.0320	.0094	.0002	.0069

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX THERMAL ANALYSIS NORM. OPER. XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B12

CONDITION 20
LOADS
THERMAL

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
43	2615	0.	0.	0.	0.	0.	0.	.0005	.0069	-.0316	.0094	.0002	.0068
44	2680	0.	0.	0.	0.	0.	0.	-.0018	-.0095	-.0092	.0095	-.0010	-.0005
45	2690	0.	0.	0.	0.	0.	0.	-.0019	-.0107	-.0077	.0079	-.0008	-.0006
46	2710	0.	0.	0.	0.	0.	0.	-.0020	-.0119	-.0042	-.0020	-.0001	-.0012
47	2730	0.	0.	0.	0.	0.	0.	-.0029	-.0062	.0023	-.0108	-.0030	-.0027
48	2850	34.	122.	512.	-1574.	443.	9.	.0000	.0000	.0000	.0000	.0000	.0000
49	3050	79.	386.	-549.	1806.	-127.	170.	.0000	.0000	.0000	.0000	.0000	.0000
50	4030	0.	0.	0.	0.	0.	0.	-.0015	-.0072	-.0027	.0062	.0074	-.0039
51	4050	-13.	408.	-74.	300.	163.	-134.	.0000	.0000	.0000	.0000	.0000	.0000

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX THERMAL ANALYSIS NORM. OPER. XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B13

CONDITION 20
LOADS
THERMAL

MOMENTS AT TEES IN LOCAL COORDINATES
UNITS ARE IN-LB
(1 IS LEG AXIS,2 IS BRANCH AXIS)

	LEG 1			LEG 2			BRANCH		
SEQ	M1	M2	M3	M1	M2	M3	M1	M2	M3
1750	-5504.9	-36154.4	3027.2	-943.3	30331.9	689.5	6448.2	5822.5	-3716.7
2680	-2663.0	-7528.8	4528.8	447.2	9423.5	-13054.9	2215.9	-1894.7	8526.1
1890	6586.6	2873.3	1995.6	3297.5	-2852.4	452.0	-9884.1	-20.8	-2447.6

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX THERMAL ANALYSIS NORM. OPER. XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B14

CONDITION 20
LOADS
THERMAL

NETWORK POINT SUMMARY IN THE LOCAL COORDINATES
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
1	500	-29.	0.	0.	0.	0.	0.	.0000	.0000	.0000	.0000	.0000	.0000
36	2200	-22.	-10.	-53.	-84.	-191.	11.	.0000	.0000	.0000	.0000	.0000	.0000
48	2850	122.	-34.	512.	443.	1574.	9.	.0000	.0000	.0000	.0000	.0000	.0000
49	3050	386.	-79.	-549.	-127.	-1806.	170.	.0000	.0000	.0000	.0000	.0000	.0000
51	4050	408.	13.	-74.	163.	-300.	-134.	.0000	.0000	.0000	.0000	.0000	.0000

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX THERMAL ACCIDENT TEMP. 244 DEG. XXX

CONDITION 21
LOADS
THERMAL

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B15

SPRING/HANGER SUMMARY
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
2	1	1000	RI	1005.	-1970.	-2263.	-859.	-7972.	7978.	.0017	.0000	-.0015	.0462	-.1096	.0593
7	1	1200	RI	-2344.	2657.	0.	0.	0.	0.	-.0068	.0077	-.5775	.0244	-.0190	-.1131
9	1	1275	SN	0.	0.	0.	0.	0.	0.	-.0216	-.0259	-.4604	-.0322	.0617	-.0380
10	1	1340	RI	1468.	-1099.	0.	0.	0.	0.	.0043	-.0032	-.3894	-.0161	-.0076	-.0283
11	1	1380	RI	0.	67.	0.	0.	0.	0.	.0047	.0002	-.2279	.0050	.0027	-.0252
12	1	1420	RI	-2279.	2322.	0.	0.	0.	0.	-.0066	.0067	-.0664	-.0172	-.0171	-.0220
14	1	1455	RI	-173.	0.	173.	0.	0.	0.	.0462	-.0125	.0472	.0196	-.0054	-.0534
15	1	1460	RI	0.	-5305.	0.	0.	0.	0.	.0485	-.0154	.0499	.0220	-.0055	-.0556
16	1	1540	RI	3742.	568.	3705.	0.	0.	0.	.0109	.0016	.0107	-.0414	-.0196	.0376
17	1	1570	RI	-1781.	0.	-1247.	0.	0.	0.	-.0052	.1216	-.0036	.0083	-.0233	-.0021
19	1	1630	RI	73.	0.	750.	0.	0.	0.	.0002	.3435	.0022	-.0144	-.0301	-.0096
20	1	1710	RI	0.	5944.	0.	0.	0.	0.	.1517	.0172	-.1771	-.0722	-.0260	-.0407
21	1	1715	SN	0.	0.	0.	0.	0.	0.	.1530	.0146	-.1791	-.0689	-.0258	-.0397
24	1	1775	RI	0.	-3512.	0.	0.	0.	0.	.2023	-.0200	-.2780	.0002	-.0088	-.0238
25	1	1780	SN	0.	0.	0.	0.	0.	0.	.2030	-.0202	-.2809	-.0014	-.0075	-.0239
29	1	1900	RI	0.	-2654.	0.	0.	0.	0.	.0481	-.0151	.0519	-.1412	.2094	-.0238
31	1	1980	RI	-147.	0.	0.	0.	0.	0.	-.0014	.0596	.2871	-.0767	.1341	-.0889
32	1	1985	SN	0.	0.	0.	0.	0.	0.	.0017	.0619	.2844	-.0762	.1321	-.0891
33	1	2040	RI	-346.	406.	0.	0.	0.	0.	-.0033	.0038	.1346	-.0508	.0295	-.0745
34	1	2070	SN	0.	0.	0.	0.	0.	0.	-.0439	-.0420	.0333	-.0130	.0199	-.0460
35	1	2110	SN	0.	0.	0.	0.	0.	0.	-.0302	-.0543	-.0138	.0106	-.0173	-.0125
40	1	2570	RI	0.	-458.	0.	0.	0.	0.	.0595	-.0026	-.2308	.0112	-.0104	.0148
41	1	2610	RI	758.	0.	0.	0.	0.	0.	.0043	.0400	-.1959	.0574	.0012	.0423
42	1	2615	SN	0.	0.	0.	0.	0.	0.	.0029	.0423	-.1939	.0579	.0011	.0418
46	1	2720	RI	-781.	0.	0.	0.	0.	0.	-.0131	-.0598	-.0061	-.0588	-.0076	-.0117
47	1	2740	RI	0.	-2442.	0.	0.	0.	0.	-.0245	-.0205	.0338	-.0329	-.0246	-.0211

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX THERMAL ACCIDENT TEMP. 244 DEG. XXX

CONDITION 21
LOADS
THERMAL

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B16

SPRING/HANGER SUMMARY IN LOCAL COORDINATES
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
2	1	1000	RI	1049.	-2243.	-1970.	-5459.	5881.	-7972.	.0000	-.0022	.0000	-.0751	.0040	-.1096
14	1	1455	RI	-245.	0.	0.	0.	0.	0.	-.0007	.0660	.0125	.0516	-.0239	.0054
21	1	1715	SN	0.	0.	0.	0.	0.	0.	.1166	.0146	-.2047	-.0752	-.0258	-.0260
25	1	1780	SN	0.	0.	0.	0.	0.	0.	.1718	-.0202	-.3010	-.0039	-.0075	-.0237

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX THERMAL ACCIDENT TEMP. 244 DEG. XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B17

CONDITION 21
LOADS
THERMAL

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
1	500	134.	1.	-116.	-1.	2.	-1.	.0000	.0000	.0000	.0000	.0000	.0000
2	800	0.	0.	0.	0.	0.	0.	.0031	.0015	.0002	.0443	-.1053	.0571
3	1000	0.	0.	0.	0.	0.	0.	.0017	.0000	-.0015	.0462	-.1096	.0593
4	1080	0.	0.	0.	0.	0.	0.	-.2499	-.0777	-.3260	-.2337	-.0896	-.1372
5	1090	0.	0.	0.	0.	0.	0.	-.2455	-.0756	-.3335	-.2344	-.0889	-.1378
6	1100	0.	0.	0.	0.	0.	0.	-.2146	-.1527	-.2770	-.2337	-.0896	-.1372
7	1190	0.	0.	0.	0.	0.	0.	-.0014	.0193	-.6021	.0325	-.0110	-.1201
8	1200	0.	0.	0.	0.	0.	0.	-.0068	.0077	-.5775	.0244	-.0190	-.1131
9	1270	0.	0.	0.	0.	0.	0.	-.0340	-.0186	-.4483	-.0323	.0613	-.0395
10	1330	0.	0.	0.	0.	0.	0.	.0090	-.0127	-.4197	-.0231	-.0100	-.0289
11	1370	0.	0.	0.	0.	0.	0.	.0028	.0034	-.2683	.0041	.0029	-.0259
12	1410	0.	0.	0.	0.	0.	0.	.0015	-.0009	-.1068	-.0080	-.0093	-.0228
13	1420	0.	0.	0.	0.	0.	0.	-.0066	.0067	-.0664	-.0172	-.0171	-.0220
14	1450	0.	0.	0.	0.	0.	0.	.0159	.0112	.0116	-.0049	-.0058	-.0325
15	1455	0.	0.	0.	0.	0.	0.	.0462	-.0125	.0472	.0196	-.0054	-.0534
16	1530	0.	0.	0.	0.	0.	0.	.0379	-.0331	.0405	-.0637	-.0185	.0575
17	1560	0.	0.	0.	0.	0.	0.	-.0069	.0812	-.0081	.0021	-.0220	.0003
18	1570	0.	0.	0.	0.	0.	0.	-.0052	.1216	-.0036	.0083	-.0233	-.0021
19	1620	0.	0.	0.	0.	0.	0.	-.0040	.3032	.0084	-.0062	-.0289	-.0045
20	1700	0.	0.	0.	0.	0.	0.	.1456	.0310	-.1680	-.0861	-.0269	-.0452
21	1710	0.	0.	0.	0.	0.	0.	.1517	.0172	-.1771	-.0722	-.0260	-.0407
22	1720	0.	0.	0.	0.	0.	0.	.1618	-.0003	-.1931	-.0488	-.0245	-.0329
23	1750	0.	0.	0.	0.	0.	0.	.1684	-.0087	-.2045	-.0350	-.0234	-.0279
24	1770	0.	0.	0.	0.	0.	0.	.1917	-.0218	-.2479	.0005	-.0193	-.0236
25	1775	0.	0.	0.	0.	0.	0.	.2023	-.0200	-.2780	.0002	-.0088	-.0238
26	1840	0.	0.	0.	0.	0.	0.	.1203	-.0362	-.1824	-.1079	.2031	-.0130
27	1850	0.	0.	0.	0.	0.	0.	.1181	-.0357	-.1757	-.1092	.2038	-.0133
28	1860	0.	0.	0.	0.	0.	0.	.1344	-.0286	-.1779	-.1079	.2031	-.0130
29	1890	0.	0.	0.	0.	0.	0.	.0589	-.0195	.0167	-.1445	.2093	-.0230
30	1910	0.	0.	0.	0.	0.	0.	.0285	-.0081	.1154	-.1354	.2087	-.0231
31	1970	0.	0.	0.	0.	0.	0.	-.0199	.0461	.3035	-.0810	.1457	-.0869
32	1980	0.	0.	0.	0.	0.	0.	-.0014	.0596	.2871	-.0767	.1341	-.0889
33	2030	0.	0.	0.	0.	0.	0.	.0129	.0346	.1684	-.0651	.0341	-.0840
34	2060	0.	0.	0.	0.	0.	0.	-.0322	-.0330	.0671	-.0222	.0246	-.0555
35	2100	0.	0.	0.	0.	0.	0.	-.0404	-.0523	-.0165	.0097	-.0163	-.0141
36	2200	59.	-134.	-323.	1168.	-514.	67.	.0000	.0000	.0000	.0000	.0000	.0000
37	2520	0.	0.	0.	0.	0.	0.	.1378	-.0001	-.2159	-.0220	-.0169	-.0132
38	2530	0.	0.	0.	0.	0.	0.	.1357	.0003	-.2165	-.0211	-.0166	-.0123
39	2540	0.	0.	0.	0.	0.	0.	.1366	.0014	-.2114	-.0220	-.0169	-.0132
40	2560	0.	0.	0.	0.	0.	0.	.0882	.0022	-.2262	-.0010	-.0112	.0060
41	2600	0.	0.	0.	0.	0.	0.	.0215	.0153	-.2170	.0516	.0029	.0454
42	2610	0.	0.	0.	0.	0.	0.	.0043	.0400	-.1959	.0574	.0012	.0423

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX THERMAL ACCIDENT TEMP. 244 DEG. XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B18

CONDITION 21
LOADS
THERMAL

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
43	2615	0.	0.	0.	0.	0.	0.	.0029	.0423	-.1939	.0579	.0011	.0418
44	2680	0.	0.	0.	0.	0.	0.	-.0112	-.0580	-.0565	.0579	-.0061	-.0033
45	2690	0.	0.	0.	0.	0.	0.	-.0119	-.0656	-.0470	.0481	-.0047	-.0036
46	2710	0.	0.	0.	0.	0.	0.	-.0125	-.0729	-.0259	-.0122	-.0009	-.0071
47	2730	0.	0.	0.	0.	0.	0.	-.0175	-.0381	.0139	-.0659	-.0186	-.0164
48	2850	209.	750.	3139.	-9648.	2714.	52.	.0000	.0000	.0000	.0000	.0000	.0000
49	3050	486.	2364.	-3367.	11068.	-777.	1045.	.0000	.0000	.0000	.0000	.0000	.0000
50	4030	0.	0.	0.	0.	0.	0.	-.0089	-.0442	-.0168	.0380	.0451	-.0239
51	4050	-80.	2500.	-451.	1839.	997.	-819.	.0000	.0000	.0000	.0000	.0000	.0000

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX THERMAL ACCIDENT TEMP. 244 DEG. XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B19

CONDITION 21
LOADS
THERMAL

NETWORK POINT SUMMARY IN THE LOCAL COORDINATES
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
1	500	-177.	1.	-1.	0.	2.	2.	.0000	.0000	.0000	.0000	.0000	.0000
36	2200	-134.	-59.	-323.	-514.	-1168.	67.	.0000	.0000	.0000	.0000	.0000	.0000
48	2850	750.	-209.	3139.	2714.	9648.	52.	.0000	.0000	.0000	.0000	.0000	.0000
49	3050	2364.	-486.	-3367.	-777.	-11068.	1045.	.0000	.0000	.0000	.0000	.0000	.0000
51	4050	2500.	80.	-451.	997.	-1839.	-819.	.0000	.0000	.0000	.0000	.0000	.0000

ADLPIPE P. 346 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANALYS WINDOWS 3F9.3 7/18/ 0 09:10:02

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX COLUMN CLOSURE WATERHAMMER LOAD CASE XXX

CONDITION 30
LOADS
SHOCK

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B20

SPRING/HANGER SUMMARY
MAXIMUM COMPONENT OF FORCE OR MOMENT
FORCES AND MOMENTS ACT ON THE RESTRAINT

SEC	MEM	SEQ	TYPE	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
1	2	1000	RI	2813.	-1257.	-2520.	4289.	2090.	9566.	.0028	.0000	-.0025	.0831	.0287	.0996
14	1	1200	RI	-2631.	-3154.	0.	0.	0.	0.	-.0076	-.0091	-.0364	-.1443	-.0485	-.0464
19	1	1275	SN	0.	0.	-10583.	0.	0.	0.	-.1322	.1130	-.0381	.0160	.1114	-.1445
23	1	1340	RI	-1419.	2286.	0.	0.	0.	0.	-.0041	.0066	-.0915	.0235	.0849	-.1297
26	1	1380	RI	0.	-994.	0.	0.	0.	0.	.1144	-.0029	-.0934	.0028	-.0063	-.0964
29	1	1420	RI	-3425.	1071.	0.	0.	0.	0.	-.0099	.0031	-.0946	-.0101	-.0570	-.0636
32	1	1455	RI	1629.	0.	-1629.	0.	0.	0.	-.0639	.0032	-.0593	-.0366	-.0430	-.0398
32	2	1460	RI	0.	1309.	0.	0.	0.	0.	-.0653	.0038	-.0579	-.0368	-.0441	-.0397
36	1	1540	RI	-2957.	8493.	-1533.	0.	0.	0.	-.0086	.0246	-.0044	.0140	-.0369	-.0322
38	1	1570	RI	1061.	0.	1468.	0.	0.	0.	.0031	.0257	.0043	.0077	-.0288	.0059
42	1	1630	RI	1245.	0.	-3747.	0.	0.	0.	.0036	.0264	-.0109	-.0418	-.0140	-.0141
44	1	1710	RI	0.	-1603.	0.	0.	0.	0.	.0124	-.0046	-.0649	-.0094	.0062	.0051
44	2	1715	SN	-1048.	0.	-201.	0.	0.	0.	.0122	-.0044	-.0649	-.0091	.0063	.0051
48	1	1775	RI	0.	-1159.	0.	0.	0.	0.	-.0050	-.0066	-.0672	.0166	.0259	.0034
48	2	1780	SN	-2079.	0.	-224.	0.	0.	0.	-.0056	-.0074	-.0674	.0176	.0277	.0033
56	1	1900	RI	0.	1165.	0.	0.	0.	0.	-.0434	.0066	-.0341	-.0115	.0235	-.0402
61	1	1980	RI	-625.	0.	0.	0.	0.	0.	-.0059	.0912	.0057	-.0428	.0278	-.0792
62	1	1985	SN	0.	0.	587.	0.	0.	0.	-.0058	.0912	.0055	-.0431	.0278	-.0790
65	2	2040	RI	424.	993.	0.	0.	0.	0.	.0040	.0093	-.0328	-.0368	.0207	-.0442
67	1	2070	SN	-481.	-346.	0.	0.	0.	0.	-.0045	-.0032	-.0326	.0081	-.0048	-.0256
69	2	2110	SN	0.	0.	-1640.	0.	0.	0.	.0064	-.0022	-.0154	.0092	-.0477	-.0064
78	1	2570	RI	0.	847.	0.	0.	0.	0.	.0097	.0048	-.0425	.0278	.0312	-.0036
81	1	2610	RI	196.	0.	0.	0.	0.	0.	.0011	.0058	-.0074	.0384	.0202	.0130
81	2	2615	SN	0.	0.	-1061.	0.	0.	0.	.0009	.0058	-.0060	.0380	.0198	.0129
89	1	2720	RI	150.	0.	0.	0.	0.	0.	.0025	.0018	.0081	-.0009	-.0034	.0096
90	1	2740	RI	0.	-84.	0.	0.	0.	0.	.0013	-.0007	.0082	.0033	-.0026	.0082

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX COLUMN CLOSURE WATERHAMMER LOAD CASE XXX

CONDITION 30
LOADS
SHOCK

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B21

SPRING/HANGER SUMMARY IN LOCAL COORDINATES
MAXIMUM COMPONENT OF FORCE OR MOMENT
FORCES AND MOMENTS ACT ON THE RESTRAINT

SEC	MEM	SEQ	TYPE	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
1	2	1000	RI	187.	-3776.	-1257.	-9429.	3734.	2090.	.0000	-.0038	.0000	-.1297	.0026	.0287
32	1	1455	RI	2304.	0.	0.	0.	0.	0.	.0067	-.0871	-.0032	-.0116	-.0515	.0430
44	2	1715	SN	-1067.	0.	0.	0.	0.	0.	-.0031	-.0044	-.0660	-.0098	.0063	-.0036
48	2	1780	SN	-2091.	0.	0.	0.	0.	0.	-.0119	-.0074	-.0665	.0174	.0277	.0047

ADLPIPE P. 348 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANALYS. WINDOWS 3F9.3 7/18/ 0 09:10:02

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
R013 SNUB IN @ NP1275;WAVE=4135FPS;RISE=100MS;DURATION=200MS;P=225
XXX COLUMN CLOSURE WATERHAMMER LOAD CASE XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B22

CONDITION 30
LOADS
SHOCK

RESTRAINED NETWORK POINT SUMMARY
MAXIMUM COMPONENTS OF FORCE AND MOMENT
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
1	500	225.	1.	-196.	-2.	-1.	-2.	.0000	.0000	.0000	.0000	.0000	.0000
73	2200	408.	-123.	129.	-468.	-913.	1318.	.0000	.0000	.0000	.0000	.0000	.0000
95	2850	51.	47.	166.	-505.	132.	159.	.0000	.0000	.0000	.0000	.0000	.0000
99	3050	-116.	-332.	670.	-1920.	205.	333.	.0000	.0000	.0000	.0000	.0000	.0000
102	4050	-146.	-247.	-84.	588.	108.	-857.	.0000	.0000	.0000	.0000	.0000	.0000

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX DEADWEIGHT ANALYSIS XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B23

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

SPRING/HANGER SUMMARY
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
5	1	1200	RI	-131.	-3906.	0.	0.	0.	0.	-.0004	-.0113	-.0043	-.0472	.0041	-.0215
7	1	1275	SN	0.	0.	0.	0.	0.	0.	.0035	.0043	-.0036	.0008	-.0015	-.0353
8	1	1340	RI	81.	-1513.	0.	0.	0.	0.	.0002	-.0044	-.0028	-.0020	-.0018	-.0251
9	1	1380	RI	0.	-1474.	0.	0.	0.	0.	-.0012	-.0043	-.0028	.0009	.0003	-.0184
10	1	1420	RI	-25.	-1074.	0.	0.	0.	0.	-.0001	-.0031	-.0028	-.0033	.0002	-.0118
12	1	1455	RI	-8.	0.	8.	0.	0.	0.	-.0014	-.0045	-.0014	-.0027	-.0016	-.0083
13	1	1460	RI	0.	-1617.	0.	0.	0.	0.	-.0015	-.0047	-.0013	-.0024	-.0016	-.0085
14	1	1540	RI	-10.	-5471.	1.	0.	0.	0.	.0000	-.0159	.0000	-.0002	-.0036	-.0005
15	1	1570	RI	25.	0.	8.	0.	0.	0.	.0001	-.0167	.0000	.0002	-.0036	.0001
17	1	1630	RI	3.	0.	6.	0.	0.	0.	.0000	-.0176	.0000	-.0006	-.0035	-.0001
18	1	1710	RI	0.	-1739.	0.	0.	0.	0.	.0066	-.0050	.0009	.0037	-.0022	.0050
19	1	1715	SN	0.	0.	0.	0.	0.	0.	.0067	-.0049	.0010	.0034	-.0022	.0050
22	1	1775	RI	0.	-1039.	0.	0.	0.	0.	.0102	-.0059	.0015	-.0088	-.0024	.0033
23	1	1780	SN	0.	0.	0.	0.	0.	0.	.0103	-.0064	.0015	-.0096	-.0024	.0032
27	1	1900	RI	0.	-1458.	0.	0.	0.	0.	.0128	-.0083	-.0039	-.0047	-.0032	.0012
29	1	1980	RI	51.	0.	0.	0.	0.	0.	.0005	-.0298	-.0072	.0073	-.0074	.0231
30	1	1985	SN	0.	0.	0.	0.	0.	0.	-.0003	-.0298	-.0070	.0075	-.0075	.0230
31	1	2040	RI	-80.	-922.	0.	0.	0.	0.	-.0008	-.0087	-.0002	.0014	-.0084	.0307
32	1	2070	SN	0.	0.	0.	0.	0.	0.	.0073	-.0257	-.0002	-.0125	-.0028	.0370
33	1	2110	SN	0.	0.	0.	0.	0.	0.	.0090	-.0177	.0003	-.0032	-.0010	.0433
38	1	2570	RI	0.	-1271.	0.	0.	0.	0.	.0077	-.0072	-.0002	.0011	.0003	.0022
39	1	2610	RI	64.	0.	0.	0.	0.	0.	.0004	-.0095	.0015	.0015	.0028	.0089
40	1	2615	SN	0.	0.	0.	0.	0.	0.	.0001	-.0095	.0015	.0015	.0028	.0089
44	1	2720	RI	114.	0.	0.	0.	0.	0.	.0019	-.0002	.0019	.0010	-.0009	.0103
45	1	2740	RI	0.	-239.	0.	0.	0.	0.	.0019	-.0020	.0019	.0051	.0007	.0113

ADLPIPE P. 36 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANALYS. WINDOWS 3F9.3 7/18/ 0 11:59:46

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX DEADWEIGHT ANALYSIS XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B24

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

SPRING/HANGER SUMMARY IN LOCAL COORDINATES
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
12	1	1455	RI	-11.	0.	0.	0.	0.	0.	.0000	-.0020	.0045	.0039	-.0078	.0016
19	1	1715	SN	0.	0.	0.	0.	0.	0.	.0068	-.0049	-.0003	.0043	-.0022	.0043
23	1	1780	SN	0.	0.	0.	0.	0.	0.	.0104	-.0064	.0004	-.0092	-.0024	.0042

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX DEADWEIGHT ANALYSIS XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B25

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
1	1000	68.	-3307.	-5.	17506.	516.	20464.	.0000	.0000	.0000	.0000	.0000	.0000
2	1080	0.	0.	0.	0.	0.	0.	-.0149	-.1702	.0185	.0043	.0025	.0051
3	1090	0.	0.	0.	0.	0.	0.	-.0151	-.1702	.0186	.0039	.0025	.0050
4	1100	0.	0.	0.	0.	0.	0.	-.0149	-.1685	.0171	.0043	.0025	.0030
5	1190	0.	0.	0.	0.	0.	0.	-.0022	-.0330	-.0043	-.0622	.0051	-.0198
6	1200	0.	0.	0.	0.	0.	0.	-.0004	-.0113	-.0043	-.0472	.0041	-.0215
7	1270	0.	0.	0.	0.	0.	0.	.0035	.0111	-.0039	.0010	-.0014	-.0354
8	1330	0.	0.	0.	0.	0.	0.	.0012	-.0061	-.0028	-.0043	-.0023	-.0264
9	1370	0.	0.	0.	0.	0.	0.	-.0013	-.0046	-.0028	-.0006	.0000	-.0201
10	1410	0.	0.	0.	0.	0.	0.	-.0003	-.0054	-.0028	-.0028	.0004	-.0134
11	1420	0.	0.	0.	0.	0.	0.	-.0001	-.0031	-.0028	-.0033	.0002	-.0118
12	1450	0.	0.	0.	0.	0.	0.	-.0007	-.0032	-.0021	-.0053	-.0013	-.0073
13	1455	0.	0.	0.	0.	0.	0.	-.0014	-.0045	-.0014	-.0027	-.0016	-.0083
14	1530	0.	0.	0.	0.	0.	0.	-.0004	-.0159	.0001	-.0003	-.0037	-.0010
15	1560	0.	0.	0.	0.	0.	0.	.0002	-.0165	-.0001	.0001	-.0036	.0001
16	1570	0.	0.	0.	0.	0.	0.	.0001	-.0167	.0000	.0002	-.0036	.0001
17	1620	0.	0.	0.	0.	0.	0.	.0000	-.0175	.0003	-.0003	-.0035	.0000
18	1700	0.	0.	0.	0.	0.	0.	.0063	-.0060	.0009	.0049	-.0023	.0052
19	1710	0.	0.	0.	0.	0.	0.	.0066	-.0050	.0009	.0037	-.0022	.0050
20	1720	0.	0.	0.	0.	0.	0.	.0072	-.0042	.0011	.0018	-.0021	.0048
21	1750	0.	0.	0.	0.	0.	0.	.0076	-.0038	.0011	.0010	-.0020	.0048
22	1770	0.	0.	0.	0.	0.	0.	.0091	-.0036	.0013	-.0028	-.0022	.0042
23	1775	0.	0.	0.	0.	0.	0.	.0102	-.0059	.0015	-.0088	-.0024	.0033
24	1840	0.	0.	0.	0.	0.	0.	.0128	-.0155	-.0007	-.0078	-.0026	-.0077
25	1850	0.	0.	0.	0.	0.	0.	.0128	-.0152	-.0008	-.0077	-.0026	-.0078
26	1860	0.	0.	0.	0.	0.	0.	.0126	-.0150	-.0007	-.0078	-.0026	-.0077
27	1890	0.	0.	0.	0.	0.	0.	.0128	-.0085	-.0034	-.0052	-.0030	-.0023
28	1910	0.	0.	0.	0.	0.	0.	.0128	-.0098	-.0049	-.0039	-.0034	.0074
29	1970	0.	0.	0.	0.	0.	0.	.0053	-.0298	-.0087	.0064	-.0066	.0233
30	1980	0.	0.	0.	0.	0.	0.	.0005	-.0298	-.0072	.0073	-.0074	.0231
31	2030	0.	0.	0.	0.	0.	0.	-.0058	-.0133	-.0002	.0135	-.0105	.0286
32	2060	0.	0.	0.	0.	0.	0.	.0055	-.0186	-.0002	-.0139	-.0041	.0349
33	2100	0.	0.	0.	0.	0.	0.	.0090	-.0245	.0001	-.0036	-.0011	.0435
34	2200	23.	-553.	-9.	-49.	-45.	864.	.0000	.0000	.0000	.0000	.0000	.0000
35	2520	0.	0.	0.	0.	0.	0.	.0077	-.0060	.0003	.0013	-.0012	.0033
36	2530	0.	0.	0.	0.	0.	0.	.0077	-.0061	.0003	.0013	-.0012	.0031
37	2540	0.	0.	0.	0.	0.	0.	.0076	-.0061	.0003	.0013	-.0012	.0033
38	2560	0.	0.	0.	0.	0.	0.	.0077	-.0070	-.0002	.0012	-.0002	.0004
39	2600	0.	0.	0.	0.	0.	0.	.0038	-.0095	.0009	.0016	.0023	.0091
40	2610	0.	0.	0.	0.	0.	0.	.0004	-.0095	.0015	.0015	.0028	.0089
41	2615	0.	0.	0.	0.	0.	0.	.0001	-.0095	.0015	.0015	.0028	.0089
42	2680	0.	0.	0.	0.	0.	0.	.0019	-.0019	.0019	-.0050	.0017	.0095

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX DEADWEIGHT ANALYSIS XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B26

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
43	2690	0.	0.	0.	0.	0.	0.	.0021	-.0012	.0019	-.0044	.0013	.0095
44	2710	0.	0.	0.	0.	0.	0.	.0023	-.0002	.0019	-.0015	-.0005	.0099
45	2730	0.	0.	0.	0.	0.	0.	.0018	-.0008	.0019	.0028	.0000	.0108
46	2850	-6.	-288.	-6.	-40.	5.	178.	.0000	.0000	.0000	.0000	.0000	.0000
47	3040	0.	0.	0.	0.	0.	0.	-.0001	.0000	.0001	-.0005	.0002	-.0004
48	3050	-169.	-869.	-3.	-122.	35.	-172.	.0000	.0000	.0000	.0000	.0000	.0000

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX DEADWEIGHT ANALYSIS XXX

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B27

MOMENTS AT TEES IN LOCAL COORDINATES
UNITS ARE IN-LB
(1 IS LEG AXIS,2 IS BRANCH AXIS)

	LEG 1			LEG 2			BRANCH		
SEQ	M1	M2	M3	M1	M2	M3	M1	M2	M3
1750	-942.8	10041.8	1511.8	222.8	-10217.5	794.6	720.0	175.6	-2306.5
2680	725.1	2126.2	-8651.7	-279.0	-1293.9	7181.3	-446.1	-832.4	1470.3

ADLPIPE I . 40 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANALYS. WINDOWS 3F9.3 7/18/ 0 11:59:46
WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX DEADWEIGHT ANALYSIS XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B28

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

NETWORK POINT SUMMARY IN THE LOCAL COORDINATES
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
1	1000	-55.	-3307.	-40.	-20.	516.	-26930.	.0000	.0000	.0000	.0000	.0000	.0000
34	2200	-553.	-23.	-9.	-45.	49.	864.	.0000	.0000	.0000	.0000	.0000	.0000
46	2850	-288.	6.	-6.	5.	40.	178.	.0000	.0000	.0000	.0000	.0000	.0000
48	3050	-869.	169.	-3.	35.	122.	-172.	.0000	.0000	.0000	.0000	.0000	.0000

ADLPIPE PA 102 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANALYSI WINDOWS 3F9.3 7/18/ 0 11:59:46

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX THERMAL ANALYSIS NORM. OPER. XXX

CONDITION 20
LOADS
THERMAL

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B29

SPRING/HANGER SUMMARY
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
5	1	1200	RI	-359.	596.	0.	0.	0.	0.	-.0010	.0017	-.0848	.0114	-.0044	-.0083
7	1	1275	SN	0.	0.	0.	0.	0.	0.	-.0046	-.0087	-.0674	-.0040	.0133	.0046
8	1	1340	RI	242.	-221.	0.	0.	0.	0.	.0007	-.0006	-.0569	-.0028	-.0011	.0043
9	1	1380	RI	0.	29.	0.	0.	0.	0.	.0005	.0001	-.0306	.0007	.0002	.0025
10	1	1420	RI	-373.	348.	0.	0.	0.	0.	-.0011	.0010	-.0043	-.0023	-.0022	.0006
12	1	1455	RI	-75.	0.	75.	0.	0.	0.	.0109	-.0021	.0114	.0055	.0016	-.0066
13	1	1460	RI	0.	-879.	0.	0.	0.	0.	.0114	-.0026	.0117	.0059	.0015	-.0070
14	1	1540	RI	730.	136.	649.	0.	0.	0.	.0021	.0004	.0019	-.0072	-.0016	.0076
15	1	1570	RI	-355.	0.	-203.	0.	0.	0.	-.0010	.0200	-.0006	.0015	-.0024	-.0005
17	1	1630	RI	29.	0.	55.	0.	0.	0.	.0001	.0562	.0002	-.0031	-.0039	-.0017
18	1	1710	RI	0.	852.	0.	0.	0.	0.	.0237	.0025	-.0305	-.0121	-.0041	-.0065
19	1	1715	SN	0.	0.	0.	0.	0.	0.	.0239	.0020	-.0308	-.0116	-.0041	-.0063
22	1	1775	RI	0.	-441.	0.	0.	0.	0.	.0324	-.0025	-.0469	.0038	-.0027	-.0021
23	1	1780	SN	0.	0.	0.	0.	0.	0.	.0326	-.0024	-.0474	.0038	-.0026	-.0020
27	1	1900	RI	0.	-65.	0.	0.	0.	0.	.0100	-.0004	-.0086	.0070	.0279	.0024
29	1	1980	RI	-34.	0.	0.	0.	0.	0.	-.0003	.0028	.0337	.0073	.0175	-.0106
30	1	1985	SN	0.	0.	0.	0.	0.	0.	.0001	.0032	.0340	.0073	.0172	-.0107
31	1	2040	RI	-63.	72.	0.	0.	0.	0.	-.0006	.0007	.0215	-.0066	.0041	-.0100
32	1	2070	SN	0.	0.	0.	0.	0.	0.	-.0070	-.0063	.0050	-.0026	.0035	-.0067
33	1	2110	SN	0.	0.	0.	0.	0.	0.	-.0049	-.0087	-.0026	.0014	-.0034	-.0023
38	1	2570	RI	0.	-78.	0.	0.	0.	0.	.0086	-.0004	-.0386	.0021	-.0012	.0018
39	1	2610	RI	103.	0.	0.	0.	0.	0.	.0006	.0068	-.0324	.0100	.0005	.0056
40	1	2615	SN	0.	0.	0.	0.	0.	0.	.0004	.0072	-.0320	.0101	.0005	.0056
44	1	2720	RI	-131.	0.	0.	0.	0.	0.	-.0022	-.0098	-.0011	-.0096	-.0012	-.0021
45	1	2740	RI	0.	-399.	0.	0.	0.	0.	-.0041	-.0034	.0054	-.0054	-.0040	-.0036

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX THERMAL ANALYSIS NORM. OPER. XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B30

CONDITION 20
LOADS
THERMAL

SPRING/HANGER SUMMARY IN LOCAL COORDINATES
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
12	1	1455	RI	-107.	0.	0.	0.	0.	0.	-.0003	.0157	.0021	.0085	-.0008	-.0016
19	1	1715	SN	0.	0.	0.	0.	0.	0.	.0176	.0020	-.0347	-.0126	-.0041	-.0040
23	1	1780	SN	0.	0.	0.	0.	0.	0.	.0273	-.0024	-.0506	.0036	-.0026	-.0024

ADLPIPE 104 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANALY WINDOWS 3F9.3 7/18/ 0 11:59:46

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX THERMAL ANALYSIS NORM. OPER. XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B31

CONDITION 20
LOADS
THERMAL

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
1	1000	150.	-447.	-468.	631.	-2685.	3003.	.0000	.0000	.0000	.0000	.0000	.0000
2	1080	0.	0.	0.	0.	0.	0.	-.0239	.0046	-.0332	-.0459	-.0099	-.0151
3	1090	0.	0.	0.	0.	0.	0.	-.0234	.0050	-.0347	-.0460	-.0098	-.0152
4	1100	0.	0.	0.	0.	0.	0.	-.0181	-.0036	-.0278	-.0459	-.0099	-.0151
5	1190	0.	0.	0.	0.	0.	0.	.0004	.0066	-.0888	.0134	-.0031	-.0095
6	1200	0.	0.	0.	0.	0.	0.	-.0010	.0017	-.0848	.0114	-.0044	-.0083
7	1270	0.	0.	0.	0.	0.	0.	-.0066	-.0096	-.0648	-.0038	.0132	.0044
8	1330	0.	0.	0.	0.	0.	0.	.0014	-.0023	-.0619	-.0039	-.0013	.0047
9	1370	0.	0.	0.	0.	0.	0.	.0003	.0006	-.0372	.0006	.0003	.0029
10	1410	0.	0.	0.	0.	0.	0.	.0000	.0000	-.0109	-.0011	-.0012	.0011
11	1420	0.	0.	0.	0.	0.	0.	-.0011	.0010	-.0043	-.0023	-.0022	.0006
12	1450	0.	0.	0.	0.	0.	0.	.0046	.0018	.0069	.0014	.0018	-.0028
13	1455	0.	0.	0.	0.	0.	0.	.0109	-.0021	.0114	.0055	.0016	-.0066
14	1530	0.	0.	0.	0.	0.	0.	.0076	-.0053	.0071	-.0111	-.0014	.0117
15	1560	0.	0.	0.	0.	0.	0.	-.0014	.0134	-.0014	.0004	-.0021	.0000
16	1570	0.	0.	0.	0.	0.	0.	-.0010	.0200	-.0006	.0015	-.0024	-.0005
17	1620	0.	0.	0.	0.	0.	0.	-.0007	.0496	.0015	-.0014	-.0036	-.0008
18	1700	0.	0.	0.	0.	0.	0.	.0227	.0048	-.0290	-.0143	-.0042	-.0072
19	1710	0.	0.	0.	0.	0.	0.	.0237	.0025	-.0305	-.0121	-.0041	-.0065
20	1720	0.	0.	0.	0.	0.	0.	.0253	-.0005	-.0331	-.0083	-.0039	-.0052
21	1750	0.	0.	0.	0.	0.	0.	.0263	-.0019	-.0350	-.0060	-.0037	-.0044
22	1770	0.	0.	0.	0.	0.	0.	.0302	-.0040	-.0420	.0012	-.0037	-.0029
23	1775	0.	0.	0.	0.	0.	0.	.0324	-.0025	-.0469	.0038	-.0027	-.0021
24	1840	0.	0.	0.	0.	0.	0.	.0218	.0016	-.0385	.0058	.0249	.0011
25	1850	0.	0.	0.	0.	0.	0.	.0215	.0016	-.0377	.0059	.0250	.0012
26	1860	0.	0.	0.	0.	0.	0.	.0236	.0012	-.0378	.0058	.0249	.0011
27	1890	0.	0.	0.	0.	0.	0.	.0118	.0000	-.0133	.0068	.0276	.0022
28	1910	0.	0.	0.	0.	0.	0.	.0068	-.0012	-.0001	.0073	.0281	.0027
29	1970	0.	0.	0.	0.	0.	0.	-.0025	.0006	.0322	.0075	.0191	-.0101
30	1980	0.	0.	0.	0.	0.	0.	-.0003	.0028	.0337	.0073	.0175	-.0106
31	2030	0.	0.	0.	0.	0.	0.	.0015	.0045	.0270	-.0075	.0042	-.0111
32	2060	0.	0.	0.	0.	0.	0.	-.0050	-.0046	.0105	-.0037	.0041	-.0078
33	2100	0.	0.	0.	0.	0.	0.	-.0066	-.0084	-.0031	.0011	-.0033	-.0025
34	2200	17.	-9.	-64.	215.	-106.	27.	.0000	.0000	.0000	.0000	.0000	.0000
35	2520	0.	0.	0.	0.	0.	0.	.0213	-.0005	-.0367	-.0037	-.0025	-.0023
36	2530	0.	0.	0.	0.	0.	0.	.0210	-.0005	-.0368	-.0035	-.0024	-.0021
37	2540	0.	0.	0.	0.	0.	0.	.0212	-.0003	-.0360	-.0037	-.0025	-.0023
38	2560	0.	0.	0.	0.	0.	0.	.0133	.0001	-.0381	.0000	-.0014	.0005
39	2600	0.	0.	0.	0.	0.	0.	.0029	.0028	-.0360	.0090	.0009	.0061
40	2610	0.	0.	0.	0.	0.	0.	.0006	.0068	-.0324	.0100	.0005	.0056
41	2615	0.	0.	0.	0.	0.	0.	.0004	.0072	-.0320	.0101	.0005	.0056
42	2680	0.	0.	0.	0.	0.	0.	-.0018	-.0094	-.0093	.0095	-.0012	-.0008

ADLPIPE P. 105 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANALYS. WINDOWS 3F9.3 7/18/ 0 11:59:46

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX THERMAL ANALYSIS NORM. OPER. XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B32

CONDITION 20
LOADS
THERMAL

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
43	2690	0.	0.	0.	0.	0.	0.	-.0020	-.0107	-.0078	.0079	-.0009	-.0009
44	2710	0.	0.	0.	0.	0.	0.	-.0021	-.0119	-.0043	-.0019	-.0002	-.0014
45	2730	0.	0.	0.	0.	0.	0.	-.0029	-.0062	.0021	-.0108	-.0030	-.0029
46	2850	34.	122.	510.	-1567.	441.	7.	.0000	.0000	.0000	.0000	.0000	.0000
47	3040	0.	0.	0.	0.	0.	0.	.0001	-.0022	-.0008	.0063	-.0007	.0006
48	3050	88.	383.	-555.	1824.	-135.	190.	.0000	.0000	.0000	.0000	.0000	.0000

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX THERMAL ANALYSIS NORM. OPER. XXX

CONDITION 20
LOADS
THERMAL

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B33

MOMENTS AT TEES IN LOCAL COORDINATES
UNITS ARE IN-LB
(1 IS LEG AXIS,2 IS BRANCH AXIS)

	LEG 1			LEG 2			BRANCH		
SEQ	M1	M2	M3	M1	M2	M3	M1	M2	M3
1750	-5519.3	-37955.2	2331.4	111.6	31933.9	2089.2	5407.7	6021.3	-4420.6
2680	-2388.4	-7333.9	4652.6	436.6	9320.5	-13225.7	1951.8	-1986.6	8573.2

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX THERMAL ANALYSIS NORM. OPER. XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B34

CONDITION 20
LOADS
THERMAL

NETWORK POINT SUMMARY IN THE LOCAL COORDINATES
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
1	1000	-418.	-447.	258.	1470.	-2685.	-2693.	.0000	.0000	.0000	.0000	.0000	.0000
34	2200	-9.	-17.	-64.	-106.	-215.	27.	.0000	.0000	.0000	.0000	.0000	.0000
46	2850	122.	-34.	510.	441.	1567.	7.	.0000	.0000	.0000	.0000	.0000	.0000
48	3050	383.	-88.	-555.	-135.	-1824.	190.	.0000	.0000	.0000	.0000	.0000	.0000

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX THERMAL ACCIDENT TEMP. 244 DEG. XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B35

CONDITION 21
LOADS
THERMAL

SPRING/HANGER SUMMARY
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
5	1	1200	RI	-2197.	3652.	0.	0.	0.	0.	-.0064	.0106	-.5198	.0697	-.0268	-.0511
7	1	1275	SN	0.	0.	0.	0.	0.	0.	-.0281	-.0534	-.4128	-.0245	.0813	.0280
8	1	1340	RI	1481.	-1353.	0.	0.	0.	0.	.0043	-.0039	-.3490	-.0170	-.0067	.0266
9	1	1380	RI	0.	181.	0.	0.	0.	0.	.0030	.0005	-.1876	.0045	.0015	.0152
10	1	1420	RI	-2289.	2134.	0.	0.	0.	0.	-.0066	.0062	-.0262	-.0143	-.0133	.0038
12	1	1455	RI	-462.	0.	462.	0.	0.	0.	.0669	-.0127	.0696	.0336	.0096	-.0403
13	1	1460	RI	0.	-5389.	0.	0.	0.	0.	.0698	-.0156	.0717	.0360	.0093	-.0426
14	1	1540	RI	4472.	835.	3979.	0.	0.	0.	.0130	.0024	.0115	-.0443	-.0098	.0466
15	1	1570	RI	-2177.	0.	-1243.	0.	0.	0.	-.0063	.1224	-.0036	.0094	-.0147	-.0031
17	1	1630	RI	179.	0.	340.	0.	0.	0.	.0005	.3443	.0010	-.0191	-.0238	-.0103
18	1	1710	RI	0.	5223.	0.	0.	0.	0.	.1450	.0151	-.1867	-.0742	-.0250	-.0396
19	1	1715	SN	0.	0.	0.	0.	0.	0.	.1462	.0125	-.1887	-.0711	-.0248	-.0386
22	1	1775	RI	0.	-2706.	0.	0.	0.	0.	.1985	-.0154	-.2874	.0233	-.0165	-.0126
23	1	1780	SN	0.	0.	0.	0.	0.	0.	.1996	-.0144	-.2903	.0236	-.0157	-.0122
27	1	1900	RI	0.	-395.	0.	0.	0.	0.	.0615	-.0023	-.0527	.0428	.1708	.0150
29	1	1980	RI	-211.	0.	0.	0.	0.	0.	-.0020	.0172	.2068	.0448	.1072	-.0652
30	1	1985	SN	0.	0.	0.	0.	0.	0.	.0003	.0194	.2084	.0445	.1055	-.0655
31	1	2040	RI	-389.	442.	0.	0.	0.	0.	-.0037	.0042	.1316	-.0406	.0249	-.0611
32	1	2070	SN	0.	0.	0.	0.	0.	0.	-.0432	-.0384	.0303	-.0159	.0212	-.0410
33	1	2110	SN	0.	0.	0.	0.	0.	0.	-.0301	-.0536	-.0157	.0085	-.0210	-.0141
38	1	2570	RI	0.	-476.	0.	0.	0.	0.	.0525	-.0027	-.2369	.0130	-.0076	.0108
39	1	2610	RI	629.	0.	0.	0.	0.	0.	.0036	.0417	-.1983	.0614	.0030	.0345
40	1	2615	SN	0.	0.	0.	0.	0.	0.	.0024	.0439	-.1961	.0618	.0028	.0341
44	1	2720	RI	-804.	0.	0.	0.	0.	0.	-.0135	-.0598	-.0068	-.0588	-.0076	-.0131
45	1	2740	RI	0.	-2443.	0.	0.	0.	0.	-.0249	-.0205	.0330	-.0331	-.0245	-.0223

ADLPIPE F 164 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANALYS WINDOWS 3F9.3 7/18/ 0 11:59:46

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX THERMAL ACCIDENT TEMP. 244 DEG. XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B36

CONDITION 21
LOADS
THERMAL

SPRING/HANGER SUMMARY IN LOCAL COORDINATES
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
12	1	1455	RI	-653.	0.	0.	0.	0.	0.	-.0019	.0965	.0127	.0523	-.0047	-.0096
19	1	1715	SN	0.	0.	0.	0.	0.	0.	.1081	.0125	-.2129	-.0771	-.0248	-.0245
23	1	1780	SN	0.	0.	0.	0.	0.	0.	.1674	-.0144	-.3100	.0221	-.0157	-.0147

ADLPIPE P. 165 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANALYS. WINDOWS 3F9.3 7/18/ 0 11:59:46

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX THERMAL ACCIDENT TEMP. 244 DEG. XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B37

CONDITION 21
LOADS
THERMAL

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET	PT SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
1	1000	918.	-2742.	-2866.	3869.	-16454.	18401.	.0000	.0000	.0000	.0000	.0000	.0000
2	1080	0.	0.	0.	0.	0.	0.	-.1464	.0283	-.2036	-.2810	-.0607	-.0924
3	1090	0.	0.	0.	0.	0.	0.	-.1435	.0304	-.2125	-.2816	-.0601	-.0929
4	1100	0.	0.	0.	0.	0.	0.	-.1111	-.0222	-.1704	-.2810	-.0607	-.0924
5	1190	0.	0.	0.	0.	0.	0.	.0022	.0407	-.5445	.0821	-.0193	-.0580
6	1200	0.	0.	0.	0.	0.	0.	-.0064	.0106	-.5198	.0697	-.0268	-.0511
7	1270	0.	0.	0.	0.	0.	0.	-.0405	-.0588	-.3968	-.0233	.0808	.0270
8	1330	0.	0.	0.	0.	0.	0.	.0083	-.0140	-.3792	-.0239	-.0078	.0287
9	1370	0.	0.	0.	0.	0.	0.	.0018	.0035	-.2280	.0038	.0016	.0181
10	1410	0.	0.	0.	0.	0.	0.	-.0003	-.0002	-.0666	-.0068	-.0074	.0067
11	1420	0.	0.	0.	0.	0.	0.	-.0066	.0062	-.0262	-.0143	-.0133	.0038
12	1450	0.	0.	0.	0.	0.	0.	.0283	.0109	.0423	.0089	.0108	-.0171
13	1455	0.	0.	0.	0.	0.	0.	.0669	-.0127	.0696	.0336	.0096	-.0403
14	1530	0.	0.	0.	0.	0.	0.	.0465	-.0323	.0433	-.0678	-.0084	.0718
15	1560	0.	0.	0.	0.	0.	0.	-.0088	.0820	-.0086	.0024	-.0130	.0000
16	1570	0.	0.	0.	0.	0.	0.	-.0063	.1224	-.0036	.0094	-.0147	-.0031
17	1620	0.	0.	0.	0.	0.	0.	-.0040	.3040	.0094	-.0086	-.0221	-.0049
18	1700	0.	0.	0.	0.	0.	0.	.1391	.0292	-.1776	-.0879	-.0256	-.0440
19	1710	0.	0.	0.	0.	0.	0.	.1450	.0151	-.1867	-.0742	-.0250	-.0396
20	1720	0.	0.	0.	0.	0.	0.	.1549	-.0030	-.2028	-.0510	-.0238	-.0319
21	1750	0.	0.	0.	0.	0.	0.	.1614	-.0119	-.2142	-.0367	-.0230	-.0267
22	1770	0.	0.	0.	0.	0.	0.	.1854	-.0243	-.2576	.0076	-.0226	-.0180
23	1775	0.	0.	0.	0.	0.	0.	.1985	-.0154	-.2874	.0233	-.0165	-.0126
24	1840	0.	0.	0.	0.	0.	0.	.1337	.0099	-.2359	.0357	.1525	.0069
25	1850	0.	0.	0.	0.	0.	0.	.1316	.0097	-.2309	.0359	.1533	.0071
26	1860	0.	0.	0.	0.	0.	0.	.1443	.0074	-.2314	.0357	.1525	.0069
27	1890	0.	0.	0.	0.	0.	0.	.0724	.0002	-.0813	.0418	.1693	.0137
28	1910	0.	0.	0.	0.	0.	0.	.0420	-.0072	-.0005	.0448	.1722	.0165
29	1970	0.	0.	0.	0.	0.	0.	-.0155	.0037	.1972	.0457	.1169	-.0622
30	1980	0.	0.	0.	0.	0.	0.	-.0020	.0172	.2068	.0448	.1072	-.0652
31	2030	0.	0.	0.	0.	0.	0.	.0091	.0276	.1654	-.0462	.0258	-.0678
32	2060	0.	0.	0.	0.	0.	0.	-.0309	-.0284	.0641	-.0227	.0251	-.0477
33	2100	0.	0.	0.	0.	0.	0.	-.0402	-.0513	-.0190	.0070	-.0199	-.0154
34	2200	103.	-58.	-392.	1321.	-649.	167.	.0000	.0000	.0000	.0000	.0000	.0000
35	2520	0.	0.	0.	0.	0.	0.	.1307	-.0034	-.2251	-.0227	-.0152	-.0140
36	2530	0.	0.	0.	0.	0.	0.	.1286	-.0029	-.2256	-.0218	-.0148	-.0132
37	2540	0.	0.	0.	0.	0.	0.	.1297	-.0018	-.2206	-.0227	-.0152	-.0140
38	2560	0.	0.	0.	0.	0.	0.	.0812	.0005	-.2335	-.0001	-.0084	.0030
39	2600	0.	0.	0.	0.	0.	0.	.0177	.0169	-.2209	.0554	.0053	.0373
40	2610	0.	0.	0.	0.	0.	0.	.0036	.0417	-.1983	.0614	.0030	.0345
41	2615	0.	0.	0.	0.	0.	0.	.0024	.0439	-.1961	.0618	.0028	.0341
42	2680	0.	0.	0.	0.	0.	0.	-.0111	-.0578	-.0572	.0585	-.0073	-.0049

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX THERMAL ACCIDENT TEMP. 244 DEG. XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B38

CONDITION 21
LOADS
THERMAL

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
43	2690	0.	0.	0.	0.	0.	0.	-.0120	-.0655	-.0477	.0487	-.0058	-.0052
44	2710	0.	0.	0.	0.	0.	0.	-.0128	-.0729	-.0266	-.0119	-.0013	-.0086
45	2730	0.	0.	0.	0.	0.	0.	-.0179	-.0382	.0131	-.0660	-.0185	-.0177
46	2850	207.	748.	3124.	-9602.	2702.	45.	.0000	.0000	.0000	.0000	.0000	.0000
47	3040	0.	0.	0.	0.	0.	0.	.0006	-.0134	-.0052	.0387	-.0044	.0036
48	3050	539.	2347.	-3404.	11181.	-828.	1162.	.0000	.0000	.0000	.0000	.0000	.0000

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX THERMAL ACCIDENT TEMP. 244 DEG. XXX

CONDITION 21
LOADS
THERMAL

NETWORK POINT SUMMARY IN THE LOCAL COORDINATES
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
1	1000	-2559.	-2742.	1583.	9009.	-16454.	-16505.	.0000	.0000	.0000	.0000	.0000	.0000
34	2200	-58.	-103.	-392.	-649.	-1321.	167.	.0000	.0000	.0000	.0000	.0000	.0000
46	2850	748.	-207.	3124.	2702.	9602.	45.	.0000	.0000	.0000	.0000	.0000	.0000
48	3050	2347.	-539.	-3404.	-828.	-11181.	1162.	.0000	.0000	.0000	.0000	.0000	.0000

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX CONDENSATION INDUCED WATERHAMMER LOAD CASE XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B40

CONDITION 30
LOADS
SHOCK

SPRING/HANGER SUMMARY
MAXIMUM COMPONENT OF FORCE OR MOMENT
FORCES AND MOMENTS ACT ON THE RESTRAINT

SEC	MEM	SEQ	TYPE	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
14	1	1200	RI	-2360.	3110.	0.	0.	0.	0.	-.0068	.0090	-.1617	.0413	.0176	.0610
19	1	1275	SN	0.	0.	-21144.	0.	0.	0.	-.0987	-.0499	-.0761	.0080	-.1118	.0623
23	1	1340	RI	-7388.	-1531.	0.	0.	0.	0.	-.0214	-.0044	-.0710	-.0138	-.0528	.0577
26	1	1380	RI	0.	643.	0.	0.	0.	0.	-.0785	.0019	-.0734	.0026	-.0084	.0378
29	1	1420	RI	-8425.	-274.	0.	0.	0.	0.	-.0244	-.0008	-.0751	.0022	.0445	.0179
32	1	1455	RI	2284.	0.	-2284.	0.	0.	0.	-.0542	.0012	-.0507	.0068	-.0219	.0075
32	2	1460	RI	0.	435.	0.	0.	0.	0.	-.0550	.0013	-.0500	.0067	-.0221	.0075
36	1	1540	RI	-2458.	-390.	-1376.	0.	0.	0.	-.0071	-.0011	-.0040	.0121	.0107	-.0240
38	1	1570	RI	1070.	0.	513.	0.	0.	0.	.0031	-.0011	.0015	-.0016	.0084	.0027
42	1	1630	RI	-128.	0.	-120.	0.	0.	0.	-.0004	-.0009	-.0003	.0006	.0040	-.0012
45	1	1710	RI	0.	-54.	0.	0.	0.	0.	.0002	-.0002	-.0001	.0005	.0004	-.0006
45	2	1715	SN	66.	0.	13.	0.	0.	0.	.0002	-.0001	-.0001	.0005	.0004	-.0006
48	3	1775	RI	0.	31.	0.	0.	0.	0.	.0001	.0002	-.0001	-.0002	-.0001	-.0004
48	4	1780	SN	-8.	0.	-1.	0.	0.	0.	.0000	.0002	-.0001	-.0003	-.0001	-.0004
55	2	1900	RI	0.	9.	0.	0.	0.	0.	.0000	.0001	-.0001	-.0002	.0001	-.0001
59	1	1980	RI	2.	0.	0.	0.	0.	0.	.0000	.0000	.0000	.0000	.0001	.0001
60	1	1985	SN	0.	0.	-4.	0.	0.	0.	.0000	.0000	.0000	.0000	.0001	.0001
62	2	2040	RI	-1.	-2.	0.	0.	0.	0.	.0000	.0000	.0000	.0000	.0000	.0000
64	1	2070	SN	-1.	0.	0.	0.	0.	0.	.0000	.0000	.0000	.0000	.0000	.0000
66	2	2110	SN	0.	0.	0.	0.	0.	0.	.0000	.0000	.0000	.0000	.0000	.0000
74	1	2570	RI	0.	18.	0.	0.	0.	0.	.0001	.0001	-.0003	.0004	-.0003	.0002
77	1	2610	RI	9.	0.	0.	0.	0.	0.	.0000	.0001	-.0001	.0003	-.0002	-.0001
77	2	2615	SN	0.	0.	-15.	0.	0.	0.	.0000	.0001	-.0001	.0003	-.0002	-.0001
84	1	2720	RI	2.	0.	0.	0.	0.	0.	.0000	-.0001	.0001	.0001	.0001	-.0001
85	1	2740	RI	0.	-6.	0.	0.	0.	0.	.0000	.0000	.0001	-.0001	-.0001	.0000

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX CONDENSATION INDUCED WATERHAMMER LOAD CASE XXX

CONDITION 30
LOADS
SHOCK

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B41

SPRING/HANGER SUMMARY IN LOCAL COORDINATES
MAXIMUM COMPONENT OF FORCE OR MOMENT
FORCES AND MOMENTS ACT ON THE RESTRAINT

SEC	MEM	SEQ	TYPE	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
32	1	1455	RI	3231.	0.	0.	0.	0.	0.	.0094	-.0742	-.0012	-.0018	.0100	.0219
45	2	1715	SN	67.	0.	0.	0.	0.	0.	.0002	-.0001	-.0001	.0005	.0004	-.0007
48	4	1780	SN	-8.	0.	0.	0.	0.	0.	.0000	.0002	-.0001	-.0002	-.0001	-.0004

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX CONDENSATION INDUCED WATERHAMMER LOAD CASE XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B42

CONDITION 30
LOADS
SHOCK

RESTRAINED NETWORK POINT SUMMARY
MAXIMUM COMPONENTS OF FORCE AND MOMENT
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
1	1000	7558.	3094.	5288.	-11986.	15038.	-18064.	.0000	.0000	.0000	.0000	.0000	.0000
69	2200	0.	1.	0.	0.	0.	1.	.0000	.0000	.0000	.0000	.0000	.0000
90	2850	3.	1.	3.	-8.	2.	5.	.0000	.0000	.0000	.0000	.0000	.0000
93	3050	-7.	-21.	8.	-18.	6.	-16.	.0000	.0000	.0000	.0000	.0000	.0000

ADLPIPE P. 331 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANALYSI WINDOWS 3F9.3 7/18/ 0 11:59:46

WOLFCREEK NUCLEAR OPERATING CORP.
PIPING ANA. CONTMT. AIRCOOLER "A" RETURN LINE
SNUB R013 IN @ NP1275;WAVE=4135FPS;RISE=17MS;DURATION=34.1MS;P=179
XXX CONDENSATION INDUCED WATERHAMMER LOAD CASE XXX

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B43

CONDITION 30
LOADS
SHOCK

RESTRAINED NETWORK POINT SUMMARY
MAXIMUM COMPONENTS OF FORCE AND MOMENT IN THE LOCAL COORDINATES
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
1	1000	-9035.	3094.	-1863.	6309.	15038.	21398.	.0000	.0000	.0000	.0000	.0000	.0000
8	1100	1915.	-2506.	-2442.	0.	0.	0.	.0396	.1148	-.0593	-.1046	.0682	.0458
54	1860	-9.	14.	-1.	0.	0.	0.	-.0001	.0000	.0000	-.0001	.0001	.0002
69	2200	1.	0.	0.	0.	0.	1.	.0000	.0000	.0000	.0000	.0000	.0000
73	2540	10.	15.	-6.	0.	0.	0.	-.0002	.0001	-.0001	-.0003	.0002	-.0004
90	2850	1.	-3.	3.	2.	8.	5.	.0000	.0000	.0000	.0000	.0000	.0000
93	3050	-21.	7.	8.	6.	18.	-16.	.0000	.0000	.0000	.0000	.0000	.0000

Tal -1.0
Wolf Creek Nuclear Power Plant
Train "A" Return Line Pipe Support Load Summary with Column Closure Waterhammer

Mark Number	Node	Load Direction	Deadweight	Thermal Normal	Thermal Accident	Column Closure Waterhammer	+ Total w/ TH Accident	- Total w/ TH Accident	+ Total w/o TH Accident	- Total w/o TH Accident	Maximum Absolute DW+Tha+CC Combination	Maximum Load	Mark Number
C005	1200	FX	-38	-383	-2344	2631	249	-5013	2593	-2669	5013	5013	C005
C005	1200	FY	-5726	434	2657	3154	85	-6223	-2572	-8880	8880	8880	C005
R013	1275	FZ	0	0	0	10583	10583	-10583	10583	-10583	10583	10583	R013
C006	1340	FX	62	240	1468	1419	2949	111	1481	-1357	2949	2949	C006
C006	1340	FY	-604	-179	-1099	2286	583	-3989	1682	-2890	3989	3989	C006
H003	1380	FY	-1852	11	67	994	-791	-2779	-858	-2846	2846	2846	H003
C007	1420	FX	9	-372	-2279	3425	1155	-5695	3434	-3416	5695	5695	C007
C007	1420	FY	-820	379	2322	1071	2573	431	251	-1891	2573	2573	C007
C008	1455	FLateral	74	-40	-245	2304	2133	-2475	2378	-2230	2475	2475	C008
C008	1460	FY	-1668	-866	-5305	1309	-5664	-8282	-359	-2977	8282	8282	C008
C017	1540	FX	-273	611	3742	2957	6426	512	2684	-3230	6426	6426	C017
C017	1540	FY	-5554	93	568	8493	3507	-13479	2939	-14047	14047	14047	C017
C017	1540	FZ	-141	605	3705	1533	5097	2031	1392	-1674	5097	5097	C017
R004	1570	FX	181	-291	-1781	1061	-539	-2661	1242	-880	2661	2661	R004
R004	1570	FZ	46	-204	-1247	1468	267	-2669	1514	-1422	2669	2669	R004
R005	1630	FX	-9	12	73	1245	1309	-1181	1236	-1254	1309	1309	R005
R005	1630	FZ	-15	122	750	3747	4482	-3012	3732	-3762	4482	4482	R005
C019	1710	FY	-1781	970	5944	1603	5766	2560	-178	-3384	5766	5766	C019
C019	1715	FLateral	0	0	0	1067	1067	-1067	1067	-1067	1067	1067	C019
C018	1775	FY	-985	-573	-3512	1159	-3338	-5656	174	-2144	5656	5656	C018
C018	1780	FLateral	0	0	0	2091	2091	-2091	2091	-2091	2091	2091	C018
H005	1900	FY	-1366	-433	-2654	1165	-2855	-5185	-201	-2531	5185	5185	H005
R010	1980	FX	18	-24	-147	625	496	-754	643	-607	754	754	R010
R010	1985	FZ	0	0	0	587	587	-587	587	-587	587	587	R010
C015	2040	FX	-73	-57	-346	424	5	-843	351	-497	843	843	C015
C015	2040	FY	-921	66	406	993	478	-1508	72	-1914	1914	1914	C015
R012	2070	FX	0	0	0	481	481	-481	481	-481	481	481	R012
R012	2070	FY	0	0	0	346	346	-346	346	-346	346	346	R012
R011	2110	FZ	0	0	0	1640	1640	-1640	1640	-1640	1640	1640	R011
H006	2570	FY	-1281	-75	-458	847	-892	-2586	-434	-2128	2586	2586	H006
R014	2610	FX	63	124	758	196	1017	625	259	-133	1017	1017	R014
R014	2615	FZ	0	0	0	1061	1061	-1061	1061	-1061	1061	1061	R014
R009	2720	FX	113	-127	-781	150	-518	-818	263	-37	818	818	R009
H007	2740	FY	-240	-399	-2442	84	-2598	-2766	-156	-324	2766	2766	H007

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Tal[illegible]-2.0

Wolf Creek Nu[illegible]ar Power Plant

Train "A" Return Line Pipe Support Load Summary with Condensation Induced Waterhammer

Mark Number	Node	Load Direction	Deadweight	Thermal Normal	Thermal Accident	Condensation Induced Waterhammer	+ Total w/ TH Accident	- Total w/ TH Accident	+ Total w/o TH Accident	- Total w/o TH Accident	Maximum Absolute DW+Tha+CI Combination	Maximum Load	Mark Number
C005	1200	FX	-131	-359	-2197	2360	32	-4688	2229	-2491	4688	4688	C005
C005	1200	FY	-3906	596	3652	3110	2856	-3364	-796	-7016	7016	7016	C005
R013	1275	FZ	0	0	0	21144	21144	-21144	21144	-21144	21144	21144	R013
C006	1340	FX	81	242	1481	7388	8950	-5826	7469	-7307	8950	8950	C006
C006	1340	FY	-1513	-221	-1353	1531	-1335	-4397	18	-3044	4397	4397	C006
H003	1380	FY	-1474	29	181	643	-650	-1936	-831	-2117	2117	2117	H003
C007	1420	FX	-25	-373	-2289	8425	6111	-10739	8400	-8450	10739	10739	C007
C007	1420	FY	-1074	348	2134	274	1334	786	-800	-1348	1348	1348	C007
C008	1455	FLateral	-11	-107	-653	3231	2567	-3895	3220	-3242	3895	3895	C008
C008	1460	FY	-1617	-879	-5389	435	-6571	-7441	-1182	-2052	7441	7441	C008
C017	1540	FX	-10	730	4472	2458	6920	2004	2448	-2468	6920	6920	C017
C017	1540	FY	-5471	136	835	390	-4246	-5026	-5081	-5861	5861	5861	C017
C017	1540	FZ	1	649	3979	1376	5356	2604	1377	-1375	5356	5356	C017
R004	1570	FX	25	-355	-2177	1070	-1082	-3222	1095	-1045	3222	3222	R004
R004	1570	FZ	8	-203	-1243	513	-722	-1748	521	-505	1748	1748	R004
R005	1630	FX	3	29	179	128	310	54	131	-125	310	310	R005
R005	1630	FZ	6	55	340	120	466	226	126	-114	466	466	R005
C019	1710	FY	-1739	852	5223	54	3538	3430	-1685	-1793	3538	3538	C019
C019	1715	FLateral	0	0	0	67	67	-67	67	-67	67	67	C019
C018	1775	FY	-1039	-441	-2706	31	-3714	-3776	-1008	-1070	3776	3776	C018
C018	1780	FLateral	0	0	0	8	8	-8	8	-8	8	8	C018
H005	1900	FY	-1458	-65	-395	9	-1844	-1862	-1449	-1467	1862	1862	H005
R010	1980	FX	51	-34	-211	2	-158	-162	53	49	162	162	R010
R010	1985	FZ	0	0	0	4	4	-4	4	-4	4	4	R010
C015	2040	FX	-80	-63	-389	1	-468	-470	-79	-81	470	470	C015
C015	2040	FY	-922	72	442	2	-478	-482	-920	-924	924	924	C015
R012	2070	FX	0	0	0	1	1	-1	1	-1	1	1	R012
R012	2070	FY	0	0	0	0	0	0	0	0	0	0	R012
R011	2110	FZ	0	0	0	0	0	0	0	0	0	0	R011
H006	2570	FY	-1271	-78	-476	18	-1729	-1765	-1253	-1289	1765	1765	H006
R014	2610	FX	64	103	629	9	702	684	73	55	702	702	R014
R014	2615	FZ	0	0	0	15	15	-15	15	-15	15	15	R014
R009	2720	FX	114	-131	-804	2	-688	-692	116	112	692	692	R009
H007	2740	FY	-239	-399	-2443	6	-2676	-2688	-233	-245	2688	2688	H007

Table B-3.0
Wolf Creek Nuclear Power Plant
Train 'A' Load Comparison

Mark Number	Node	Support Type	Load Direction	New Maximum Load (CC)	New Maximum Load (CI)	Existing Load	IR		Comments
C005	1200	Struts	Fx	5013	4688	6806 [2]	0.74		Support o.k.
			Fy	8880	7016	10958 [1]	0.81		
R013	1275	Snubber	Fz	10583	21144	9750 [2]	21144 / 22100 = 0.96		Support o.k.
C006	1340	VC/LC	Fx	2949	8950	16732 [1]	0.53		Support o.k.
			Fy	3989	4397	8537 [1]	0.52		
H003	1380	Strut	Fy	2846	2117	4353 [1]	0.65		Support o.k.
C007	1420	VC/LC	Fx	5695	10739	18109 [1]	0.59		Support o.k.
			Fy	2573	1348	8537 [1]	0.30		
C008	1455	Struts	Flat	2475	3895	4561 [2]	0.85		Support o.k.
	1460		Fy	8282	7441	10836 [2]	0.76		
C017	1540	Box Frame	Fx	6426	6920	13095 [1,3]	0.53		Support o.k.
			Fy	14047	5861	15000 [1,3]	0.94		
			Fz	5097	5356	13030 [1,3]	0.41		
R004	1570	Box Frame	Fx	2661	3222	6644 [2]	0.48		Support o.k.
			Fz	2669	1748	6435 [2]	0.41		
R005	1630	Box Frame	Fx	1309	310	5268 [2]	0.25		Support o.k.
			Fz	4482	466	10796 [2]	0.42		
C019	1710	Y-Strut Lat.-Snubber	Fy	5766	3538	10216 [2]	0.56		Support o.k.
	1715		Flat	1067	67	5450 [2]	0.20		
C018	1775	Y-Strut Lat.-Snubber	Fy	5656	3776	8033 [2]	0.70		Support o.k.
	1780		Flat	2091	8	4750 [2]	0.44		
H005	1900	Box Frame	Fy	5185	1862	7803 [2]	0.66		Support o.k.
R010	1980	X-Strut Z-Snubber	Fx	754	162	3250 [2]	0.23		Support o.k.
	1985		Fz	587	4	2850 [2]	0.21		
C015	2040	Struts	Fx	843	470	1700 [2]	0.50		Support o.k.
			Fy	1914	924	2450 [2]	0.78		
R012	2070	Snubbers	Fx	481	1	800 [2]	0.60		Support o.k.
			Fy	346	0	800 [2]	0.43		
R011	2110	Snubber	Fz	1640	0	2650 [2]	0.62		Support o.k.
H006	2570	Strut	Fy	2586	1765	3134 [2]	0.83		Support o.k.
R014	2610	X-Strut Z-Snubber	Fx	1017	702	2361 [2]	0.43		Support o.k.
	2615		Fz	1061	15	3850 [2]	0.28		
R009	2720	Strut	Fx	818	692	1100 [2]	0.74		Support o.k.
H007	2740	Strut	Fy	2766	2688	2917 [2]	0.95		Support o.k.

[1] Existing loads taken from Calculation 96227-TR-03, Rev. 0.
[2] Existing loads taken from issued pipe support drawing contained within this attachment.
[3] Loads taken from Calculation GN-01-35 Rev.4 for Hanger 0-GN01-C016 [3B].

Note: I.R.'s taken from a sampling of existing calculations.

	0-GN01-C006	**0-GN01-R009**
Maximum I.R.	0.908 (N/U) 0.903 (Faulted)	0.0763 / 0.25 = 0.305

	0-GN01-C007	**0-GN01-H007**
Maximum I.R.	0.908 (N/U) 0.903 (Faulted)	0.0394 / 0.25 = 0.178

	0-GN01-H005
Maximum I.R.	0.06 / .25 = 0.240

	0-GN01-R010
Maximum I.R.	0.032 / .25 = 0.128

	0-GN01-C015
Maximum I.R.	0.116 / 0.25 = 0.464

	0-GN01-R012
Maximum I.R.	0.030 / 0.25 = 0.12

	0-GN01-R011
Maximum I.R.	0.224 / 0.25 = 0.896

	0-GN01-H006
Maximum I.R.	0.046 / 0.25 = 0.184

	0-GN01-R014
Maximum I.R.	4.185 / 6.45 = 0.648

Calculation Sheet

altran

ATT. B

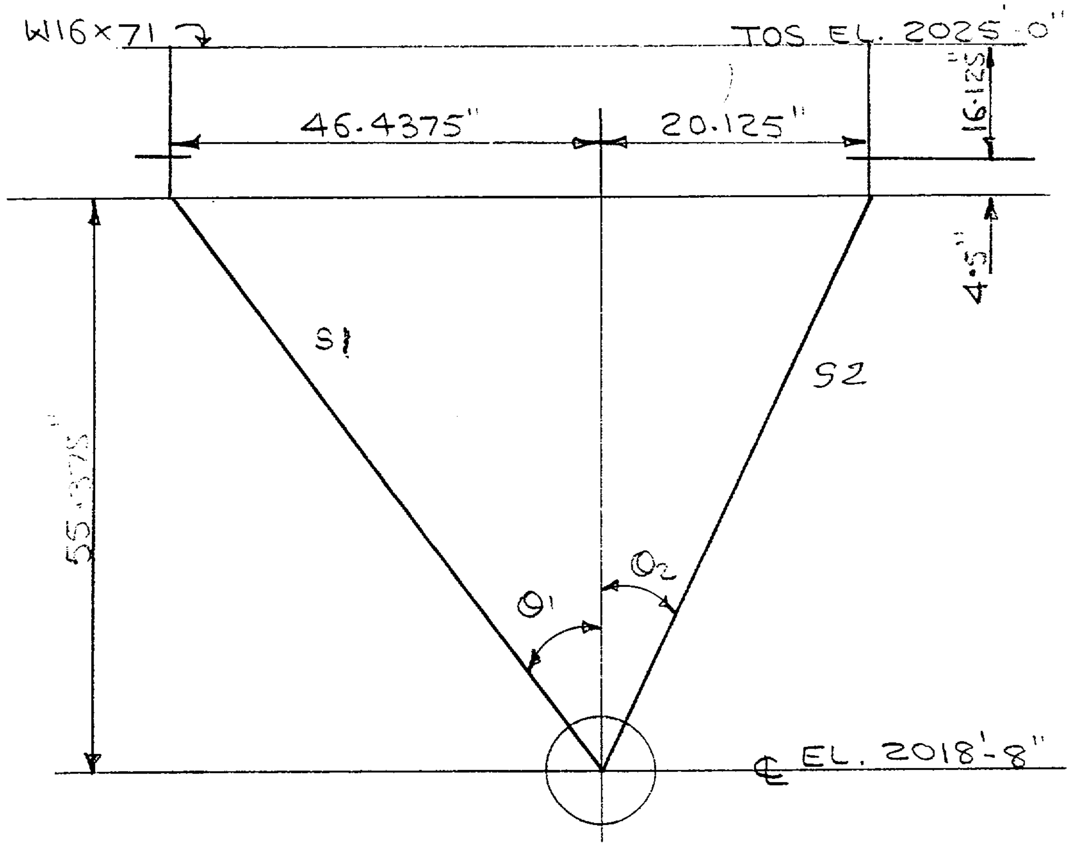
Calc. No. 96227-TR-03 By: N. Patel Date: 2-13-98 Sheet B47

Rev. No. ø 1 Chk: [illegible] Date: 2-16-98

Reference

MARK NO. 1-GN01-C005/231(Q) REV. 2

DATA POINT 1200



$$\Theta_1 = \tan^{-1} \frac{46.4375}{55.375} = 40^\circ$$

$$\Theta_2 = \tan^{-1} \frac{20.125}{55.375} = 20^\circ$$

Calculation Sheet

ATT. B

altran

Calc. No. 96227-TR-03 By: N. Patel Date: 2-13-98 Sheet B48

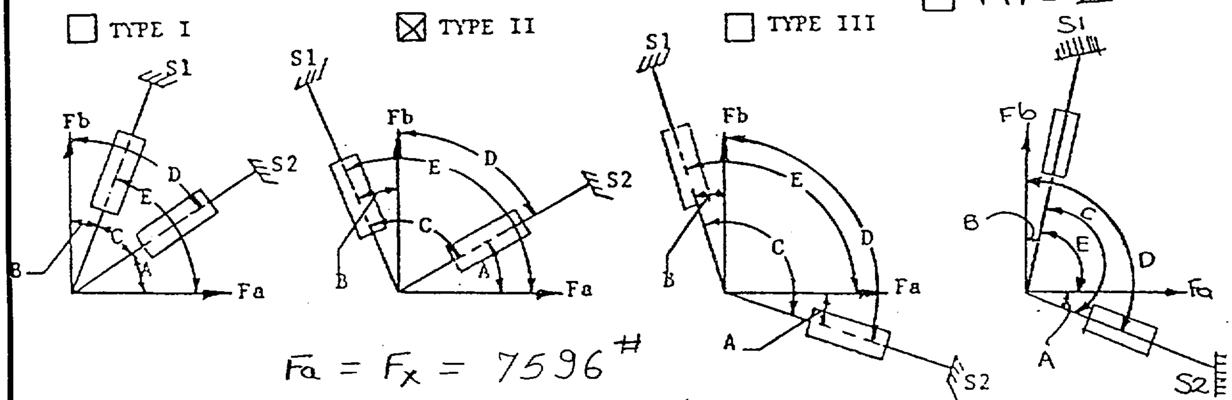
Rev. No. ∅1 Chk: [illegible] Date: 2-16-98

Reference

MARK NO. 1-GN01-C005/231 (@ REV. 2
DATA PT. 1200

STRUT ORIENTATION TYPE I, II AND III, IV.

☐ TYPE I ☒ TYPE II ☐ TYPE III ☐ TYPE IV



$Fa = F_x = 7596^{\#}$

$Fb = F_y = 10958^{\#}$

ANGLES		SINES OF ANGLES		
A =	70°	A =	0.94	(1)
B =	40°	B =	0.643	(2)
C =	60°	C =	0.866	(3)
D =	20°	D =	0.342	(4)
E =	130°	E =	0.766	(5)

FORCE IN	FROM	EQUATION	WORK SPACE
S_1	Fa	$\frac{Fa\ (1)}{(3)}$	$\frac{7596 \times 0.94}{0.866} = 8245^{\#}$
S_1	Fb	$\frac{Fb\ (4)}{(3)}$	$\frac{10958 \times .342}{0.866} = 4328^{\#}$
			Total Force in S_1 = $12573^{\#}$
S_2	Fa	$\frac{Fa\ (5)}{(3)}$	$\frac{7596 \times 0.766}{0.866} = 6719^{\#}$
S_2	Fb	$\frac{Fb\ (2)}{(3)}$	$\frac{10958 \times 0.643}{0.866} = 8136^{\#}$
			Total Force in S_2 = $14855^{\#}$

altran | **Calculation Sheet**

ATT. B

Calc. No. 96227-TR-03   By: N. Patel   Date: 2-13-98   Sheet B49

Rev. No. Ø1   Chk: [illegible]   Date: 2-15-98

Reference

MARK NO. 1-GN01-C005/231 (Q) REV. 2

DATA PT. 1200

CHECK SWAY STRUT : BP 2100 REF 28

$14855^{\#} < 28000^{\#}$ ∴ OK   #18

@ NORM. COND. (CONSV.)

$IR = \frac{14855}{28000} = 0.53 < 1$ ∴ O.K

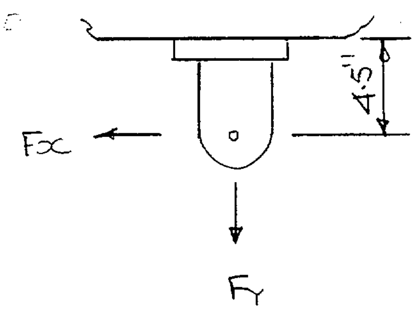
CHECK WELD BETWEEN REAR BRACKET & W16x71 :

FOR CONS. CALC. ENVELOPE LOADS USED

$F_x = 12573 \cos 50 = 8082^{\#}$

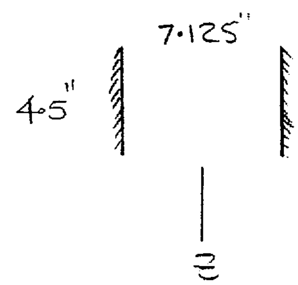
$F_y = 14855 \cos 20 = 13959^{\#}$

$M_z = 8082 \times 4.5 = 36369^{''\#}$



$A_w = 4.5 + 4.5 = 9''$

$S_w = 7.125 \times 4.5 = 32.0625 \; in^2$



$$f_r = \left[\left(\frac{13959}{9} + \frac{36369}{32.0625}\right)^2 + \left(\frac{8082}{9}\right)^2\right]^{1/2} = 2832 \; \#/in$$

$$W_{req} = \frac{2832}{.707 \times 21000} = 0.191'' < 5/16'' \; ∴ OK$$

$$IR = \frac{0.191}{0.3125} = 0.61 < 1.0 \; ∴ OK$$

∴ SUPPORT IS O.K.

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Calculation Sheet

ATT. B

Calc. No.	96227-7R-03	By:	N. Patil	Date:	2-13-98
Rev. No.	~~Ø~~ 1	Chk:	[illegible]	Date:	2.16.98

Sheet B50

Reference

MARK NO. 1-GH01-H003/232 (Ø) REV. –.

DATA POINT : 1380

~~REF ALTRAN TECH. REPORT 96227-7R-03 REV. 0~~ 13

~~REF APPX. B01 ALTRAN~~ (SEE ~~PG B55~~ PG.B61 OF THIS ATT.)

SUPPORT IS ACCEPTABLE FOR LOAD $F_Y = 4353^{\#}$

NEW LOAD $F_Y = 3319^{\#} < 4353^{\#}$

∴ FOR NEW LOADS SUPPORT IS OK BY COMPARISION WITH ABOVE REF. REPORT QUALIFICATION

1

altran

Calculation Sheet

ATT B

Calc. No. 96227-TR-03 By: N Patel Date: 2-13-98 Sheet B51

Rev. No. ~~0~~ 1 Chk: [illegible] Date: 2-16-98

	Reference
MARK NO: 1-GN01-C007/232 (S) REV A	
DATA POINT : 1420	
~~REF. ALTRAN TECH REPORT NO. 96227-TR-02 REV 0~~	13 △1
NEW LOADS:	
Fx = +11002#/-15428# Fy = +2554#/-364#	
CHECK U BOLT: BP PART 283 - 14"Φ PIPE	
Fy = +2554# ∠ ALLOW 7500# (LEVEL A&B)	# 18
RATIO: $\frac{2554}{7500}$ = 0.34 ∠ 1 (O.K.)	
PER ABOVE REF. REPORT (SEE PG B52 THRU B60 ~~B46 B47~~ OF THIS ATT)	△1
LOADS USED, Fx : 18100# Fy = 9000#	
TO QUALIFY REST OF THE SUPPORT.	
Fx = 18100# > 15428# (NEW LOAD)	
Fy = 9000# > 2554# (NEW LOAD)	
∴ FOR NEW LOADS SUPPORT ACCEPTABLE	

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Calculation Sheet

ATTACHMENT - B.

Calc. No. ~~96227-TR-02~~ By: PB Date: 1/27/97 Sheet ~~10~~

Rev. No. ~~0~~ Chk: F Yony Date: 1/27/97

Reference

MARK NO. 1-GN01-C006 &
1-GN01-C007

LOADS FROM 1-GN01-C006 (#)

FX = +16732 FY = +2397
FX = -12617 FY = -8537

LOADS FROM 1-GN01-C007 (#)

FX = +10621 FY = +1542
FX = -18109 FY = -138#

ENVELOPED LOADS (#) ENVELOPED

FX = +16732 FY = +2397
FX = -18109 FY = -8537

CHECK U-BOLT CAPACITY (ITEM 4)
BP PART NO. 283 14"

MAX +FY ONLY = 2397# ≤ 7500# LEVEL A&B

$\boxed{\text{MAX IR = 0.80 WELD}}$

ALTRAN
CALC NO 96227-TR-03 REV. Ø1
ATT. B SHEET B52

1
JB

JB
12/13/00

Calculation Sheet

ATTACHMENT - B

altran

Calc. No. ~~96227-TR-02~~ By: PB Date: 1/27/97 Sheet ~~11~~

Rev. No. ~~0~~ Chk: FYong Date: 1/27/97

Reference

MARK NO. 1GN01-C006 &
1-GN01-C007

ALTRAN
CALC NO 96227-TR-03 REV. Ø1
ATT. B SHEET 353

CHECK ITEM NO. 2

$FX = 18{,}109^{\#} \quad eY = 14''/2 = 7$

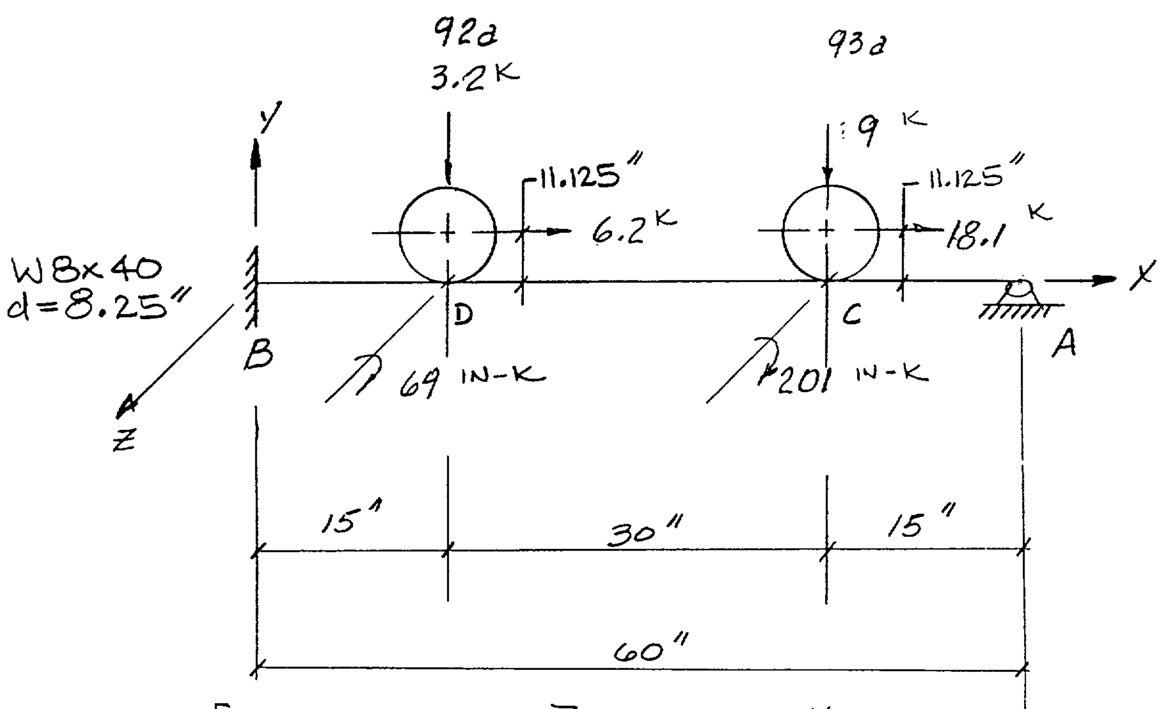
$MZ = FX\,eY = 18109(7) = 126{,}763^{\#}$

$f_b = \frac{MZ}{S_x} = \frac{126763}{5.46} = 23{,}200 \text{ PSI} \le 1.33\,FY(.66)$ [3]

31,600 PSI
∴ OK

$IR = 23200/31600 = 0.73 \le 1.00$ ∴ OK

CHECK ITEM NO. 1 . ON 1-GN01-C006/231 (Q)



$\Sigma M_A = [9(15) + 3.2(45)]/6 = 4.65^K = R_A$

altran **Calculation Sheet**

ATTACHMENT - B

Calc. No. ~~96227-TR-02~~ By: PB Date: 1/27/97 Sheet ~~12~~

Rev. No. ~~0~~ Chk: F/ml Date: 1/27/97

Reference

ALTRAN
CALC NO. 96227-TR-03 REV. Ø1
ATT. B SHEET B54

MARK NO. 1-GN01-C006
1-GN01-C007

FORCES & MOMENTS DUE TO 9 K LOAD

[2] TABLE 3 CASE 1c.

$$R_A = \frac{W}{2l^3}(l-a)^2(2l+a)$$

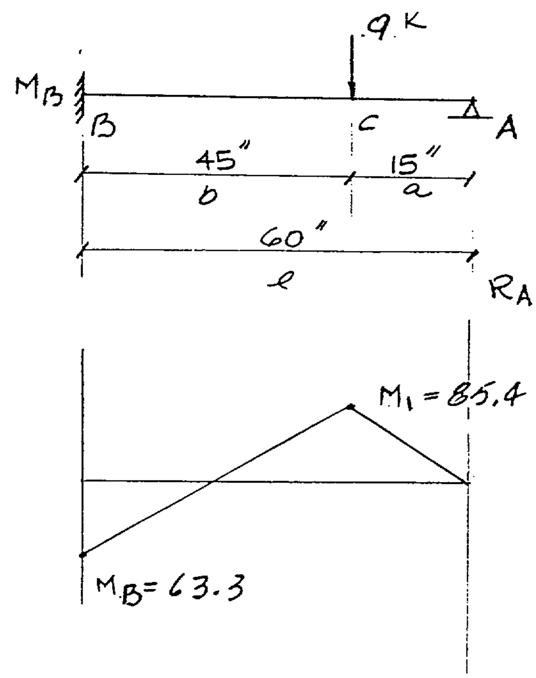
$$R_A = \frac{9}{2(60)^3}(60-15)^2(120+15)$$

$$R_A = 5.7K$$

$$R_B = \frac{Wa}{2l^3}(3l^2 - a^2)$$

$$R_B = \frac{9 \times 15}{2(60)^3}\left[3(60)^2 - (15)^2\right]$$

$$R_B = 3.3K.$$



$$M_B = -\frac{Wa}{2l^2}(l^2 - a^2) = -\frac{9 \times 15}{2(60)^2}\left[(60)^2 - (15)^2\right] = -63.3 \text{ in-K}$$

$$(+)\ M_{MAX} = \frac{Wa}{2l^3}(l-a)^2(2l+a)$$

$$= \frac{9 \times 15}{2(60)^3}\left[(60-15)^2(120+15)\right] = 85.4 \text{ in-K} \quad @ \text{ JOINT C}$$

Calculation Sheet

ATTACHMENT – B .

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Calc. No. ~~96227-TR-02~~ By: PB Date: 1/27/97 Sheet ~~13~~

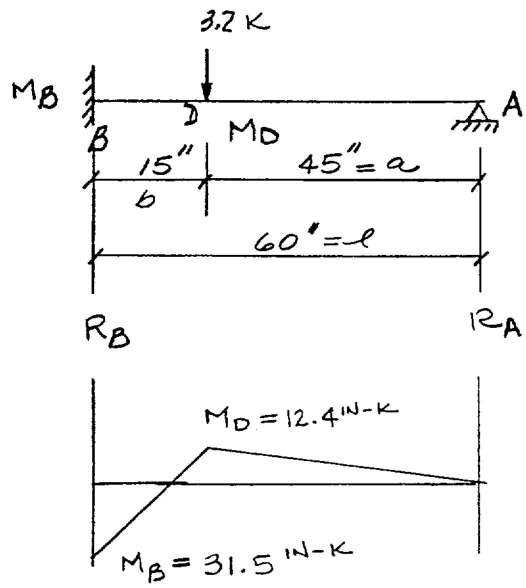
Rev. No. ~~0~~ Chk: F/mg Date: 1/27/97

ALTRAN
CALC NO 96227-TR-03 REV ~~0~~ 1
ATT. B SHEET B55
JB
JB 12/15/00

Reference

MARK NO. 1-GN01-C006
1-GN01-C007

FORCES & MOMENT DUE TO 3.2^K LOAD



[2] TABLE 3 CASE 1c.

$$R_A = \frac{W}{2l^3}(l-a)^2(2l+a)$$

$$R_A = \frac{3.2\,(60-45)^2(120+45)}{2\,(60)^3}$$

$$R_A = 0.275 \text{ K.}$$

$$R_B = \frac{Wa\,(3l^2-a^2)}{2l^3}$$

$$R_B = \frac{3.2\,(45)\left[3(60)^2-(45)^2\right]}{2\,(60)^3}$$

$$R_B = 2.81 \text{ K.}$$

$$M_B = \frac{-Wa\,(l^2-a^2)}{2l^2} = -\frac{3.2\times 45\left[(60)^2-(45)^2\right]}{2\,(60)^2} = -31.5 \text{ in-k}$$

$$(+)\,M_{MX} = \frac{Wa\,(l-a)^2(2l+a)}{2l^3} = \frac{3.2\times 45\,(60-45)^2(120+45)}{2\,(60)^3} = 12.4 \text{ in-k}$$

$M_D = +M_{MX}.$

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Calculation Sheet

ATTACHMENT - B

Calc. No. ~~96227-TR-02~~ By: PB Date: 1/27/97 Sheet ~~14~~

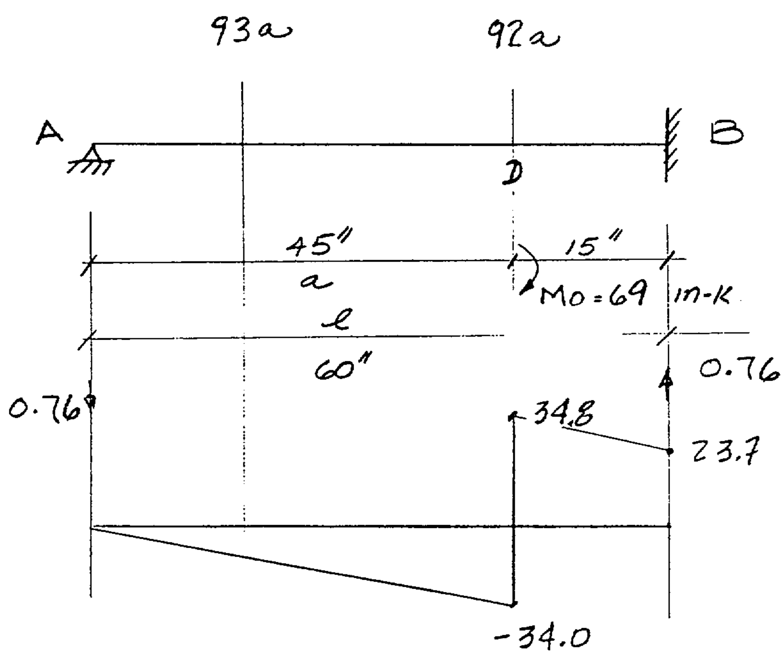
Rev. No. ~~0~~ Chk: FY/my Date: 1/27/97

ALTRAN
CALC NO 96227-TR-03 REV 1 ~~0~~
ATT. B SHEET B56

Reference

MARK NO. 1-GN01-C006
1-GN01-C007

FORCES & MOMENTS DUE TO 69 IN-K MOMENT



$$R_a = \frac{-3M_o}{2\ell^3}(\ell^2 - a^2) = \frac{-3(69)}{2(60)^3}(60^2 - 45^2) = -0.76\,K$$

[2] TABLE 3 CASE 3C.

$$R_B = 0.76^K$$

$$M_B = \frac{M_o}{2\ell^2}(3a^2 - \ell^2) = \frac{69}{2(60)^2}[(3 \times 45^2 - 60^2] = 23.7 \text{ in K}$$

$$-M_{MAX} = \frac{-3M_o a}{2\ell^3}(\ell^2 - a^2) = \frac{-3(69)45}{2(60)^3}(60^2 - 45^2) = -34.0 \text{ in-k}$$

$$+M_{MAX} = M_o + R_A a = 69 - 0.76(45) = 34.8 \text{ in-k}$$

Calculation Sheet

ATTACHMENT-B

altran

Calc. No. ~~96227-TR-02~~ By: PB Date: 1/27/97 Sheet ~~15~~

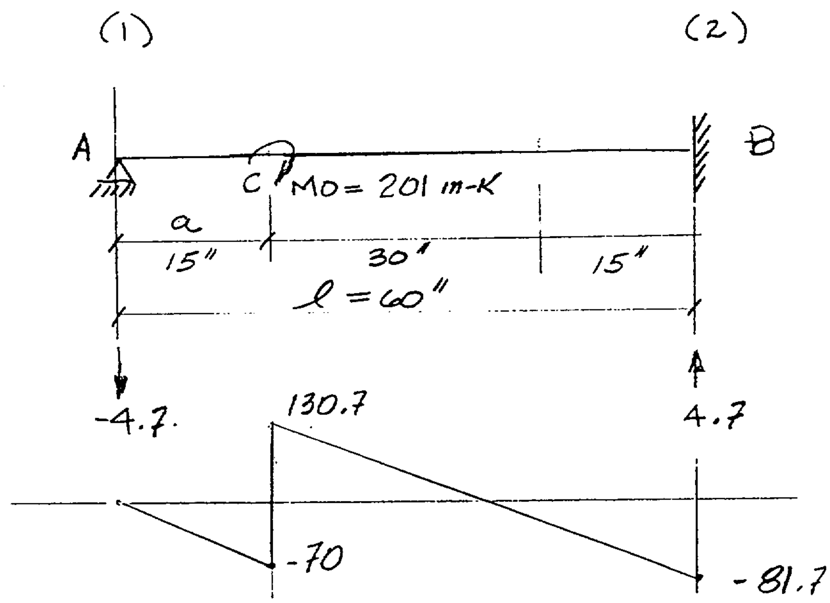
Rev. No. ~~0~~ Chk: [illegible] Date: 1/27/97

ALTRAN CALC NO. 96227-TR-03 REV. 01 ATT. B SHEET B57

Reference: [illegible] 12/13/00

MARK NO. 1-GN01-C006
1-GN01-C007

FORCES & MOMENT DUE TO 201.$^{IN-K}$ MOMENT



[2] TABLE 3 CASE 3c

$$R_a = \frac{-3M_o}{2\ell^3}(\ell^2 - a^2) = -\frac{3(201)}{2(60)^3}(60^2 - 15^2) = -4.7\ K$$

$$R_B = 4.7\ K$$

$$M_B = \frac{M_o}{2\ell^2}(3a^2 - \ell^2) = \frac{201}{2(60)^2}\left[(3)15^2 - 60^2\right] = -81.7\ \text{in-K}$$

$$-M_{MAX} = \frac{-3M_o a}{2\ell^3}(\ell^2 - a^2) = \frac{-3(201)(15)}{2(60)^3}(60^2 - 15^2) = -70\ ^{IN-K}$$

$$+M_{AX} = M_o + R_A = 201 - 4.7(15) = 130.5\ \text{in-K}$$

Calculation Sheet

ATTACHMENT - B

altran

Calc. No. 96227-TR-02	By: PB	Date: 1/27/97	Sheet 16
Rev. No. Ø	Chk: PY/my	Date: 1/27/97	

Reference

MARK NO: 1-GN01-C006
1-GN01-C007

ALTRAN
CALC NO. 96227-TR-03 REV. Ø1
ATT. B SHEET B58

1B
12/13/00

COMBINED FORCES & MOMENTS

MOMENTS	JT B	JT D	JT C	JT A
DUE TO FY = 9K	-63.3		85.4	
DUE TO FY = 3.2	-31.5	12.4		
DUE TO Mo = 69	23.7	34.8		
DUE TO Mo = 201	-81.7		130.5	
TOTAL M	-152.8 in-K	47.2 in-K	215.9 inK	0

FORCES	JT B	JT A
DUE TO FY = 9K	3.3 K	5.7 K
DUE TO FY = 3.2 K	2.81 K	0.275 K
DUE TO Mo = 69 inK	0.76 K	-0.76 K
DUE TO Mo = 201 inK	4.7 K	-4.7 K
TOTAL F	11.57 K	0.515 K

CHECK W8x40

BENDING $= f_b = \frac{M}{S} = \frac{216 \text{ in-K}}{35.5 \text{ in}^3} = 6.1 \text{ Ksi} < .6F_Y$ ...OK

WHERE $S = 35.5 \text{ in}^3$ [3]

SHEAR $= f_s = \frac{F}{A} = \frac{9 \text{ K}}{2.67 \text{ in}^2} = 3.37 \text{ Ksi} < .4F_Y$ OK

WHERE $A = [8\tfrac{1}{4} - 2(9/16)]\ 3/8 = 2.67 \text{ in}^2$ [3]

ALTRAN

CALC NO. 96227-TR-03 REV. ~~0~~1
ATT. B SHEET B59

Calculation Sheet

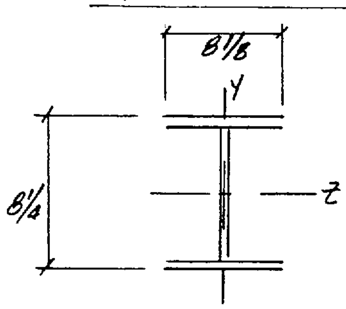
ATTACHMENT - B

altran

Calc. No. ~~96227-TR-02~~ By: PB Date: 1/27/97 Sheet ~~17~~ 14

Rev. No. ~~0~~ Chk: FY Date: 1/27/97

	Reference
MARK NO. 1-GN01-C006 & 1-GN01-C007	
COMPRESSION. $\frac{Kl}{r} = \frac{2.1 \times 60}{2.04} \approx 62 \longrightarrow F_a = 17.24$ Ksi	[3]
WHERE $r = 2.04$, $A = 11.7 \, in^2$	[3]
$f_a = \frac{F}{A} = \frac{6.2 + 18.1}{11.7} = 2.1$ Ksi $\longrightarrow \frac{f_a}{F_a} = .12 < .15$	
INTERACTION CHECK	
$.12 + \frac{6.1}{.6F_y} = 0.4 < 1.0$ ---- OK	
WEB CRIPPLING CHECK. (INTERIOR LOADS)	
$\frac{R}{t(N+2K)} = \frac{9}{.375(1 + 2 \times 1\frac{1}{16})} = 7.68$ Ksi $< .75 F_y$ ... OK	
WHERE : $t = 3/8$, $K = 1\frac{1}{16}"$, $N = 1$	[3]
CHECK WELD @ W8×40/EMBED.	[4]



$F_x = 24.3K$ $M_x = 0$
$F_y = 11.57K$ $M_y = 0$
$F_z = 0$ $M_z = 152.8$ in K.

$L_x = 2(2 \times 8\frac{1}{8} + 8\frac{1}{4}) = 49$ in
$L_y = 2 \times 8\frac{1}{4} = 16.5$ in
$L_z = 4 \times 8\frac{1}{8} = 32.5$ in

$$S_z = \frac{8\frac{1}{4}}{3}(6 \times 8\frac{1}{8} + 8\frac{1}{4}) = 156.75 \, in^2$$

$$f_R = \left[\left(\frac{24.3}{49} + \frac{152.8}{156.75}\right)^2 + \left(\frac{11.57}{16.5}\right)^2\right]^{1/2} = 1.63 \text{ K/in}$$

$w = \frac{1.63}{.707 \times 21} = .11" < 1/4"$ FILLET EXISTING ... OK

$IR = 0.11/.25 = 0.44 \leq 1.0$

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Calculation Sheet

ATTACHMENT – B

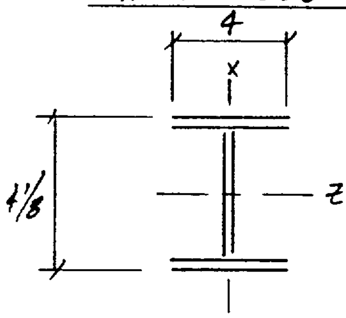
Calc. No. ~~96227-TR-02~~ By: PB Date: 1/27/97 Sheet ~~18~~

Rev. No. ~~0~~ Chk: FY/mf Date: 1/27/97

Reference

MARK NO. 1-GN01-C006 & 1-GN01-C007

CHECK WELD @ W4x13 / W8x40



[4]

$F_x = 18.1$ K $\quad M_x = 0$

$F_y = 0 \quad M_z = 126.8$ K

$F_z = 0 \quad M_y = 0$

$L_x = 2 \times 4\frac{1}{8} = 8.25$ in

$S_z = \frac{4\frac{1}{8}}{3}(6 \times 4 + 4\frac{1}{8}) = 38.7 \ in^2$

$f_R = \left[\left(\frac{126.8}{38.7}\right)^2 + \left(\frac{18.1}{8.25}\right)^2\right]^{1/2} = 3.94$ K/in

$w = \frac{3.94}{.707 \times 21 \times 1.33} = 0.2 < 1/4"$ FILLET EXISTING --- OK

IR = 0.2/0.25 = 0.80 ← MAX

CHECK ANGLE CLIPS (2) 3x3x3/8 ∡.

$F_y = .575$ KIPS

PER TABLE IV (4-37), THE ANGLE CLIPS ARE RATED [3]

$F_{CAPACITY} = 19.5 \times (3/8)/.51 = 14.3$ KIPS

FOR A CONNECTION USING 1/4 FILLET WELD, 5" LONG ANGLES.

∴ 14.3 > .575 ---- OK

ALTRAN

CALC NO 96227-TR-03 REV ~~0~~ 1

ATT. B SHEET B60

1 JB 12/13/00

Reference

MARK NO. 1GN01-H003/232 (Q) REV. 2
DATA POINT 1380

CALCULATE EXISTING STRUT CAPACITY
STRUT 2100-7 LEVEL A&B = 7000#

$FY = 2550^{\#} \leq 7000^{\#}$ BPCAT 77NFRI

$$IR_{EXIST} = \frac{2550}{7000} = 0.36$$

CALCULATE NEW STRUT CAPACITY

$FY = 4353^{\#} \leq 7000^{\#}$

$$IR_{NEW} = \frac{4353}{7000} = 0.62 \leq 1.0 \therefore OK$$

STRUCTURAL CAPACITY OF W8x40
REF 0-GN01-C007/232 (Q) PG 2

PER REVIEW OF ABOVE CALCULATION W8x40
CAPACITY Y-DIRECTION = 6.5 + 3.2 = 9.7 K

$$\text{EXISTING IR} = \frac{\text{DP 75 PROB 92a + DP 75 93a}}{\text{Y-DIRECTION CAPACITY}}$$

$$= \frac{-2.3 + (-2.55)}{9.7} = 0.50 \leq 1.0$$

NEW IR BASED ON INCREASE ALTRAN LOAD

$$\text{NEW IR} = \frac{\text{DP PROB 92a + ALTRAN LD}}{\text{Y-DIR CAP}}$$

$$= \frac{-2.3 - 4.353}{9.7} = 0.69 \leq 1.0 \therefore OK$$

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Calculation Sheet

ATT B

Calc. No. 96227-TR-03 By: N. Patel Date: 2-13-98 Sheet B62

Rev. No. ϕ1 Chk: [illegible] Date: 2-16-98

	Reference
MARK NO: 1-GN01-C008/232 (Q) REV 6	
DATA POINT: 1455 & 1460	
REF. ALTRAN TECHNICAL REPORT NO. 96227-TR-02 REV 0	13
NEW LOADS:	
F_{LAT} = +19700#/-19316# F_y = 0/-6736#	
(FROM ABOVE REF. CALC. (SEE PG. B56 OF THIS ATT.)	
LOADS USED TO QUALIFY THIS SUPPORT ARE	
F_{LAT} = 19910# F_y = 7823#	
WHICH ARE HIGHER THAN NEW LOADS.	
∴ SUPPORT IS OK. BY COMPARISION WITH ABOVE REF REPORT QUALIFICATION.	

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Calculation Sheet

ATTACHMENT - B

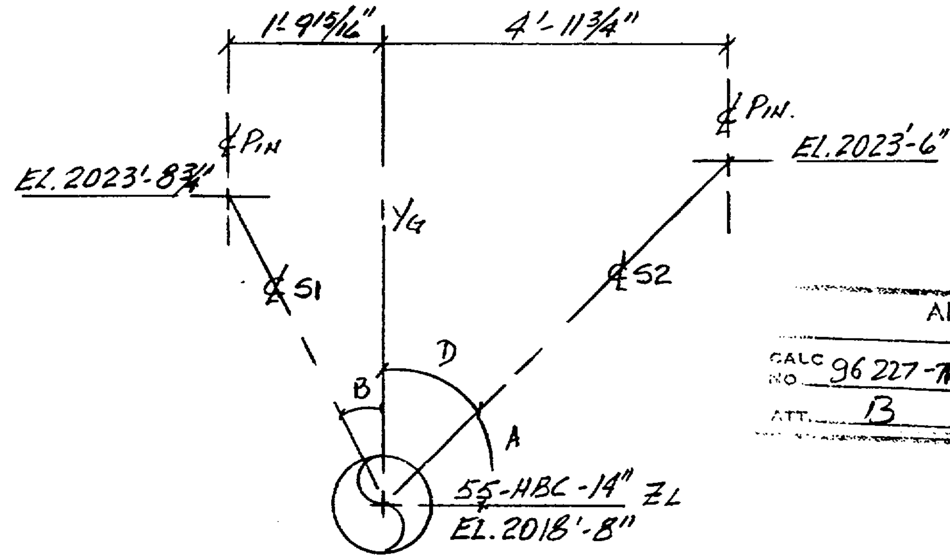
Calc. No. ~~96227-TR-02~~ By: FY/mj Date: 1/28/97 Sheet ~~20~~

Rev. No. ~~0~~ Chk: PB Date: 1/28/97

MARK 1-4N01-C008/232(Q) : D.P. 1455 & 1460

Reference

ANALYSIS



ALTRAN
CALC NO 96227-TR-03 REV ~~0~~ 1
ATT. B SHT B63

DBB 1/11/00

ELEVATION LOOKING N-E.

[1e] Sht. 1

ANGLES		
A =		= 44.5°
B =		= 20°
C =	B+D	= 65.5°
D =		= 45.5°
E =	A+C	= 110°

SINES OF ANGLES		
A =	0.701	(1)
B =	0.342	(2)
C =	0.910	(3)
D =	0.713	(4)
E =	0.940	(5)

NEW LOADS: F_{YG} = 7.823 K.

F_{ZL} = 19.91 K.

FORCES ALONG STRUTS

S1 = FZL(1)/(3) = 19.91(0.701)/(0.91) = 15.337 K

S1 = FYG(4)/(3) = 7.823(.713)/(0.91) = 6.130

TOTAL FORCE S1 = 21.467 K

ALTRAN

CALC NO. 96227-TR-03 REV. ~~ϕ~~ 1 ATTACHMENT-B

ATT. B SHEET ~~B~~ B64

altran Calculation Sheet

Calc. No. ~~96227-TR-02~~ By: F4 Date: 1/28/97 Sheet ~~21~~

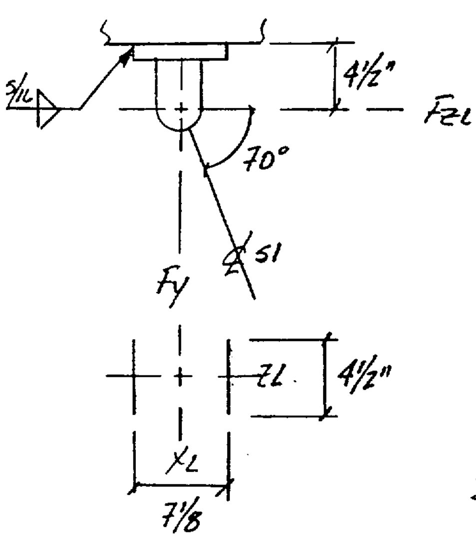
Rev. No. ~~0~~ Chk: PB Date: 1/28/97

MARK NO. 1-GN01-C008/232(Q): D.P. 1455 & 1460

	Reference
S2 = FZL(5)/(3) = 19.91(0.94)/(0.91) = 20.566 K	
FY4(2)/(3) = 7.823(0.342)/(0.91) = 2.940 K	
TOTAL FORCE S2 = 23.506 K	
INSTALLED STRUTS, S1 & S2, ARE BERGEN PATERSON PART 2100, SIZE 28 WITH A NORMAL CAPACITY OF 28 KIPS.	[5]
NEW INTERACTION IR = 23.506/28 = 0.84 .. OK (MAXIMUM.)	

WELD EVALUATION.

THE REAR BRACKET OF S1 IS WELDED TO THE STRUCTURE WITH A 5/16" BOTH SIDES FILLET WELD



S1 = 21.467 K [4][5]

FZL = S1 COS 70 = 7.342 K

Fy = S1 SIN 70 = 20.172 K

$M_{XL} = F_{ZL}(4.5) = 33.04$ in K

$L_W = 2 \times 4.5 = 9$ in

$S_{XL} = 4.5 \times 7.125 = 32.06$ in^2

$$f_R = \left[(7.342/9)^2 + \left(\frac{20.172}{9} + \frac{33.04}{32.06}\right)^2\right]^{1/2}$$

$$= 3.372 \text{ K/in}$$

$$w = \frac{f_R}{.707 F_a} = \frac{3.372}{.707 \times 21} = 0.23''$$

NEW INTERACTION IR = 0.23/0.3125" = 0.73 ... OK

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Calculation Sheet

ALTRAN CALC NO. 96227-TR-03 REV. Φ1 ATTACHMENT-B

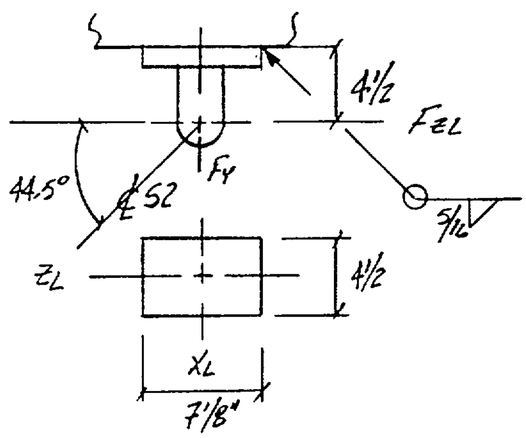
Calc. No. ~~96227-TR-02~~ ATT. B By: ~~FL~~ SHEET B65 Date: 1/28/97 Sheet ~~2/2~~

Rev. No. ~~0~~ Chk: PB Date: 1/28/97

	Reference

MARK NO. 1-GN01-C008/232(Q) : D.P. 1455 & 1460

THE REAR BRACKET OF S2 IS WELDED TO THE STRUCTURE WITH A 5/16" ALL AROUND FILLET WELD.



[4][5]

$S2 = 23.506\ K$

$F_{ZL} = S2 \cos 44.5° = 16.77\ K$

$F_Y = S2 \sin 44.5° = 16.48\ K$

$M_{XL} = F_{ZL}(4.5) = 75.45\ in\,K$

$l_w = (4.5 + 7.125)2 = 23.25\ in$

$S_{XL} = \frac{7.125}{3}(7.125 + 3 \times 4.5) = 48.98\ in^2$

$l_{ZL} = 4.5 \times 2 = 9\ in$

$$f_R = \left[\left(\frac{16.48}{23.25}\right)^2 + \left(\frac{16.77}{9} + \frac{75.45}{48.98}\right)^2\right]^{1/2} = 3.49\ K/in$$

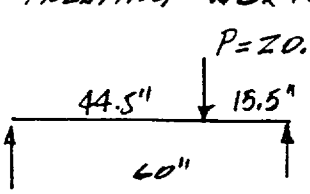
$$W = \frac{f_R}{.707 F_a} = \frac{3.49}{.707 \times 21} = 0.24''$$

NEW INTERACTION $IR = 0.24/0.3125 = 0.75$ ... OK

SUPPLEMENTARY STEEL EVALUATION

[3]

TREATING W8x40 AS A SIMPLY SUPPORTED BEAM.



$$M = \frac{Pab}{L} = \frac{20.172 \times 44.5 \times 15.5}{60}$$

$M = 231.9\ in \cdot K$

$S = 35.5\ in^3$

ALTRAN

CALC NO. 96227-TR-03 REV. ϕ1 ATT. B SHEET B66

Calculation Sheet

ATTACHMENT- B

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Calc. No. ~~96227-TR-02~~ By: F. Yon Date: 1/28/97 Sheet ~~23~~ B8

Rev. No. ~~0~~ Chk: PB Date: 1/28/97

MARK NO. 1-GN01-C008/232 (ϕ): D.P. 1455 & 1460

Reference

$f_b = M/S = 231.9/35.5 = 6.53 \text{ Ksi} < .6 F_y$ OK.

NEW INTERACTION $IR = 6.53/21.6 = 0.3$ OK

WEB CRIPPLING [3]

FOR INTERIOR LOADS.

$$\frac{R}{t(N+2K)} \leq .75 F_y$$

WHERE : $R = 20.172$ K

$t = .375''$

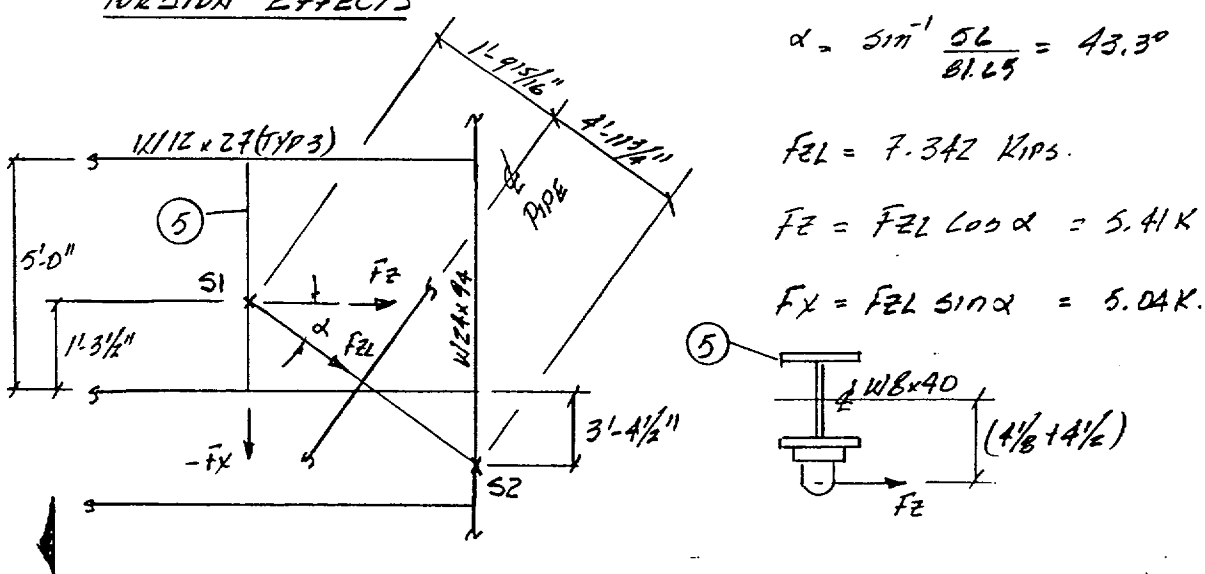
$N = 4.5''$ (CONS.)

$K = 1\frac{1}{16}''$

$$\frac{20.172}{.375(4.5 + 2 \times 1.0625)} = 8.12 \text{ Ksi} < .75 F_y \; (= 27.0 \text{ Ksi})$$

NEW INTERACTION. $IR = 8.12/27.0 = 0.3$ ... OK

TORSION EFFECTS



$\alpha = \sin^{-1} \frac{56}{81.65} = 43.3^\circ$

$F_{ZL} = 7.342$ Kips.

$F_Z = F_{ZL} \cos\alpha = 5.41$ K

$F_X = F_{ZL} \sin\alpha = 5.04$ K.

PLAN @ EL. 2026'-0"

ELEV. LOOKING N.

$T = F_Z (4\frac{1}{8} + 4\frac{1}{2}) = 46.7$ in.K

altran **Calculation Sheet**

ATTACHMENT- B

Calc. No. ~~96227-TR-02~~ By: Hong Date: 1/28/97 Sheet ~~24~~

Rev. No. ~~0~~ Chk: PB Date: 1/28/97

Reference

MARK NO. 1-GN01-C008/232 (Q): DP.1455 & 1460

PER DWG. 1-GN01-C008/232 (Q), REV.6, PAGE 2, ITEM 5 IS ATTACHED TO EXISTING STRUCTURE WITH (4) 3x3x3/8 ANGLES. THIS TYPE OF CONNECTION HAS LIMITED TORSIONAL CAPACITY; THEREFORE, IT IS RECOMMENDED ITEM 5 BE REINFORCED FOR TORSIONAL AND FLANGE LOCAL EFFECTS.

FOOT PRINT LOADS

AT JOINT 1 :
$F_x = F_{2L} \sin\alpha = 5.04$ K.
$F_y = 51 (\sin 70) = 20.172$ K.
$F_z = F_{2L} \cos\alpha = 5.41$ K.
$M_x = F_z (4\tfrac{1}{2}) = 24.35$ in·K
$M_z = F_x (4\tfrac{1}{2}) = 22.68$ in K.

AT JOINT 2 :
$F_x = F_{2L} \sin\alpha = 11.50$ K.
$F_y = 52 (\sin 44.5) = 16.48$ K.
$F_z = F_{2L} \cos\alpha = 12.20$ K.
$M_x = F_z (4\tfrac{1}{2}) = 54.90$ in.K.
$M_z = F_x (4\tfrac{1}{2}) = 51.75$ in K.

ALTRAN
CALC NO. 96227-TR-03 REV. ~~0~~ 1
ATT. B SHEET B67

JB
DSB 12/13/00

Calculation Sheet

altran

A77.13

Calc. No. 96227-TR-03 By: N. Patel Date: 2-13-98 Sheet 568

Rev. No. ϕ 1 Chk: [illegible] Date: 2-16-98

Reference

MARK NO. 1-GN01-R004/242(Q) REV. 5

DATA POINT: 1570

REF. CALC. NO. GN01-12 REV 4 FOR HGR # 0-GN01-R003-252(6) #14

ABOVE REF. CALC ALSO QUALIFIES MARK NO. 0-GN01-R004-242(Q)

LOADS USED TO QUALIFY SUPPORT (PG 2 OF REF CALC)

$F_y = +5680^{\#} / -8320^{\#}$

$F_z = +10650^{\#} / -9440^{\#}$

NEW TOTAL LOADS ARE

$F_x = +1549^{\#} / -4801^{\#}$

$F_z = +4750^{\#} / -7144^{\#}$

NEW TOTAL LOADS ARE SMALLER THAN LOADS USED IN ANALYSIS OF ABOVE REF CALC.

∴ SUPPORT IS ACCEPTABLE FOR NEW LOADS BY COMPARISION WITH ABOVE REF CALC. QUALIFICATION

Calculation Sheet

ATT B

altran

Calc. No. 96227-TR-03 By: N. Patel Date: 2-13-98 Sheet B69

Rev. No. 0 1 Chk: [illegible] Date: 2-16-98

	Reference
MARK NO.: 1-GN01-R012/251(Q) REV. 3	
DATA POINT: 2070	
REF CALC. NO GN01-38 REV. 1 FOR HANGER NO	#14
0-GN01-R012/251(Q)	
NEW TOTAL LOADS	
Fx = ± 813#	
Fy = ± 910#	
LOADS USED IN ABOVE REF CALC FOR ANALYSIS (PG #1)	
Fx = ± 535#	
Fy = ± 755#	
LOAD INCREASE FACTOR (MAX) = $\frac{813}{535}$ = 1.52	
MAX FORCE IN SNUBBER = 957# (PG #1 OF REF CALC)	
NEW MAX. FORCE = 957 x 1.52 = 1455# (CONS)	
SNUBBER CAPACITY = 2000# (LEVEL C / EMER. CON) > 1455#	#18
NEW I.R. = $\frac{1455}{2000}$ = 0.73 < 1 (O.K.)	
REQ'D WELD SIZE (MAX) = 0.03" (PG # 2 OF REF CALC)	
NEW WELD SIZE REQ'D = 0.03 x 1.52 = 0.05" < 0.25"	
IR = $\frac{0.05}{.25}$ = 0.2 < 1 (OK)	
∴ SUPPORT IS OK.	

Calculation Sheet

altran

A77 B

Calc. No. 96227-TR-03 By: N Patel Date: 2-13-98 Sheet B70

Rev. No. ~~0~~ 1 Chk: S Patel Date: 2-16-98

	Reference
MARK NO 1-GN01-R011/251 (Q) REV. 5	
DATA POINT: 2110	
REF CALC NO: GN01-32 REV. 2 FOR HANGER NO.	#14
0-GN01-R011/251 (Q)	
LOADS USED FOR ANALYSIS IN REF CALC. (PG #1)	
$F_Z = \pm 2920^{\#}$	
NEW TOTAL LOADS	
$F_Z = \pm 3452^{\#}$	
SNUBBER CAPACITY	
FOR 3840-6 = $6000^{\#}$ (N&U CASE) > $3452^{\#}$ (O.K)	#18
$I.R = \frac{3452}{6000} = 0.58 < 1$ (O.K)	
LOAD INCREASE FACTOR $= \frac{3452}{2920} = 1.182$	
MEMBER CHECK:	
WORST STRESS MEM. 1 W4X13 (PG 2 OF REF CALC)	
$f_b = 5.08 \times 1.182 = 6$ KSI < 18.6 KSI	
$IR = \frac{6}{18.6} = 0.32 < 1$ (O.K)	
WELD CHECK	
WORST CASE (PG #3 OF REF CALC.)	
TOTAL FORCE/IN = $2.064 \times 1.182 = 2.44$ K/in	
WELD SIZE REQD: $\frac{2.44}{9.24 \times 1.33} = 0.2'' < 0.25''$ (O.K) (EMERG CASE)	
NEW IR: $\frac{.2}{.25} = 0.8 < 1$ (O.K)	
∴ SUPPORT IS O.K.	

altran | **Calculation Sheet**

A77.B

Calc. No. 96227-TR-03 By: N. Patel Date: 2.13.98 Sheet B71

Rev. No. ϕ1 Chk: [illegible] Date: 2.16.98

Reference

MARK NO: 1-GN01-R009/252 (Q) REV. 2

DATA POINT : 2720

REF CALC # GN01-30 REV. 1 FOR HANGER NO — #14

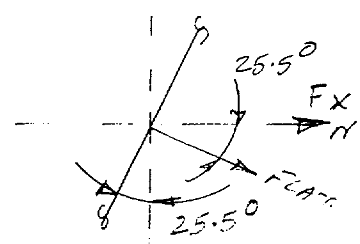
0-GN01-R009/252 (Q)

MAX NEW LOAD : $F_x = 0/-1461^{\#}$

AS PIPE IS NOT IN GLOBAL AXES RESOLVE LOAD

⊥^{ar} TO PIPE AXIS.

$$F_{LAT} = \frac{F_x}{\cos 25.5} = \frac{1461}{\cos 25.5} = 1619^{\#}$$



USE 2000$^{\#}$ (CONS.)

SWAY STRUT FIG 211 SIZE 6 C-C = 61 5/8''

ALLOW. (LEVEL C) = 2250$^{\#}$ > 2000$^{\#}$ — #19

$$IR = \frac{2000}{2250} = 0.89 < 1 \quad (O.K.)$$

LOADS USED FOR ANALYSIS IN ABOVE REF CALC. (PG #1)

$= 1230^{\#}$

$$\text{LOAD INCREASE FACTOR} = \frac{2000}{1230} = 1.63$$

MAX MEM STRESS (REF CALC PG #1)

SHEAR STRESS = 1165 × 1.63 = 1899 PSI < 12400 PSI OK

BENDING STRESS 2000 × 2.05 / 1.34 = 3060 PSI < .6 × 31000 = 18600 PSI (O.K.)

MAX WELD REQ'D (REF CALC. PG #2)

0.0763 × 1.63 = 0.124'' < 0.25'' (O.K.)

∴ SUPPORT IS O.K.

altran

Calculation Sheet

A7-B

Calc. No. 96227-TR-03 By: N. Palit Date: 2-13-98 Sheet E72

Rev. No. ø 1 Chk: [illegible] Date: 2-15-98

	Reference
MARK NO: 1-GN01-H007 (252 (Q)) REV 3	
DATA POINT: 2740	
REF CALC # GN01-22 REV 2 FOR HANGER NO.	# 14
0-GN01-H007/252 (Q)	
LOADS USED FOR ANALYSIS IN ABOVE REF. CALC - (PG #1)	
$F_y = 2640^{\#}$	
NEW LOAD $F_y = 3353^{\#}$	
LOAD INCREASE FACTOR: $\frac{3353}{2640} = 1.27$	
CHECK SWAY STRUT FIG 211 SIZE C C-C = $26\frac{3}{8}''$	
NEW LD $3353^{\#} \angle$ ALLOW. LD $4500^{\#}$ (LEVEL A&B) (CONS)	# 19
$IR = \frac{3353}{4500} = 0.75 \angle 1$ OK.	
CHECK WELD:	
FROM REF. CALC. PG 1 WELD REQ'D: $0.0394''$	
NEW WR = $0.0394 \times 1.27 = 0.05'' \angle 0.25''$ OK.	
CLIP ANGLES WELD CAPACITY PER PG # 4 OF REF CALC.	
$2''$ LG $\frac{1}{4}''$ FILLET WELD = $2 \times 2325 = 4650^{\#}$	
$4650^{\#} >$ TOTAL NEW LOAD $3353^{\#}$ (CONS)	
RATIO: $\frac{3353}{4650} = 0.72 \angle 1$ O.K.	
MEM W6x20	
FOR SIMPLY SUPPORTED $5'0''$ SPAN FOR CONCENTRATED	# 23 ED PG 2-48
LOAD @ CENTER CAPACITY: $\frac{42900}{2} = 21450^{\#} > 3353^{\#}$ (O.K.)	
∴ SUPPORT IS OK	

Mark No. 1-GN01-C017 / 242 (Q) (Rev. 2)
Data Point 1540

Reference: Calculation GN01-35, Hanger Design 0-GN01-C016, Revision 4.

This hanger is a gang hanger with support 1-GN01-C016. A STRUDL program was used to qualify both supports.

The local Z loads (Global Y) in the STRUDL model at Joint 10 are a product of both supports. The loads at Joint 8 are ½ the load produced by support 1-GN01-C017.

Therefore, the total loads analyzed in the above referenced calculation is:

Joint 8 Load = 7.5 kips

Total Load = 7.5 kips x 2 = 15,000 lbs.

The new vertical load with Column Closure Waterhammer = 14,047 lbs.

IR = 14,047 / 15,000 = 0.94 < 1.0 ∴ o.k.

Reference

Mark No. 1-GN01-R013/231(Q) Revision 7
Data Point 1275

Qualification of Pipe Support

Snubber Assembly
Clamp
End Bracket

New Load due to Condensation Induced Waterhammer

= 21,144 lbs.

Vendor Items Qualified to Level 'D' Allowables
Load Capacity Data Sheets (LCD) for part number 2540 size 15 snubber

= 22,100 lbs.

Therefore, IR = 21,144 / 22,100 = 0.957 $\therefore$ Vendor Assembly is Acceptable

Member Stresses as reported in PD STRUDL for the frame.

Maximum Stress = 10,980 psi < 0.6 Sy Therefore, acceptable.

altran

Calculation Sheet

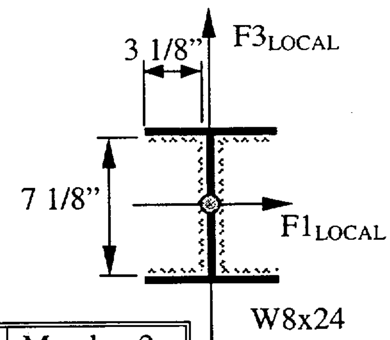
Report No. 96227-TR-03 Rev.: 1 Sheet: B.75

By: J. Brem Date: 9/26/00 Chk: D.G. Gusso Date: 12/13/00

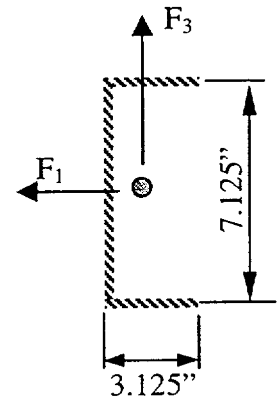
Reference

Mark No. 1-GN01-R013/231(Q) Revision 7
Data Point 1275

Weld Qualification for:
Joint 6
Member 5 Joint 7
Member 2 Joint 3



Loading Condition	Joint 6	Member 5 Joint 7	Member 2 Joint 3
F1 (lbs.)	40*	40*	384
F2 (lbs.)	21,231	29,628	21,280
F3 (lbs.)	20,763	738	40*
M1 (in.–lbs.)	0	60,581	2,577
M2 (in.–lbs.)	2403	3*	10*
M3 (in.–lbs.)	2577	0	0



Above loads are results from PD STRUDL
* Negligible loads that are not included in the analysis.

For analysis purposes will use ½ the loading with ½ of the weld configuration.

Weld for Member Joint 6 & Member 2 Joint 3

$A = 7.125 + 2\,(3.125) = 13.375"$ $C_1 = 7.125 / 2 = 3.56$ in.

$Z_1 = 7.125\,(7.125 + 6 \times 3.125) / 6 = 30.73\ in^2$ $C_3 = (3.125)^2 / (7.125 + 2 \times 3.125) = .73$ in.

$$I_3 = \frac{(3.125)^3 \times (2 \times 7.125 + 3.125)}{3 \times (7.125 + 2 \times 3.125)} = 13.215\ in^3$$

$Cp = 3.125 - (3.125)^2 / (7.125 + 2 \times 3.125) = 2.395$ in.

$J = (2 \times 3.125 + 7.125)^3 / 12 - (3.125)^2 \times (3.125 + 7.125)^2 / (2 \times 3.125 + 7.125) = 122.7\ in^3$

$f_1 = (\{10{,}616 / 13.375\} + 1{,}285 / \{13.215 / 2.395\}) = 1{,}027$ lbs./in.

$f_2 = 1{,}202 / (122.7 / 3.56) = 35$ lbs./in.

$f_3 = (\{10{,}381 / 13.375\} + \{1{,}202 / [122.7 / .73]) = 784$ lbs./in.

$f_R = [(1{,}027)^2 + (35)^2 + (784)^2]^{1/2} = 1{,}293$ lbs./in.

Weld = 1,293 / 14,400 = 0.09" < 0.25   Therefore , Acceptable.

Reference

Mark No. 1-GN01-R013/231(Q) Revision 7
Data Point 1275

For analysis purposes will use ½ the loading with ½ of the weld configuration.

Weld for Member 5 Joint 7

$A = 7.125 + 2\ (3.125) = 13.375"$ $\qquad C_1 = 7.125 / 2 = 3.56$ in.

$Z_1 = 7.125\ (7.125 + 6 \times 3.125) / 6 = 30.73\ \text{in}^2$ $\qquad C_3 = (3.125)^2 / (7.125 + 2 \times 3.125) = .73$ in.

$$I_3 = \frac{(3.125)^3 \times (2 \times 7.125 + 3.125)}{3 \times (7.125 + 2 \times 3.125)} = 13.215\ \text{in}^3$$

$Cp = 3.125 - (3.125)^2 / (7.125 + 2 \times 3.125) = 2.395$ in.

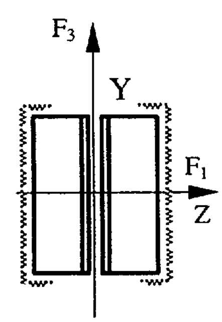
$J = (2 \times 3.125 + 7.125)^3 / 12 - (3.125)^2 \times (3.125 + 7.125)^2 / (2 \times 3.125 + 7.125) = 122.7\ \text{in}^3$

$f_R = (\{14{,}814 / 13.375\} + (30{,}290 / 30.73) = 2093$ lbs./in.

Weld = 2093 / 14,400 = 0.145" < 0.25 Therefore , Acceptable.

Weld Qualification for
Member 3 Joint 4
Member 4 Joint 5

Loading Condition	Member 3 Joint 4	Member 4 Joint 5
F1 (lbs.)	152	231
F2 (lbs.)	17*	23*
F3 (lbs.)	9,204	12,257
M1 (in.–lbs.)	0	0
M2 (in.–lbs.)	0	0
M3 (in.–lbs.)	2,936	3,837



Angle 3x3x 3/8

Above loads are results from PD STRUDL
* Negligible loads that are not included in the analysis.

The weld of Item # 6 (clip angles) to Item # 4 (W8x40) is acceptable based on this evaluation.

altran — Calculation Sheet

Report No. 96227-TR-03 Rev.: 1 Sheet: B.77

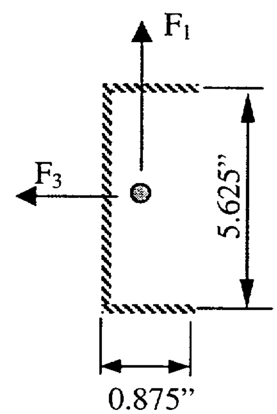
By: J.Brem Date: 9/26/00 Chk: D.G.Gusso Date: 12/13/00

Reference

Mark No. 1-GN01-R013/231(Q) Revision 7
Data Point 1275

For analysis purposes will use ½ the loading with ½ of the weld configuration.

Weld for Member 3 Joint 4 & Member 4 Joint 5 (Angle to W section)



$A = 5.625 + 2\ (0.875) = 7.375"$

$Z_1 = 5.625\ (5.625 + 6 \times 0.875) / 6 = 10.2\ in^2$

$$I_3 = \frac{(0.875)^3 \times (2 \times 5.625 + 0.875)}{3 \times (5.625 + 2 \times 0.875)} = 0.37\ in^3$$

$C_1 = 5.625 / 2 = 2.8125$ in.

$C_3 = (0.875)^2 / (5.625 + 2 \times 0.875) = 0.104$ in.

$C_P = 0.875 - 0.104 = 0.771$ in.

$f_1 = (\{1{,}919 / (0.37 / 0.771)\} = 3{,}999$ lbs./in.

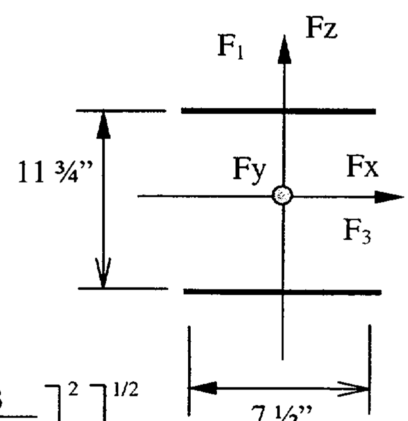
$f_2 = 116 / (7.375) = 16$ lbs./in.

$f_3 = 6{,}129 / (7.375) = 831$ lbs./in.

$f_R = [(3{,}999)^2 + (16)^2 + (831)^2]^{1/2} = 4{,}084$ lbs./in.

Weld = 4.084 / 14.400(4/3) = 0.2127" < 0.25 Therefore . Acceptable. (Faulted Allowable)

Weld for Member Item #7, PL ¾ x 7 ½ x 11 ¾
Use loads from Joint 6



A = 7 ½ x 2 = 15" C_1 = 7 ½ / 2 = 3.75 in.

Z_3 = (7 ½)^2 / 3 = 18.75 in^2 C_3 = 11 ¾ / 2 = 5.875 in.

Z_1 = (7 ½) x (11 ¾) = 88.125 in^2

$$J = \frac{(7\tfrac{1}{2}) \times [3 \times (11\tfrac{3}{4})^2 + (7\tfrac{1}{2})^2]}{6} = 588\ in^3$$

$$f = \left[\left[\frac{21{,}231}{15} + \frac{2{,}577}{88.125}\right]^2 + \left[\frac{2{,}403}{588 / 3.75}\right]^2 + \left[\frac{20{,}763}{15} + \frac{2{,}403}{588 / 5.875}\right]^2\right]^{1/2}$$

f = 2,017 lbs./in.

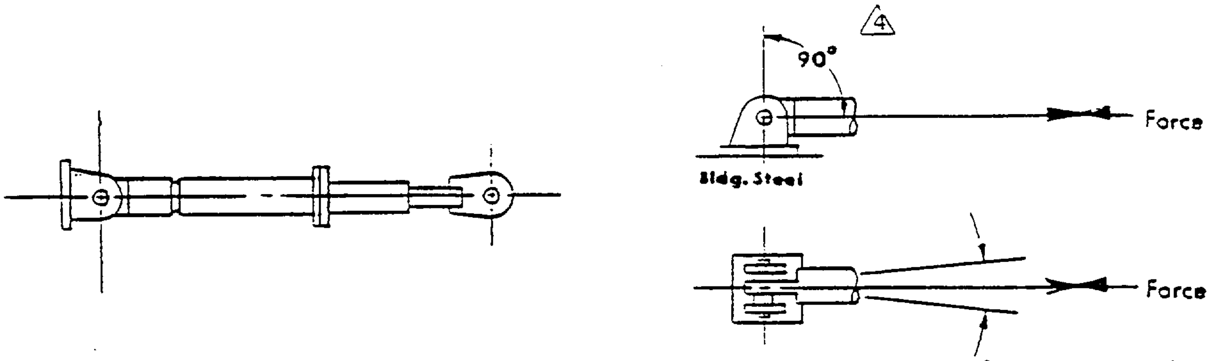
Weld = 2,017 / 14,400 = 0.14" < 0.25 Therefore , Acceptable.

The weld of snubber end bracket to Item # 5 (Bill of Material) (W8x24) is acceptable based on this evaluation.

Form BP-NF6

LOAD CAPACITY DATA SHEET
for
NUCLEAR POWER PLANT COMPONENT STANDARD SUPPORTS

STRUT ASSEMBLY WITH MSA BY PS CO. 4



DIRECTION OF LOADING

DESIGNED BY: Linear Analysis

LOAD RATING (lbs.) Cl. 1, 2, 3, & MC

TEMPERATURE 300 °F

SIZE	STRUT LENGTH *	OPERATING CONDITIONS LEVEL A & B NORMAL & UPSET	LEVEL C EMERGENCY 3	LEVEL D FAULTED 3
0.35	5'- 6"	350	450	500
0.65	5'- 6"	650	850	850
1.5	6'- 5"	1500	2000	2100
6	5'- 0"	6000	8000	9000
15	4'- 6"	15000	20000	22100
50	12'- 9"	50000	66600	72400
120	9'-10"	120000	160000	160000

*Maximum strut length for rated loads shown with transverse acceleration ≤ 1G. For greater lengths, see Load Chart Sheet 2.

REV.
4 Material & Graph 6/15/81
3 Mat'L. Address, Level C&D Loads 9/24/78

REV.
2 CRN, Mat'l, P to P, Des & Emer Lds 5-12-78
1 Change Des. Temp to 300°F 9-2-76
1 Note Transverse Acceleration

ORIG. ISSUE 5-27-76

Materials: 4
Plate: SA36
Rod: SA36
Pipe: SA106 Gr. B
Pin: SA564 Ty. 630
Bolts: A574 (Code Case N71)
Mechanical Snubber: Pacific

Stress calculations or test data for this product were performed in accordance with: A.S.M.E. SECTION III - SUBSECTION NF COMPONENT SUPPORTS (date of issue 7-1-77) and are on file at:

BERGEN-PATERSON PIPESUPPORT CORPORATION LACONIA, NEW HAMPSHIRE 03246 U.S.A.

Control Ref. No. 2540

SEAL 5/27/76 SIGNED

BERGEN-PATERSON PIPESUPPORT CORP. LOAD CAPACITY DATA SHEET

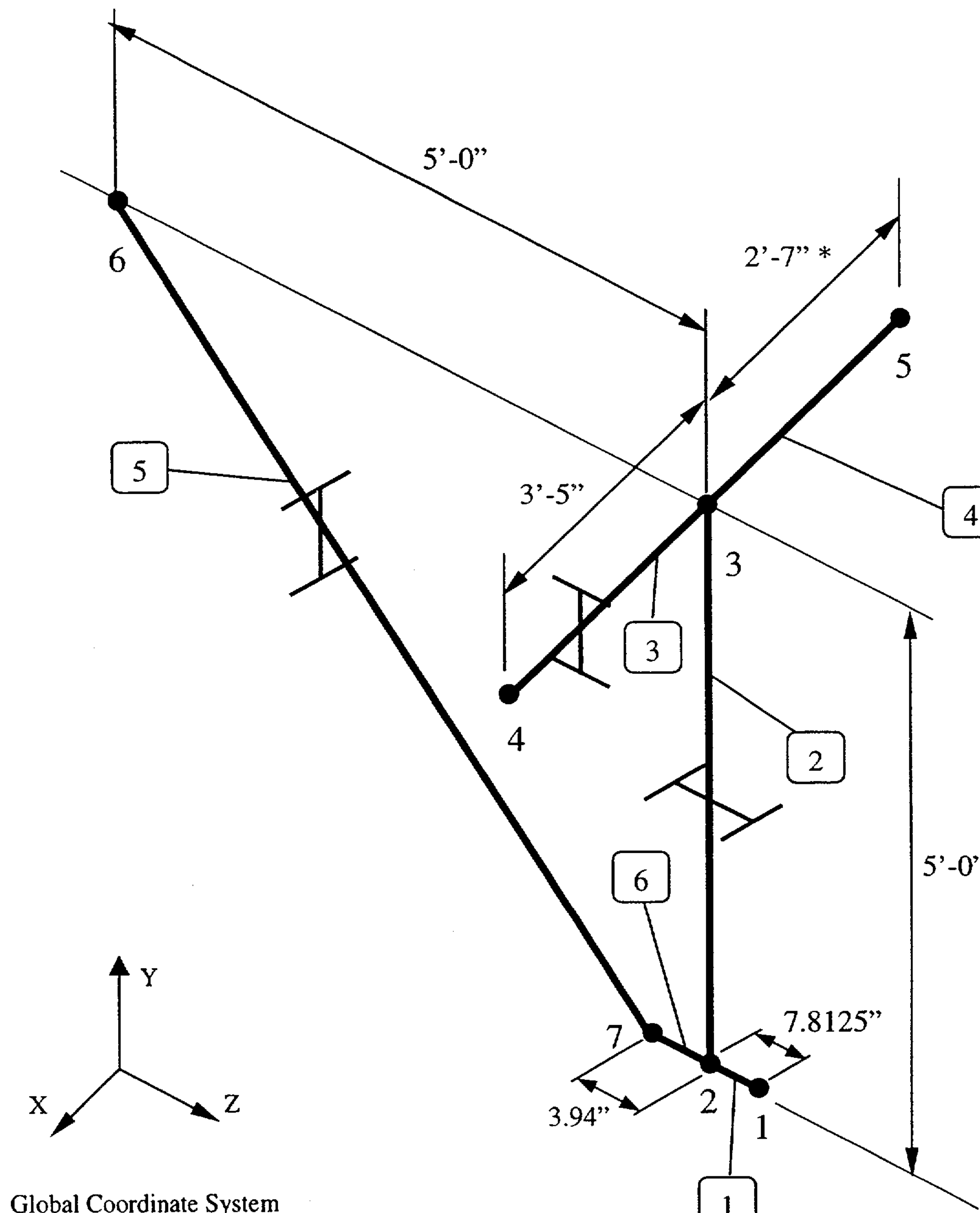
SHEET 1 OF 2 REV. 4 PART NO. 2540

altran

Calculation Sheet

Report No. 96227-TR-03 Rev.: 1 Sheet: B.79

By: J. Brem Date: 9/26/00 Chk: D. Gusso Date: 12/13/00



PD STRUDL Stick Model
for Pipe Support 1-GN01-R013

* Actual dimension is 1'-7". The 2'-7" dimension is acceptable since its conservative.

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         PPPPPPPPP  DDDDDDDDDD        SSSSSSSSSSS TTTTTTTTTT RRRRRRRRRR  UU       UU DDDDDDDDDD  LL
        PPPPPPPPPPP DDDDDDDDDDD      SSSSSSSSSSS TTTTTTTTTT RRRRRRRRRRR UU       UU DDDDDDDDDDD LL
       PP       PP DD       DD      SS              TT     RR       RR UU       UU DD       DD LL
      PP       PP DD       DD      SS              TT     RR       RR UU       UU DD       DD LL
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    PPPPPPPPPP  DD       DD HHHHHH SSSSSSSSSSS       TT     RRRRRRRRRR  UU       UU DD       DD LL
   PP         DD       DD                SS       TT     RRRRR       UU       UU DD       DD LL
  PP         DD       DD                SS       TT     RR    RR    UU       UU DD       DD LL
 PP         DDDDDDDDDDD       SSSSSSSSSSS       TT     RR      RR   UUUUUUUUUUU DDDDDDDDDDD LLLLLLLLLLL
PP         DDDDDDDDDD        SSSSSSSSSSS       TT     RR        RR UUUUUUUUUUU DDDDDDDDDD  LLLLLLLLLL
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*****************************************************************
*                                                               *
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ALTRAN CORPORATION
IS AUTHORIZED BY PHI-DELTA TO USE PD-STRUDL AT THE ESTABLISHED RATE OF PROGRAM SURCHARGE.

ACCOUNT .... lebbi
PASSWORD .... PDELTA-STRUDL
JOB LOG NO 00000531
JOB STARTED AT ... 02-OCT-2000 10:56:45.00

```
STRUDL '1-GN01-R013'
$
$
$       1-GN01-R013/231Q NODE 1275
$       *START OF DATA FOR HAN R013 'HANGER 013' SHIFT UNIT FEET DEGREE -
$       TRA X 0 Y 0 Z 0 ROT R2 0
$
$       DATE:   09/29/00        ORIGINATOR: J. BREM
$       DATE:   10/04/00        CHECKER   : D. GUSSO
$
TYPE SPACE FRAME
UNIT INCHES
JOINT COORDINATES
1        0.0   0.0   7.8125
2        0.0   0.0   0.0
3        0.0  60.0   0.0
4       41.0  60.0   0.0  S
5      -31.0  60.0   0.0  S
6        0.0  60.0 -60.0  S
7        0.0   0.0  -3.94
$
UNIT INCH POUND DEGREE
$
MEMBER INCIDENCES
1       1       2
2       2       3
3       3       4
4       5       3
5       7       6
6       2       7
$
MEMBER RELEASE
3 END MOM X Z
4 START MOM X Z
5 END MOM Z
$
MEMBER PROPERTIES PRISMATIC
1 6 PRIS  AX 10.0  AY 10.0  AZ 10.0  IX 100.0  IY 100.0  IZ 100.0
MEMBER PROPERTIES
2   TABLE 'STEELW' 'W8X24'
3 4 TABLE 'STEELW' 'W8X40'
5   TABLE 'STEELW' 'W8X24'
$
$-----------------DEFINE MATERIAL PROPERTIES AS REQUIRED----------------
CONSTANTS
E       29.0E6  ALL
G       11.15E6 ALL
DENS    0.283   ALL BUT 0.001 MEM 1 6
POISSON 0.3     ALL
BETA 0.0        ALL
$
ACTIVE JOINTS ALL
ACTIVE MEMBERS ALL
$
UNITS INCHES DEGREES POUND
LOADING '1'
```

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```
JOINT LOAD
1 FORCE Z 21144
DEAD LOAD COMP GLOBAL Y -1.0
LOADING '2'
JOINT LOAD
1 FORCE Z -21144
DEAD LOAD COMP GLOBAL Y -1.0
$
UNITS POUNDS
$
QUERY
```

****
* RESULTS OF LATEST QUERY *
****

JOB ID - 1-GN01-R JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

NUMBER OF JOINTS	: TOTAL	7 ACTIVE	7 INACTIVE	0
NUMBER OF MEMBERS	: TOTAL	6 ACTIVE	6 INACTIVE	0
NUMBER OF FINITE ELEMENTS	: TOTAL	0 ACTIVE	0 INACTIVE	0
NUMBER OF SUBSTRUCTURES	: TOTAL	0 ACTIVE	0 INACTIVE	0
NUMBER OF INDEPENDENT LOADS	: TOTAL	2 ACTIVE	2 INACTIVE	0
NUMBER OF DEPENDENT LOADS	: TOTAL	0 ACTIVE	0 INACTIVE	0
NUMBER OF DYNAMIC LOADS	: TOTAL	0 ACTIVE	0 INACTIVE	0

LIMIT ON MAXIMUM NUMBER OF JOINTS : 3000
MEMBERS AND ELEMENTS : 6000
LOADINGS : 500
INPUT MODE IS : ADDITION
SCAN MODE IS : OFF

PRINT STRUCTURAL DATA

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****
* PROBLEM DATA FROM INTERNAL STORAGE *
****

JOB ID - 1-GN01-R JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

********** STRUCTURAL DATA **********

JOINT COORDINATES----------------------------------/-CONDITION-/--STATUS--/

JOINT	X	Y	Z	CONDITION	STATUS
1	0.000	0.000	7.813		ACTIVE
2	0.000	0.000	0.000		ACTIVE
3	0.000	60.000	0.000		ACTIVE
4	41.000	60.000	0.000	SUPPORT	ACTIVE
5	-31.000	60.000	0.000	SUPPORT	ACTIVE
6	0.000	60.000	-60.000	SUPPORT	ACTIVE
7	0.000	0.000	-3.940		ACTIVE

JOINT RELEASES------------------------------------/ELASTIC SUPPORT RELEASES--/

JOINT	FORCE	MOMENT	THETA 1	THETA 2	THETA 3	KFX	KFY	KFZ	KMX	KMY	KMZ

MEMBER INCIDENCES----------/ LENGTH PROJECTIONS ON GLOBAL AXES----/ RELEASES---------------------/ STATUS--/

MEMBER	START	END	LENGTH	X	Y	Z	START FORCE	START MOMENT	END FORCE	END MOMENT	STATUS		
1	1	2	7.813	0.000	0.000	-7.813					ACTIVE	SPACE	FRAME
2	2	3	60.000	0.000	60.000	0.000					ACTIVE	SPACE	FRAME
3	3	4	41.000	41.000	0.000	0.000			X	Z	ACTIVE	SPACE	FRAME
4	5	3	31.000	31.000	0.000	0.000	X	Z			ACTIVE	SPACE	FRAME
5	7	6	82.114	0.000	60.000	-56.060				Z	ACTIVE	SPACE	FRAME
6	2	7	3.940	0.000	0.000	-3.940					ACTIVE	SPACE	FRAME

ELEMENT INCIDENCES--/

ELEMENT NODES

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MEMBER PROPERTIES---/

MEM/SEG,LEN	TYPE / TABLE	AX	AY / YD / FLTK	AZ / ZD / WBTK	IX / OD / RY	IY / ID / RZ	IZ / SFX	SY / RAD	SZ / ALP	YC / TYP	ZC / SPA	EY / GEN	EZ / IYZ
1	PRISMATIC	10.000	10.000	10.000	100.000	100.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000
			0.000	0.000	0.000	0.000	0.000	0.000	0.000	NON-STD	0.000	YES	0.000
			0.000	0.000	0.000	0.000							
2	TABLE	7.060	1.943	3.449	0.343	18.200	82.500	5.610	20.800	3.965	3.250	0.000	0.000
	STEELW W8X24		7.930	6.500	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
			0.398	0.245	1.610	3.420							
3	TABLE	11.800	3.011	6.009	1.120	49.000	146.000	12.100	35.500	4.125	4.038	0.000	0.000
	STEELW W8X40		8.250	8.077	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
			0.558	0.365	2.040	3.530							
4	TABLE	11.800	3.011	6.009	1.120	49.000	146.000	12.100	35.500	4.125	4.038	0.000	0.000
	STEELW W8X40		8.250	8.077	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
			0.558	0.365	2.040	3.530							
5	TABLE	7.060	1.943	3.449	0.343	18.200	82.500	5.610	20.800	3.965	3.250	0.000	0.000
	STEELW W8X24		7.930	6.500	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
			0.398	0.245	1.610	3.420							
6	PRISMATIC	10.000	10.000	10.000	100.000	100.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000
			0.000	0.000	0.000	0.000	0.000	0.000	0.000	NON-STD	0.000	YES	0.000
			0.000	0.000	0.000	0.000							

MEMBER CONSTANTS---/

CONSTANT	STANDARD VALUE	DOMAIN,	VALUE	MEMBER LIST
E	0.290000E+08	ALL		
G	0.111500E+08	ALL		
CTE	0.650000E-05	ALL		
DENSITY	0.283000E+00	ALL BUT	0.100000E-02	1 6
POISSON	0.300000E+00	ALL		
FYLD	0.360000E+05	ALL		
BETA	0.100000E-19	ALL		
CBETA	0.000000E+00	ALL		
FULT	0.600000E+05	ALL		

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* PHI-DELTA S * NONE GIVEN

EC	0.280000E+08	ALL
FYLDH	0.300000E+05	ALL
SC	0.150000E+05	ALL
SH	0.150000E+05	ALL
FULTH	0.500000E+05	ALL

```
*****************************************
*  END OF DATA FROM  INTERNAL STORAGE  *
*****************************************
```

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PRINT LOADING DATA

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```
****************************************
* PROBLEM DATA FROM INTERNAL STORAGE *
****************************************

JOB ID -    1-GN01-R       JOB TITLE - NONE GIVEN

ACTIVE UNITS -  LENGTH        WEIGHT        ANGLE       TEMPERATURE      TIME          MASS
                  INCH          LBF           DEG           FAH           SEC           LBM


         ********** LOADING DATA **********


LOADING - 1                                                                           STATUS - ACTIVE

/----------NON-SELECTIVE DEAD LOAD COMPONENTS GIVEN----------/

 COMPONENTS : X    0.0000 Y  -1.0000 Z    0.0000  BY  JOINTS    GLOBAL

MEMBER AND ELEMENT LOADS------------------------------------------------------------------------------------------/
MEMBER/ELEMENT

JOINT LOADS------------------------------------------/ ------------------------------------/
JOINT      STEP    FORCE X           Y           Z        MOMENT X           Y           Z
1                      0.000         0.000   21144.000           0.000       0.000       0.000

JOINT DISPLACEMENTS----------------------------------/ ------------------------------------/
JOINT      STEP    DISP. X           Y           Z        ROT.   X           Y           Z

JOINT FORCE ASSUMPTIONS ------------------------------------------------------------------------------------------/

JOINT      THETA  1         2         3      FORCE X           Y           Z       MOMENT X           Y           Z
NO ASSUMPTIONS GIVEN FOR THIS LOADING


MEMBER FORCE ASSUMPTIONS ----------------------/    ----------------------------------/

MEMBER        COMPONENT    DISTANCE      VALUE          COMPONENT    DISTANCE      VALUE
NO ASSUMPTIONS GIVEN FOR THIS LOADING


LOADING - 2                                                                           STATUS - ACTIVE
```

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```
/----------NON-SELECTIVE DEAD LOAD COMPONENTS GIVEN----------/

 COMPONENTS : X    0.0000 Y  -1.0000 Z    0.0000  BY  JOINTS   GLOBAL


MEMBER AND ELEMENT LOADS-----------------------------------------------------------------------------------------------/
MEMBER/ELEMENT

JOINT LOADS------------------------------------------/ ------------------------------------/
JOINT      STEP    FORCE X           Y           Z      MOMENT X           Y           Z
1                      0.000        0.000  -21144.000         0.000        0.000        0.000

JOINT DISPLACEMENTS----------------------------------/ ------------------------------------/
JOINT      STEP    DISP. X           Y           Z      ROT.   X           Y           Z


JOINT FORCE ASSUMPTIONS -----------------------------------------------------------------------------------------/

JOINT      THETA  1         2         3     FORCE X           Y           Z      MOMENT X           Y           Z
NO ASSUMPTIONS GIVEN FOR THIS LOADING


MEMBER FORCE ASSUMPTIONS ----------------------/    ----------------------------------/

MEMBER        COMPONENT   DISTANCE    VALUE          COMPONENT   DISTANCE     VALUE
NO ASSUMPTIONS GIVEN FOR THIS LOADING

****************************************
*  END OF DATA FROM  INTERNAL STORAGE  *
****************************************
```

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```
$
LOAD LIST ALL
$
STIFFNESS ANALYSIS REDUCE BANDWIDTH

BANDWIDTH USING INITIAL JOINT NUMBERING :

THE MAXIMUM BANDWIDTH IS     2 AND OCCURS AT JOINT 7
THE AVERAGE BANDWIDTH IS                        1.000
THE STANDARD DEVIATION OF THE BANDWIDTH IS      0.816

BANDWIDTH AFTER INTERNALLY RENUMBERING STRUCTURE :

THE MAXIMUM BANDWIDTH IS     2 AND OCCURS AT JOINT 2
THE AVERAGE BANDWIDTH IS                        0.750
THE STANDARD DEVIATION OF THE BANDWIDTH IS      0.957

**********************************************************
* TOTAL DEAD WEIGHT OF STRUCTURE =  0.524495378D+03 LBF  *
**********************************************************

$
OUTPUT BY JOINTS
OUTPUT DECIMAL 3
LIST DISPLACEMENT JOINTS 1
```

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****
RESULTS OF LATEST ANALYSIS
****

JOB ID - 1-GN01-R JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

JOINT DISPLACEMENTS - SUPPORTS

JOINT	LOADING	X DISP	Y DISP	Z DISP	X ROT	Y ROT	Z ROT

JOINT DISPLACEMENTS - FREE JOINTS

JOINT	LOADING	X DISP	Y DISP	Z DISP	X ROT	Y ROT	Z ROT
1	GLOBAL						
	1	0.017	0.057	0.075	-0.020	0.008	0.014
	2	-0.017	-0.058	-0.077	0.022	-0.009	-0.015

THE MAXIMUM DISPLACEMENT VALUES ARE AS FOLLOWS :

VALUE FOR X TRANS. IS = -0.0173260 AND IT OCCURS AT JOINT 1 FOR LOADING 2
VALUE FOR Y TRANS. IS = -0.0583370 AND IT OCCURS AT JOINT 1 FOR LOADING 2
VALUE FOR Z TRANS. IS = -0.0767362 AND IT OCCURS AT JOINT 1 FOR LOADING 2
VALUE FOR X ROT. IS = 0.0215963 AND IT OCCURS AT JOINT 1 FOR LOADING 2
VALUE FOR Y ROT. IS = -0.0086039 AND IT OCCURS AT JOINT 1 FOR LOADING 2
VALUE FOR Z ROT. IS = -0.0148378 AND IT OCCURS AT JOINT 1 FOR LOADING 2

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```
$
OUTPUT BY MEMBER
OUTPUT DECIMAL 3
LIST REACTIONS ALL
```

****
RESULTS OF LATEST ANALYSIS
****

JOB ID - 1-GN01-R JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

REACTIONS AT SUPPORT JOINTS

JOINT		LOADING	FORCES X FORCE	FORCES Y FORCE	FORCES Z FORCE	MOMENTS X MOMENT	MOMENTS Y MOMENT	MOMENTS Z MOMENT
4	GLOBAL							
		1	16.805	-8864.052	-151.631	0.000	-2917.809	0.000
		2	-17.316	9272.766	152.594	0.000	2936.366	0.000
5	GLOBAL							
		1	22.226	-11842.865	-229.731	0.000	3812.945	0.000
		2	-22.902	12308.315	231.201	0.000	-3837.304	0.000
6	GLOBAL							
		1	-39.030	21231.414	-20762.639	0.000	-2332.172	-2500.500
		2	40.218	-21056.586	20760.205	0.000	2403.131	2576.581

THE MAXIMUM REACTION VALUES ARE AS FOLLOWS :

VALUE FOR X FORCE IS = 40.2175941 AND IT OCCURS AT JOINT 6 FOR LOADING 2
VALUE FOR Y FORCE IS = 21231.4140625 AND IT OCCURS AT JOINT 6 FOR LOADING 1
VALUE FOR Z FORCE IS = -20762.6386719 AND IT OCCURS AT JOINT 6 FOR LOADING 1
VALUE FOR Y MOMENT IS = -3837.3041992 AND IT OCCURS AT JOINT 5 FOR LOADING 2
VALUE FOR Z MOMENT IS = 2576.5812988 AND IT OCCURS AT JOINT 6 FOR LOADING 2

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```
$
LIST FORCES ALL MEMBERS
```

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****
RESULTS OF LATEST ANALYSIS
****

JOB ID - 1-GN01-R JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

MEMBER FORCES

MEMBER	LOADING	JOINT	AXIAL (FORCES)	SHEAR Y (FORCES)	SHEAR Z (FORCES)	TORSION(CG) (MOMENTS)	MOMENT Y (MOMENTS)	MOMENT Z (MOMENTS)
1								
	1	1	-21144.000	-0.039	0.000	0.000	0.000	0.000
		2	21144.000	0.039	0.000	0.000	0.000	-0.305
	2	1	21144.000	-0.039	0.000	0.000	0.000	0.000
		2	-21144.000	0.039	0.000	0.000	0.000	-0.305
2								
	1	2	21007.295	39.030	381.362	9.640	-22881.701	-158.689
		3	-21007.295	-39.030	-381.362	-9.640	0.000	2500.500
	2	2	-21280.705	-40.218	-383.795	-9.924	23027.703	163.526
		3	21280.705	40.218	383.795	9.924	0.000	-2576.581
3								
	1	3	-16.805	8932.510	151.631	0.000	-3299.064	366232.906
		4	16.805	-8932.510	-151.631	0.000	-2917.809	0.000
	2	3	17.316	-9204.308	-152.594	0.000	3319.997	-377376.625
		4	-17.316	9204.308	152.594	0.000	2936.366	0.000
4								
	1	5	22.226	-11894.626	-229.731	0.000	3812.945	0.000
		3	-22.226	11894.626	229.731	0.000	3308.704	-368733.406
	2	5	-22.902	12256.555	231.201	0.000	-3837.304	0.000
		3	22.902	-12256.555	-231.201	0.000	-3329.922	379953.188
5								
	1	7	-29628.490	732.199	39.030	-3.017	214.358	60123.891
		6	29628.490	-732.199	-39.030	3.017	-3419.287	0.000
	2	7	29618.963	-737.771	-40.218	3.109	-220.891	-60581.422
		6	-29618.963	737.771	40.218	-3.109	3523.323	0.000
6								
	1	2	-20762.639	-21067.332	39.030	-158.689	-9.640	-22881.396
		7	20762.639	21067.332	-39.030	158.689	-144.139	-60123.891
	2	2	20760.205	21220.668	-40.218	163.526	9.924	23028.010
		7	-20760.205	-21220.668	40.218	-163.526	148.533	60581.422

THE MAXIMUM MEMBER FORCE VALUES ARE AS FOLLOWS :

VALUE FOR AXIAL IS = -29628.4902344 AND IT OCCURS IN MEMBER 5 AT JOINT 7 FOR LOADING 1

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```
VALUE FOR SHEAR Y  IS =    21220.6679688 AND IT OCCURS IN MEMBER 6    AT JOINT 2    FOR LOADING 2
VALUE FOR SHEAR Z  IS =     -383.7950745 AND IT OCCURS IN MEMBER 2    AT JOINT 2    FOR LOADING 2
VALUE FOR TORSION  IS =      163.5256653 AND IT OCCURS IN MEMBER 6    AT JOINT 2    FOR LOADING 2
VALUE FOR BEND. Y  IS =    23027.7031250 AND IT OCCURS IN MEMBER 2    AT JOINT 2    FOR LOADING 2
VALUE FOR BEND. Z  IS =   379953.1875000 AND IT OCCURS IN MEMBER 4    AT JOINT 3    FOR LOADING 2
```

```
$
SECTIONS FR NS 2 0. 1.
$
LIST SECTION STRESS 2 3 4 5
```

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****
RESULTS OF LATEST ANALYSIS
****

JOB ID - 1-GN01-R JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

INTERNAL MEMBER RESULTS - SECTIONAL STRESSES

***** MEMBER 2 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING 1							
0.000FR	-2975.538	-20.089	-110.561	4078.735	7.629	4086.364	-7061.902
1.000FR	-2975.538	-20.089	-110.561	0.000	120.216	120.216	-3095.754
LOADING 2							
0.000FR	3014.265	20.700	111.267	4104.760	7.862	4112.622	7126.886
1.000FR	3014.265	20.700	111.267	0.000	123.874	123.874	3138.139

***** MEMBER 3 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING 1							
0.000FR	1.424	-2966.379	-25.233	272.650	10316.420	10589.070	10590.494
1.000FR	1.424	-2966.379	-25.233	241.141	0.000	241.141	242.565
LOADING 2							
0.000FR	-1.467	3056.640	25.393	274.380	10630.327	10904.707	-10906.175
1.000FR	-1.467	3056.640	25.393	242.675	0.000	242.675	-244.142

***** MEMBER 4 ***** SECTION STRESSES

!- DISTANCE --!------------------------------ STRESS ------------------------------!

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FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
	LOADING 1						
0.000FR	-1.884	3950.063	38.229	315.119	0.000	315.119	-317.003
1.000FR	-1.884	3950.063	38.229	273.447	10386.856	10660.303	-10662.187
	LOADING 2						
0.000FR	1.941	-4070.255	-38.474	317.133	0.000	317.133	319.073
1.000FR	1.941	-4070.255	-38.474	275.200	10702.906	10978.106	10980.047

***** MEMBER 5 ***** SECTION STRESSES

DISTANCE FROM START	STRESS						
	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
	LOADING 1						
0.000FR	4196.670	-376.869	-11.315	38.210	2890.573	2928.783	7125.454
1.000FR	4196.670	-376.869	-11.315	609.498	0.000	609.498	4806.169
	LOADING 2						
0.000FR	-4195.321	379.737	11.660	39.375	2912.570	2951.945	-7147.266
1.000FR	-4195.321	379.737	11.660	628.043	0.000	628.043	-4823.364

OVERALL MAXIMUM STRESSES OCCUR AS FOLLOWS

STRESS			APPEARING IN MEMBER	AT SECTION	FOR LOAD	OPTION
MAXIMUM AXIAL STRESS	=	4196.67041	5	82.1141	1	2
MAXIMUM SHEAR Y STRESS	=	-4070.25464	4	31.0000	2	2
MAXIMUM SHEAR Z STRESS	=	111.26656	2	60.0000	2	2
MAXIMUM Y BENDING TENSION	=	4104.75977	2	0.0000	2	2
MAXIMUM Z BENDING TENSION	=	10702.90625	4	31.0000	2	2
MAXIMUM Y BENDING COMPRESSION	=	-4104.75977	2	0.0000	2	2
MAXIMUM Z BENDING COMPRESSION	=	-10702.90625	4	31.0000	2	2
MAXIMUM COMBINED BENDING TENSION	=	10978.10645	4	31.0000	2	2
MAXIMUM COMB. BEND. COMPRESSION	=	10978.10645	4	31.0000	2	2
MAXIMUM ABS. COMBINED BENDING	=	10978.10645	4	31.0000	2	2
MAXIMUM COMB. AXIAL AND BENDING	=	10980.04688	4	31.0000	2	2

WHERE,

OPTION=1 - SECTION IS UNSYMMETRIC AND ITS 'TYPE' IS NOT KNOWN. BENDING Y AND Z MAY NOT BE COMBINED AND FURTHERMORE BENDING STRESSES MAY NOT BE COMBINED WITH AXIAL STRESSES.
2 - BENDING Y IS COMBINED WITH BENDING Z BY TAKING SIGN OF STRESSES (COMPRESSION OR TENSION) INTO ACCOUNT.

ALSO COMBINED BENDING STRESS IS FURTHER COMBINED WITH AXIAL STRESS WITH PROPER SIGNS.

LIST MAXIMUM STRESS 2 3 4 5

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****
RESULTS OF LATEST ANALYSIS
****

JOB ID - 1-GN01-R JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

INTERNAL MEMBER RESULTS - MAXIMUM STRESSES

MEMBER	BEND YZ	AT SECTION	AT LOADING	BEND YZ + AXIAL	AT SECTION	AT LOADING
	STRESS					
2	4112.622	0.000 FR	2	7126.886	0.000 FR	2
3	10904.707	0.000 FR	2	-10906.175	0.000 FR	2
4	10978.106	1.000 FR	2	10980.047	1.000 FR	2
5	2951.945	0.000 FR	2	-7147.266	0.000 FR	2

OVERALL MAXIMUM STRESSES OCCUR AS FOLLOWS

STRESS			APPEARING IN MEMBER	AT SECTION	FOR LOAD	OPTION
MAXIMUM AXIAL STRESS	=	4196.67041	5	82.1141	1	2
MAXIMUM SHEAR Y STRESS	=	-4070.25464	4	31.0000	2	2
MAXIMUM SHEAR Z STRESS	=	111.26656	2	60.0000	2	2
MAXIMUM Y BENDING TENSION	=	4104.75977	2	0.0000	2	2
MAXIMUM Z BENDING TENSION	=	10702.90625	4	31.0000	2	2
MAXIMUM Y BENDING COMPRESSION	=	-4104.75977	2	0.0000	2	2
MAXIMUM Z BENDING COMPRESSION	=	-10702.90625	4	31.0000	2	2
MAXIMUM COMBINED BENDING TENSION	=	10978.10645	4	31.0000	2	2
MAXIMUM COMB. BEND. COMPRESSION	=	10978.10645	4	31.0000	2	2
MAXIMUM ABS. COMBINED BENDING	=	10978.10645	4	31.0000	2	2
MAXIMUM COMB. AXIAL AND BENDING	=	10980.04688	4	31.0000	2	2

WHERE,

OPTION=1 - SECTION IS UNSYMMETRIC AND ITS 'TYPE' IS NOT KNOWN. BENDING Y AND Z MAY NOT BE COMBINED AND FURTHERMORE BENDING STRESSES MAY NOT BE COMBINED WITH AXIAL STRESSES.
2 - BENDING Y IS COMBINED WITH BENDING Z BY TAKING SIGN OF STRESSES (COMPRESSION OR TENSION) INTO ACCOUNT.

Altran Report
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Attachment: B, Sh: B/01

ALSO COMBINED BENDING STRESS IS FURTHER COMBINED WITH AXIAL STRESS WITH PROPER SIGNS.

```
$
$
$
$
PDGRAF SELECTIVE BINARY DATA
ACTIVE JOINTS ALL
ACTIVE ELEMENTS ALL
LOAD LIST ALL
$
WRITE PDGRAF BINARY  DEFAULT ALL ACTIVE JOINTS ELEMENTS
```

Altran Report
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Attachment: B, Sh: B 102

```
************************************************************************
* RESULTS OF LATEST ANALYSIS AND/OR OUTPUT OF DATA FROM INTERNAL STORAGE *
************************************************************************

JOB ID -   1-GN01-R      JOB TITLE - NONE GIVEN

ACTIVE UNITS -  LENGTH       WEIGHT       ANGLE       TEMPERATURE      TIME          MASS
                  INCH         LBF          DEG           FAH            SEC           LBM

**** STRUDL WARNING - NOT ENOUGH PROPERTIES AVAILABLE TO  COMPUTE STRESSES FOR BENDING Y   OF MEMBER 1
                      FOR AT LEAST ONE SECTION - STRESS COMPUTATION TERMINATED FOR ENTIRE MEMBER.
**** STRUDL WARNING - NOT ENOUGH PROPERTIES AVAILABLE TO  COMPUTE STRESSES FOR BENDING Z   OF MEMBER 1
                      FOR AT LEAST ONE SECTION - STRESS COMPUTATION TERMINATED FOR ENTIRE MEMBER.
**** STRUDL WARNING - NOT ENOUGH PROPERTIES AVAILABLE TO  COMPUTE STRESSES FOR BENDING Y   OF MEMBER 6
                      FOR AT LEAST ONE SECTION - STRESS COMPUTATION TERMINATED FOR ENTIRE MEMBER.
**** STRUDL WARNING - NOT ENOUGH PROPERTIES AVAILABLE TO  COMPUTE STRESSES FOR BENDING Z   OF MEMBER 6
                      FOR AT LEAST ONE SECTION - STRESS COMPUTATION TERMINATED FOR ENTIRE MEMBER.

$
FINISH NOMESSAGES
```

T A B L E   O F   C O N T E N T S

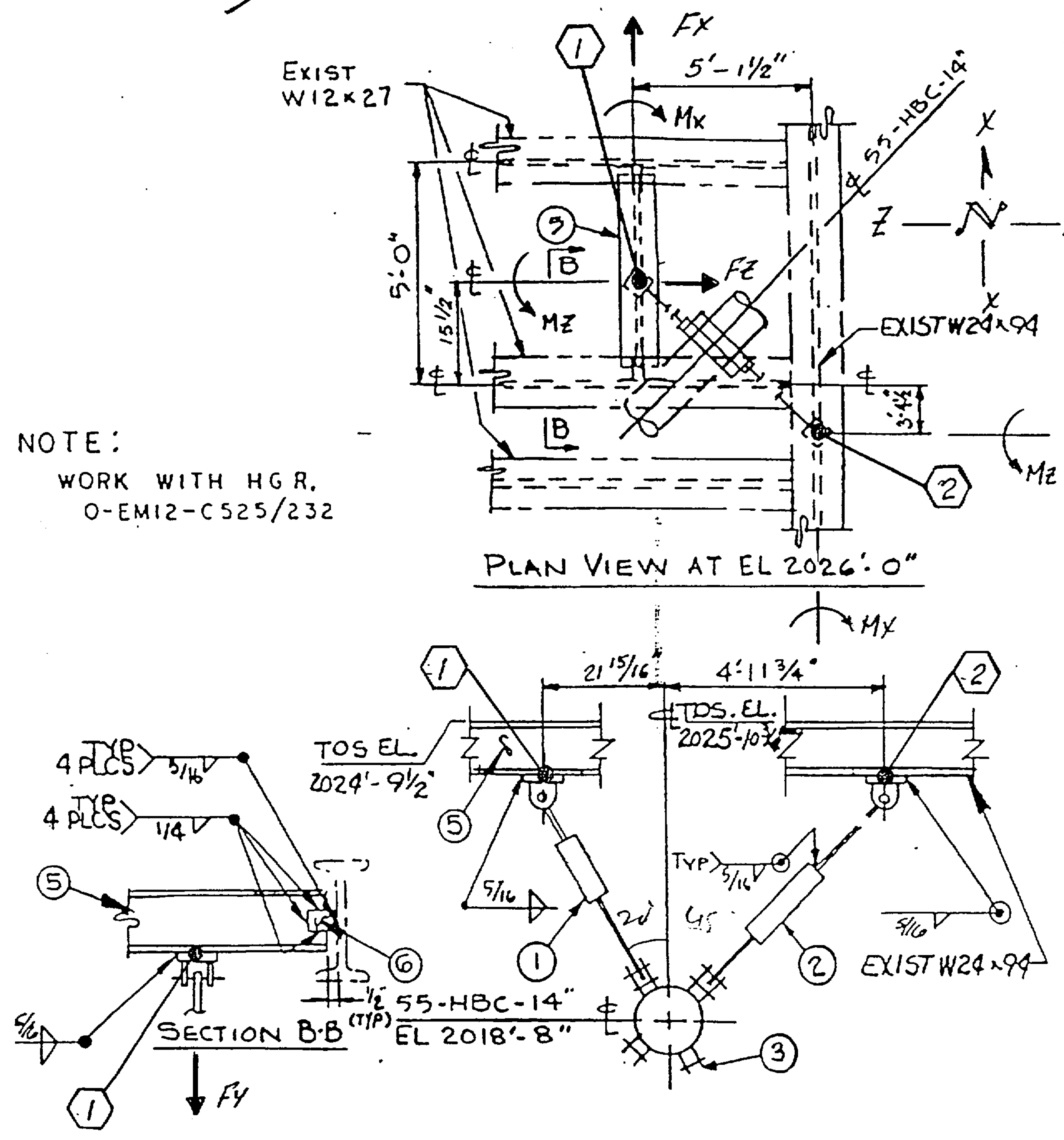
Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B103

```
*****************************************************************
*                                                               *
*                     PDA JOB STATISTICS                        *
*                                                               *
*          ACCOUNT ............. lebbi                          *
*          PASSWORD ............ PDELTA-STRUDL                  *
*          JOB LOG NO .......... 00000531                       *
*          JOB TERMINATED AT ... 02-OCT-2000 10:56:50.00        *
*          ELAPSED TIME ........ 00 - 00:00:05.00               *
*          ELAPSED CPU TIME .... 00 - 00:00:03.40               *
*          CHARGED CPU TIME .... 00 - 00:00:03.40               *
*                                                               *
*****************************************************************
```

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B 104

CALC. NO. ~~96227-TR-02~~ BY: FY/ony DATE: 1/28/97 ATTACHMENT-B

REV. NO. ~~0~~ CK: PB DATE: 1/28/97 SHEET ~~25~~



NOTE:
WORK WITH HGR. 0-EM12-C525/232

Forces = Kips, Moments = in-Kips.

FOOTPRINT LOADS ON STRUCTURES.					
ATTACHMENT POINT	Fx	Fy	Fz	Mx	Mz
1	5.04	20.172	5.41	24.35	22.68
2	11.50	16.48	12.20	54.90	51.75

CALC NO. 96227-TR-03 REV. 1 ATT. B SHEET B/05

WOLF CREEK NUCLEAR OPERATING CORPORATION

DRAWING NO. M-16GN01

PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A"

REF. DWGS.
ISO M-13GN01
PIPE
STEEL C-0S2421

HANGER NO. 1-GN01-C008/232(Q)

REV. 6

PAGE 2 OF 2

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1	2100	R/2-28 SWAY STRUT P-P=4'-8¼"	
			(BY M-218A SUPPLIER)	
2	1	2100	R/2-28 SWAY STRUT P-P=3'-6⅞"	
			(BY M-218A SUPPLIER)	
3	2	2600-28	R/1-14" PIPE CLAMP	
			(BY M-218A SUPPLIER)	

Return A

Altran Report 96227-TR-03 Rev. 1
Att./Appx. B Sh. 6106

JB DSS 12/13/00

FORCES*	FX	FY	FZ
POSITIVE	4550	6850	—
NEGATIVE	6806	7250	—

MVMTS *	X	Y	Z
THERMAL	—	—	-0.654
SEISMIC	—	—	0.061

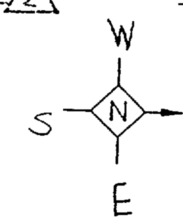
2

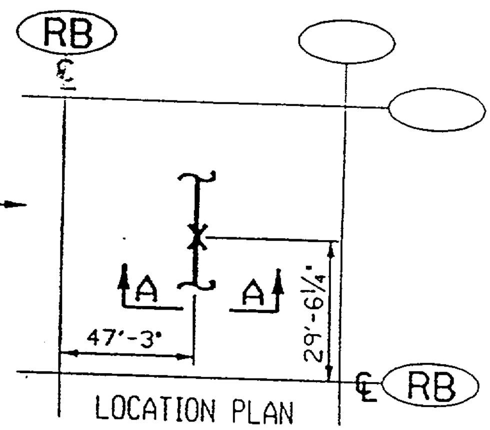
PROBLEM NO. P-093A

STRESS NO. —

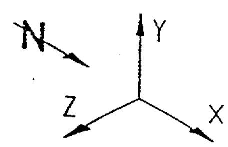
ISSUE 6 DATA PT. 45

NUCLEAR CLASS 3





LOCATION PLAN AREA



LOAD ____

NODE 1200

NOTES:
1. All welds for nuclear supports to be visually inspected unless noted otherwise
2. THIS DWG. REPLACES 0-GN01-C005/231(Q), R/1
3. FOR DOCUMENT CLARITY REV.0 & 1 OMITTED.
4. USE ITEMS 1 THRU 3 FROM 0-GN01-C005/231(Q), R/1.

2

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	2	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(0)-28-01 PER PMR 03478 CLOSE-OUT AND AS NOTED. CAD DWG.	KAM	RP	RP	7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS. ISO M-13GN01
PIPE ____
STEEL C-0S2411

DRAWING NO. M-16GN01

PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A"

HANGER NO. 1-GN01-C005/231(Q) PAGE 1 OF 2

REV. 2

LEVEL 1 5 | 1 3 | 3 3 | 6 0

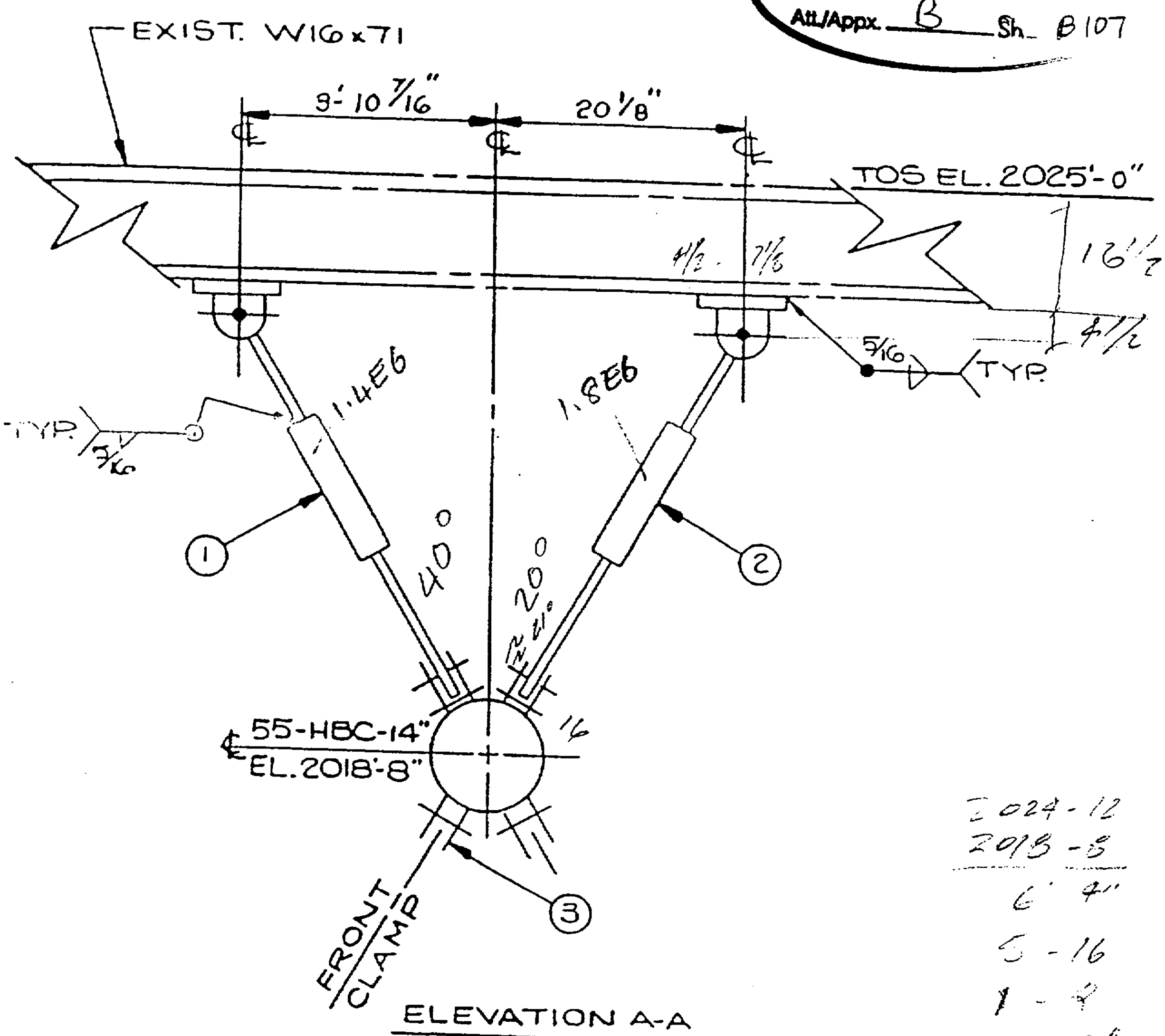
DFN-ATS/ga01c005 Ldga
REF DFN-ATS/

8 1/2X11 A SIZE
PSC-

Return A

Altran
96227-1R-03 Rev. 1
Att/Appx. B Sh. B107

JB
12/13/00



2024-12
2018-8
6' 4"
5-16
1-4
0' 3"

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN01 PIPE STEEL C-0S2411
DRAWING NO. M-16GN01		HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".		1-GN01-C005/231(Q) PAGE 2 OF 2	2

LEVEL 1 5 3 3 6 0

DFN-ATS/gaO1cO05 2.dga
REF DFN-ATS/gaO1cO05 2.cit

8 1/2X11 A SIZE

PSC-

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1		W8 × 40 4'-11½" LG W/(2) 15/16" Ø HOLES	
			(BY M-216 SUPPLIER)	
2	4		W4 × 13 10" LG.	
			(BY M-216 SUPPLIER)	
3	2		∠3 × 3 × 3/8 5⅛" LG.	
			(BY M-216 SUPPLIER)	
4	1	283	R/3-14" LONG TANGENT U-BOLT	
			(BY M-218A SUPPLIER)	
5	8		¼" × 1⅝" × 3 7/16" BAR	SA-36
			(BY M-216 SUPPLIER)	
6	2		⅞" HEX NUT	
			(BY M-218A SUPPLIER)	

Return A

Altran Report
96227-TR-03 Rev. 1
Att./Appx. B Sh B108

JB
[illegible] 12/1/00

FORCES*	FX	FY	FZ
POSITIVE	5450	1400	—
NEGATIVE	3700	6628	—

MVMTS "	X	Y	Z
THERMAL	—	—	-0.461
SEISMIC	—	—	0.044

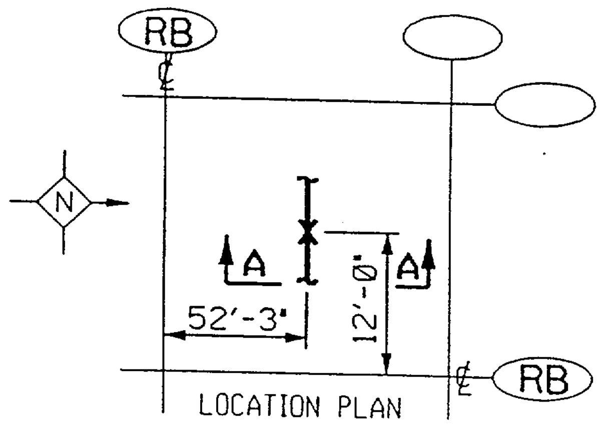
6

PROBLEM NO. P-093A

STRESS NO. —

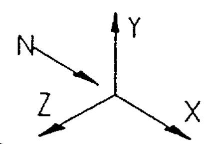
ISSUE 6 DATA PT. 70

NUCLEAR CLASS 3



LOCATION PLAN
AREA 1

NOTES:
1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-C006/231(Q) REV.2
3. FOR DOCUMENT CLARITY REV.0, 1, & 2, OMITTED.
4. USE ITEMS 1 THRU 6 FROM 0-GN01-C006/231(Q) REV.2



NODE 1340

LOAD ______

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	6	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RP	[illegible] 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS. ISO M-13GN01
PIPE ______
STEEL C-0S2411

DRAWING NO.
M-16GN01

PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A"

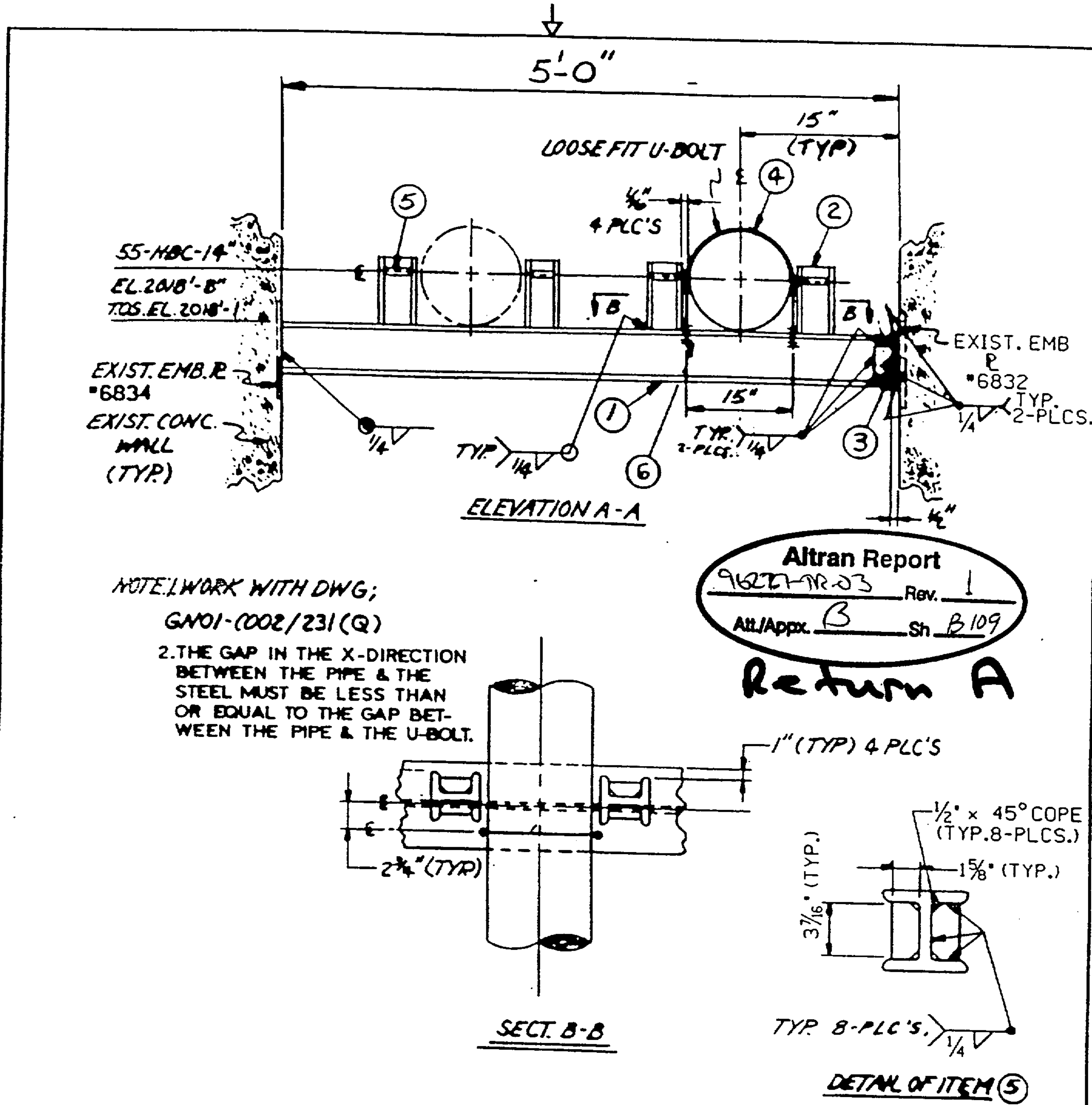
HANGER NO. 1-GN01-C006/231(Q) REV. 6

PAGE 1 OF 2

LEVEL 1 5 1 3 3 3 6 0

DFN-ATS/ ga01c006 1.dgn
REF DFN-ATS/

8 1/2X11 A SIZE
PSC-



Altran Report 96277-TR-03 Rev. 1
Att./Appx. B Sh. B109

Return A

JB
DB
11/13/00

WOLF CREEK NUCLEAR OPERATING CORPORATION	REF. DWGS.	ISO M-13GN01 / PIPE / STEEL C-0S2411
DRAWING NO. M-16GN01	HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".	1-GN01-C006/231(Q) PAGE 2 OF 2	6

LEVEL 1 5 1 3 3 3 6 0

DFN-ATS/gn01c006 2.dgn
REF DFN-ATS/gn01c006 2.cit

8 1/2X11 A SIZE
PSC-

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1	2100	R/2-7 SWAY STRUT P-P 21⅝"	
			(BY M-218A SUPPLIER)	
2	1	2600-7	R/1-14" PIPE CLAMP	
			(BY M-218A SUPPLIER)	

Return A

Altran Report 96277-TR-03 Rev. 1
Att./Appx. B Sh B110

FORCES*	FX	FY	LATERAL
POSITIVE	—	1400	—
NEGATIVE	—	2550	—

2

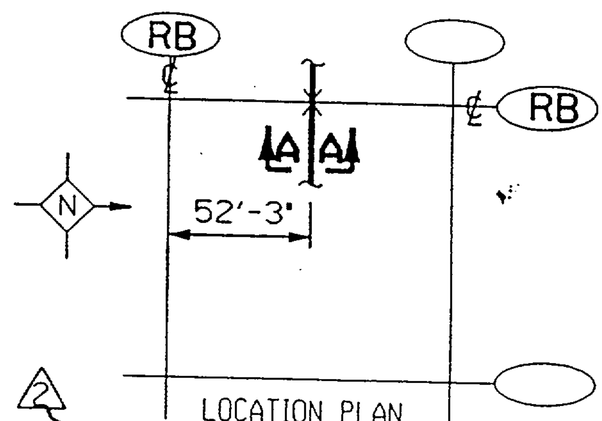
MVMTS *	X	Y	Z
THERMAL	0.022	—	-0.266
SEISMIC	0.093	—	0.045

PROBLEM NO. P-093A

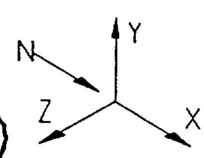
STRESS NO. —

ISSUE 6 DATA PT. 75

NUCLEAR CLASS 3



LOCATION PLAN
AREA 2



1380

LOAD

2

NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-H003/232(Q) REV.1
3. FOR DOCUMENT CLARITY REV.0, & 1 OMITTED.
4. USE ITEMS 1 & 2 FROM 0-GN01-H003/232(Q) R/1

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	2	DCZ 8/24/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RP	EKU 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS. ISO M-13GN01
PIPE
C-0C2926
STEEL C-0C2914

DRAWING NO.
M-16GN01
PIPE SUPPORTS

CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A"

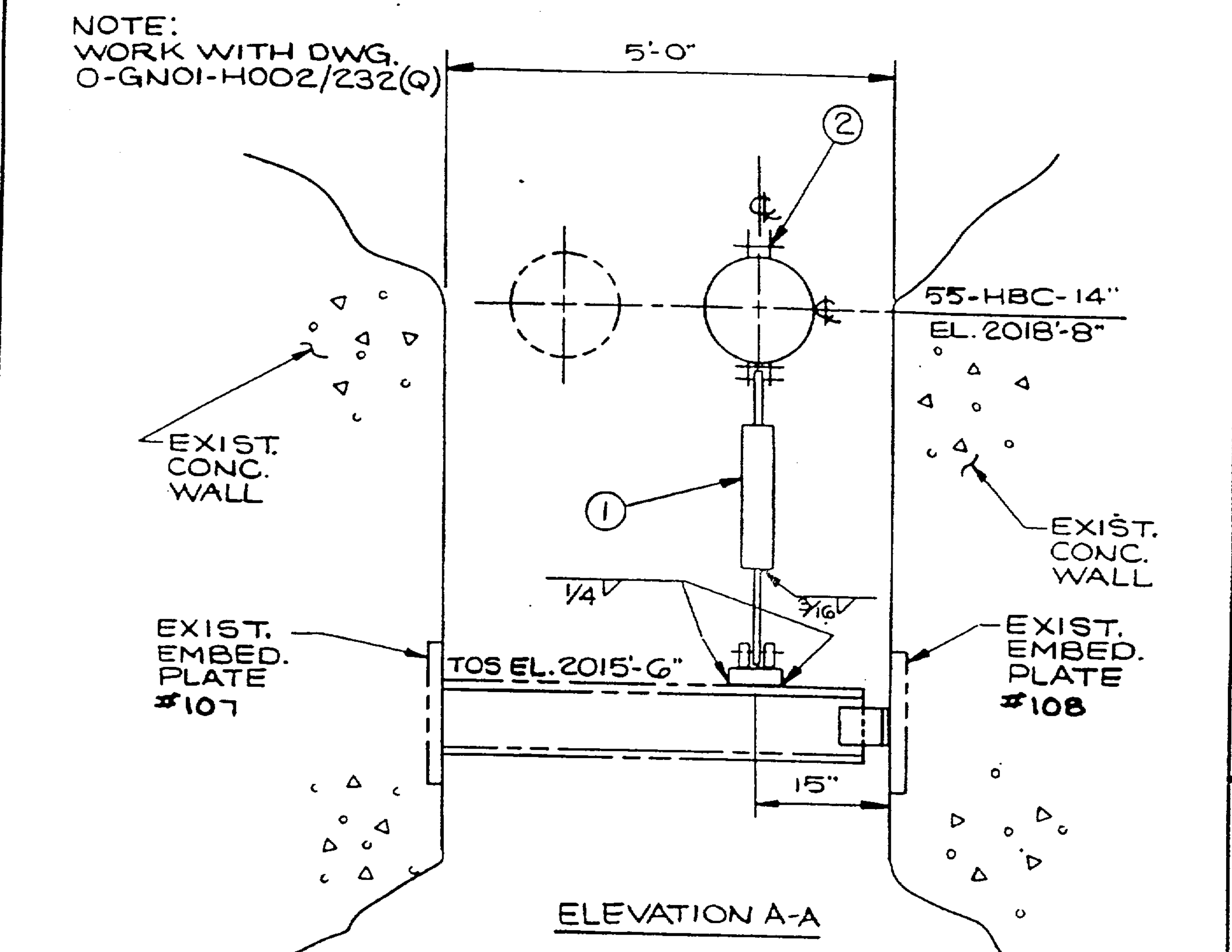
HANGER NO. 1-GN01-H003/232(Q)
REV. 2

PAGE 1 OF 2

LEVEL 1 5 1 3 3 3 6 0

DFN-ATS/ gn01h003 1.dgn
REF DFN-ATS/

8 1/2X11 A SIZE
PSC-



Return A

Altran Report 96227-TR-03 Rev. 1
Att./Appx. B Sh. B111

JB
12/13/00

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS. ISO M-13GN01; PIPE; STEEL C-0C2926, C-0C2914 — DATE
DRAWING NO. M-16GN01		HANGER NO. / REV.
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A"		1-GN01-H003/232(Q) PAGE 2 OF 2 — REV. 2

LEVEL 1 5 1 3 3 3 6 0

DFN-ATS/ga01h003 2.dgn
REF DFN-ATS/ga01h003 2.cit

8 1/2X11 A SIZE
PSC-

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1	283	R/3 - 14 LONG TANGENT U-BOLT	
			(BY M-218A SUPPLIER)	
2	1		W4 x 13 10½" LG.	
			(BY M-216 SUPPLIER)	
3	4		¼" x 1⅝" x 3 7/16" BAR	SA-36
			(BY M-216 SUPPLIER)	
4	2		⅞" HEX NUT	
			(BY M-218A SUPPLIER)	
5	1		W4 x 13 10⅜" LG.	
			(BY M-216 SUPPLIER)	

Return A

Altran Report 96227-TR-03 Rev. 1
Att./Appx. B Sh B112

JB
12/13/00

FORCES*	FX	FY	FZ
POSITIVE	3600	3200	—
NEGATIVE	6992	2400	—

MVMTS *	X	Y	Z
THERMAL	—	—	-0.072
SEISMIC	—	—	0.046

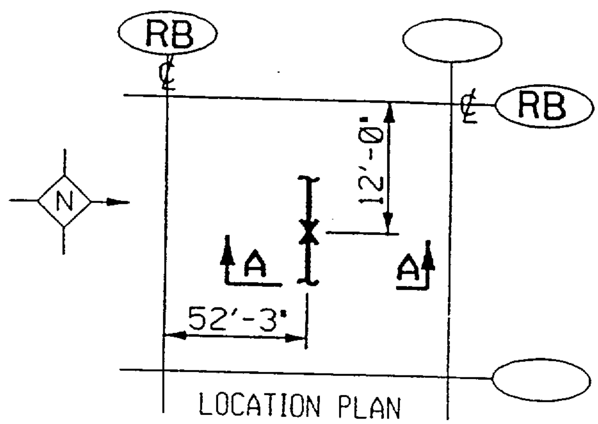
4

PROBLEM NO. P-093A

STRESS NO. —

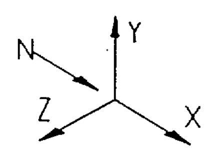
ISSUE 6 DATA PT. 80

NUCLEAR CLASS 3



LOCATION PLAN
AREA 2

NOTES:
1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-C007/232(Q) REV.1
3. FOR DOCUMENT CLARITY REV.0 & 1, OMITTED.
4. USE ITEMS 1, 3, & 4 FROM 0-GN01-C007/232(Q) REV.1



NODE 1420

LOAD ______

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	4	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RP	ELA 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO.
M-16GN01
PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A"

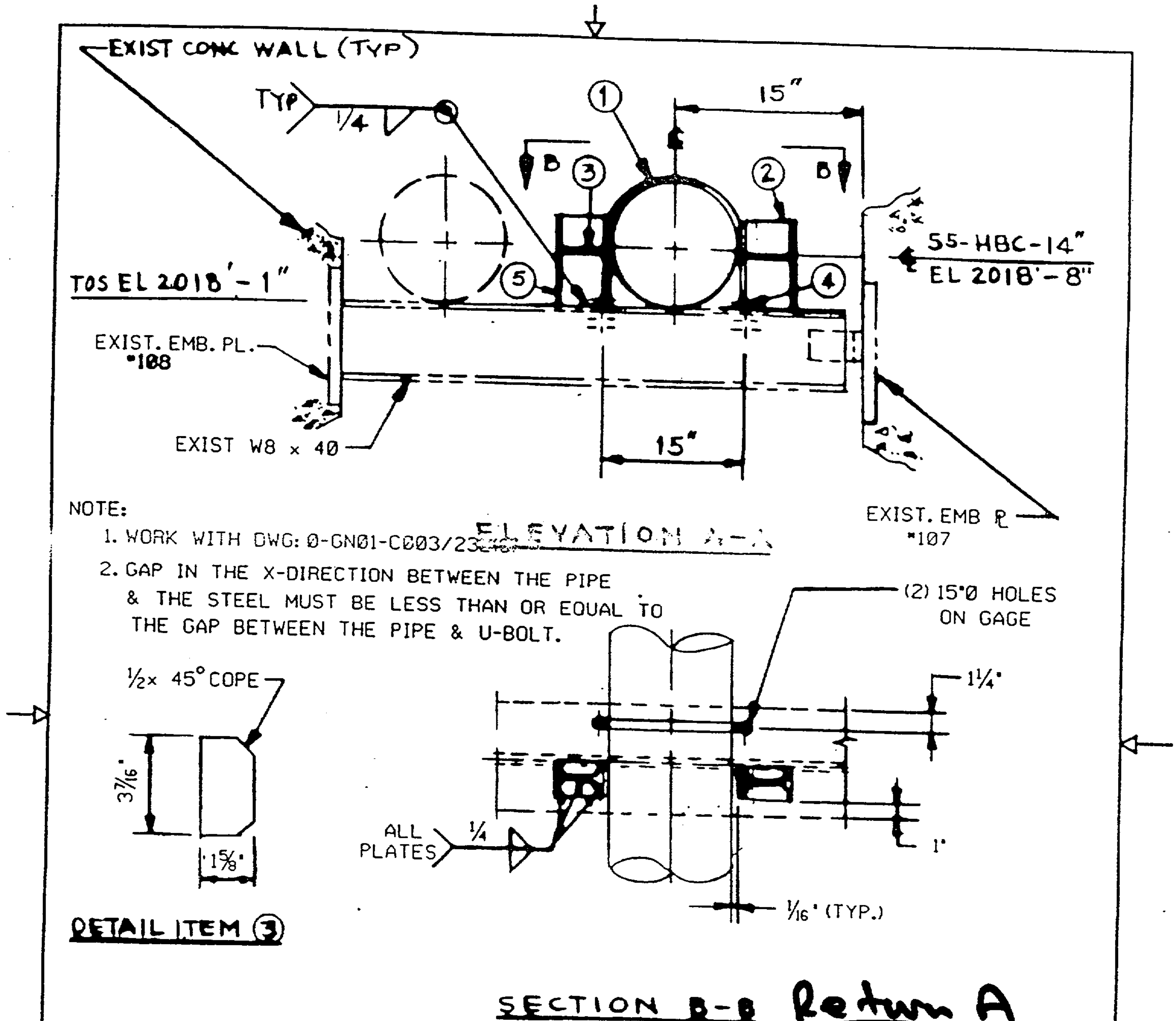
REF. DWGS. ISO M-13GN01
PIPE ______
STEEL C-0S2411

HANGER NO. 1-GN01-C007/232(Q) REV. 4
PAGE 1 OF 2

LEVEL 1 5 | 1 3 | 3 3 | 6 0

OFN-ATS/ 9a01c00Z 1.dgn
REF OFN-ATS/

8 1/2X11 A SIZE
PSC-



Return A

Altran Report
G16227-MR53 Rev. 1
Att./Appx. B Sh B113

JB
12/13/00

WOLF CREEK NUCLEAR OPERATING CORPORATION	REF. DWGS.	ISO M-13GN01
		PIPE
		STEEL C-0S2411
DRAWING NO. M-16GN01	HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".	1-GN01-C007/232(Q) PAGE 2 OF 2	4

LEVEL 1 5 | 1 3 | 3 3 | 6 0

DFN-ATS/gn01c007 2.dgn
REF DFN-ATS/gn01c007 2.cit

8 1/2X11 A SIZE
PSC-

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1	2100	R/3 - 28 SWAY STRUT, P-P=4'-0½" (BY M-218A SUPPLIER)	
	1	2100	R/3 - 28 SWAY STRUT, P-P=5'-7¼"	
	2	2600-28	R/2 - 14" PIPE CLAMP	
5	1		W8 × 40 4'-10½" LG. (BY M-216 SUPPLIER)	
6	4		3" × 3" × ⅜" 5⅝" LG.	

Return A

Altran Report 96227-TR-03 Rev. 1
Att./Appx. B Sh. B114

JB
12/11/00

FORCES*	FX	FY	LATERAL
POSITIVE	—	1400	4561
NEGATIVE	—	10836	4150

MVMTS "	X	Y	Z
THERMAL	0.067	—	0.067
SEISMIC	0.030	—	0.031

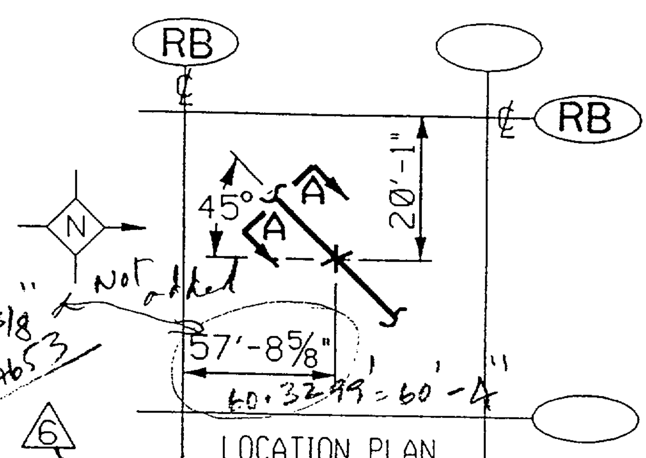
6

PROBLEM NO. P-093A

STRESS NO. —

ISSUE 6 DATA PT. 100

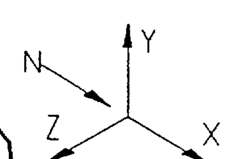
NUCLEAR CLASS 3



Not added
52'-3"
2'-7 3/8
5.4653
60.3299 = 60'-4"

6

LOCATION PLAN
AREA 2



1460

LOAD ______

NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-C008/232(Q) REV.5
3. FOR DOCUMENT CLARITY REV.0 THRU 5, OMITTED.
4. USE ITEMS 1, 2, 3, 5 & 6 FROM 0-GN01-C008/232(Q) REV.5

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	6	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RP	7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

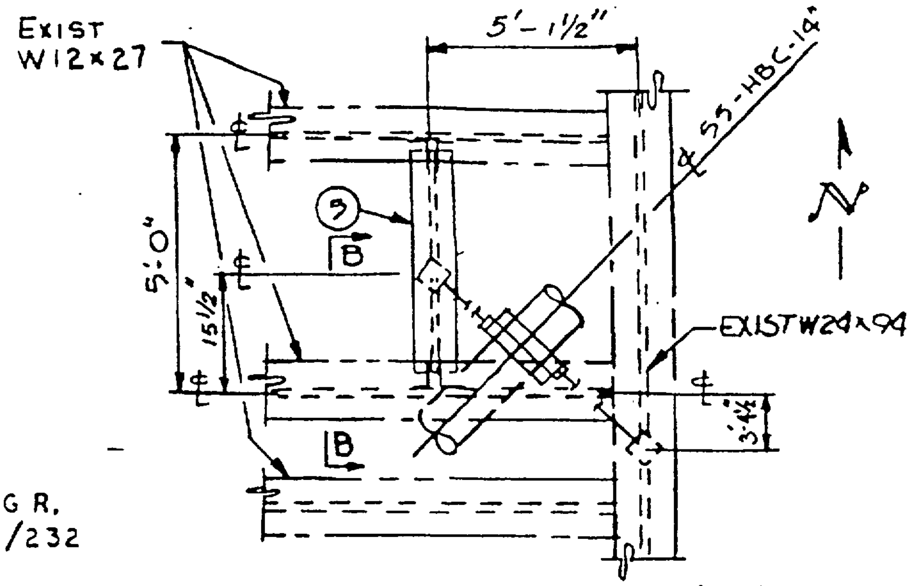
REF. DWGS.: ISO M-13GN01; PIPE ______; STEEL C-0S2421

DRAWING NO. M-16GN01

PIPE SUPPORTS
CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A"

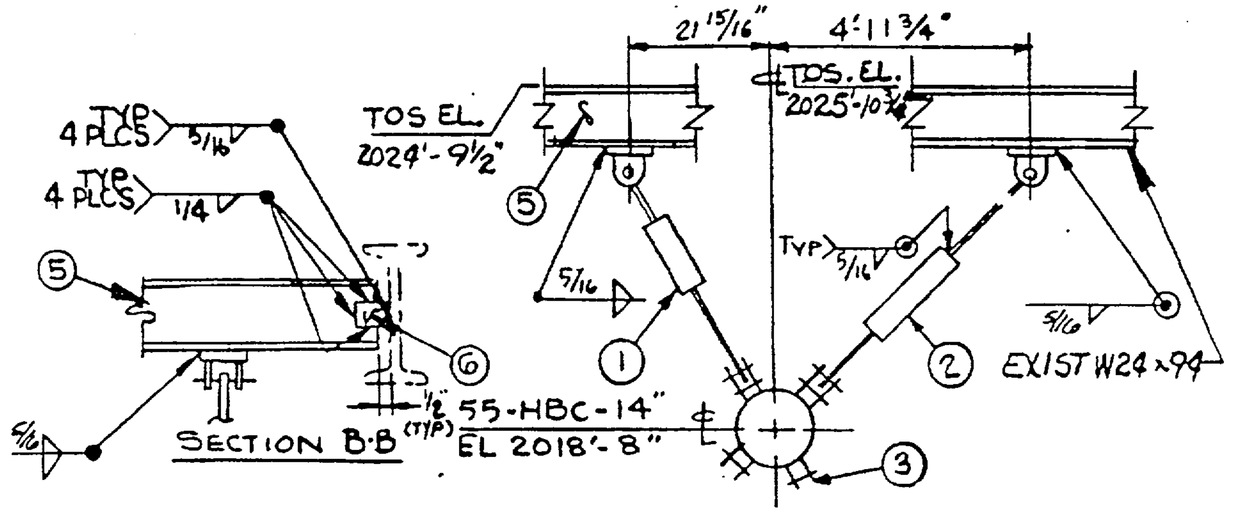
HANGER NO. 1-GN01-C008/232(Q) REV. 6

PAGE 1 OF 2



PLAN VIEW AT EL 2026'-0"

NOTE:
WORK WITH HGR.
0-EM12-C525/232



ELEVATION A-A

Return A

Altran Report 96227-PR-03 Rev. 1
Att./Appx. B Sh B115

NB
12/10/00

WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO. M-16GN01	REF. DWGS.	ISO M-13GN01 PIPE STEEL C-0S2421
PIPE SUPPORTS	HANGER NO.	REV.
CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A"	1-GN01-C008/232(Q) PAGE 2 OF 2	6

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	4		1½" × 2½" × 3½" LUG (BY M-216 SUPPLIER)	SA515 GR65
2	1		6" SCHEDULE 40 PIPE STANCHION 7 1/16" LG.	SA106 GR B
3	1		5/8" × 7" × 7" PLATE	SA515 GR65

Return A

Altran Report 96227-TR-03 Rev. 1
Att./Appx. B Sh B116

FORCES*	FX	FY	LATERAL
POSITIVE	10408	2000	10222
NEGATIVE	4050	11500	4200

2

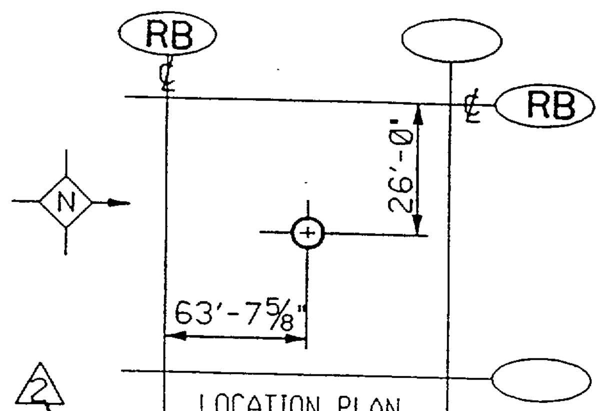
MVMTS *	X	Y	Z
THERMAL	—	—	—
SEISMIC	—	—	—

PROBLEM NO. P-093A

STRESS NO. —

ISSUE 6 DATA PT. 110

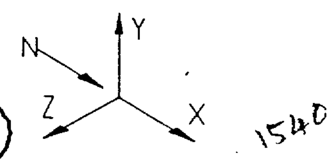
NUCLEAR CLASS 3



LOCATION PLAN
AREA 2

2

NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-C017/242(Q) REV.1
3. FOR DOCUMENT CLARITY REV.0 TO 1 OMITTED.
4. USE ITEMS 1 THRU 3 FROM 0-GN01-C017/242(Q) R/1



1540

LOAD ______

JB
DS
12/18/00

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	2	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(0)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RP	EFG 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO.
M-16GN01

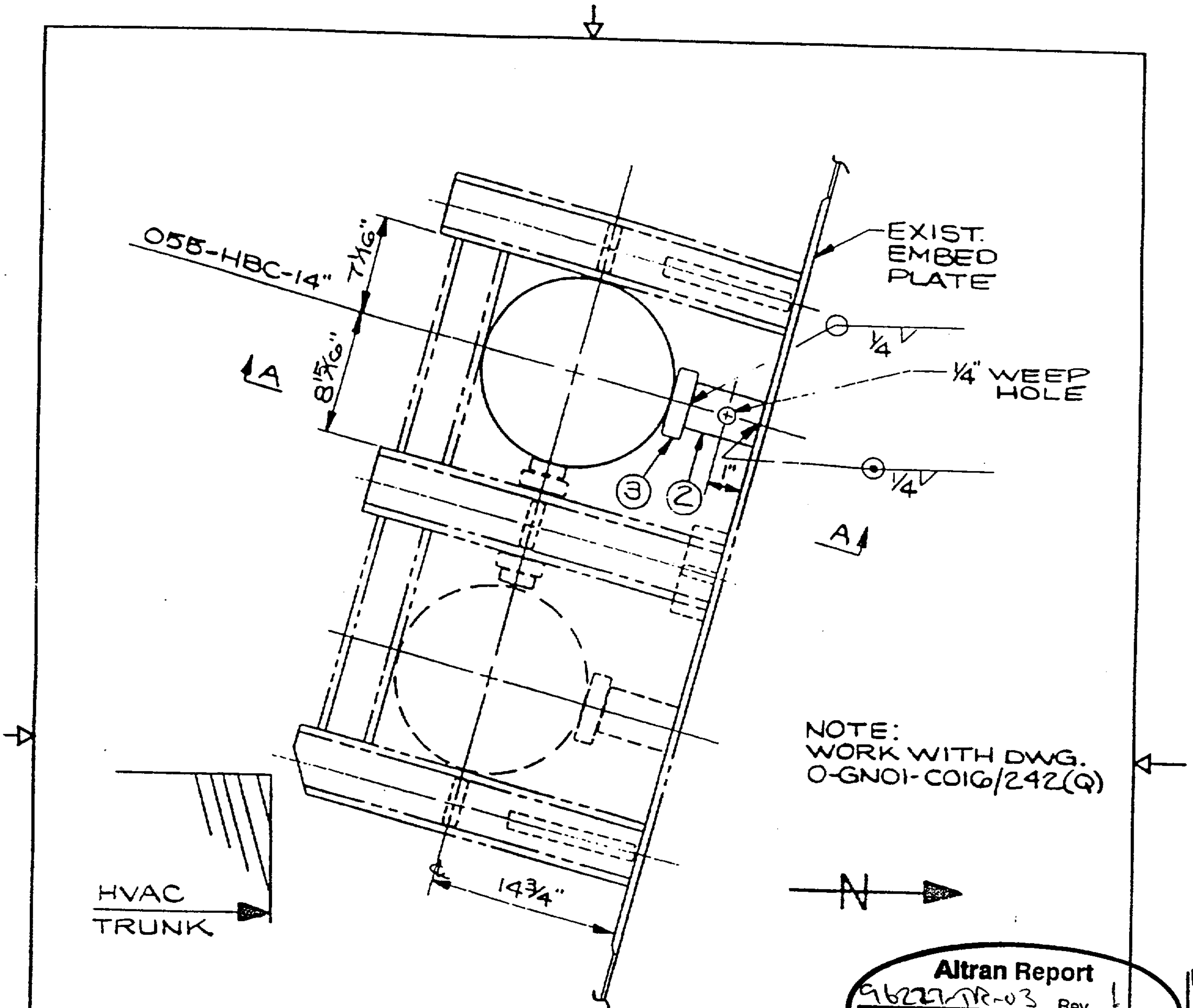
PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A"

REF. DWGS. ISO M-13GN01
PIPE
STEEL C-0L2902

HANGER NO. 1-GN01-C017/242(Q) REV. 2

PAGE 1 OF 3

LEVEL 1 45 1 3 3 3 6 0
DFN-ATS/ ga01c017 1.dga
REF DFN-ATS/
8 1/2X11 A SIZE
PSC-



PLAN VIEW AT EL. 2028-11 1/16"

NOTE:
WORK WITH DWG.
0-GN01-C016/242(Q)

Altran Report 96227-TR-03 Rev. 1
Att./Appx. B Sh B 117

Return A

TBB 12/13/01

WOLF CREEK NUCLEAR OPERATING CORPORATION

DRAWING NO.	REF. DWGS.	ISO M-13GN01
M-16GN01		PIPE
		STEEL C-0L2902

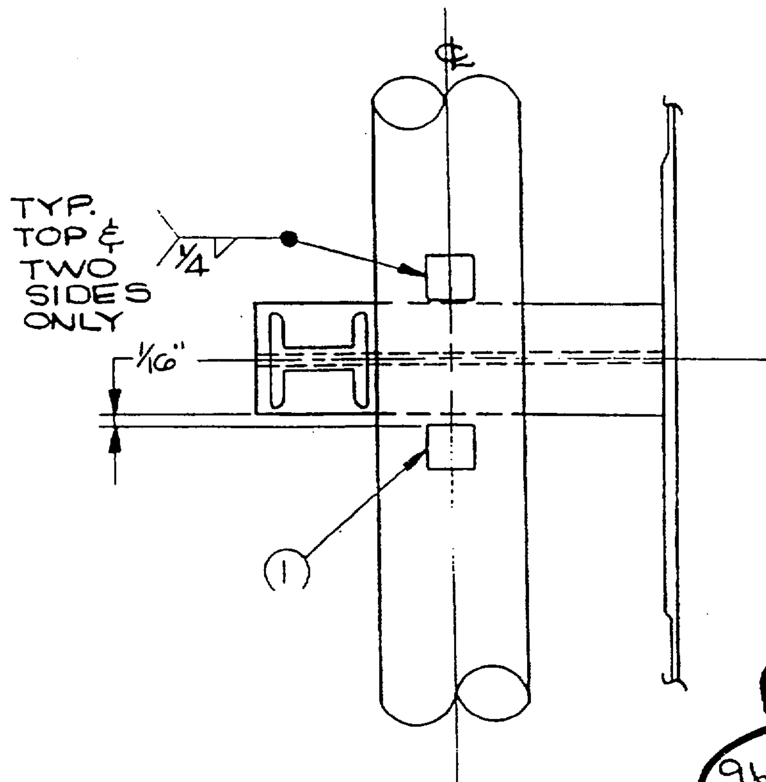
PIPE SUPPORTS
CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".

HANGER NO.	REV.
1-GN01-C017/242(Q) PAGE 2 OF 3	2

LEVEL 1 45 3 3 6 0

DFN-ATS/ga01c017 2.dgn
REF DFN-ATS/ga01c017 2.cil

8 1/2X11 A SIZE
PSC-



SECTION A-A

Return A

Altran Report
96227-TR-03 Rev. 1
Att./Appx. B Sh B118

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN01 PIPE STEEL C-0L2902
DRAWING NO. M-16GN01		HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN"A"		1-GN01-C017/242(Q) PAGE 3 OF 3	2

12 FOR DOCUMENT CLARITY REV.0 TO 4 OMITTED

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	3		W6 × 20 2'-1" LG. (BY M-216 SUPPLIER)	
2	2		W6 × 20 17" LG.	
3	2		1½" × 4" × 4" BAR	SA 36
4	4		¼" × 2⅝" × 2$^{11}/_{16}$" BAR	SA 36
5	1		W6 × 20 6" LG. (SEE DETAIL)	
6	2		1" × 3" × 4" BAR	SA 36
7	10		¼" × 2⅞" × 5$^{7}/_{16}$" BAR	SA 36

Return A

Altran Report
96227-TR-03 Rev. 1
Att./Appx. B Sh B119

1 JB 12/13/..

FORCES*	FX	FY	FZ
POSITIVE	3100	—	4200
NEGATIVE	6644	—	6435

5

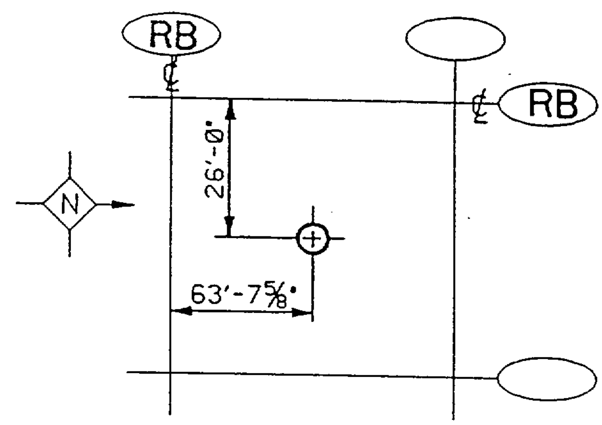
MVMTS *	X	Y	Z
THERMAL	—	0.144	—
SEISMIC	—	0.012	—

PROBLEM NO. P-093A

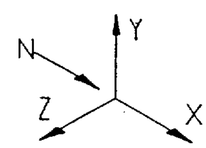
STRESS NO. —

ISSUE 6 DATA PT. 115

NUCLEAR CLASS 3



LOCATION PLAN
AREA 2



1570

NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-R004/242(Q) REV.4
3. FOR DOCUMENT CLARITY REV.0 TO 4 OMITTED.
4. USE ITEMS 1 TO 7 FROM 0-GN01-R004/242(Q) R/4

5

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	5	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RP	EPQ 7/26/94

WOLF CREEK NUCLEAR OPERATING CORPORATION

DRAWING NO. M-16GN01

PIPE SUPPORTS

CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".

REF. DWGS. ISO M-13GN01 PIPE STEEL C-0L2902

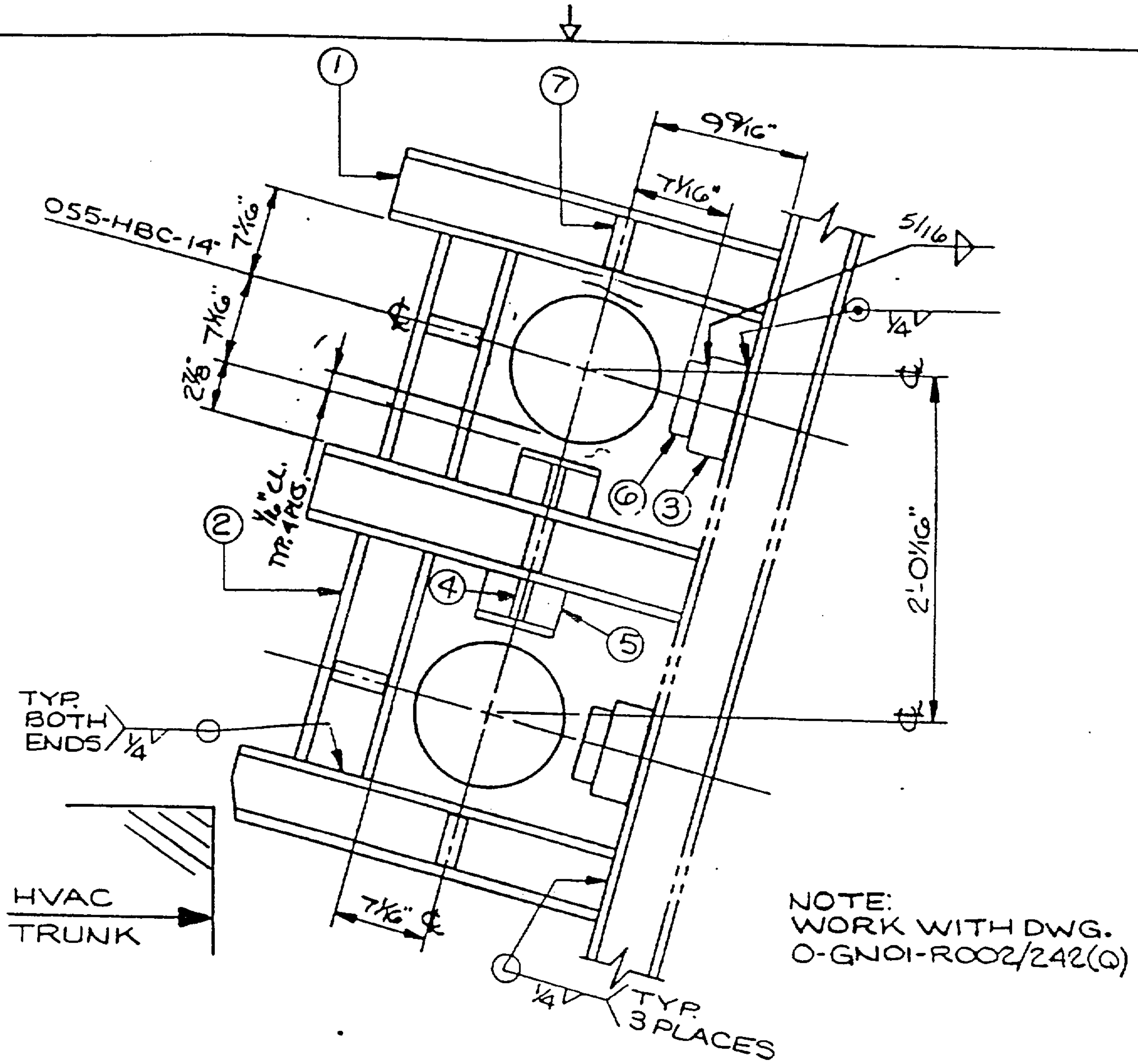
HANGER NO. 1-GN01-R004/242(Q) REV. 5

PAGE 1 OF 3

LEVEL 1 45 | 1 3 | 3 3 | 6 0

DFN-ATS/ go01r004 1.dgn
REF DFN-ATS/

B 1/2X11 A SIZE
PSC-



NOTE:
WORK WITH DWG.
0-GN01-R002/242(Q)

PLAN VIEW AT EL. 2037'-6"

Return A

Altran Report
96227-TR-03 Rev. 1
Att./Appx. B Sh B/20

1 JB DSB 12/13/..

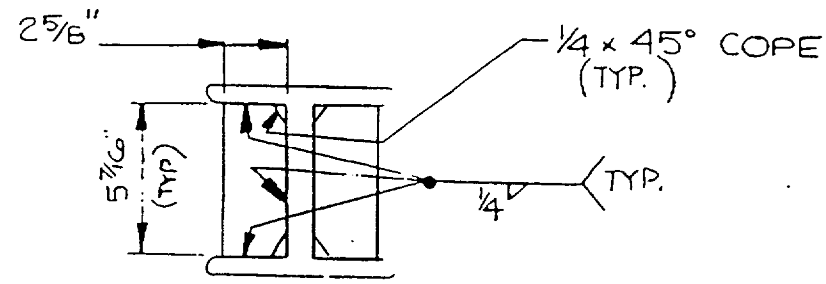
WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS. ISO M-13GN01 PIPE STEEL C-0C2902 DATE
DRAWING NO. M-16GN01		HANGER NO. / REV.
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".		1-GN01-R004/242(Q) PAGE 2 OF 3 / 5

LEVEL 1 5 3 3 6 0

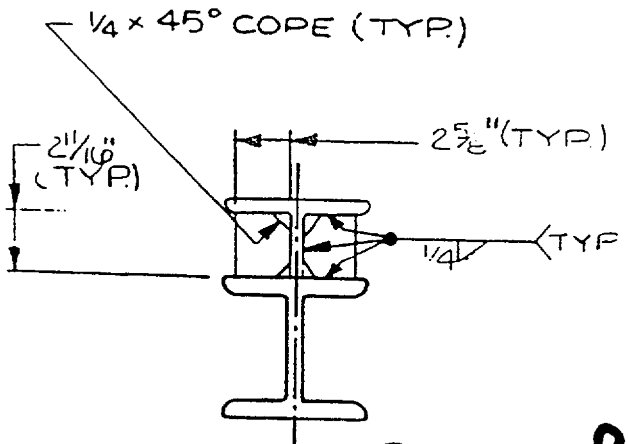
DFN-ATS/gn01k004 2.dgn
REF DFN-ATS/gn01k004 2.cit

8 1/2X11 A SIZE

PSC-



DETAIL ITEM (7)



DETAIL ITEM (5)

Return A

Altran Report
96227-TR-03 Rev. 1
Att./Appx. B Sh B121

JB
12/13/00

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN01 PIPE STEEL C-0C2902
DRAWING NO. M-16GN01		HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A"		1-GN01-R004/242(Q) PAGE 3 OF 3	5

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1		1½" x 4" x 4" BAR (BY M-216 SUPPLIER)	SA 36
2	1		1" x 3" x 4" BAR	SA 36

Return A

Altran Report 96227-TR-03 Rev. 1
Att./Appx. B Sh B 122

FORCES*	FX	FY	FZ
POSITIVE	5268	—	10796
NEGATIVE	4900	—	9800

3

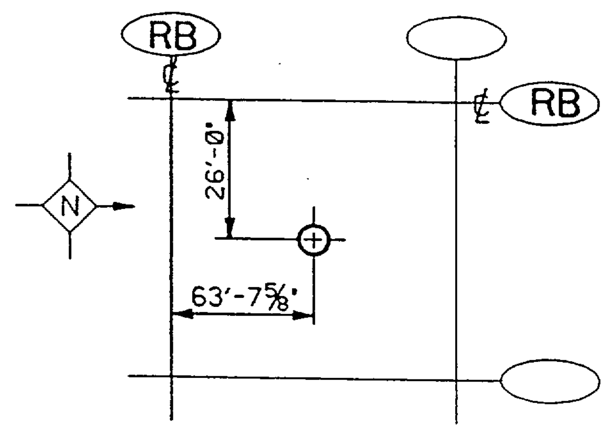
MVMTS *	X	Y	Z
THERMAL	—	0.410	—
SEISMIC	—	0.013	—

PROBLEM NO. P-093A

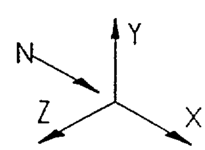
STRESS NO. —

ISSUE 6 DATA PT. 120

NUCLEAR CLASS 3



LOCATION PLAN
AREA 2



1630

NOTES:
1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-R005/252(Q) REV.2
3. FOR DOCUMENT CLARITY REV.0 TO 2 OMITTED.
4. USE ITEMS 1 & 2 FROM 0-GN01-R005/252(Q) R/2

3

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	3	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RS	ERG 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS. ISO M-13GN01
PIPE
STEEL C-0L2902

DRAWING NO.
M-16GN01
PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A".

HANGER NO. 1-GN01-R005/252(Q) REV. 3

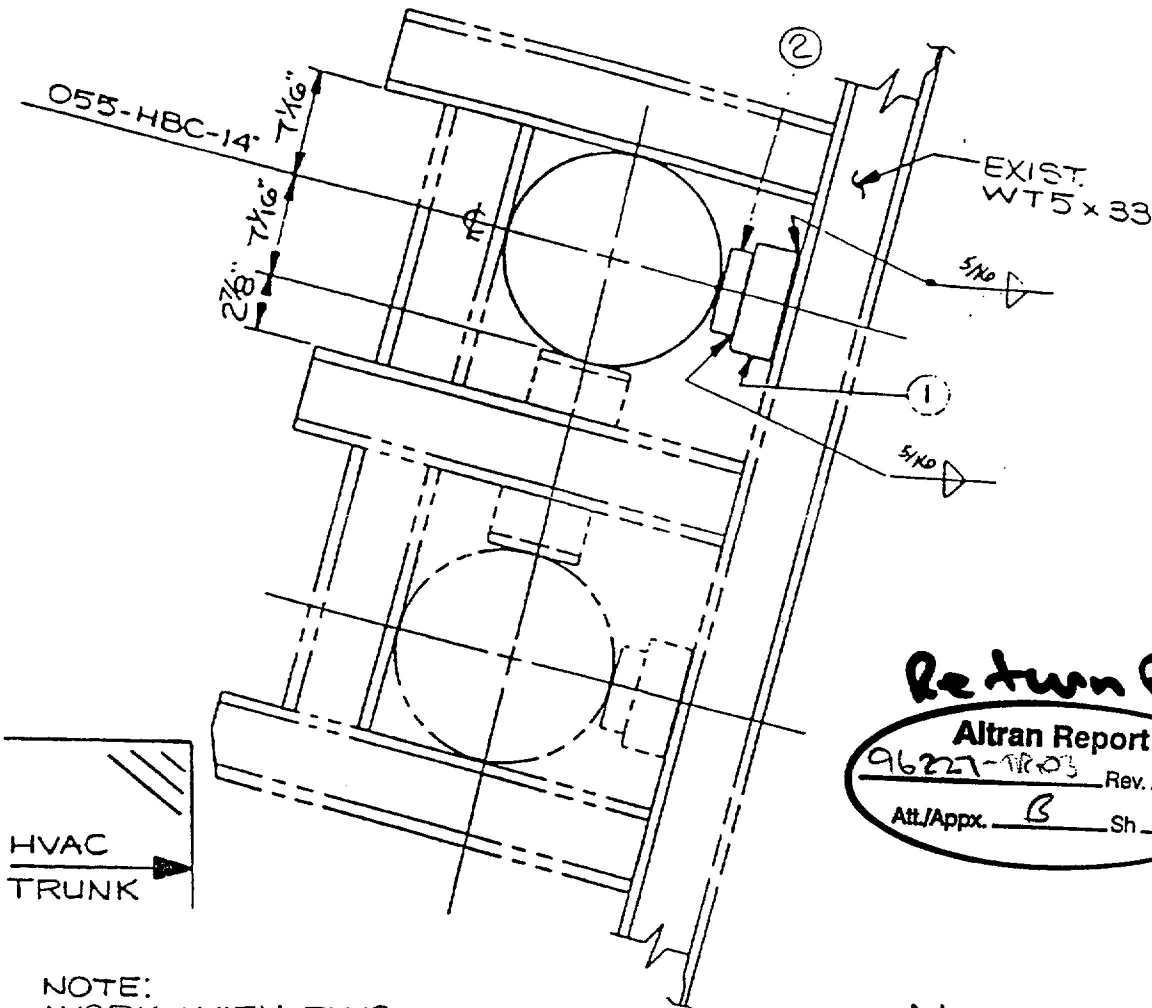
PAGE 1 OF 2

LEVEL 1 5 1 3 3 3 6 0

DFN-ATS/ gn01r005 1.dgn
REF DFN-ATS/

8 1/2X11 A SIZE
PSC-

JB 12/12/00



NOTE:
WORK WITH DWG.
0-GN01-R003/252(Q)

PLAN VIEW AT EL. 2054'-0"

Return A

Altran Report 96227-TR-03 Rev. 1
Att./Appx. B Sh B123

JB
DS
12/11/96

WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO. M-16GN01	REF. DWGS. ISO M-13GN01 / PIPE / STEEL C-0C2902	DATE
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".	HANGER NO. 1-GN01-R005/252(Q) PAGE 2 OF 2	REV. 3

LEVEL 1 45 3 3 6 0

DFN-ATS/ga01k005 2.dga
REF DFN-ATS/ga01k005 2.cil

8 1/2X11 A SIZE
PSC-

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1	2100	R/2-12 SWAY STRUT P-P= 6'-5" (BY M-218A SUPPLIER)	
2	1	2600-12	R/1-14" PIPE CLAMP	
3	1	2540	R/1-6 SNUBBER STROKE=5"	
			MVM'T.=.164(T), L=17" P-P=3'-8"	
4	1	2640-6	R/1-14" PIPE CLAMP	
5	1		W6 x 20 7'-6" LG. (BY M-216 SUPPLIER)	
6	1		W6 x 20 10'-4½" LG.	

Return A

Altran Report
96272-TR-03 Rev. 1
Att./Appx. B Sh B124

JB
DDJ
12/15/02

FORCES*	FX	FY	LATERAL
POSITIVE	—	10216	5450
NEGATIVE	—	3600	5450

5

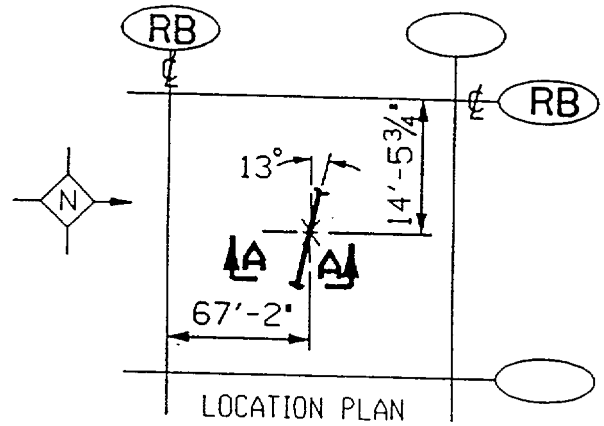
MVMTS *	X	Y	Z
THERMAL	0.181	—	-0.211
SEISMIC	0.017	—	0.113

PROBLEM NO. P-093A

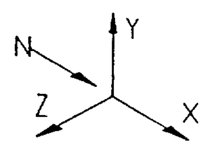
STRESS NO. —

ISSUE 6 DATA PT. 132

NUCLEAR CLASS 3



LOCATION PLAN
AREA 2



1710 [illegible]

LOAD ______

NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-C019/252(Q), R/2
3. FOR DOCUMENT CLARITY REV.0 TO 2 OMITTED.
4. USE ITEMS 1 THRU 6 FROM 0-GN01-C019/252(Q), R/2

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	5	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RP	[illegible] 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO.
M-16GN01

PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A"

REF. DWGS. ISO M-13GN01
PIPE C-1S2521
STEEL C-1S2621

HANGER NO. 1-GN01-C019/252(Q) REV. 5

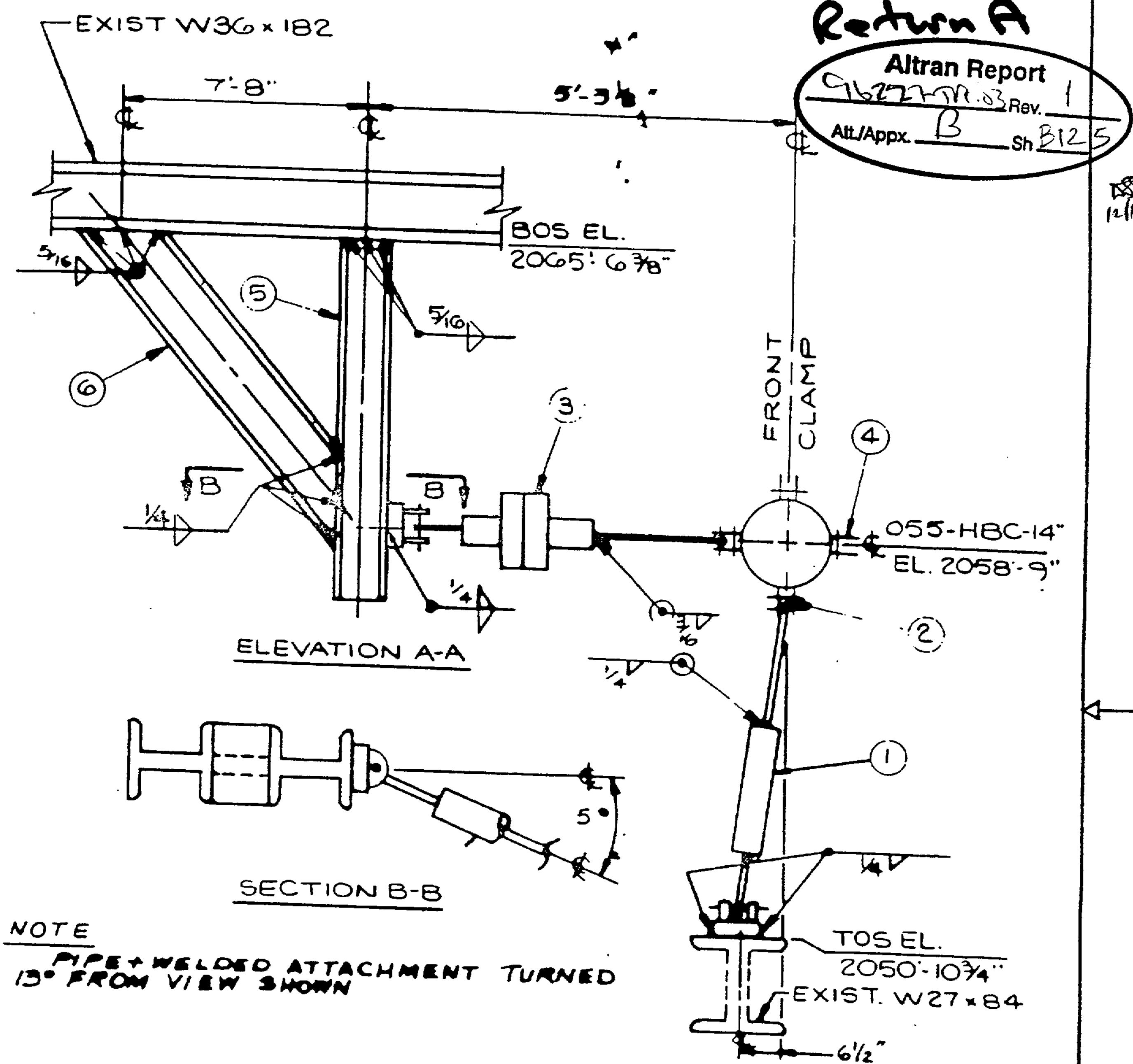
LEVEL 1 45 1 3 3 3 6 0

DFN-ATS/ gn01c019 1.dgn
REF DFN-ATS/

8 1/2X11 A SIZE
PSC-

Return A

Altran Report 96277-TR-03 Rev. 1
Att/Appx. B Sh B12.5



NOTE
PIPE + WELDED ATTACHMENT TURNED 13° FROM VIEW SHOWN

WOLF CREEK NUCLEAR OPERATING CORPORATION	REF. DWGS.	ISO M-13GN01 PIPE C-1S2521 STEEL C-1S2621
DRAWING NO. M-16GN01	HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".	1-GN01-C019/252(Q) PAGE 2 OF 2	5

LEVEL 1 45 1 3 3 3 6 0

DFN-ATS/ga01c019 2.dga
REF DFN-ATS/ga01c019 2.cit

8 1/2X11 A SIZE

PSC-

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1	2100	R/2-12 SWAY STRUT P-P 6'-7"(BY M-218A SUPPLIER)	
2	1	2600-12	R/1-10 CLAMP	
3	1	2540	R/1-6 SNUBBER STROKE=5"	
			MVM'T.=.227(T), L=16 7/8" P-P=2'-3 1/2"	
4	1	2640-6	R/1-10 CLAMP	
5	1		W6 x 20 7'-2" LG. (BY M-216 SUPPLIER)	
6	1		W6 x 20 9'-2 5/8" LG.	

Return A

Altran Report
96227-TR-03 Rev. 1
Att./Appx. B Sh B126

JB
11/13/00

FORCES*	FX	FY	LATERAL
POSITIVE	—	1000	4750
NEGATIVE	—	8033	4750

4

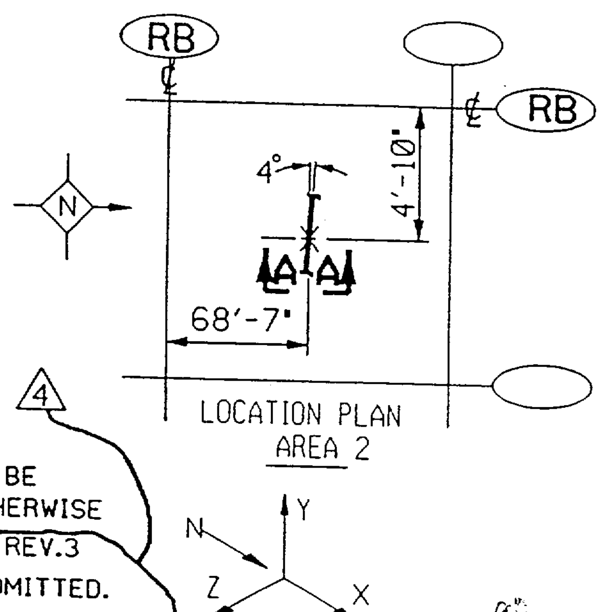
MVMTS *	X	Y	Z
THERMAL	0.274	—	-0.351
SEISMIC	0.016	—	0.116

PROBLEM NO. P-093A

STRESS NO. —

ISSUE 6 DATA PT. 155

NUCLEAR CLASS 3



4

NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-C018/252(Q) REV.3
3. FOR DOCUMENT CLARITY REV.0 THRU 3 OMITTED.
4. USE ITEMS 1 THRU 6 FROM 0-GN01-C018/252(Q) R/3

1780

LOAD ______

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPV'L DATE
	4	DC2 8/24/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RP	CEQ 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO.
M-16GN01
PIPE SUPPORTS

CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A"

REF. DWGS.
ISO M-13GN01
PIPE
STEEL C-1S2521 C-1S2621

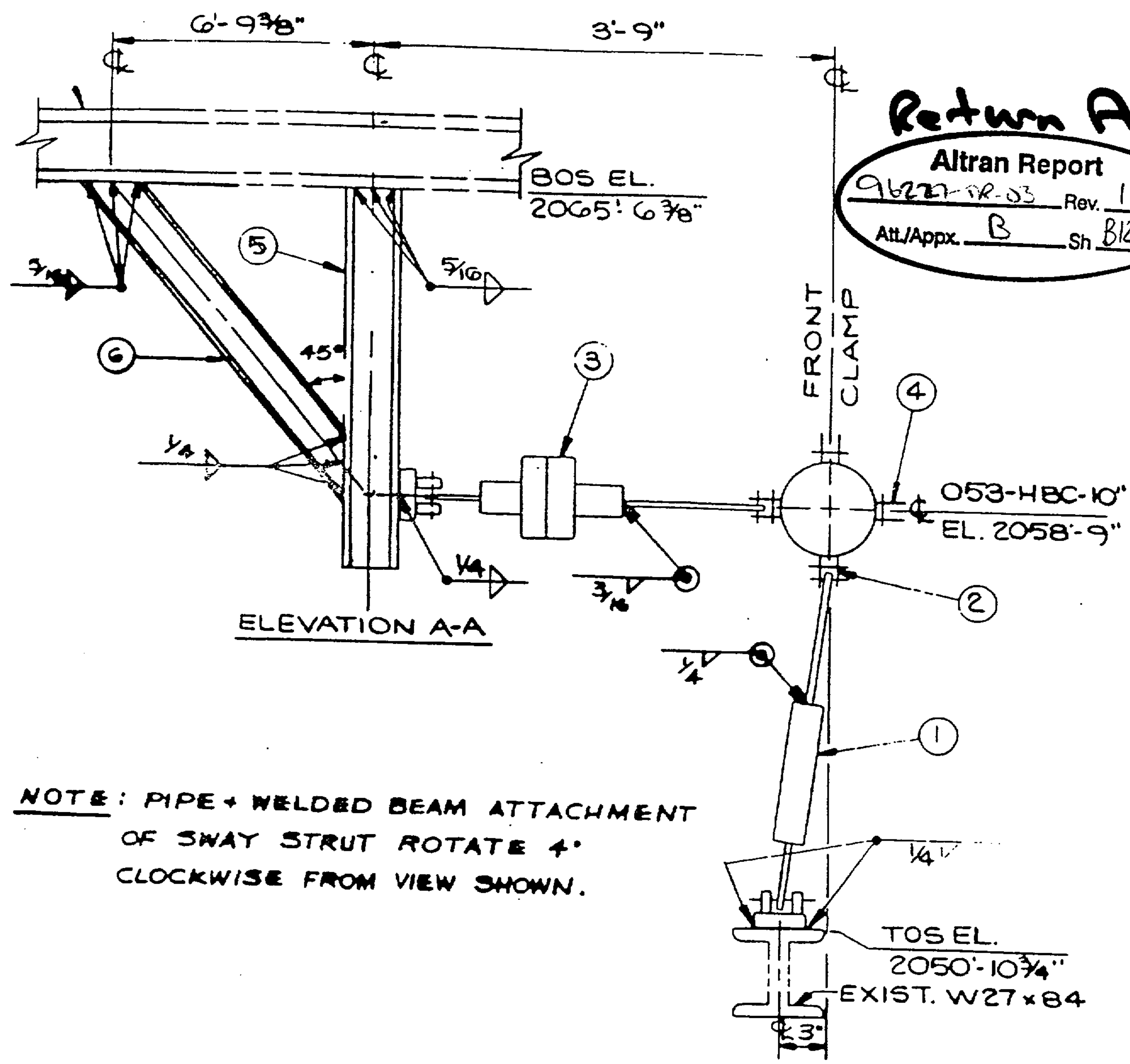
HANGER NO.
1-GN01-C018/252(Q)
PAGE 1 OF 2

REV.
4

LEVEL 1 5 1 3 3 3 6 0

DFN-ATS/ gn01c018 1.dgn
REF DFN-ATS/

8 1/2X11 A SIZE
PSC-



Return A

Altran Report 96227-TR-03 Rev. 1
Att./Appx. B Sh B127

JB
TB 12/18/00

NOTE: PIPE + WELDED BEAM ATTACHMENT OF SWAY STRUT ROTATE 4° CLOCKWISE FROM VIEW SHOWN.

WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO.
M-16GN01

PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A".

REF. DWGS.
ISO M-13GN01
PIPE
STEEL C-1S2521
C-1S2621

HANGER NO.
1-GN01-C018/252(Q)
PAGE 2 OF 2

REV.
4

LEVEL 1 45 3 3 6 0
DFN-ATS/ga01c018 2.dga
REF DFN-ATS/ga01c018 2.cit
8 1/2X11 A SIZE
PSC-

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	2	211	C SWAY STRUT PIPE O.D.=10¾"	
			W=8'-1¾" OPTION #2 (BY M-218B SUPPLIER)	
2	2	137N	¾" x 10 STANDARD U-BOLT	
3	1		W6 x 20 2'-4" LG. (BY M-216 SUPPLIER)	
			W/(4) 13/16 "Ø HOLES ON GAGE	

Return A

Altran Report
91227-TR-03 Rev. 1
Att./Appx. B Sh B128

JB
11/13/00

FORCES*	FX	FY	LATERAL
POSITIVE	—	1350	—
NEGATIVE	—	7803	—

4

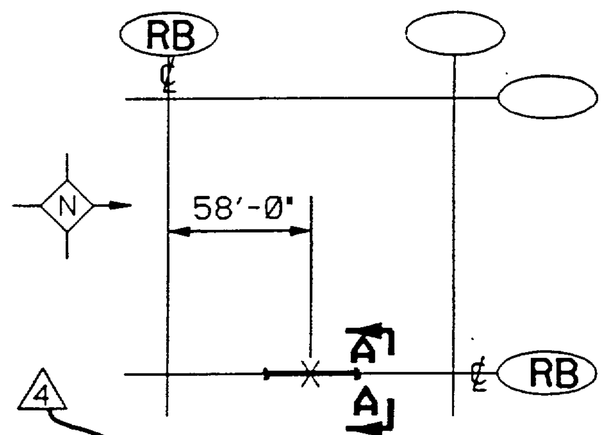
MVMTS *	X	Y	Z
THERMAL	0.045	—	-0.008
SEISMIC	0.085	—	0.158

PROBLEM NO. P-093A

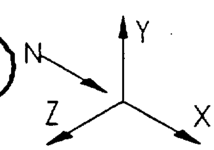
STRESS NO. —

ISSUE 6 DATA PT. 190

NUCLEAR CLASS 3



LOCATION PLAN
AREA 2



NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-H005/252(Q) REV.3
3. FOR DOCUMENT CLARITY REV.0 THRU 3 OMITTED.
4. USE ITEMS 1 THRU 3 FROM 0-GN01-H005/252(Q) R/3

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	4	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	SP	SP	ERU 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO.
M-16GN01

REF. DWGS. ISO M-13GN01
PIPE
STEEL C-1S2621

PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A"

HANGER NO. 1-GN01-H005/252(Q) REV. 4

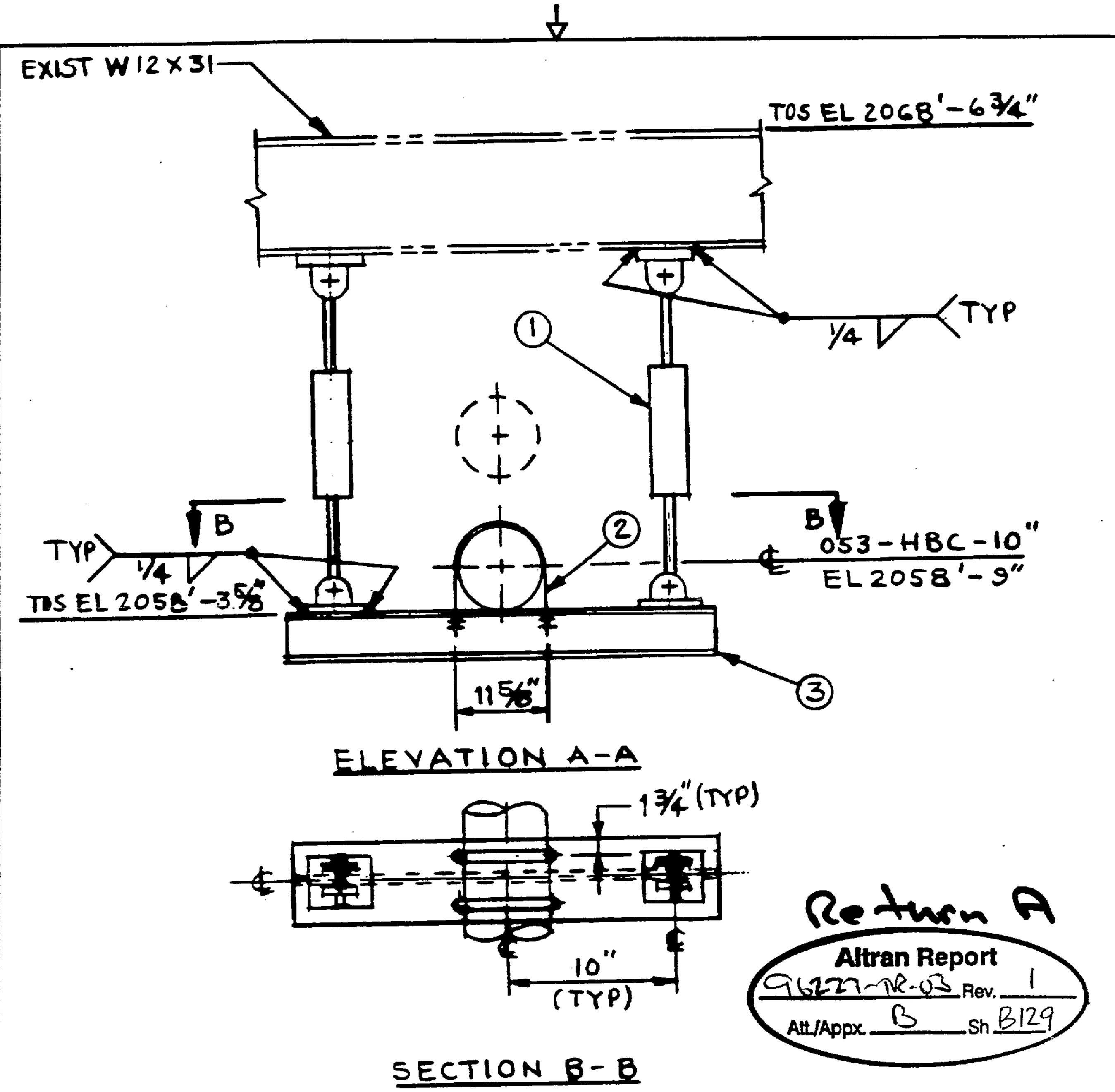
PAGE 1 OF 2

LEVEL 1 45 | 1 3 | 3 3 | 6 0

DFN-ATS/ gn01h005 1.dgn
REF DFN-ATS/

8 1/2X11 A SIZE
PSC-

wa



Return A

Altran Report
96227-TR-03 Rev. 1
Att./Appx. B Sh B129

JB
12/13/..

DATE

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS. ISO M-13GN01; PIPE ; STEEL C-1S2621
DRAWING NO. M-16GN01		HANGER NO. / REV.
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".	-	1-GN01-H005/252(Q) PAGE 2 OF 2 / 4

LEVEL 1 5 1 3 3 3 6 0

DFN-ATS/gn01h005 2.dgn
REF DFN-ATS/gn01h005 2.cit

8 1/2X11 A SIZE
PSC-

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1		W4 x 13 5'-9"LG. (BY M-216 SUPPLIER)	
2	1		1/2" x 4" x 4 1/8" BAR	SA 36
3	1		W4 x 13 7'-10 3/4"LG.	
4	1	2540	R/1-6 SNUBBER, STROKE=5"	
			MVM'T.= .268, L=17 1/8", P-P=3'-5"	
			(BY M-218A SUPPLIER)	
5	1		W4 x 13 4'-7"LG. (BY M-216 SUPPLIER)	
6	1	6202-6	R/2-8" PIPE CLAMP (BY M-218A SUPPLIER)	(SEE NOTE 5)
7	1	2100	R/2-12 SWAY STRUT P-P=9'-4 1/4"	
8	1	2600-12	R/1-8" PIPE CLAMP	

Return A

Altran Report 96227-TR-03 Rev. 1
Att./Appx. B Sh B130

JB
12/01

FORCES*	FX	FY	FZ
POSITIVE	2600	—	2850
NEGATIVE	3250	—	2850

6

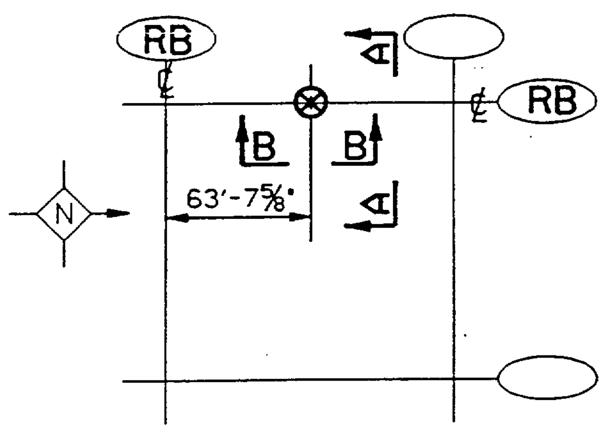
MVMTS *	X	Y	Z
THERMAL	—	0.083	0.293
SEISMIC	—	0.120	

PROBLEM NO. P-093A

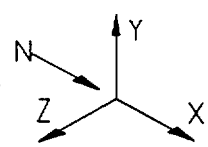
STRESS NO. —

ISSUE 6 DATA PT. 212

NUCLEAR CLASS 3



LOCATION PLAN
AREA 2



NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-R010/252(Q) REV.2
3. FOR DOCUMENT CLARITY REV.0 TO 2 OMITTED.
4. USE ITEMS 1 TO 5 & 7 & 8 FROM 0-GN01-R010/252(Q) R/2
5. ITEM 6 WILL BE FIELD PROCURED.

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	6	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	JR	7/26/94

WOLF CREEK NUCLEAR OPERATING CORPORATION

REF. DWGS. ISO M-13GN01
PIPE C-1S2621
STEEL C-1S2611

DRAWING NO. M-16GN01

PIPE SUPPORTS
CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".

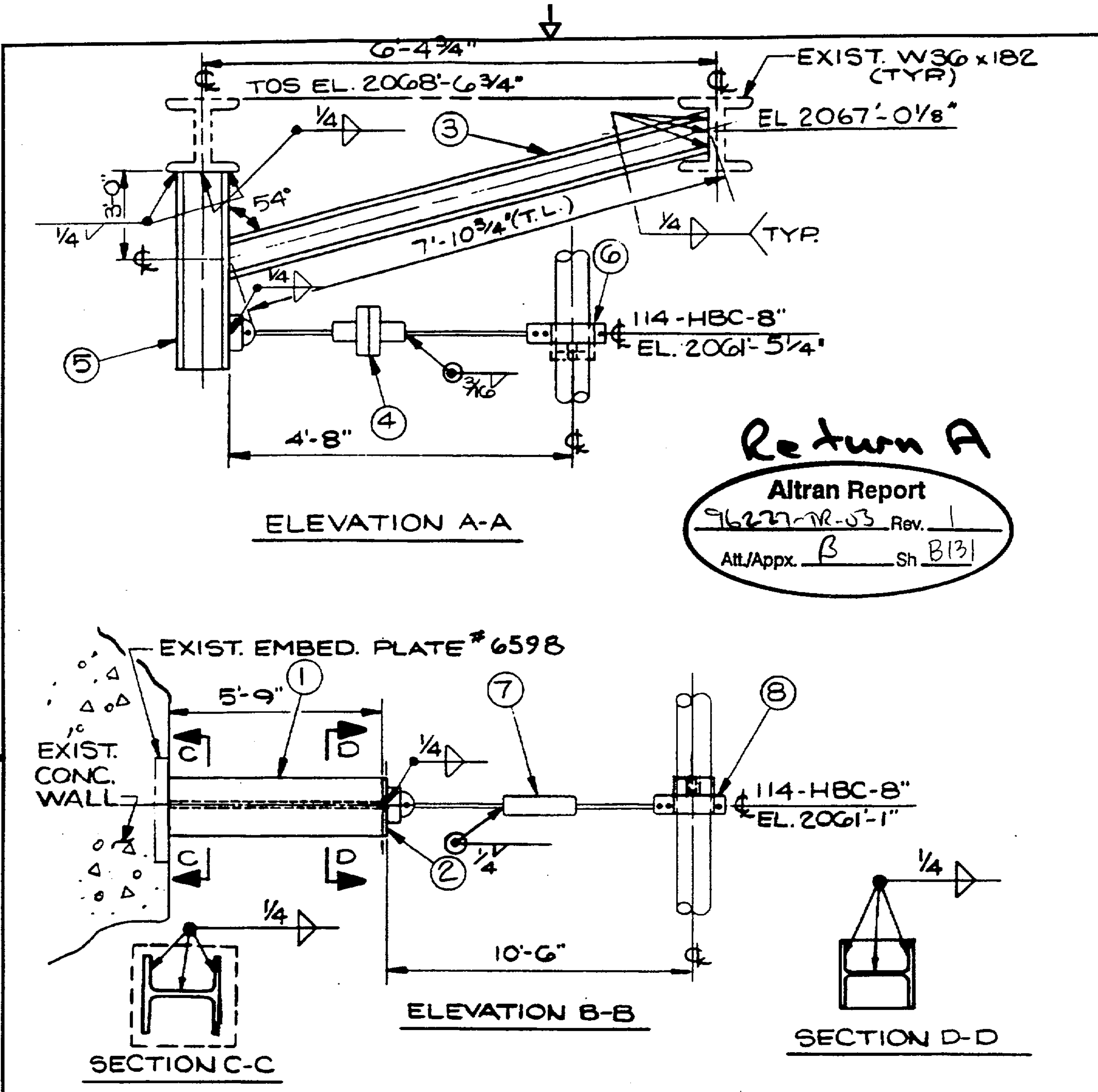
HANGER NO. 1-GN01-R010/252(Q)
REV. 6

PAGE 1 OF 2

DFN-ATS/ gn01r010 1.dgn
REF DFN-ATS/

8 1/2X11 A SIZE
PSC- . : . :

LEVEL 1 5 1 3 3 3 6 0



Return A

Altran Report
96227-TR-03 Rev. 1
Att./Appx. B Sh B131

JB
DB
12/8/00

WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO.
M-16GN01

PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A".

REF. DWGS.
ISO M-13GN01
PIPE
STEEL C-1S2621
C-1S2611

HANGER NO.
1-GN01-R010/252(Q)
PAGE 2 OF 2

REV.
6

DFN-ATS/gn01r010 2.dgn
REF DFN-ATS/gn01r010 2.cit
8 1/2X11 A SIZE
PSC-

LEVEL 1 5 1 3 3 3 6 0

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1	211	C SWAY STRUT, PIPE O.D.=8⅝"	
			W= 18¼" CLAMP MAT'L=C.S.	
			(BY M-218B SUPPLIER)	
2	1	211	C SWAY STRUT, PIPE O.D.=8⅝"	
			W= 2'-10⅛" CLAMP MAT'L=C.S.	
			(BY M-218B SUPPLIER)	

Return A

Altran Report 96227-TR-03 Rev. 1
Att./Appx. B Sh B132

JB
12/15/...

FORCES*	FX	FY	LATERAL
POSITIVE	1200	1450	—
NEGATIVE	1700	2450	—

MVMTS *	X	Y	Z
THERMAL	—	—	0.117
SEISMIC	—	—	0.056

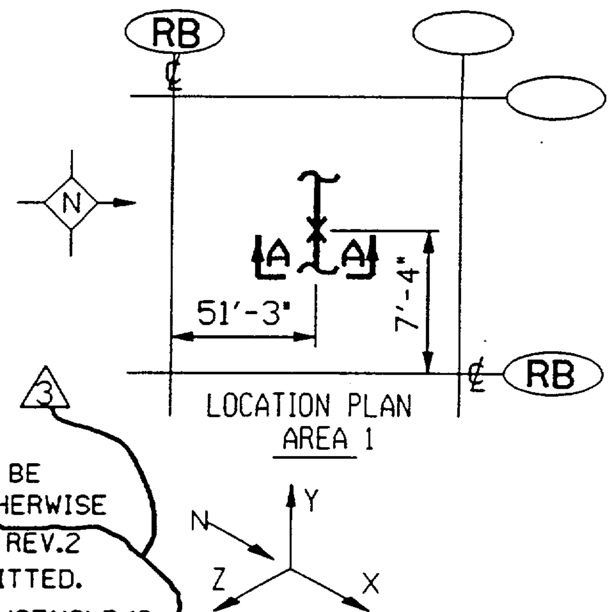
3

PROBLEM NO. P-093A

STRESS NO. —

ISSUE 6 DATA PT. 220

NUCLEAR CLASS 3



LOAD ______

3

NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-C015/251(Q) REV.2
3. FOR DOCUMENT CLARITY REV.0 TO 2 OMITTED.
4. USE ITEMS 1 THRU 2 FROM 0-GN01-C015/251(Q) R/2

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	3	DC2 8/24/94	REV. TO INC. PMPCN M-798-W-M-16GN01(0)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RP	EZA 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS.: ISO M-13GN01; PIPE ______; STEEL C-1S2611

DRAWING NO.
M-16GN01

PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A"

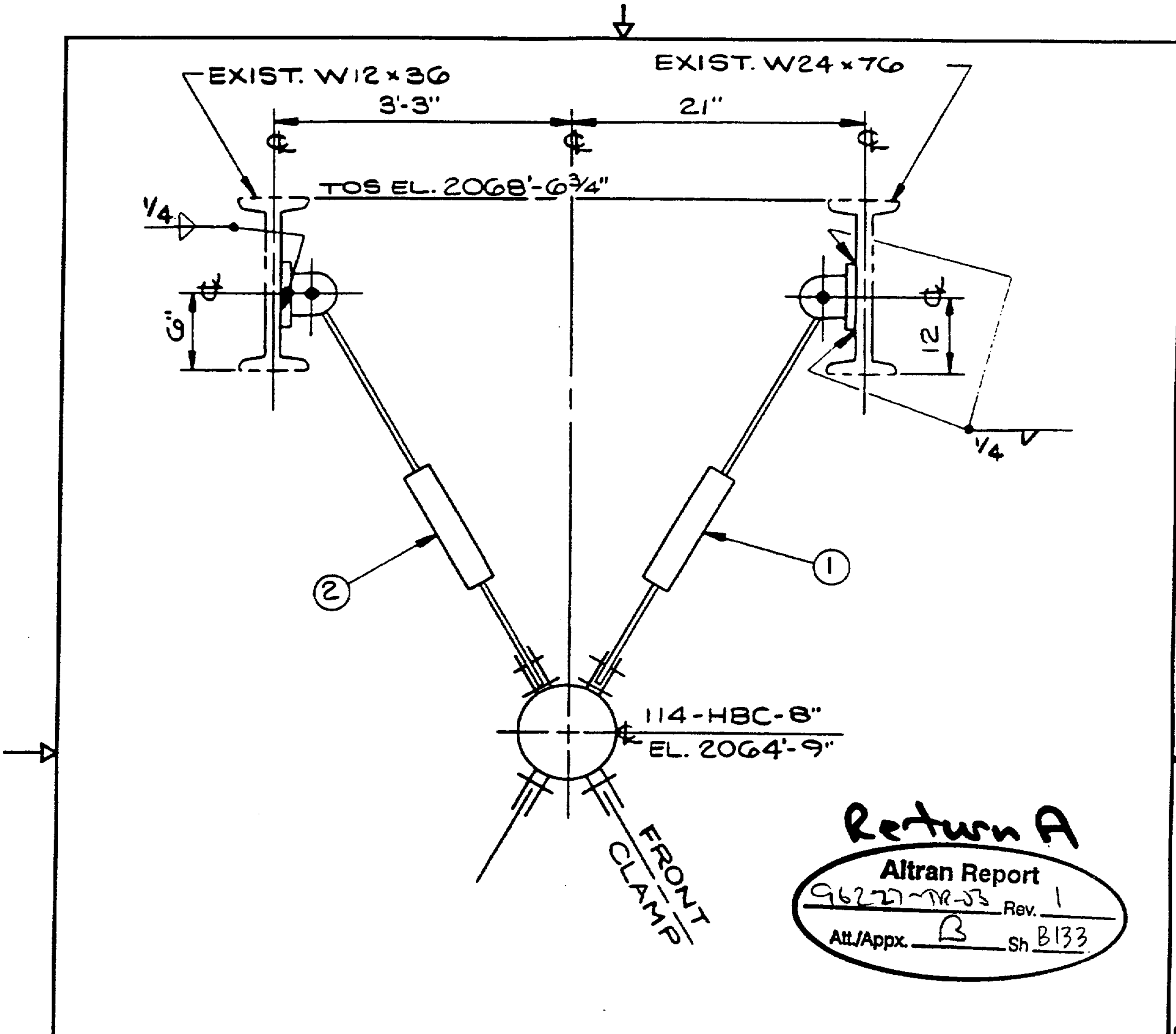
HANGER NO.: 1-GN01-C015/251(Q) REV. 3

PAGE 1 OF 2

LEVEL	1	5	1 3	3 3	6 0

DFN-ATS/ gn01c015 1.dgn
REF DFN-ATS/

8 1/2X11 A SIZE
PSC-



ELEVATION A-A

Return A

Altran Report 96227-TR-03 Rev. 1
Att./Appx. B Sh B133

JB
BB 12/13/96

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN01 PIPE STEEL C-1S2611	
DRAWING NO.				
M-16GN01		HANGER NO.		REV.
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".	-	1-GN01-C015/251(Q) PAGE 2 OF 2		3

LEVEL 1 5 13 33 60

DFN-ATS/gn01c015 2.dgn
REF DFN-ATS/gn01c015 2.cit

8 1/2X11 A SIZE
PSC-

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1A	1	2540	R/1-1.5 SNUBBER, STROKE=4" MVM'T.=.006"(T),	
			L=13", P-P=3'-6¼" (BY M-218A SUPPLIER)	
2B	1	2540	R/1-1.5 SNUBBER, STROKE=4"	
			MVM'T.= .071"(T), L=13", P-P=2'-10¾"	
3	2	2640-1.5	R/1-8" PIPE CLAMP	

Return A

Altran Report
96227-TR-03 Rev. 1
Att./Appx. B Sh B134

JB
12/10/c

FORCES*	FX(SNUB)	FY(SNUB)	FZ
POSITIVE	800	800	—
NEGATIVE	800	800	—

3

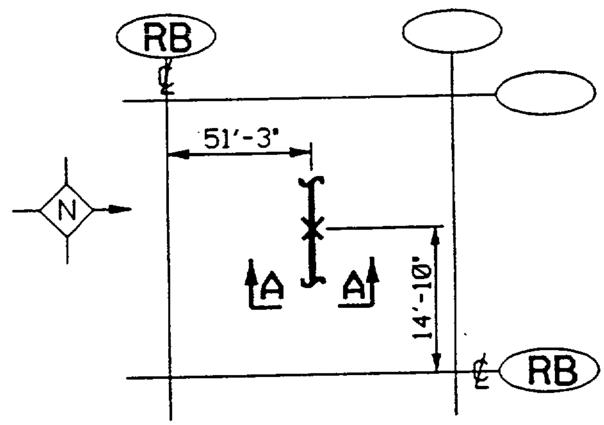
MVMTS *	X	Y	Z
THERMAL	-0.058	-0.056	-0.004
SEISMIC	—	—	0.055

PROBLEM NO. P-093A

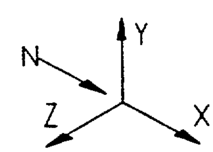
STRESS NO. —

ISSUE 6 DATA PT. 223

NUCLEAR CLASS 3



LOCATION PLAN
AREA 1



NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-R012/251(Q) REV.2
3. FOR DOCUMENT CLARITY REV.0 TO 2 OMITTED.
4. USE ITEMS 1 TO 3 FROM 0-GN01-R012/251(Q) R/2

3

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	3	DC2 8/24/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RP	ELD 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS. ISO M-13GN01
PIPE
STEEL C-0S2611

DRAWING NO.
M-16GN01
PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A"

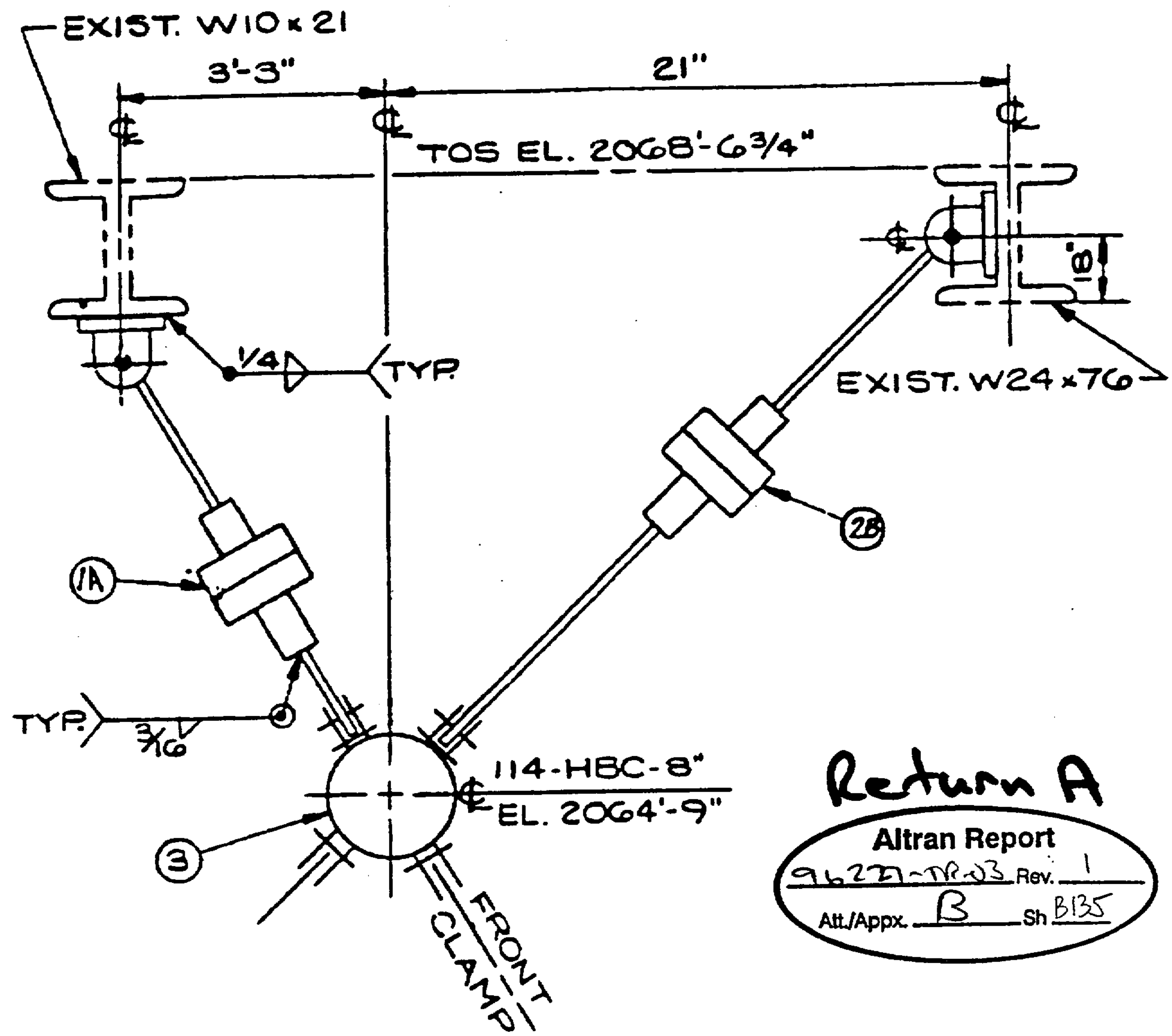
HANGER NO. 1-GN01-R012/251(Q)
PAGE 1 OF 2

REV. 3

8 1/2X11 A SIZE

DFN-ATS/ gn01r012 1.dgn
REF DFN-ATS/
PSC-

LEVEL 1 5 1 3 3 3 6 0



ELEVATION A-A

Return A

Altran Report
96227-TR-03 Rev. 1
Att./Appx. B Sh B135

NB
12/13/00

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS. ISO M-13GN01 PIPE STEEL C-0S2611
DRAWING NO. M-16GN01		HANGER NO.
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".		1-GN01-R012/251(Q) PAGE 2 OF 2 — REV. 3

LEVEL 1 45 3 3 6 0

DFN-ATS/gn01r012 2.dgn
REF DFN-ATS/gn01r012 2.cit

8 1/2X11 A SIZE
PSC-

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1		W4 x 13 14" LG. (BY M-216 SUPPLIER)	
2	1		W6 x 20 2'-9" LG. ↓	
3	1	2640-6	R/1-8" PIPE CLAMP (BY M-218A SUPPLIER)	
4	1	2540	R/1-6 SNUBBER, STROKE=5" ↓	
			MVM'T.= .044(C), L=17 ", P-P=2'-5¼"	
5	1		⅜" x 4¾" x 2'-4¼" PLATE (BY M-216 SUPPLIER)	SA 515, GR 65

Return A

Altran Report 96220-TR-03 Rev. 1
Att./Appx. B Sh B136

JB
RSS 12/11/01

FORCES*	FX	FY	FZ(SNUBB.)
POSITIVE	—	—	2650
NEGATIVE	—	—	2650

5

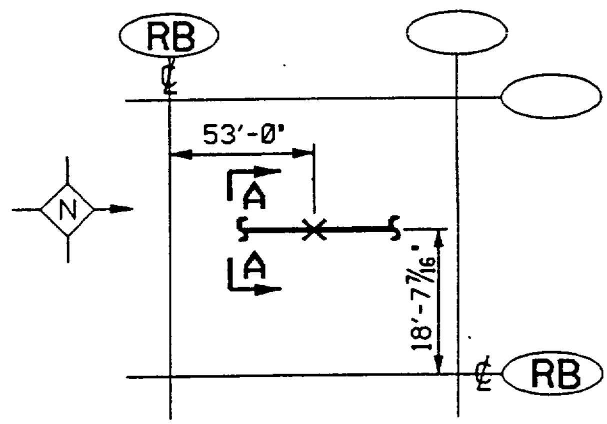
MVMTS *	X	Y	Z
THERMAL	-0.033	-0.067	-0.047
SEISMIC	0.019	0.005	—

PROBLEM NO. P-093A

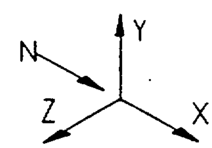
STRESS NO. —

ISSUE 6 DATA PT. 227

NUCLEAR CLASS 3



LOCATION PLAN
AREA 1



NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-R011/251(Q) REV.3
3. FOR DOCUMENT CLARITY REV.0 TO 3 OMITTED.
4. USE ITEMS 1 TO 5 FROM 0-GN01-R011/251(Q) R/3

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	5	DCZ 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RP	ERA 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO.
M-16GN01
PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A"

REF. DWGS. ISO M-13GN01
PIPE
STEEL C-1S2611

HANGER NO. 1-GN01-R011/251(Q)
REV. 5
PAGE 1 OF 2

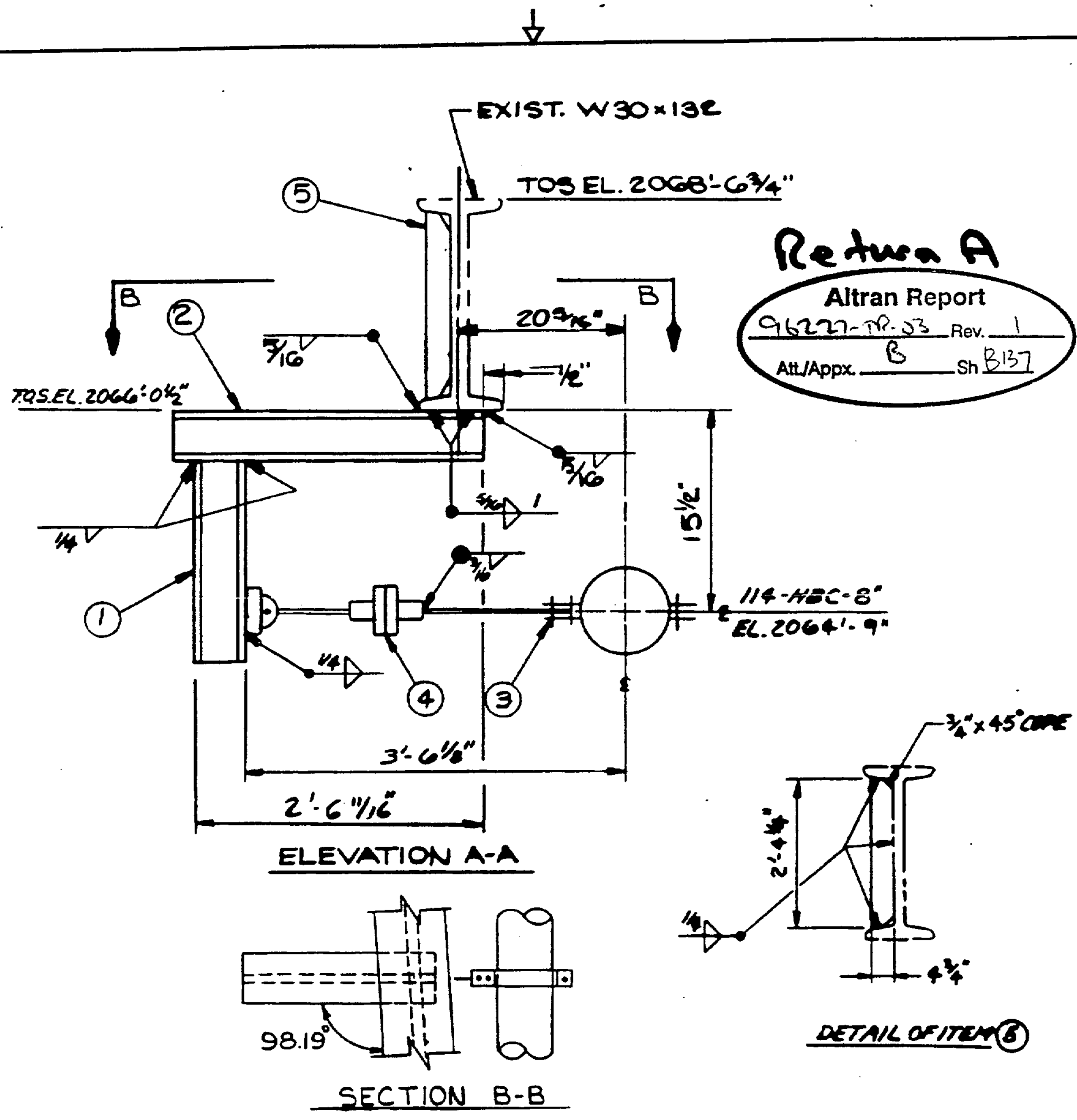
DFN-ATS/ gn01r011 1.dgn
REF DFN-ATS/
8 1/2X11 A SIZE
PSC-

LEVEL 1 5 | 1 3 | 3 3 | 6 0

Return A

Altran Report
96227-TR-03 Rev. 1
Att./Appx. B Sh B137

JB



WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS. ISO M-13GN01 / PIPE / STEEL C-1S2611	
DRAWING NO. M-16GN01		HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".	-	1-GN01-R011/251(Q) PAGE 2 OF 2	5

LEVEL 1 5 1 3 3 3 6 0

DFN-ATS/gn01r011 2.dgn
REF DFN-ATS/gn01r011 2.cit

8 1/2X11 A SIZE
PSC- . : . :

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1	211	C SWAY STRUT PIPE O.D.=10¾"	
			W=5'-8⅛" CLAMP MAT'L.=C.S. (BY M-218B SUPPLIER)	
2	1		W10 x 45 9'-2¼" LG. (BY M-216 SUPPLIER)	
3	4		∆3 x 3 x ⅜ 7¼" LG. (BY M-216 SUPPLIER)	

Return A

Altran Report 96227-TR-53 Rev. 1
Att./Appx. B Sh B138

℄ OF PIPE ATTACHMENT
℄ OF STEEL ATTACHMENT

NB
12/1/16

FORCES*	FX	FY	LATERAL
POSITIVE	—	1000	—
NEGATIVE	—	3134	—

2

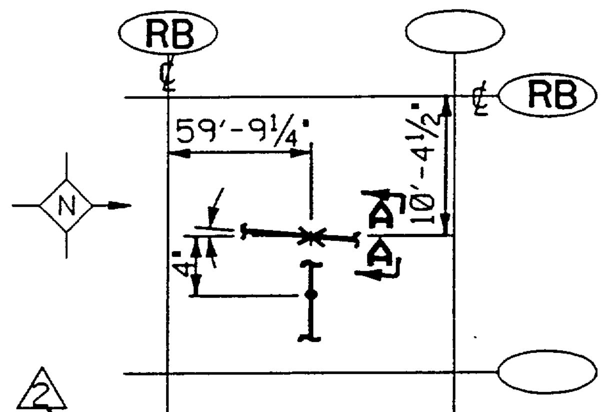
MVMTS *	X	Y	Z
THERMAL	0.094	—	-0.299
SEISMIC	0.009	—	0.068

PROBLEM NO. P-093A

STRESS NO. —

ISSUE 6 DATA PT. 360

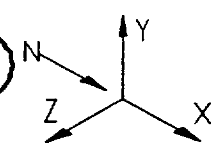
NUCLEAR CLASS 3



2

NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-H006/252(Q) REV.1
3. FOR DOCUMENT CLARITY REV.0 & 1 OMITTED.
4. USE ITEMS 1 THRU 3 FROM 0-GN01-H006/252(Q) R/1

LOCATION PLAN
AREA 2



REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	2	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RP	EPQ 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS. ISO M-13GN01
PIPE
STEEL C-1S2621

DRAWING NO.
M-16GN01

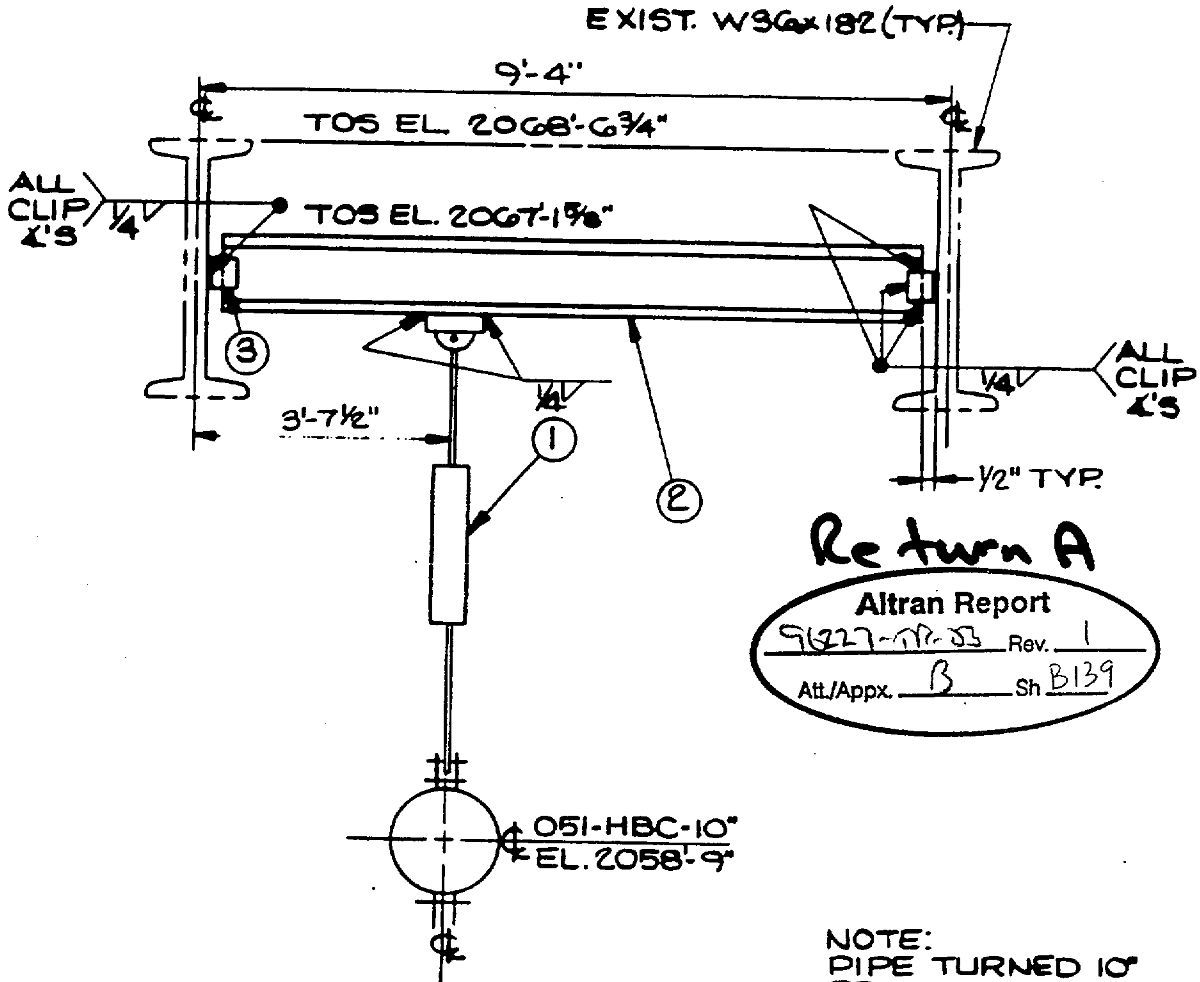
PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A".

HANGER NO. 1-GN01-H006/252(Q)
REV. 2

PAGE 1 OF 2

LEVEL 1 5 1 3 3 3 6 0

DFN-ATS/ gn01h006 1.dgn
REF DFN-ATS/
8 1/2X11 A SIZE
PSC-



ELEVATION A-A

Return A

Altran Report
96227-TR-03 Rev. 1
Att./Appx. B Sh B139

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS. ISO M-13GN01 PIPE STEEL C-1S2621
DRAWING NO. M-16GN01		HANGER NO. / REV.
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".		1-GN01-H006/252(Q) PAGE 2 OF 2 / 2

LEVEL 1 45 3 3 6 0

DFN-ATS/gn01h006 2.dgn
REF DFN-ATS/gn01h006 2.cit

8 1/2X11 A SIZE
PSC-

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1	2100	R/2-7 SWAY STRUT, P-P=3'-4 5/16" (BY M-218A SUPPLIER)	
2	1	2600-7	R/1-10 PIPE CLAMP	
3	1		W4 x 13 5'-0" LG. (BY M-216 SUPPLIER)	
4	1		W4 x 13 5'-3 3/4" LG.	
5	1	2540	R/1-6 SNUBBER, STROK=5"	
			MVM'T.= .216(C), L=17 1/8",	
			P-P=2'-8 11/16" (BY M-218A SUPPLIER)	
6	1	2640-6	R/1-10 PIPE CLAMP	
9	1		W8 x 40 5'-10 3/8" LG. (BY M-216 SUPPLIER)	
10	1		W8 x 40 4'-4" LG.	
11	1		W8 x 40 9'-3 1/8" LG.	
12	2		3" x 3" x 3/8", 5 1/2" LG.	

Return A

Altran Report 96227-TR-03 Rev. 1
Att./Appx. B Sh B140

JB 12/13/96

FORCES*	FX	FY	FZ(SNUBB.)
POSITIVE	2361	—	3850
NEGATIVE	1000	—	3850

5

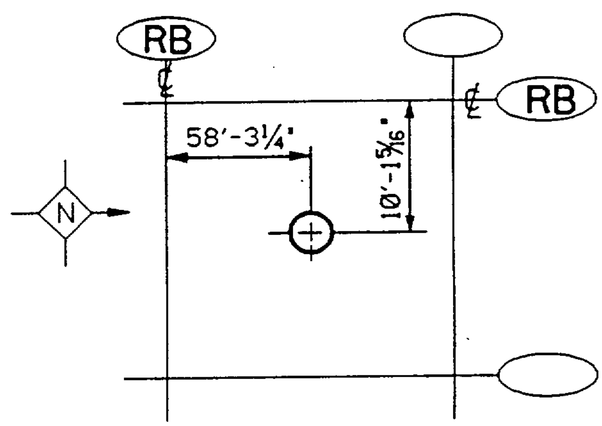
MVMTS *	X	Y	Z
THERMAL	—	0.055	-0.24
SEISMIC	—	0.004	—

PROBLEM NO. P-093A

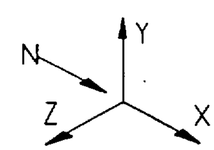
STRESS NO. —

ISSUE 6 DATA PT. 370

NUCLEAR CLASS 3



LOCATION PLAN
AREA 2



NOTES:
1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-R014/252(Q) REV.4
3. FOR DOCUMENT CLARITY REV.0 TO 4 OMITTED.
4. USE ITEMS 1 TO 6 & 9 THRU 12 FROM 0-GN01-R014/252(Q) R/4

5

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	5	DCZ 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RP	EPQ 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS. ISO M-13GN01
PIPE
STEEL C-0S2611

DRAWING NO.
M-16GN01

PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A"

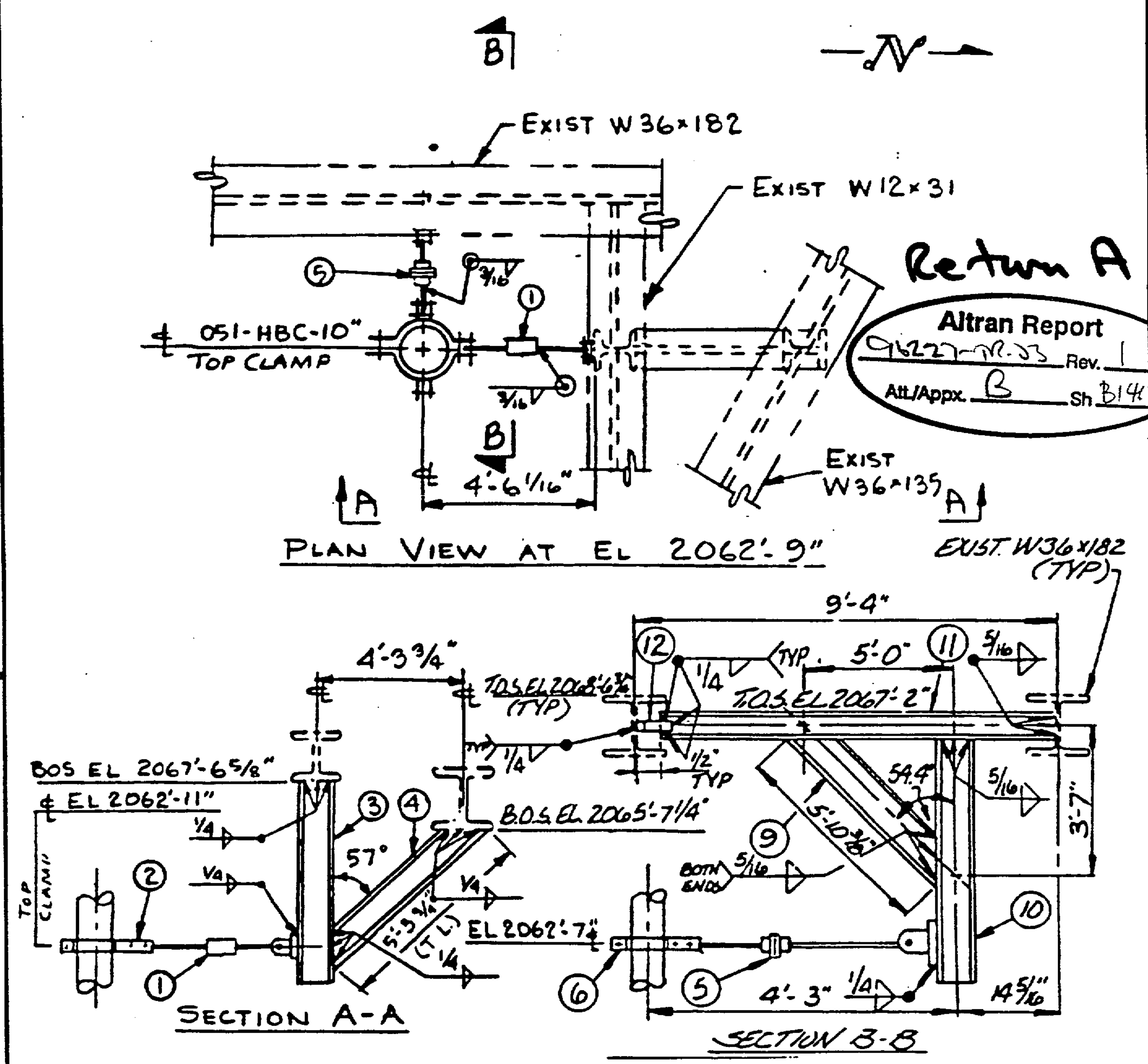
HANGER NO. 1-GN01-R014/252(Q) REV. 5

PAGE 1 OF 2

DFN-ATS/ gn01r014 1.dgn
REF DFN-ATS/

8 1/2X11 A SIZE
PSC-

LEVEL 1 5 1 3 3 3 6 0



Return A

Altran Report
96227-TR-03 Rev. 1
Att./Appx. B Sh. B141

WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO. M-16GN01	REF. DWGS.	ISO M-13GN01 PIPE STEEL C-0S2621
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".	HANGER NO. 1-GN01-R014/252(Q) PAGE 2 OF 2	REV. 5

LEVEL 1 5 3 3 6 0

DFN-ATS/gn01r014 2.dgn
REF DFN-ATS/gn01r014 2.cit

8 1/2X11 A SIZE
PSC- . : :

Wâ

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1	211	B SWAY STRUT ASSEMBLY PIPE O.D.= 6⅝"	
			W=4'-3⅞" CLAMP MAT'L.=C.S. (BY M-218B SUPPLIER)	
2	1		W6 x 20 2'-0" LG. (BY M-216 SUPPLIER)	
3	2		⅜" x 4" x 22½" PLATE (BY M-216 SUPPLIER)	SA 515. GR 65

Return A

Altran Report 96227-TR-03 Rev. 1
Att./Appx. B Sh B142

FORCES*	LATERAL	FY	FZ
POSITIVE	850	—	—
NEGATIVE	1100	—	—

MVMTS *	X	Y	Z
THERMAL	-0.011	-0.043	0.021
SEISMIC	0.010	0.002	0.120

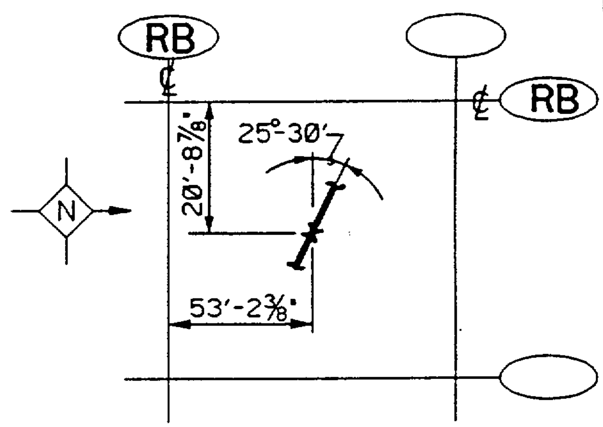
2

PROBLEM NO. P-093A

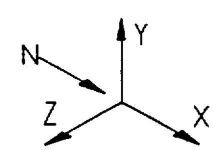
STRESS NO. —

ISSUE 6 DATA PT. 395

NUCLEAR CLASS 3



LOCATION PLAN
AREA 2



NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-R009/252(Q) REV.1
3. FOR DOCUMENT CLARITY REV.0 & 1 OMITTED.
4. USE ITEMS 1 TO 3 FROM 0-GN01-R009/252(Q) R/1

2

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	2	DCZ 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(0)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RP	ELQ 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO.
M-16GN01

PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A"

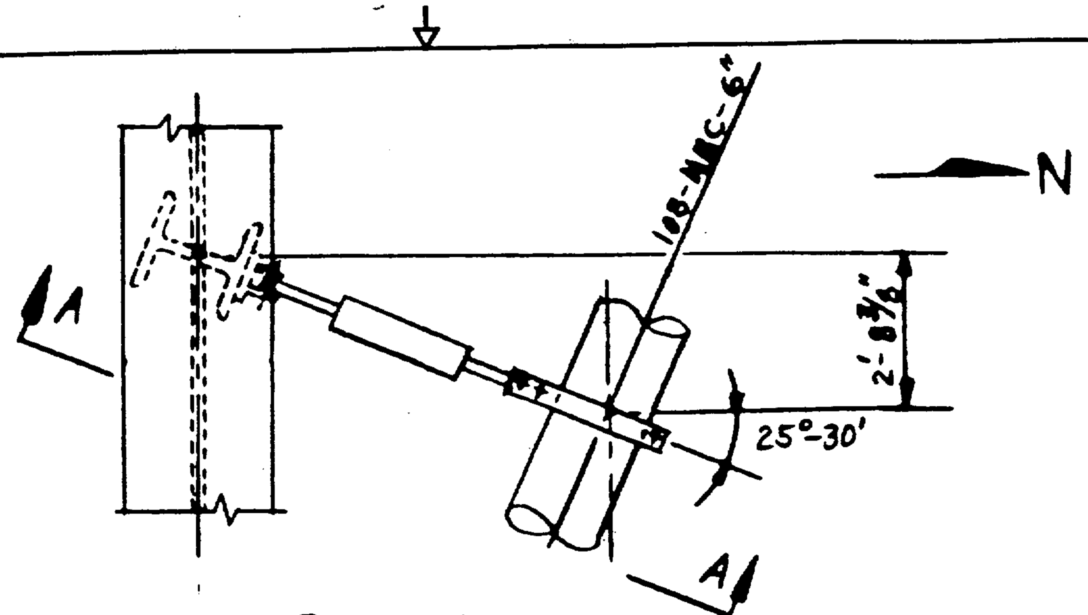
REF. DWGS. ISO M-13GN01
PIPE
STEEL C-1S2621

HANGER NO. 1-GN01-R009/252(Q)
REV. 2

PAGE 1 OF 2

DFN-ATS/ gn01r009 1.dgn
REF DFN-ATS/
8 1/2X11 A SIZE
PSC-

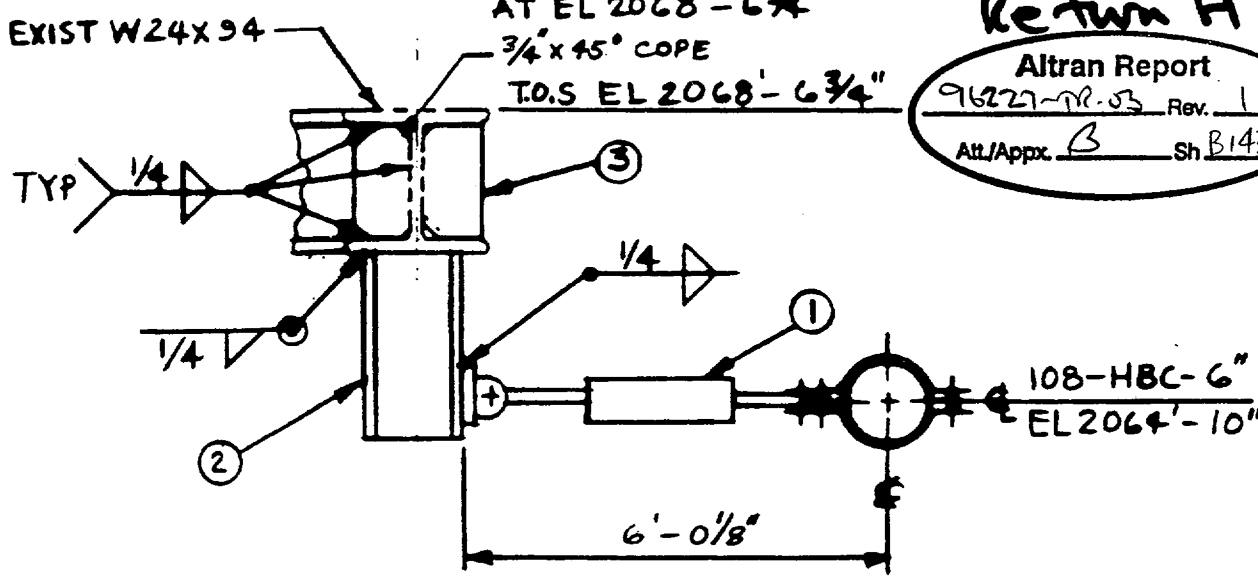
LEVEL 1 5 1 3 3 3 6 0



PLAN VIEW
AT EL 2068'-6¾"

Return A

Altran Report
96227-RR-03 Rev. 1
Att./Appx. B Sh B143



SECTION A-A

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS. ISO M-13GN01 PIPE STEEL C-1S2611
DRAWING NO. M-16GN01		HANGER NO. / REV.
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN"A".		1-GN01-R009/252(Q) PAGE 2 OF 2 / 2

LEVEL 1 5 13 3 33 60

DFN-ATS/gn01k009 2.dgn
REF DFN-ATS/gn01k009 2.cit

8 1/2X11 A SIZE
PSC-

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1		W6 × 20 4'-7 5/16" LG. (BY M-216 SUPPLIER)	
2	1	211	C SWAY STRUT PIPE O.D.=6 5/8"	
			W=16½", CLAMP MAT'L.=C.S. (BY M-218B SUPPLIER)	
3	4		∠ 3 × 3 × 3/8 4" LG. (BY M-216 SUPPLIER)	

Return A

Altran Report
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Att./Appx. B Sh B144

JB
12/13/0

FORCES*	FX	FY	FZ
POSITIVE	—	600	—
NEGATIVE	—	2917	—

3

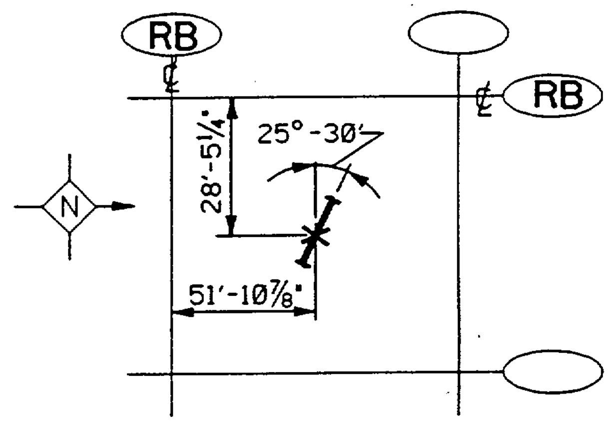
MVMTS *	X	Y	Z
THERMAL	-0.042	—	0.061
SEISMIC	0.038	—	.020

PROBLEM NO. P-093A

STRESS NO. —

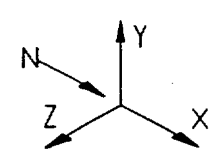
ISSUE 6 DATA PT. 397

NUCLEAR CLASS 3



NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-H007/252(Q) REV.1
3. FOR DOCUMENT CLARITY REV.0 & 1 OMITTED.
4. USE ITEMS 1 TO 3 FROM 0-GN01-H007/252(Q) R/1

LOCATION PLAN
AREA 2



REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	3	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RR	ELA 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS. ISO M-13GN01
PIPE
STEEL C-1S2621

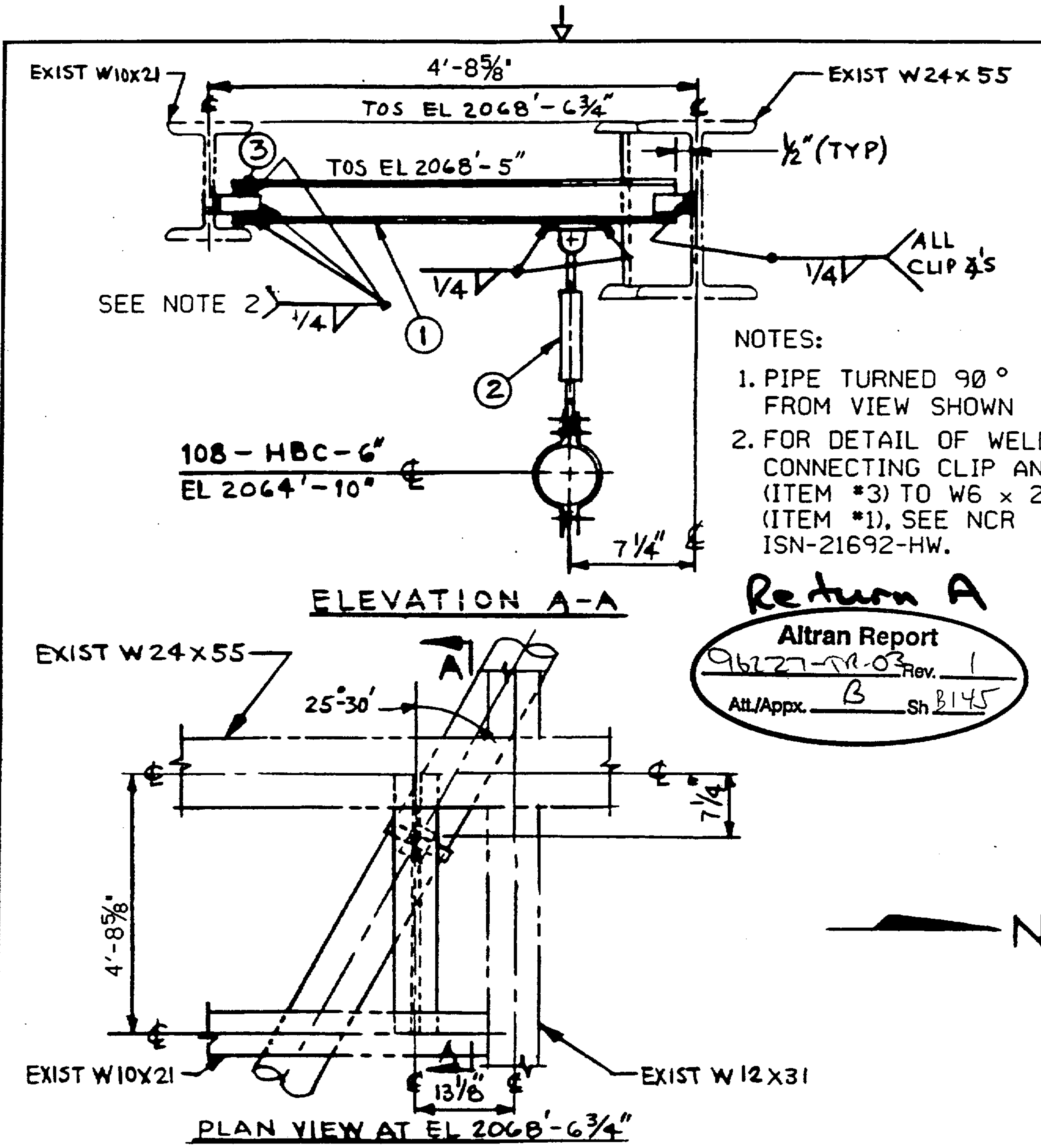
DRAWING NO.
M-16GN01

PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A".

HANGER NO. 1-GN01-H007/252(Q)
REV. 3
PAGE 1 OF 2

DFN-ATS/ gn01h007 1.dgn
REF DFN-ATS/
8 1/2X11 A SIZE
PSC-

LEVEL 1 5 1 3 3 3 6 0



NOTES:

1. PIPE TURNED 90° FROM VIEW SHOWN
2. FOR DETAIL OF WELDS CONNECTING CLIP ANGLES (ITEM #3) TO W6 x 20 (ITEM #1). SEE NCR ISN-21692-HW.

Return A

Altran Report 96227-TR-03 Rev. 1
Att./Appx. B Sh B145

JB 12/01

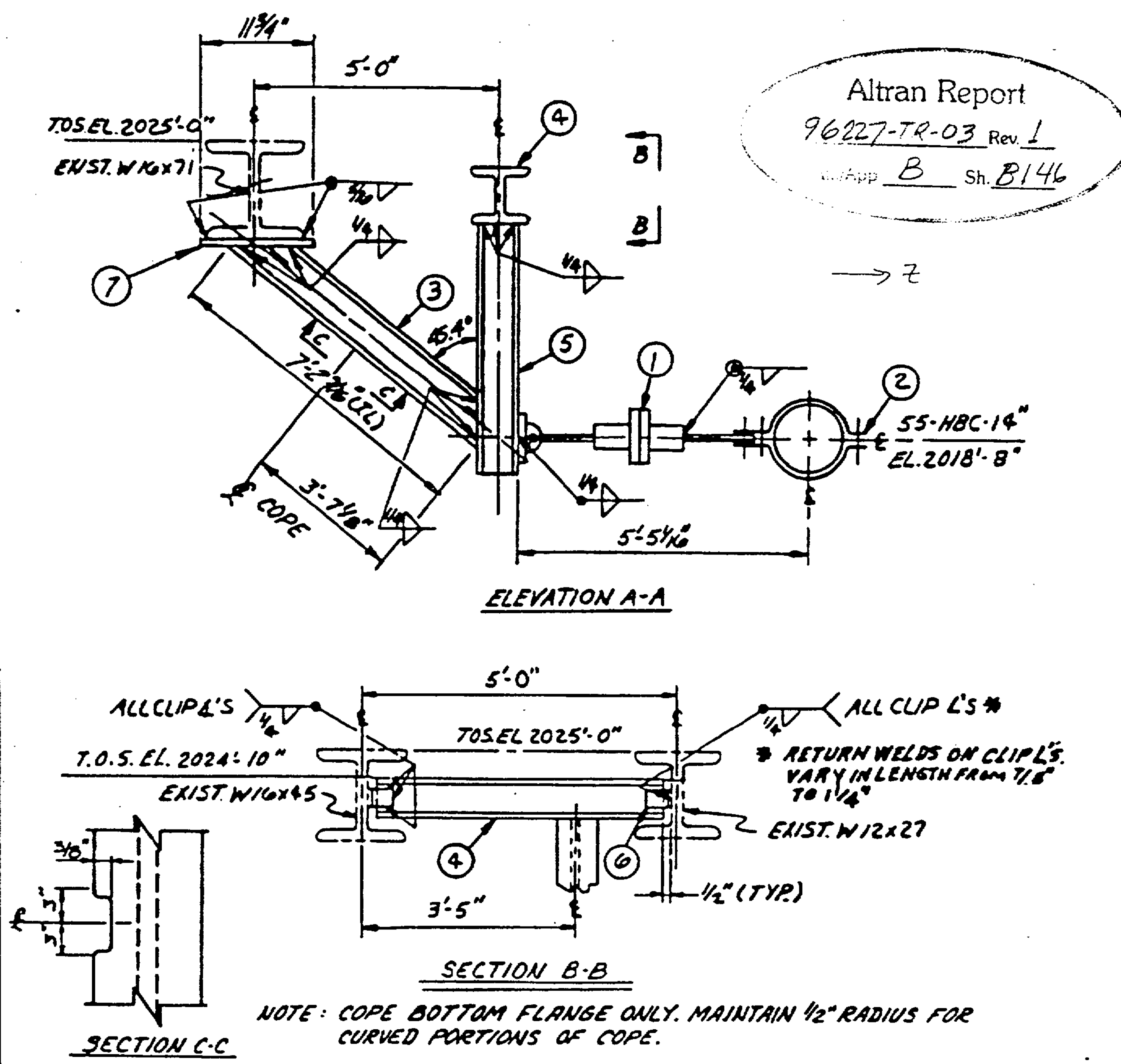
WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS. ISO M-13GN01; PIPE; STEEL C-1S2621
DRAWING NO. M-16GN01		HANGER NO. / REV.
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".		1-GN01-H007/252(Q) PAGE 2 OF 2 / 3

LEVEL 1 5 3 3 6 0

DFN-ATS/gn01h007 2.dgn
REF DFN-ATS/gn01h007 2.cil

8 1/2X11 A SIZE
PSC- . : . :

Altran Report 96227-TR-03 Rev. 1
App B Sh. B146



NOTE: COPE BOTTOM FLANGE ONLY. MAINTAIN ½" RADIUS FOR CURVED PORTIONS OF COPE.

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS. ISO M-13GN01 PIPE STEEL C-ØS2411	
DRAWING NO. M-16GN01		HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYS. REACTOR BLDG. TRAIN "A".		1-GN01-R013/231(Q) PAGE 2 OF 2	7

LEVEL 1 5 3 3 6 0
DFN-ATS/gn01k013 2.dgn
REF DFN-ATS/gn01k013 2.cit
8 1/2X11 A SIZE
PSC-

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1	2540	R/1-15 SNUBBER, STROKE=6" MVM'T.=.498(C),	
			L=20⅜", P-P=3'-11¹³⁄₁₆" (BY M-218A SUPPLIER)	
2	1	2640-15	R/1-14" PIPE CLAMP	
3	1		W8 x 24 7'-2⁵⁄₁₆"LG. (BY M-216 SUPPLIER)	
4	1		W8 x 40 4'-10¹¹⁄₁₆"LG.	
5	1		W8 x 24 5'-11" LG.	
6	4		∠3 x 3 x ⅜ 5⅝" LG.	
7	1		¾" x 7½" x 11¾" PLATE	SA-515, GR.65

Altran Report
96227-TR-03 Rev. 1
Att./App. B Sh. B/47

FORCES*	FX	FY	FZ
POSITIVE	—	—	9750
NEGATIVE	—	—	9750

7

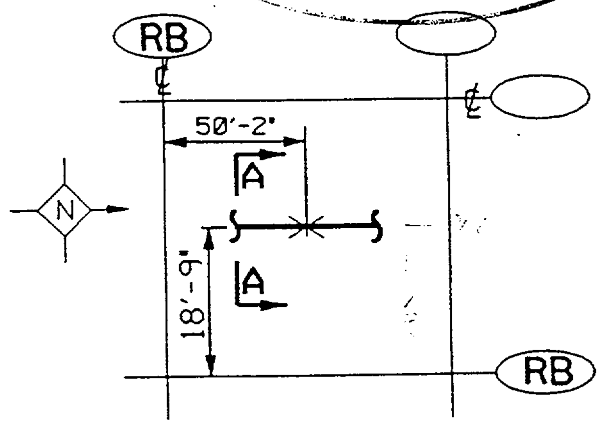
MVMTS *	X	Y	Z
THERMAL	-0.064	-0.087	-0.530
SEISMIC	0.079	0.066	—

PROBLEM NO. P-093A

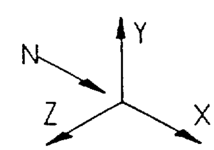
STRESS NO. —

ISSUE 6 DATA PT. 60

NUCLEAR CLASS 3



LOCATION PLAN
AREA 1



NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN01-R013/231(Q) REV.4
3. FOR DOCUMENT CLARITY REV.0 TO 4 OMITTED.
4. USE ITEMS 1 TO 7 FROM 0-GN01-R013/231(Q) R/4

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	7	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	[illegible]	[illegible]	[illegible] 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS.
ISO M-13GN01
PIPE
STEEL C-0S2411

DRAWING NO.
M-16GN01

HANGER NO. 1-GN01-R013/231(Q)
REV. 7

PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "A".

PAGE 1 OF 2

DFN-ATS/ gn01r013 1.dgn
REF DFN-ATS/
8 1/2X11 A SIZE
PSC-

LEVEL 1 5 1 3 3 3 6 0

Reference

Train 'B' Return Line

For Containment Cooling System (Train 'B' Return Line), one stress analysis has been performed for two separate Water Hammer (WH) condition.

Column Closure Water Hammer
Condensation Induced Water Hammer
(Dated: 7/18/00)

For Load Table (Table B-4.0) due to Column Closure and Condensation Induced Water Hammer Condition, see pages B172, for Load Comparison Summary (Table B-5.0) evaluation of supports see page B173 of this attachment. SEE PAGES B173 AND B173A FOR MAXIMUM I.R. VALUES.

Remaining support loads due to this condition are lower than loads due to Column Closure Water Hammer Condition. Therefore, those remaining supports are acceptable by comparison with evaluation due to Column Closure Water Hammer Condition.

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
DEADWEIGHT LOADS (FILE 10)

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B149

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

SPRING/HANGER SUMMARY
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
5	1	40	SP	313.	-1456.	0.	0.	0.	0.	.0018	-.0083	.0122	.0130	-.0111	-.0051
7	1	57	SP	-263.	-1500.	0.	0.	0.	0.	-.0015	-.0086	.0120	-.0151	-.0021	.0082
9	1	65	SP	0.	0.	387.	0.	0.	0.	-.0042	-.0152	.0022	.0032	-.0067	.0050
11	1	85	SP	182.	-1689.	0.	0.	0.	0.	.0010	-.0096	.0065	.0266	-.0016	-.0080
13	1	100	SP	-14.	-1875.	0.	0.	0.	0.	-.0001	-.0107	.0066	-.0111	-.0005	-.0076
15	1	117	SP	12.	-1665.	-136.	0.	0.	0.	.0001	-.0095	-.0008	-.0063	-.0014	-.0109
17	1	140	SP	-8.	-1266.	6.	0.	0.	0.	-.0005	-.0072	-.0006	-.0124	.0003	-.0118
19	1	160	SP	0.	-2073.	0.	0.	0.	0.	-.0006	-.0118	-.0004	.0004	-.0002	-.0340
21	1	172	SP	-21.	0.	59.	0.	0.	0.	-.0009	-.1685	.0001	.0103	.0001	-.0100
23	1	187	SP	-10.	0.	-520.	0.	0.	0.	-.0001	-.1721	-.0030	-.0155	.0128	-.0049
27	1	215	SP	0.	-6543.	0.	0.	0.	0.	.0261	-.0373	.0076	.1084	.0165	-.0436
29	1	217	SN	0.	0.	0.	0.	0.	0.	.0186	.0004	.0076	.0669	.0166	-.0485
31	1	223	SP	0.	1435.	581.	0.	0.	0.	.0062	.0082	.0033	.0133	.0062	-.0555
34	1	240	SP	0.	-1283.	84.	0.	0.	0.	.0062	-.0121	.0008	-.0009	-.0007	.0142
36	1	260	2S	28.	-459.	-20.	-318.	-53.	36.	.0004	-.0019	-.0001	.0000	-.0073	.0000
38	1	275	2S	4.	-453.	-185.	41.	-6.	23.	.0001	-.0014	-.0024	.0021	-.0008	.0032
40	1	320	SP	0.	-1933.	33.	0.	0.	0.	.0131	-.0110	.0002	.0072	.0080	.0000
42	1	335	SP	0.	0.	-22.	0.	0.	0.	.0119	-.0225	-.0001	.0010	.0051	.0045
44	1	347	SP	67.	-3863.	34.	0.	0.	0.	.0004	-.0220	.0002	.0002	.0030	.0024
48	1	390	SP	-27.	0.	0.	0.	0.	0.	-.0002	-.0241	.0002	-.0018	.0005	.0040
50	1	399	SP	0.	-1305.	-46.	0.	0.	0.	-.0008	-.0074	-.0003	.0145	.0008	.0039
53	1	407	SP	0.	-464.	-71.	0.	0.	0.	-.0008	-.0078	-.0012	.0241	.0034	-.0037
54	1	409	SN	0.	0.	0.	0.	0.	0.	-.0008	-.0093	-.0022	.0254	.0053	-.0092
56	1	430	2S	0.	-366.	28.	134.	33.	-35.	.0000	-.0012	.0004	.0069	.0045	-.0049
58	1	450	2S	-3.	-507.	74.	-54.	3.	-63.	.0000	-.0021	.0005	.0000	.0004	.0000

ADLPIPE P 41 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANALYS WINDOWS 3F9.3 7/18/ 0 15:22:29

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 962.. TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
DEADWEIGHT LOADS (FILE 10)

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B150

SPRING/HANGER SUMMARY IN LOCAL COORDINATES
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
15	1	117	SP	62.	-1665.	-122.	0.	0.	0.	.0004	-.0095	-.0007	-.0017	-.0014	-.0125
17	1	140	SP	-10.	-1266.	0.	0.	0.	0.	-.0001	-.0072	-.0008	-.0028	.0003	-.0168
19	1	160	SP	0.	-2073.	0.	0.	0.	0.	.0000	-.0118	-.0007	.0278	-.0002	-.0196
21	1	172	SP	-62.	0.	0.	0.	0.	0.	-.0004	-.1685	-.0008	.0130	.0001	.0062
36	1	260	2S	28.	-459.	-20.	-318.	-53.	36.	.0004	-.0019	-.0001	.0000	-.0073	.0000
38	1	275	2S	4.	-453.	-185.	41.	-6.	23.	.0001	-.0014	-.0024	.0021	-.0008	.0032
56	1	430	2S	0.	-366.	28.	134.	33.	-35.	.0000	-.0012	.0004	.0069	.0045	-.0049
58	1	450	2S	-3.	-507.	74.	-54.	3.	-63.	.0000	-.0021	.0005	.0000	.0004	.0000

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
DEADWEIGHT LOADS (FILE 10)

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B151

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
1	5	-258.	-4005.	-287.	7653.	-382.	-7449.	.0000	.0000	.0000	.0000	.0000	.0000
2	20	0.	0.	0.	0.	0.	0.	.0076	-.0102	.0108	.0085	-.0050	-.0062
3	2121	0.	0.	0.	0.	0.	0.	.0041	-.0147	.0096	.0088	-.0050	-.0062
4	30	0.	0.	0.	0.	0.	0.	.0166	-.0104	.0205	.0074	-.0079	-.0086
5	38	0.	0.	0.	0.	0.	0.	.0092	-.0036	.0122	.0061	-.0153	-.0068
6	40	0.	0.	0.	0.	0.	0.	.0018	-.0083	.0122	.0130	-.0111	-.0051
7	55	0.	0.	0.	0.	0.	0.	-.0013	-.0215	.0120	-.0190	.0011	.0061
8	57	0.	0.	0.	0.	0.	0.	-.0015	-.0086	.0120	-.0151	-.0021	.0082
9	61	0.	0.	0.	0.	0.	0.	-.0042	-.0077	.0095	.0001	-.0103	.0122
10	65	0.	0.	0.	0.	0.	0.	-.0042	-.0152	.0022	.0032	-.0067	.0050
11	81	0.	0.	0.	0.	0.	0.	.0014	-.0054	.0065	.0247	-.0017	-.0080
12	85	0.	0.	0.	0.	0.	0.	.0010	-.0096	.0065	.0266	-.0016	-.0080
13	95	0.	0.	0.	0.	0.	0.	.0000	-.0443	.0065	-.0214	.0002	-.0077
14	100	0.	0.	0.	0.	0.	0.	-.0001	-.0107	.0066	-.0111	-.0005	-.0076
15	116	0.	0.	0.	0.	0.	0.	.0006	-.0112	-.0010	-.0100	-.0017	-.0089
16	117	0.	0.	0.	0.	0.	0.	.0001	-.0095	-.0008	-.0063	-.0014	-.0109
17	130	0.	0.	0.	0.	0.	0.	-.0008	-.0150	-.0004	-.0117	.0002	-.0093
18	140	0.	0.	0.	0.	0.	0.	-.0005	-.0072	-.0006	-.0124	.0003	-.0118
19	150	0.	0.	0.	0.	0.	0.	-.0004	-.0033	-.0006	-.0177	-.0001	-.0095
20	160	0.	0.	0.	0.	0.	0.	-.0006	-.0118	-.0004	.0004	-.0002	-.0340
21	170	0.	0.	0.	0.	0.	0.	-.0009	-.1364	.0000	.0172	-.0001	-.0342
22	172	0.	0.	0.	0.	0.	0.	-.0009	-.1685	.0001	.0103	.0001	-.0100
23	180	0.	0.	0.	0.	0.	0.	-.0039	-.1728	.0100	.0018	.0072	.0008
24	187	0.	0.	0.	0.	0.	0.	-.0001	-.1721	-.0030	-.0155	.0128	-.0049
25	195	0.	0.	0.	0.	0.	0.	.0063	-.1717	-.0199	-.0168	.0151	-.0088
26	196	0.	0.	0.	0.	0.	0.	.0058	-.1717	-.0189	-.0168	.0151	-.0087
27	211	0.	0.	0.	0.	0.	0.	.0380	-.1390	.0077	.1467	.0158	-.0357
28	215	0.	0.	0.	0.	0.	0.	.0261	-.0373	.0076	.1084	.0165	-.0436
29	216	0.	0.	0.	0.	0.	0.	.0242	-.0258	.0076	.0959	.0166	-.0449
30	217	0.	0.	0.	0.	0.	0.	.0186	.0004	.0076	.0669	.0166	-.0485
31	221	0.	0.	0.	0.	0.	0.	.0062	.0157	.0042	.0138	.0071	-.0578
32	223	0.	0.	0.	0.	0.	0.	.0062	.0082	.0033	.0133	.0062	-.0555
33	230	0.	0.	0.	0.	0.	0.	.0062	-.0452	.0017	.0045	-.0006	.0049
34	235	0.	0.	0.	0.	0.	0.	.0062	-.0430	.0018	.0041	.0000	.0102
35	240	0.	0.	0.	0.	0.	0.	.0062	-.0121	.0008	-.0009	-.0007	.0142
36	260	0.	0.	0.	0.	0.	0.	.0004	-.0019	-.0001	.0000	-.0073	.0000
37	2600	28.	-459.	-20.	-318.	-53.	36.	.0000	.0000	.0000	.0000	.0000	.0000
38	275	4.	0.	0.	0.	0.	0.	.0001	-.0014	-.0024	.0021	-.0008	.0032
39	2750	4.	-453.	-185.	41.	-6.	23.	.0000	.0000	.0000	.0000	.0000	.0000
40	310	0.	0.	0.	0.	0.	0.	.0131	-.0314	.0138	.0097	.0074	.0112
41	320	0.	0.	0.	0.	0.	0.	.0131	-.0110	.0002	.0072	.0080	.0000
42	330	0.	0.	0.	0.	0.	0.	.0166	-.0225	-.0033	.0030	.0064	.0008

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
DEADWEIGHT LOADS (FILE 10)

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B152

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
43	335	0.	0.	0.	0.	0.	0.	.0119	-.0225	-.0001	.0010	.0051	.0045
44	340	0.	0.	0.	0.	0.	0.	.0054	-.0223	.0003	-.0001	.0040	.0048
45	347	0.	0.	0.	0.	0.	0.	.0004	-.0220	.0002	.0002	.0030	.0024
46	370	0.	0.	0.	0.	0.	0.	-.0004	-.0228	.0016	.0005	.0012	-.0006
47	371	0.	0.	0.	0.	0.	0.	-.0004	-.0227	.0017	.0005	.0012	-.0006
48	386	0.	0.	0.	0.	0.	0.	-.0001	-.0239	.0002	-.0019	.0005	.0039
49	390	0.	0.	0.	0.	0.	0.	-.0002	-.0241	.0002	-.0018	.0005	.0040
50	396	0.	0.	0.	0.	0.	0.	-.0008	-.0132	.0002	.0141	.0005	.0103
51	399	0.	0.	0.	0.	0.	0.	-.0008	-.0074	-.0003	.0145	.0008	.0039
52	400	0.	0.	0.	0.	0.	0.	-.0008	-.0110	-.0014	.0155	.0001	-.0028
53	405	0.	0.	0.	0.	0.	0.	-.0008	-.0116	-.0014	.0158	-.0001	-.0020
54	407	0.	0.	0.	0.	0.	0.	-.0008	-.0078	-.0012	.0241	.0034	-.0037
55	409	0.	0.	0.	0.	0.	0.	-.0008	-.0093	-.0022	.0254	.0053	-.0092
56	430	0.	0.	0.	0.	0.	0.	.0000	-.0012	.0004	.0069	.0045	-.0049
57	4300	0.	-366.	28.	134.	33.	-35.	.0000	.0000	.0000	.0000	.0000	.0000
58	450	0.	0.	0.	0.	0.	0.	.0000	-.0021	.0005	.0000	.0004	.0000
59	4500	-3.	-507.	74.	-54.	3.	-63.	.0000	.0000	.0000	.0000	.0000	.0000

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
DEADWEIGHT LOADS (FILE 10)

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B153

CONDITION 10
LOADS
DEADWEIGHT
PRESSURE

NETWORK POINT SUMMARY IN THE LOCAL COORDINATES
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
1	5	-386.	-4005.	-13.	-41.	-382.	-10680.	.0000	.0000	.0000	.0000	.0000	.0000
37	2600	28.	-459.	-20.	-318.	-53.	36.	.0000	.0000	.0000	.0000	.0000	.0000
39	2750	4.	-453.	-185.	41.	-6.	23.	.0000	.0000	.0000	.0000	.0000	.0000
57	4300	0.	-366.	28.	134.	33.	-35.	.0000	.0000	.0000	.0000	.0000	.0000
59	4500	-3.	-507.	74.	-54.	3.	-63.	.0000	.0000	.0000	.0000	.0000	.0000

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 962. TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
THERMAL-NORMAL OPER. LOADS (FILE 20)

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B154

CONDITION 20
LOADS
THERMAL

SPRING/HANGER SUMMARY
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
5	1	40	SP	-209.	410.	0.	0.	0.	0.	-.0012	.0023	-.0186	.0138	.0048	.0249
7	1	57	SP	818.	-158.	0.	0.	0.	0.	.0047	-.0009	.0261	-.0059	.0027	.0181
9	1	65	SP	0.	0.	-105.	0.	0.	0.	-.0072	-.0100	-.0006	-.0136	-.0385	.0090
11	1	85	SP	-764.	115.	0.	0.	0.	0.	-.0044	.0007	-.0747	-.0037	.0050	-.0578
13	1	100	SP	-64.	-74.	0.	0.	0.	0.	-.0004	-.0004	-.0239	.0052	-.0061	-.0428
15	1	117	SP	5.	32.	163.	0.	0.	0.	.0000	.0002	.0009	-.0152	-.0008	-.0314
17	1	140	SP	-31.	109.	23.	0.	0.	0.	.0231	.0006	.0311	-.0184	.0030	-.0213
19	1	160	SP	-13.	-169.	18.	0.	0.	0.	.0670	-.0010	.0486	-.0121	.0061	-.0229
21	1	172	SP	2.	0.	-4.	0.	0.	0.	.1161	-.0733	.0422	-.0035	.0082	-.0168
23	1	187	SP	103.	0.	140.	0.	0.	0.	.0006	-.0317	.0008	.0007	.0017	.0291
27	1	215	SP	0.	107.	0.	0.	0.	0.	-.0653	.0006	.0114	-.0019	-.0051	.0101
29	1	217	SN	0.	0.	0.	0.	0.	0.	-.0630	-.0002	.0067	-.0017	-.0050	.0086
31	1	223	SP	0.	-47.	-127.	0.	0.	0.	-.0555	-.0003	-.0007	-.0041	-.0004	.0016
34	1	240	SP	0.	-124.	-156.	0.	0.	0.	-.0154	-.0012	-.0015	-.0043	.0014	-.0025
36	1	260	2S	38.	53.	64.	-120.	-22.	108.	.0005	.0002	.0005	.0000	-.0030	.0000
38	1	275	2S	-57.	107.	134.	-175.	89.	-119.	-.0008	.0003	.0017	-.0090	.0123	-.0166
40	1	320	SP	0.	-937.	6.	0.	0.	0.	.0486	-.0053	.0000	-.0063	-.0048	-.0389
42	1	335	SP	0.	0.	-57.	0.	0.	0.	.0449	-.0232	-.0003	-.0012	.0012	.0173
44	1	347	SP	142.	704.	99.	0.	0.	0.	.0008	.0040	.0006	.0039	.0056	.0113
48	1	390	SP	-126.	0.	0.	0.	0.	0.	-.0007	.0461	.0193	-.0194	.0149	-.0072
50	1	399	SP	0.	100.	29.	0.	0.	0.	-.0159	.0006	.0002	-.0186	-.0022	-.0058
53	1	407	SP	0.	-103.	99.	0.	0.	0.	.0176	-.0017	.0017	-.0154	.0005	.0004
54	1	409	SN	0.	0.	0.	0.	0.	0.	.0198	-.0018	.0017	-.0155	-.0011	-.0012
56	1	430	2S	63.	46.	-42.	68.	65.	155.	.0009	.0001	-.0005	.0035	.0090	.0215
58	1	450	2S	24.	52.	-144.	425.	-2.	82.	.0003	.0002	-.0010	.0000	-.0003	.0000

ADLPIPE PA 106 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANALYSI WINDOWS 3F9.3 7/18/ 0 15:22:29

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 9622/-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
THERMAL-NORMAL OPER. LOADS (FILE 20)

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B155

CONDITION 20
LOADS
THERMAL

SPRING/HANGER SUMMARY IN LOCAL COORDINATES
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
15	1	117	SP	-57.	32.	153.	0.	0.	0.	-.0003	.0002	.0009	-.0022	-.0008	-.0349
17	1	140	SP	-38.	109.	0.	0.	0.	0.	-.0002	.0006	.0387	-.0019	.0030	-.0281
19	1	160	SP	-22.	-169.	0.	0.	0.	0.	-.0001	-.0010	.0827	.0114	.0061	-.0232
21	1	172	SP	5.	0.	0.	0.	0.	0.	.0000	-.0733	.1236	.0146	.0082	-.0090
36	1	260	2S	38.	53.	64.	-120.	-22.	108.	.0005	.0002	.0005	.0000	-.0030	.0000
38	1	275	2S	-57.	107.	134.	-175.	89.	-119.	-.0008	.0003	.0017	-.0090	.0123	-.0166
56	1	430	2S	63.	46.	-42.	68.	65.	155.	.0009	.0001	-.0005	.0035	.0090	.0215
58	1	450	2S	24.	52.	-144.	425.	-2.	82.	.0003	.0002	-.0010	.0000	-.0003	.0000

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
THERMAL-NORMAL OPER. LOADS (FILE 20)

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B156

CONDITION 20
LOADS
THERMAL

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
1	5	68.	-223.	-140.	-682.	217.	-709.	.0000	.0000	.0000	.0000	.0000	.0000
2	20	0.	0.	0.	0.	0.	0.	.0052	.0108	-.0050	-.0139	.0019	.0006
3	2121	0.	0.	0.	0.	0.	0.	.0060	.0168	.0024	-.0139	.0019	.0006
4	30	0.	0.	0.	0.	0.	0.	.0035	.0253	-.0255	-.0147	-.0001	.0024
5	38	0.	0.	0.	0.	0.	0.	-.0043	.0110	-.0243	.0166	.0058	.0257
6	40	0.	0.	0.	0.	0.	0.	-.0012	.0023	-.0186	.0138	.0048	.0249
7	55	0.	0.	0.	0.	0.	0.	.0034	-.0048	.0188	-.0053	.0011	.0192
8	57	0.	0.	0.	0.	0.	0.	.0047	-.0009	.0261	-.0059	.0027	.0181
9	61	0.	0.	0.	0.	0.	0.	.0010	-.0013	.0270	-.0111	-.0310	.0123
10	65	0.	0.	0.	0.	0.	0.	-.0072	-.0100	-.0006	-.0136	-.0385	.0090
11	81	0.	0.	0.	0.	0.	0.	-.0053	.0000	-.0765	-.0040	.0047	-.0583
12	85	0.	0.	0.	0.	0.	0.	-.0044	.0007	-.0747	-.0037	.0050	-.0578
13	95	0.	0.	0.	0.	0.	0.	.0047	.0047	-.0395	.0018	-.0010	-.0474
14	100	0.	0.	0.	0.	0.	0.	-.0004	-.0004	-.0239	.0052	-.0061	-.0428
15	116	0.	0.	0.	0.	0.	0.	-.0009	-.0007	-.0024	-.0159	-.0014	-.0319
16	117	0.	0.	0.	0.	0.	0.	.0000	.0002	.0009	-.0152	-.0008	-.0314
17	130	0.	0.	0.	0.	0.	0.	.0133	.0001	.0225	-.0155	.0023	-.0257
18	140	0.	0.	0.	0.	0.	0.	.0231	.0006	.0311	-.0184	.0030	-.0213
19	150	0.	0.	0.	0.	0.	0.	.0507	.0071	.0455	-.0185	.0050	-.0180
20	160	0.	0.	0.	0.	0.	0.	.0670	-.0010	.0486	-.0121	.0061	-.0229
21	170	0.	0.	0.	0.	0.	0.	.0995	-.0494	.0468	-.0033	.0079	-.0247
22	172	0.	0.	0.	0.	0.	0.	.1161	-.0733	.0422	-.0035	.0082	-.0168
23	180	0.	0.	0.	0.	0.	0.	.0738	-.0559	.0152	-.0111	.0040	.0312
24	187	0.	0.	0.	0.	0.	0.	.0006	-.0317	.0008	.0007	.0017	.0291
25	195	0.	0.	0.	0.	0.	0.	-.0248	-.0217	.0045	.0064	.0007	.0248
26	196	0.	0.	0.	0.	0.	0.	-.0254	-.0232	.0042	.0064	.0007	.0248
27	211	0.	0.	0.	0.	0.	0.	-.0690	.0019	.0192	-.0012	-.0049	.0125
28	215	0.	0.	0.	0.	0.	0.	-.0653	.0006	.0114	-.0019	-.0051	.0101
29	216	0.	0.	0.	0.	0.	0.	-.0647	.0004	.0102	-.0018	-.0051	.0097
30	217	0.	0.	0.	0.	0.	0.	-.0630	-.0002	.0067	-.0017	-.0050	.0086
31	221	0.	0.	0.	0.	0.	0.	-.0568	-.0005	-.0008	-.0040	-.0006	.0019
32	223	0.	0.	0.	0.	0.	0.	-.0555	-.0003	-.0007	-.0041	-.0004	.0016
33	230	0.	0.	0.	0.	0.	0.	-.0330	-.0007	-.0026	-.0044	.0007	-.0008
34	235	0.	0.	0.	0.	0.	0.	-.0301	-.0008	-.0026	-.0044	-.0001	-.0003
35	240	0.	0.	0.	0.	0.	0.	-.0154	-.0012	-.0015	-.0043	.0014	-.0025
36	260	0.	0.	0.	0.	0.	0.	.0005	.0002	.0005	.0000	-.0030	.0000
37	2600	38.	53.	64.	-120.	-22.	108.	.0000	.0000	.0000	.0000	.0000	.0000
38	275	0.	0.	0.	0.	0.	0.	-.0008	.0003	.0017	-.0090	.0123	-.0166
39	2750	-57.	107.	134.	-175.	89.	-119.	.0000	.0000	.0000	.0000	.0000	.0000
40	310	0.	0.	0.	0.	0.	0.	.0309	.0334	-.0086	-.0099	-.0052	-.0101
41	320	0.	0.	0.	0.	0.	0.	.0486	-.0053	.0000	-.0063	-.0048	-.0389
42	330	0.	0.	0.	0.	0.	0.	.0652	-.0395	.0017	-.0016	-.0015	.0067

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
THERMAL-NORMAL OPER. LOADS (FILE 20)

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B157

CONDITION 20
LOADS
THERMAL

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
43	335	0.	0.	0.	0.	0.	0.	.0449	-.0232	-.0003	-.0012	.0012	.0173
44	340	0.	0.	0.	0.	0.	0.	.0209	-.0096	-.0016	-.0001	.0034	.0180
45	347	0.	0.	0.	0.	0.	0.	.0008	.0040	.0006	.0039	.0056	.0113
46	370	0.	0.	0.	0.	0.	0.	-.0079	.0272	.0152	.0073	.0093	-.0019
47	371	0.	0.	0.	0.	0.	0.	-.0088	.0273	.0157	.0073	.0093	-.0019
48	386	0.	0.	0.	0.	0.	0.	.0001	.0471	.0199	-.0191	.0148	-.0072
49	390	0.	0.	0.	0.	0.	0.	-.0007	.0461	.0193	-.0194	.0149	-.0072
50	396	0.	0.	0.	0.	0.	0.	-.0230	.0051	-.0007	-.0203	-.0001	-.0070
51	399	0.	0.	0.	0.	0.	0.	-.0159	.0006	.0002	-.0186	-.0022	-.0058
52	400	0.	0.	0.	0.	0.	0.	.0000	-.0046	.0042	-.0149	-.0016	-.0012
53	405	0.	0.	0.	0.	0.	0.	.0029	-.0049	.0046	-.0149	-.0010	-.0006
54	407	0.	0.	0.	0.	0.	0.	.0176	-.0017	.0017	-.0154	.0005	.0004
55	409	0.	0.	0.	0.	0.	0.	.0198	-.0018	.0017	-.0155	-.0011	-.0012
56	430	0.	0.	0.	0.	0.	0.	.0009	.0001	-.0005	.0035	.0090	.0215
57	4300	63.	46.	-42.	68.	65.	155.	.0000	.0000	.0000	.0000	.0000	.0000
58	450	0.	0.	0.	0.	0.	0.	.0003	.0002	-.0010	.0000	-.0003	.0000
59	4500	24.	52.	-144.	425.	-2.	82.	.0000	.0000	.0000	.0000	.0000	.0000

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
THERMAL-NORMAL OPER. LOADS (FILE 20)

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B158

CONDITION 20
LOADS
THERMAL

NETWORK POINT SUMMARY IN THE LOCAL COORDINATES
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
1	5	-53.	-223.	-146.	-984.	217.	-2.	.0000	.0000	.0000	.0000	.0000	.0000
37	2600	38.	53.	64.	-120.	-22.	108.	.0000	.0000	.0000	.0000	.0000	.0000
39	2750	-57.	107.	134.	-175.	89.	-119.	.0000	.0000	.0000	.0000	.0000	.0000
57	4300	63.	46.	-42.	68.	65.	155.	.0000	.0000	.0000	.0000	.0000	.0000
59	4500	24.	52.	-144.	425.	-2.	82.	.0000	.0000	.0000	.0000	.0000	.0000

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
THERMAL-ACCIDENT TEMP. 244 DEG. LOADS (FILE 21)

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B159

CONDITION 21
LOADS
THERMAL

SPRING/HANGER SUMMARY
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
5	1	40	SP	-1278.	2514.	0.	0.	0.	0.	-.0073	.0143	-.1140	.0848	.0295	.1525
7	1	57	SP	5015.	-970.	0.	0.	0.	0.	.0286	-.0055	.1599	-.0360	.0168	.1109
9	1	65	SP	0.	0.	-641.	0.	0.	0.	-.0442	-.0610	-.0037	-.0831	-.2360	.0553
11	1	85	SP	-4683.	702.	0.	0.	0.	0.	-.0267	.0040	-.4577	-.0226	.0308	-.3542
13	1	100	SP	-393.	-455.	0.	0.	0.	0.	-.0022	-.0026	-.1466	.0319	-.0376	-.2620
15	1	117	SP	29.	197.	999.	0.	0.	0.	.0002	.0011	.0057	-.0933	-.0050	-.1926
17	1	140	SP	-187.	670.	141.	0.	0.	0.	.1418	.0038	.1904	-.1130	.0181	-.1304
19	1	160	SP	-79.	-1034.	109.	0.	0.	0.	.4105	-.0059	.2976	-.0743	.0373	-.1401
21	1	172	SP	10.	0.	-26.	0.	0.	0.	.7117	-.4490	.2588	-.0212	.0505	-.1031
23	1	187	SP	633.	0.	859.	0.	0.	0.	.0036	-.1941	.0049	.0042	.0101	.1784
27	1	215	SP	0.	654.	0.	0.	0.	0.	-.4004	.0037	.0701	-.0116	-.0312	.0619
29	1	217	SN	0.	0.	0.	0.	0.	0.	-.3864	-.0012	.0411	-.0105	-.0307	.0529
31	1	223	SP	0.	-288.	-781.	0.	0.	0.	-.3399	-.0016	-.0045	-.0248	-.0022	.0096
34	1	240	SP	0.	-761.	-954.	0.	0.	0.	-.0947	-.0072	-.0090	-.0263	.0088	-.0152
36	1	260	2S	234.	324.	394.	-737.	-132.	665.	.0030	.0013	.0028	-.0001	-.0184	.0000
38	1	275	2S	-349.	653.	818.	-1070.	542.	-732.	-.0048	.0021	.0105	-.0553	.0753	-.1016
40	1	320	SP	0.	-5744.	34.	0.	0.	0.	.2979	-.0327	.0002	-.0389	-.0296	-.2384
42	1	335	SP	0.	0.	-346.	0.	0.	0.	.2753	-.1422	-.0020	-.0075	.0072	.1057
44	1	347	SP	871.	4317.	605.	0.	0.	0.	.0050	.0246	.0034	.0241	.0343	.0695
48	1	390	SP	-773.	0.	0.	0.	0.	0.	-.0044	.2825	.1183	-.1188	.0915	-.0442
50	1	399	SP	0.	616.	179.	0.	0.	0.	-.0972	.0035	.0010	-.1142	-.0137	-.0354
53	1	407	SP	0.	-633.	608.	0.	0.	0.	.1076	-.0106	.0102	-.0945	.0033	.0027
54	1	409	SN	0.	0.	0.	0.	0.	0.	.1216	-.0113	.0107	-.0949	-.0065	-.0074
56	1	430	2S	385.	284.	-257.	417.	399.	950.	.0053	.0009	-.0033	.0216	.0554	.1319
58	1	450	2S	146.	318.	-885.	2606.	-11.	503.	.0019	.0013	-.0062	.0002	-.0016	.0000

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
THERMAL-ACCIDENT TEMP. 244 DEG. LOADS (FILE 21)

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B166

CONDITION 21
LOADS
THERMAL

SPRING/HANGER SUMMARY IN LOCAL COORDINATES
FORCES AND MOMENTS ACT ON RESTRAINTS

SEC	MEM	SEQ	TYPE	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
15	1	117	SP	-351.	197.	936.	0.	0.	0.	-.0020	.0011	.0053	-.0135	-.0050	-.2136
17	1	140	SP	-235.	670.	0.	0.	0.	0.	-.0013	.0038	.2374	-.0118	.0181	-.1721
19	1	160	SP	-134.	-1034.	0.	0.	0.	0.	-.0008	-.0059	.5070	.0700	.0373	-.1423
21	1	172	SP	28.	0.	0.	0.	0.	0.	.0002	-.4490	.7573	.0896	.0505	-.0552
36	1	260	2S	234.	324.	394.	-737.	-132.	665.	.0030	.0013	.0028	-.0001	-.0184	.0000
38	1	275	2S	-349.	653.	818.	-1070.	542.	-732.	-.0048	.0021	.0105	-.0553	.0753	-.1016
56	1	430	2S	385.	284.	-257.	417.	399.	950.	.0053	.0009	-.0033	.0216	.0554	.1319
58	1	450	2S	146.	318.	-885.	2606.	-11.	503.	.0019	.0013	-.0062	.0002	-.0016	.0000

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
THERMAL-ACCIDENT TEMP. 244 DEG. LOADS (FILE 21)

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B16

CONDITION 21
LOADS
THERMAL

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
1	5	420.	-1364.	-855.	-4181.	1327.	-4345.	.0000	.0000	.0000	.0000	.0000	.0000
2	20	0.	0.	0.	0.	0.	0.	.0316	.0660	-.0307	-.0854	.0114	.0035
3	2121	0.	0.	0.	0.	0.	0.	.0366	.1029	.0150	-.0854	.0114	.0035
4	30	0.	0.	0.	0.	0.	0.	.0211	.1551	-.1560	-.0901	-.0003	.0147
5	38	0.	0.	0.	0.	0.	0.	-.0261	.0673	-.1491	.1016	.0357	.1578
6	40	0.	0.	0.	0.	0.	0.	-.0073	.0143	-.1140	.0848	.0295	.1525
7	55	0.	0.	0.	0.	0.	0.	.0207	-.0297	.1153	-.0323	.0070	.1177
8	57	0.	0.	0.	0.	0.	0.	.0286	-.0055	.1599	-.0360	.0168	.1109
9	61	0.	0.	0.	0.	0.	0.	.0059	-.0081	.1657	-.0678	-.1898	.0754
10	65	0.	0.	0.	0.	0.	0.	-.0442	-.0610	-.0037	-.0831	-.2360	.0553
11	81	0.	0.	0.	0.	0.	0.	-.0326	.0001	-.4687	-.0242	.0285	-.3574
12	85	0.	0.	0.	0.	0.	0.	-.0267	.0040	-.4577	-.0226	.0308	-.3542
13	95	0.	0.	0.	0.	0.	0.	.0288	.0288	-.2422	.0110	-.0059	-.2904
14	100	0.	0.	0.	0.	0.	0.	-.0022	-.0026	-.1466	.0319	-.0376	-.2620
15	116	0.	0.	0.	0.	0.	0.	-.0058	-.0044	-.0149	-.0971	-.0084	-.1956
16	117	0.	0.	0.	0.	0.	0.	.0002	.0011	.0057	-.0933	-.0050	-.1926
17	130	0.	0.	0.	0.	0.	0.	.0813	.0005	.1378	-.0950	.0139	-.1573
18	140	0.	0.	0.	0.	0.	0.	.1418	.0038	.1904	-.1130	.0181	-.1304
19	150	0.	0.	0.	0.	0.	0.	.3105	.0437	.2786	-.1131	.0305	-.1103
20	160	0.	0.	0.	0.	0.	0.	.4105	-.0059	.2976	-.0743	.0373	-.1401
21	170	0.	0.	0.	0.	0.	0.	.6099	-.3026	.2865	-.0204	.0486	-.1512
22	172	0.	0.	0.	0.	0.	0.	.7117	-.4490	.2588	-.0212	.0505	-.1031
23	180	0.	0.	0.	0.	0.	0.	.4522	-.3427	.0931	-.0677	.0245	.1909
24	187	0.	0.	0.	0.	0.	0.	.0036	-.1941	.0049	.0042	.0101	.1784
25	195	0.	0.	0.	0.	0.	0.	-.1522	-.1331	.0275	.0389	.0043	.1521
26	196	0.	0.	0.	0.	0.	0.	-.1557	-.1420	.0255	.0389	.0043	.1521
27	211	0.	0.	0.	0.	0.	0.	-.4230	.0118	.1174	-.0072	-.0299	.0765
28	215	0.	0.	0.	0.	0.	0.	-.4004	.0037	.0701	-.0116	-.0312	.0619
29	216	0.	0.	0.	0.	0.	0.	-.3967	.0024	.0626	-.0112	-.0311	.0596
30	217	0.	0.	0.	0.	0.	0.	-.3864	-.0012	.0411	-.0105	-.0307	.0529
31	221	0.	0.	0.	0.	0.	0.	-.3482	-.0030	-.0049	-.0247	-.0038	.0117
32	223	0.	0.	0.	0.	0.	0.	-.3399	-.0016	-.0045	-.0248	-.0022	.0096
33	230	0.	0.	0.	0.	0.	0.	-.2022	-.0044	-.0157	-.0269	.0040	-.0049
34	235	0.	0.	0.	0.	0.	0.	-.1848	-.0052	-.0160	-.0269	-.0005	-.0020
35	240	0.	0.	0.	0.	0.	0.	-.0947	-.0072	-.0090	-.0263	.0088	-.0152
36	260	0.	0.	0.	0.	0.	0.	.0030	.0013	.0028	-.0001	-.0184	.0000
37	2600	234.	324.	394.	-737.	-132.	665.	.0000	.0000	.0000	.0000	.0000	.0000
38	275	0.	0.	0.	0.	0.	0.	-.0048	.0021	.0105	-.0553	.0753	-.1016
39	2750	-349.	653.	818.	-1070.	542.	-732.	.0000	.0000	.0000	.0000	.0000	.0000
40	310	0.	0.	0.	0.	0.	0.	.1894	.2048	-.0524	-.0605	-.0316	-.0621
41	320	0.	0.	0.	0.	0.	0.	.2979	-.0327	.0002	-.0389	-.0296	-.2384
42	330	0.	0.	0.	0.	0.	0.	.3998	-.2423	.0103	-.0100	-.0090	.0408

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
THERMAL-ACCIDENT TEMP. 244 DEG. LOADS (FILE 21)

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B162

CONDITION 21
LOADS
THERMAL

NETWORK POINT SUMMARY
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
43	335	0.	0.	0.	0.	0.	0.	.2753	-.1422	-.0020	-.0075	.0072	.1057
44	340	0.	0.	0.	0.	0.	0.	.1283	-.0588	-.0096	-.0007	.0208	.1102
45	347	0.	0.	0.	0.	0.	0.	.0050	.0246	.0034	.0241	.0343	.0695
46	370	0.	0.	0.	0.	0.	0.	-.0486	.1667	.0932	.0448	.0569	-.0117
47	371	0.	0.	0.	0.	0.	0.	-.0538	.1675	.0965	.0448	.0569	-.0117
48	386	0.	0.	0.	0.	0.	0.	.0004	.2887	.1217	-.1171	.0909	-.0440
49	390	0.	0.	0.	0.	0.	0.	-.0044	.2825	.1183	-.1188	.0915	-.0442
50	396	0.	0.	0.	0.	0.	0.	-.1411	.0312	-.0044	-.1245	-.0005	-.0431
51	399	0.	0.	0.	0.	0.	0.	-.0972	.0035	.0010	-.1142	-.0137	-.0354
52	400	0.	0.	0.	0.	0.	0.	.0002	-.0283	.0260	-.0915	-.0099	-.0073
53	405	0.	0.	0.	0.	0.	0.	.0176	-.0297	.0281	-.0916	-.0063	-.0038
54	407	0.	0.	0.	0.	0.	0.	.1076	-.0106	.0102	-.0945	.0033	.0027
55	409	0.	0.	0.	0.	0.	0.	.1216	-.0113	.0107	-.0949	-.0065	-.0074
56	430	0.	0.	0.	0.	0.	0.	.0053	.0009	-.0033	.0216	.0554	.1319
57	4300	385.	284.	-257.	417.	399.	950.	.0000	.0000	.0000	.0000	.0000	.0000
58	450	0.	0.	0.	0.	0.	0.	.0019	.0013	-.0062	.0002	-.0016	.0000
59	4500	146.	318.	-885.	2606.	-11.	503.	.0000	.0000	.0000	.0000	.0000	.0000

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
THERMAL-ACCIDENT TEMP. 244 DEG. LOADS (FILE 21)

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B163

CONDITION 21
LOADS
THERMAL

NETWORK POINT SUMMARY IN THE LOCAL COORDINATES
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
1	5	-323.	-1364.	-896.	-6030.	1327.	-12.	.0000	.0000	.0000	.0000	.0000	.0000
37	2600	234.	324.	394.	-737.	-132.	665.	.0000	.0000	.0000	.0000	.0000	.0000
39	2750	-349.	653.	818.	-1070.	542.	-732.	.0000	.0000	.0000	.0000	.0000	.0000
57	4300	385.	284.	-257.	417.	399.	950.	.0000	.0000	.0000	.0000	.0000	.0000
59	4500	146.	318.	-885.	2606.	-11.	503.	.0000	.0000	.0000	.0000	.0000	.0000

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
WATERHAMMER-CONDENSATE INDUCED W=4135FPS RISE=13.5MS DUR=27MS(FILE 30

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B164

CONDITION 30
LOADS
SHOCK

SPRING/HANGER SUMMARY
MAXIMUM COMPONENT OF FORCE OR MOMENT
FORCES AND MOMENTS ACT ON THE RESTRAINT

SEC	MEM	SEQ	TYPE	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
8	3	40	SP	-1931.	839.	0.	0.	0.	0.	-.0110	.0048	.1106	-.0073	.0532	.0278
12	1	57	SP	9479.	-797.	0.	0.	0.	0.	.0540	-.0045	.1080	.0189	-.0854	-.0158
13	3	65	SP	0.	0.	7993.	0.	0.	0.	-.0869	-.0323	.0456	.0603	.0379	-.0111
16	2	85	SP	5336.	2697.	0.	0.	0.	0.	.0304	.0154	.1529	.0361	.0487	-.1344
19	1	100	SP	-558.	-4552.	0.	0.	0.	0.	-.0032	-.0260	.1515	.0597	-.0367	-.1104
27	1	117	SP	-3829.	-4122.	4939.	0.	0.	0.	-.0218	-.0235	.0282	-.1260	-.0633	-.0937
30	1	140	SP	-2135.	2098.	1609.	0.	0.	0.	-.0364	.0120	.0333	-.0523	.0447	-.0842
33	1	160	SP	428.	288.	-593.	0.	0.	0.	.0394	.0016	.0297	-.0409	-.0124	-.0345
36	1	172	SP	243.	0.	-667.	0.	0.	0.	.0475	.0053	.0182	-.0211	-.0261	-.0125
41	1	187	SP	-719.	0.	186.	0.	0.	0.	-.0041	-.0048	.0011	.0032	-.0173	.0127
47	1	215	SP	0.	-214.	0.	0.	0.	0.	-.0075	-.0012	-.0007	.0031	-.0125	.0036
49	1	217	SN	-406.	0.	0.	0.	0.	0.	-.0023	.0005	-.0007	.0020	-.0107	.0027
51	2	223	SP	0.	80.	25.	0.	0.	0.	.0040	.0005	.0001	-.0011	-.0006	-.0011
54	3	240	SP	0.	-14.	-9.	0.	0.	0.	.0040	-.0001	-.0001	-.0008	.0002	.0003
60	1	260	2S	11.	8.	8.	-13.	-17.	63.	.0001	.0000	.0001	.0000	-.0024	.0000
65	1	275	2S	-6.	-16.	-9.	7.	-12.	11.	-.0001	-.0001	-.0001	.0003	-.0017	.0016
69	1	320	SP	0.	-638.	1099.	0.	0.	0.	-.0755	-.0036	.0063	.0196	.0231	-.0043
71	1	335	SP	0.	0.	202.	0.	0.	0.	-.0286	-.0036	.0012	-.0024	.0048	-.0341
73	1	347	SP	846.	-619.	-41.	0.	0.	0.	.0048	-.0035	-.0002	.0004	.0033	.0105
78	3	390	SP	31.	0.	0.	0.	0.	0.	.0002	-.0033	.0004	.0022	.0003	-.0011
80	4	399	SP	0.	-65.	12.	0.	0.	0.	-.0001	-.0004	.0001	.0017	.0003	-.0005
83	3	407	SP	0.	-5.	-1.	0.	0.	0.	-.0001	-.0001	.0000	.0006	-.0001	.0003
84	1	409	SN	-8.	0.	0.	0.	0.	0.	-.0001	.0000	.0000	.0006	-.0001	.0002
89	1	430	2S	-1.	1.	0.	0.	1.	-1.	.0000	.0000	.0000	.0000	.0002	-.0002
93	1	450	2S	-3.	8.	3.	5.	1.	-10.	.0000	.0000	.0000	.0000	.0001	.0000

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
WATERHAMMER-CONDENSATE INDUCED W=4135FPS RISE=13.5MS DUR=27MS(FILE 30

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B165

CONDITION 30
LOADS
SHOCK

SPRING/HANGER SUMMARY IN LOCAL COORDINATES
MAXIMUM COMPONENT OF FORCE OR MOMENT
FORCES AND MOMENTS ACT ON THE RESTRAINT

SEC	MEM	SEQ	TYPE	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
27	1	117	SP	-2832.	-4122.	5939.	0.	0.	0.	-.0161	-.0235	.0339	-.0813	-.0633	-.1342
30	1	140	SP	-2673.	2098.	0.	0.	0.	0.	-.0152	.0120	.0473	.0363	.0447	-.0938
33	1	160	SP	731.	288.	0.	0.	0.	0.	.0042	.0016	.0493	-.0163	-.0124	-.0534
36	1	172	SP	710.	0.	0.	0.	0.	0.	.0040	.0053	.0508	.0090	-.0261	-.0229
60	1	260	2S	11.	8.	8.	-13.	-17.	63.	.0001	.0000	.0001	.0000	-.0024	.0000
65	1	275	2S	-6.	-16.	-9.	7.	-12.	11.	-.0001	-.0001	-.0001	.0003	-.0017	.0016
89	1	430	2S	-1.	1.	0.	0.	1.	-1.	.0000	.0000	.0000	.0000	.0002	-.0002
93	1	450	2S	-3.	8.	3.	5.	1.	-10.	.0000	.0000	.0000	.0000	.0001	.0000

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
WATERHAMMER-CONDENSATE INDUCED W=4135FPS RISE=13.5MS DUR=27MS(FILE 30

CONDITION 30
LOADS
SHOCK

RESTRAINED NETWORK POINT SUMMARY
MAXIMUM COMPONENTS OF FORCE AND MOMENT
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
1	5	-5292.	-12045.	5748.	29015.	-20202.	-14830.	.0000	.0000	.0000	.0000	.0000	.0000
61	2600	11.	8.	8.	-13.	-17.	63.	.0000	.0000	.0000	.0000	.0000	.0000
66	2750	-6.	-16.	-9.	7.	-12.	11.	.0000	.0000	.0000	.0000	.0000	.0000
90	4300	-1.	1.	0.	0.	1.	-1.	.0000	.0000	.0000	.0000	.0000	.0000
94	4500	-3.	8.	3.	5.	1.	-10.	.0000	.0000	.0000	.0000	.0000	.0000

ADLPIPE PA. 335 RESEARCH ENGINEERS INC. ADLPIPE STRESS ANALYSI. WINDOWS 3F9.3 7/18/ 0 15:22:29

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
WATERHAMMER-CONDENSATE INDUCED W=4135FPS RISE=13.5MS DUR=27MS(FILE 30

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B167

CONDITION 30
LOADS
SHOCK

RESTRAINED NETWORK POINT SUMMARY
MAXIMUM COMPONENTS OF FORCE AND MOMENT IN THE LOCAL COORDINATES
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
1	5	2142.	-12045.	6809.	9497.	-20202.	-31168.	.0000	.0000	.0000	.0000	.0000	.0000
4	2121	-1424.	863.	-1100.	0.	0.	0.	.0652	-.0240	.0694	.0484	-.0560	-.0260
44	196	-87.	-70.	90.	0.	0.	0.	.0082	-.0048	-.0023	-.0023	-.0145	-.0066
61	2600	11.	8.	8.	-13.	-17.	63.	.0000	.0000	.0000	.0000	.0000	.0000
66	2750	-6.	-16.	-9.	7.	-12.	11.	.0000	.0000	.0000	.0000	.0000	.0000
77	371	16.	49.	-6.	0.	0.	0.	.0035	-.0034	-.0001	.0004	.0021	.0014
90	4300	-1.	1.	0.	0.	1.	-1.	.0000	.0000	.0000	.0000	.0000	.0000
94	4500	-3.	8.	3.	5.	1.	-10.	.0000	.0000	.0000	.0000	.0000	.0000

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
WATERHAMMER-COLUMN CLOSURE W=4135FPS RISE=100MS DUR=200MS P=205(FILE

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B168

CONDITION 40
LOADS
SHOCK

SPRING/HANGER SUMMARY
MAXIMUM COMPONENT OF FORCE OR MOMENT
FORCES AND MOMENTS ACT ON THE RESTRAINT

SEC	MEM	SEQ	TYPE	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
8	3	40	SP	1523.	-328.	0.	0.	0.	0.	.0087	-.0019	.0629	-.0092	-.0697	.0126
12	1	57	SP	1900.	231.	0.	0.	0.	0.	.0108	.0013	.0625	.0121	.0504	.0171
13	3	65	SP	0.	0.	-3720.	0.	0.	0.	.0346	-.0095	-.0212	-.0492	-.0771	.0097
16	2	85	SP	1286.	-583.	0.	0.	0.	0.	.0073	-.0033	-.2471	-.0232	-.0551	-.0214
19	1	100	SP	235.	1649.	0.	0.	0.	0.	.0013	.0094	-.2470	-.0385	.0553	.0772
27	1	117	SP	-3062.	-1176.	-5045.	0.	0.	0.	-.0175	-.0067	-.0288	.1402	-.0615	.1890
30	1	140	SP	-1463.	-1354.	1102.	0.	0.	0.	-.0314	-.0077	-.0259	.0839	.0323	.1301
33	1	160	SP	436.	-842.	-603.	0.	0.	0.	-.0296	-.0048	-.0259	.0587	-.0181	.0784
36	1	172	SP	-241.	0.	662.	0.	0.	0.	-.0348	.1603	-.0143	.0295	-.0305	.0226
41	1	187	SP	-1714.	0.	572.	0.	0.	0.	-.0098	.1720	.0033	.0148	-.0979	.0604
47	1	215	SP	0.	6023.	0.	0.	0.	0.	-.0789	.0343	-.0448	-.1102	-.1849	.0742
49	1	217	SN	1485.	0.	0.	0.	0.	0.	.0085	-.0047	-.0448	-.0689	-.1862	.0723
51	2	223	SP	0.	-2637.	-1494.	0.	0.	0.	.1373	-.0150	-.0085	-.0285	-.0565	.0438
54	3	240	SP	0.	271.	335.	0.	0.	0.	.1376	.0025	.0031	-.0312	.0177	-.0143
60	1	260	2S	672.	346.	498.	-1377.	-682.	2531.	.0086	.0014	.0035	-.0001	-.0947	.0002
65	1	275	2S	305.	344.	340.	-495.	-366.	557.	.0042	.0011	.0044	-.0256	-.0509	.0774
69	1	320	SP	0.	-459.	614.	0.	0.	0.	.0783	-.0026	.0035	.0206	.0329	.0127
71	1	335	SP	0.	0.	-559.	0.	0.	0.	.0722	.0131	-.0032	.0151	.0248	.0193
73	1	347	SP	696.	2244.	343.	0.	0.	0.	.0040	.0128	.0020	-.0052	.0151	.0221
78	3	390	SP	-321.	0.	0.	0.	0.	0.	-.0018	.0117	-.0162	-.0078	-.0078	-.0126
80	4	399	SP	0.	188.	-531.	0.	0.	0.	.0117	.0011	-.0030	-.0051	-.0119	-.0057
83	3	407	SP	0.	93.	68.	0.	0.	0.	.0114	.0016	.0011	.0066	.0078	-.0070
84	1	409	SN	676.	0.	0.	0.	0.	0.	.0114	-.0022	-.0025	.0071	.0087	-.0075
89	1	430	2S	80.	102.	-63.	209.	69.	88.	.0011	.0003	-.0008	.0108	.0096	.0122
93	1	450	2S	222.	235.	216.	-705.	50.	844.	.0028	.0010	.0015	.0000	.0069	.0001

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
WATERHAMMER-COLUMN CLOSURE W=4135FPS RISE=100MS DUR=200MS P=205(FILE

CONDITION 40
LOADS
SHOCK

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B169

SPRING/HANGER SUMMARY IN LOCAL COORDINATES
MAXIMUM COMPONENT OF FORCE OR MOMENT
FORCES AND MOMENTS ACT ON THE RESTRAINT

SEC	MEM	SEQ	TYPE	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
27	1	117	SP	-1606.	-1176.	-5015.	0.	0.	0.	-.0092	-.0067	-.0286	.0610	-.0615	.2265
30	1	140	SP	-1832.	-1354.	0.	0.	0.	0.	-.0104	-.0077	-.0396	-.0192	.0323	.1526
33	1	160	SP	744.	-842.	0.	0.	0.	0.	.0042	-.0048	-.0390	-.0437	-.0181	.0835
36	1	172	SP	-705.	0.	0.	0.	0.	0.	-.0040	.1603	-.0371	-.0251	-.0305	.0290
60	1	260	2S	672.	346.	498.	-1377.	-682.	2531.	.0086	.0014	.0035	-.0001	-.0947	.0002
65	1	275	2S	305.	344.	340.	-495.	-366.	557.	.0042	.0011	.0044	-.0256	-.0509	.0774
89	1	430	2S	80.	102.	-63.	209.	69.	88.	.0011	.0003	-.0008	.0108	.0096	.0122
93	1	450	2S	222.	235.	216.	-705.	50.	844.	.0028	.0010	.0015	.0000	.0069	.0001

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
WATERHAMMER-COLUMN CLOSURE W=4135FPS RISE=100MS DUR=200MS P=205(FILE

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B170

CONDITION 40
LOADS
SHOCK

RESTRAINED NETWORK POINT SUMMARY
MAXIMUM COMPONENTS OF FORCE AND MOMENT
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
1	5	903.	-1305.	-915.	4008.	3382.	-4435.	.0000	.0000	.0000	.0000	.0000	.0000
61	2600	672.	346.	498.	-1377.	-682.	2531.	.0000	.0000	.0000	.0000	.0000	.0000
66	2750	305.	344.	340.	-495.	-366.	557.	.0000	.0000	.0000	.0000	.0000	.0000
90	4300	80.	102.	-63.	209.	69.	88.	.0000	.0000	.0000	.0000	.0000	.0000
94	4500	222.	235.	216.	-705.	50.	844.	.0000	.0000	.0000	.0000	.0000	.0000

WOLF CREEK NUCLEAR OPERATING CORP.- ESW PROB 201, 96227-TR-03,
STRESS ANA. OF CONTAINMENT COOLING SYS., TRAIN B-RETURN LINE,
R001 RIGID @ NP65 IN MODEL;WAVE=4135FPS
WATERHAMMER-COLUMN CLOSURE W=4135FPS RISE=100MS DUR=200MS P=205(FILE

Altran Report
96227-TR-03, Rev. 1
Attachment: B, Sh: B171

CONDITION 40
LOADS
SHOCK

RESTRAINED NETWORK POINT SUMMARY
MAXIMUM COMPONENTS OF FORCE AND MOMENT IN THE LOCAL COORDINATES
FORCES AND MOMENTS ACT ON THE RESTRAINT

NET PT	SEQ	F1 (LB)	F2 (LB)	F3 (LB)	M1 (FT-LB)	M2 (FT-LB)	M3 (FT-LB)	D1 (IN)	D2 (IN)	D3 (IN)	R1 (DEG)	R2 (DEG)	R3 (DEG)
1	5	951.	-1305.	-1043.	-2751.	3382.	-5823.	.0000	.0000	.0000	.0000	.0000	.0000
4	2121	-141.	102.	202.	0.	0.	0.	.0303	-.0215	-.0294	-.0351	-.0162	-.0337
44	196	94.	-399.	71.	0.	0.	0.	.0493	.1704	-.0292	-.0285	-.1161	-.0680
61	2600	672.	346.	498.	-1377.	-682.	2531.	.0000	.0000	.0000	.0000	.0000	.0000
66	2750	305.	344.	340.	-495.	-366.	557.	.0000	.0000	.0000	.0000	.0000	.0000
77	371	35.	-134.	57.	0.	0.	0.	.0178	.0141	.0136	.0049	.0072	.0033
90	4300	80.	102.	-63.	209.	69.	88.	.0000	.0000	.0000	.0000	.0000	.0000
94	4500	222.	235.	216.	-705.	50.	844.	.0000	.0000	.0000	.0000	.0000	.0000

Table B - 4.0
Wolf Creek Nuclear Power Plant
Train "B" Return Line Pipe Support Load Summary with Column Closure and Condensation Induced Waterhammers

Mark No.	Node	Load Direction	Deadweight (lbs.)	Thermal Normal, THn (lbs.)	Thermal Accident THf (lbs.)	Column Closure Waterhammer, CC (lbs.)	Condensation Induced Waterhammer, CI (lbs.)	+ Total w/ THf (lbs.)	- Total w/ THf (lbs.)	+ Total w/o THf (lbs.)	- Total w/o THf (lbs.)	Max. Absol DW+THf+CC Combination (lbs.)	+ Total w/ THf (lbs.)	- Total w/ THf (lbs.)	+ Total w/o THf (lbs.)	- Total w/o THf (lbs.)	Max. Absol DW+THf+Max (CC or CI) (lbs.)	Mark No.
C001	40	FX	313	-209	-1278	1523	1931	558	-2488	1836	-1210	2488	966	-2896	2244	-1618	2896	C001
C001	40	FY	-1456	410	2514	328	839	-718	-1374	-1128	-1784	1784	1897	219	-617	-2295	2295	C001
C003	57	FX	-263	818	5015	1900	9479	2455	-1345	1637	-2163	2455	14231	-4727	9216	-9742	14231	C003
C003	57	FY	-1500	-158	-970	231	797	-1427	-1889	-1269	-1731	1889	-1673	-3267	-703	-2297	3267	C003
R001	65	FZ	387	-105	-641	3720	7993	4002	-3438	4107	-3333	4107	7739	-8247	8380	-7606	8380	R001
C005	85	FX	182	-764	-4683	1286	5336	704	-1868	1468	-1104	1868	835	-9837	5518	-5154	9837	C005
C005	85	FY	-1689	115	702	583	2697	-991	-2157	-1106	-2272	2272	1710	-3684	1008	-4386	4386	C005
C007	100	FX	-14	-64	-393	235	558	157	-313	221	-249	313	151	-965	544	-572	965	C007
C007	100	FY	-1875	-74	-455	1649	4552	-300	-3598	-226	-3524	3598	2222	-6882	2677	-6427	6882	C007
C009	117	FLateral	62	-57	-351	1606	2832	1611	-1601	1668	-1544	1668	2543	-3121	2894	-2770	3121	C009
C009	117	FY	-1665	32	197	1176	4122	-457	-2809	-489	-2841	2841	2654	-5590	2457	-5787	5787	C009
C009	117	FAxial	-122	153	936	5015	5939	5046	-4984	4893	-5137	5137	6753	-5125	5817	-6061	6753	C009
C011	140	FLateral	-10	-38	-235	1832	2673	1784	-1880	1822	-1842	1880	2428	-2918	2663	-2683	2918	C011
C011	140	FY	-1266	109	670	1354	2098	197	-2511	88	-2620	2620	1502	-2694	832	-3364	3364	C011
C013	160	FLateral	0	-22	-134	744	731	722	-766	744	-744	766	610	-878	744	-744	878	C013
C013	160	FY	-2073	-169	-1034	842	288	-1400	-3084	-1231	-2915	3084	-2265	-3949	-1231	-2915	3949	C013
R003	172	FLateral	-62	5	28	705	710	648	-762	643	-767	767	676	-744	648	-772	772	R003
R005	187	FX	-10	103	633	1714	719	1807	-1621	1704	-1724	1807	2337	-1091	1704	-1724	2337	R005
R005	187	FZ	-520	140	859	572	186	192	-952	52	-1092	1092	911	-233	52	-1092	1092	R005
H001	215	FY	-6543	107	654	6023	214	-413	-12459	-520	-12566	12566	134	-11912	-520	-12566	12566	H001
R007	217	FX	0	0	0	1485	406	1485	-1485	1485	-1485	1485	1485	-1485	1485	-1485	1485	R007
C015	223	FY	1435	-47	-288	2637	80	4025	-1249	4072	-1202	4072	3784	-1490	4072	-1202	4072	C015
C015	223	FZ	581	-127	-781	1494	25	1948	-1040	2075	-913	2075	1294	-1694	2075	-913	2075	C015
C017	240	FY	-1283	-124	-761	271	14	-1136	-1678	-1012	-1554	1678	-1773	-2315	-1012	-1554	2315	C017
C017	240	FZ	84	-156	-954	335	9	263	-407	419	-251	419	-535	-1205	419	-251	1205	C017
C019	320	FY	-1933	-937	-5744	**826**	638	-2044	-3696	-1107	-2759	3696	-6851	-8503	-1107	-2759	8503	C019
C019	320	FZ	33	6	34	**1105**	1099	1144	-1066	1138	-1072	1144	1172	-1038	1138	-1072	1172	C019
R009	335	FZ	-22	-57	-346	**1006**	202	927	-1085	984	-1028	1085	638	-1374	984	-1028	1374	R009
C021	347	FX	67	142	871	**1253**	846	1462	-1044	1320	-1186	1462	2191	-315	1320	-1186	2191	C021
C021	347	FY	-3863	704	4317	**4039**	619	880	-7198	176	-7902	7902	4493	-3585	176	-7902	7902	C021
C021	347	FZ	34	99	605	**617**	41	750	-484	651	-583	750	1256	22	651	-583	1256	C021
R015	390	FX	-27	-126	-773	**578**	31	425	-731	551	-605	731	-222	-1378	551	-605	1378	R015
C028	399	FY	-1305	100	616	**340**	65	-865	-1545	-965	-1645	1645	-349	-1029	-965	-1645	1645	C028
C028	399	FZ	-46	29	179	**956**	12	939	-973	910	-1002	1002	1089	-823	910	-1002	1089	C028
C025	407	FY	-464	-103	-633	**167**	5	-400	-734	-297	-631	734	-930	-1264	-297	-631	1264	C025
C025	407	FZ	-71	99	608	**122**	1	150	-94	51	-193	193	659	415	51	-193	659	C025
R013	409	FX	0	0	0	**1217**	8	1217	-1217	1217	-1217	1217	1217	-1217	1217	-1217	1217	R013

values from analysis for Nodes 320 - 409 multiplied by 1.8 (see note on Sheet A12 -- same basis) DAV 12/28/00

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Table B-5.0
Wolf Creek Nuclear Power Plant
Train 'B' Load Comparison

Mark Number	Node	Support Type	Load Direction	New Maximum Load	Existing Load	IR		Comments
C001	40	Struts	Fx	2896	7950 [2]	0.36		Support o.k.
			Fy	2295	4050 [2]	0.57		
C003	57	Struts	Fx	14231	13759 [1]	[3]14231 / 15748 = 0.91		Support o.k.
			Fy	3267	4308 [2]	0.76		
R001	65	Strut	Fz	8380	8800 [2]	0.95		Support o.k.
C005	85	Struts	Fx	9837	10955 [1]	0.90		Support o.k.
			Fy	4386	4815 [1]	0.91		
C007	100	Struts	Fx	965	3811 [2]	0.25		Support o.k.
			Fy	6882	9644 [1]	0.71		
C009	117	Box Frame	Flat	3121	36300 [1]	0.09		Support o.k.
			Fy	5787	13100 [1]	0.44		
			Faxl	6753	24200 [1]	0.28		
C011	140	Box Frame	Flat	2918	3100 [2]	0.94		Support o.k.
			Fy	3364	3750 [2]	0.90		
C013	160	Box Frame	Flat	878	2450 [2]	0.36		Support o.k.
			Fy	3949	5043 [2]	0.78		
R003	172	Box Frame	Flat	772	2150 [2]	0.36		Support o.k.
R005	187	Struts	Fx	2337	3350 [2]	0.70		Support o.k.
			Fz	1092	3650 [2]	0.30		
H001	215	Strut	Fy	12566	16050 [2]	0.78		Support o.k.
R007	217	Snubber	Fx	1485	6000 [2]	0.25		Support o.k.
C015	223	Struts	Fy	4072	5550 [2]	0.73		Support o.k.
			Fz	2075	3450 [2]	0.60		
C017	240	Struts	Fy	2315	4294 [2]	0.54		Support o.k.
			Fz	1205	2800 [2]	0.43		
C019	320	Box Frame	Fy	8503 [4]	13111 [2]	0.65		Support o.k.
			Fz	1172 [4]	2800 [2]	0.42		
R009	335	Frame	Fz	1374 [4]	2002 [2]	0.69		Support o.k.
C021	347	Box Frame	Fx	2191 [4]	4367 [2]	0.50		Support o.k.
			Fy	7902 [4]	9950 [2]	0.79		
			Fz	1256 [4]	2843 [2]	0.44		
R015	390	Strut	Fx	1378 [4]	2852 [2]	0.48		Support o.k.
C028	399	Struts	Fy	1645 [4]	3200 [2]	0.51		Support o.k.
			Fz	1089 [4]	3950 [2]	0.28		
C025	407	Struts	Fy	1264 [4]	2079 [2]	0.61		Support o.k.
			Fz	659 [4]	1700 [2]	0.39		
R013	409	Snubber	Fx	1217 [4]	3200 [2]	0.38		Support o.k.

[1] Existing loads taken from Calculation 96227-TR-03, Rev. 0
[2] Existing loads taken from issued pipe support drawings contained within this attachment.
[3] See Attachment B page B-175.
[4] Values adjusted as indicated on Sheet B-172. *QAV 12/28/00*

Maximum Pipe Support Interaction Ratio (I.R.)
Wolf Creek Nuclear Power Plant
Train 'B'

Note: I.R.'s taken from a sampling of existing calculations.

	0-GN01-C003	**0-GN02-C013**
Maximum I.R.	0.908 (N/U) 0.903 (Faulted)	0.27 / 0.3125 = 0.864
	0-GN01-R003	**1-GN02-C009**
Maximum I.R.	0.21 / 0.25 = 0.84	0.224 / 0.25 = 0.896
	0-GN01-C017	**1-GN02-R007**
Maximum I.R.	0.299 / .3125 = 0.957	0.201 / 0.25 = 0.804
	0-GN01-R005	**0-GN02-R015**
Maximum I.R.	0.21 / .25 = 0.84	0.13 / 0.25 = 0.520
	0-GN02-R001	
Maximum I.R.	0.145 / 0.3125 = 0.464	
	0-GN02-R003	
Maximum I.R.	0.097 / 0.25 = 0.388	
	0-GN02-C003	
Maximum I.R.	12.1 / 15.7 = 0.770	
	0-GN02-H001	
Maximum I.R.	0.06 / 0.25 = 0.240	
	0-GN02-C011	
Maximum I.R.	0.15 / 0.25 = 0.600	

altran | **Calculation Sheet**

ATT. B

Calc. No. 96227-TR-03 | By: [illegible] | Date: 2-13-98 | Sheet E 174

Rev. No. ∅ 1 | Chk: N Patel | Date: 2-16-98

Reference

1-GN02-C001/231 (S)

Max. Loads : $F_x = 8677^{\#}$

$F_Y = 5344^{\#}$

CHECK ITEM 1, 211 - SIZE 1 STRUT (GRINNELL) — #19

MOST CRITICAL

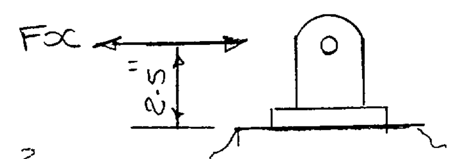
$8677^{\#} < 9600^{\#}$ (Emer. allow) ∴ OK

CHECK WELD BETWEEN REAR BKT. & EMB. PL. — #17

MOST CRITICAL

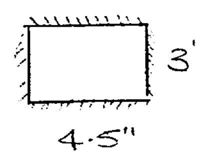
$F_x = 8677^{\#}$

$M_Z = 8677 \times 2.5 = 21693''^{\#}$



$A_w = 4.5 \times 2 + 3 \times 2 = 15''$

$S_w = 4.5 \times 3 + \frac{4.5^2}{3} = 20.25''^2$



$$f_r = \left[\left(\frac{21693}{20.25}\right)^2 + \left(\frac{8677}{15}\right)^2\right]^{1/2} = 1217^{\#}/in$$

$$W_{req} = \frac{1217}{.707 \times 21000} = .08'' < .25'' \quad ∴ OK$$

(.3 × 70,000)

$$IR = \frac{.08}{.25} = .33 < 1.0 \quad ∴ OK$$

Rest of the items are ok by comparision.

∴ SUPPORT IS ADEQUATE

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Calculation Sheet

ATT. B

Calc. No. 96227-TR-03 By: [illegible] Date: 2-13-98 Sheet B175

Rev. No. ~~0~~ 1 Chk: N Alt Date: 2-16-98

Reference

<u>1-GN02-C003/231(W)</u>

Ref. Calc no. GN02-10 Rev. 3 — #14

Loads used to qualify support is

$F_x = 10450^{\#}$

$F_Y = 4250^{\#}$

New loads are (max.)

$F_x = 13759^{\#}$

$F_Y = 4687^{\#}$

<u>Load increase factor is:</u>

$$F_x = \frac{13759}{10450} = 1.32$$

$$F_Y = \frac{4687}{4250} = 1.103$$

Use max. load increase factor to qualify support i.e. 1.32

Per sht. 2 of Ref'd. calc max. weld size required is

.18 × 1.32 = 0.24" < 5/16" weld ∴ OK

OR .16 × 1.32 = 0.21 < 1/4" WELD ∴ OK

<u>CHECK STRUTS @ 211 - SIZE 3 STRUTS</u>

Per. sht. 2 of Ref'd. calc. max loads on strut is $11930^{\#} \times 1.32 = 15748^{\#} < 18840^{\#}$ (EMER. ALLOW) — 19

∴ STRUTS ARE OK.

∴ SUPPORT IS ADEQUATE

REV. 1 BY: J. Barr 12/13/00
CHK: [illegible] 12/13/00

Calculation Sheet

ATT E

altran

Calc. No. 96227-TR-03 By: [illegible] Date: 2-13-98 Sheet E176

Rev. No. ~~0~~ 1 Chk: N. Patel Date: 2-16-98

Reference

1-GN02-R001/231 (0)

~~This support @ Data Point 65 is not modeled in stress analysis, therefore no need for further evaluation.~~

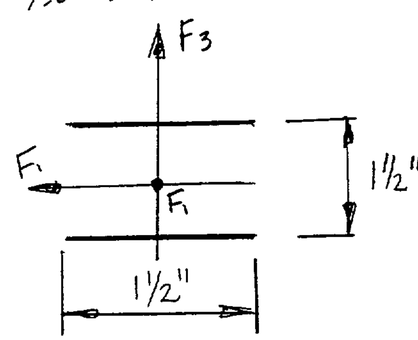
CHECK STRUT, CLAMP, END BRACKET

STANDARD COMPONENTS:

BERGEN PATTERSON 10K STRUT HAS A LEVEL D CAPACITY OF 14,000 LBS

$T/TA = 8380/14000 = 0.60 < 1.0 \therefore ok$

QUALIFICATION OF WELD



$A = 2 \times 1\frac{1}{2} = 3$ IN

$F_2 = 8800$ LBS

$f = 8800/3 = 2{,}933.$ LB/IN

$W = 2933/13150 = 0.223'' < 0.3125'' \therefore ok.$

$\therefore$ SUPPORT IS ADEQUATE

altran

Calculation Sheet

ATT. B

Calc. No. 96227-TR-03 By: [signature] Date: 2-13-98 Sheet B177

Rev. No. ~~Ø~~ 1 Chk: N. Patel Date: 2-16-98

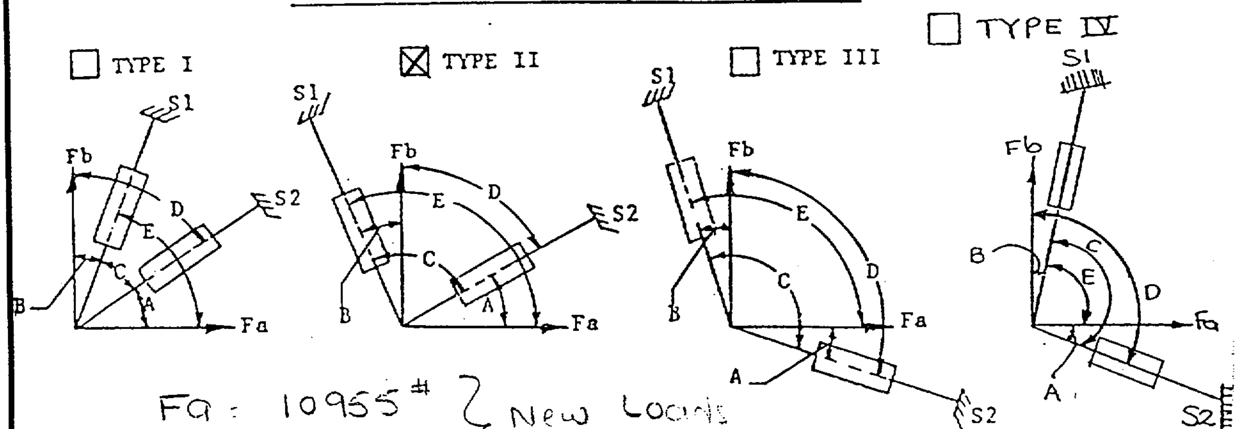
Reference

1-GN02-C005/231 (G)

Ref'd calc. GN02-8 Rev 4 sht-1

#14

STRUT ORIENTATION TYPE I, II AND III, IV.



Fa = 10955# } New Loads
Fb = 4815#

ANGLES		SINES OF ANGLES	
A = 55°		A = .819	(1)
B = 10°		B = .174	(2)
C = 45°		C = .707	(3)
D = 35°		D = .574	(4)
E = 100°		E = ≈ 1.0	(5)

FORCE IN	FROM	EQUATION	WORK SPACE
S_1	Fa	$\frac{Fa\ (1)}{(3)}$	$\frac{10955 \times .819}{.707}$ = 12690#
S_1	Fb	$\frac{Fb\ (4)}{(3)}$	$\frac{4815 \times .574}{.707}$ = 3909#
			Total Force in S_1 = 16599#
S_2	Fa	$\frac{Fa\ (5)}{(3)}$	$\frac{10955 \times 1}{.707}$ = 15495#
S_2	Fb	$\frac{Fb\ (2)}{(3)}$	$\frac{4815 \times .174}{.707}$ = 1185#
			Total Force in S_2 = 16680#

altran — **Calculation Sheet**

ATT. B

Calc. No. 96227-TR-03 By: [illegible] Date: 2-13-98 Sheet B'78

Rev. No. Ø1 Chk: N. Patil Date: 2-16-98

	Reference
1-GN02-C005/231(E) (CONT'D)	
Ref.d Calc. GN02-8-W Rev.0	#14.
Load used in refd. calc. to qualify Struts & associated members & welds:	
For S1 : 14000# S2 : 14560# (consv.)	
Due to new loads, loads on each strut:	
S1 : 16599# S2 : 16680#	
∴ Load increased factor is:	
For S1 : 16599/14000 = 1.19	
S2 : 16680/14560 = 1.15	
Use max. of two increased factor i.e. 1.19	
Max. mom. stresses	
fb = 11800 × 1.19 = 14042 PSI < 18480 PSI ∴ok	
fv = 9600 × 1.19 = 11424 PSI < 12320 PSI ∴ok	
Weld between W6x20 to emb. PL.	
fr = 2340 × 1.19 = 2785 #/in	
$\omega_{req.} = \frac{2785}{.707 \times (.3 \times 70000)} = 0.19'' < .25''$ ∴ok (normal allow. consv.)	#23
Weld between Rear bracket & shim PL to Emb. PL	
fr = 2930 × 1.19 = 3487 #/in	

Calculation Sheet
ATT. B

altran

Calc. No. 96217-TR-03 By: [illegible] Date: 2-13-98 Sheet B'79

Rev. No. ∅ 1 Chk: N. Palit Date: 2-16-98

Reference

1-GN02-C005/231 [illegible] (Cont-d)

$$w_{reqd} = \frac{3487}{.707 \times (.3 \times 70000)} = 0.23'' < .375'' \therefore OK$$ #23

normal allow (cont'd)

Weld on South end Bracket

$t_{req} = .205'' \times 1.19 = 0.24'' < 5/16'' \therefore OK$

CHECK STRUT GRINNELL FIG. 211 SIZE 3

16680# < 18810# (EMER. ALLOW) ∴ OK #19

∴ SUPPORT IS ADEQUATE

altran

Calculation Sheet

ATT B

Calc. No. 96227-TR-02 By: APatel Date: 2-24-98 Sheet B180

Rev. No. ~~0~~ 1 Chk: N. Patel Date: 2-25-98

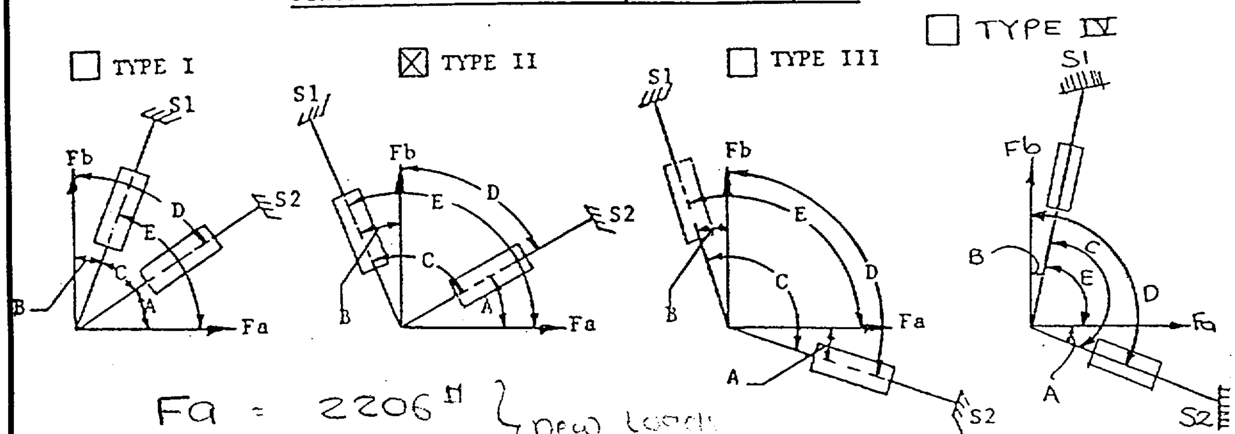
Reference

1-GN02-C007 / 232(0)

Ref'D Calc GN02-12 ...

#14

STRUT ORIENTATION TYPE I, II AND III, IV.



Fa = 2206 #
Fb = 9644 #
new loads

ANGLES

A = 16°

B = 42°

C = 116°

D = 74°

E = 132°

SINES OF ANGLES

A = 0.276 (1)

B = 0.669 (2)

C = 0.899 (3)

D = 0.961 (4)

E = 0.743 (5)

FORCE IN	FROM	EQUATION	WORK SPACE
S_1	Fa	$\frac{Fa\ (1)}{(3)}$	$\frac{2206 \times .276}{0.899}$ = 677 #
S_1	Fb	$\frac{Fb\ (4)}{(3)}$	$\frac{9644 \times .961}{0.899}$ = 10309 #
			Total Force in S_1 = 10986 #
S_2	Fa	$\frac{Fa\ (5)}{(3)}$	$\frac{2206 \times .743}{0.899}$ = 1823 #
S_2	Fb	$\frac{Fb\ (2)}{(3)}$	$\frac{9644 \times .669}{0.899}$ = 7177 #
			Total Force in S_2 = 9000 #

altran Calculation Sheet

ATT. B

Calc. No. 96227-TR-03 By: [illegible] Date: 2-24-98 Sheet B181

Rev. No. Ø 1 Chk: N. Patel Date: 2 25 98

Reference

1-GN02-C007 (CONT.D)

Ref.d Calc. GN02-1C

CHECK STRUT FROM 8100

Strut part No. 2

9000# < 9940# ∴ OK | #18

Strut Part No. 1 P. to P = 2' 1 1/8"

as per B.P. for P to P for 2' 1 1/8"

allowable is 11900# (see Pages

B 267 to B 269 of this

attachment.)

10986# < 11900# ∴ OK

CHECK WELD BETWEEN F.B. & BEAM

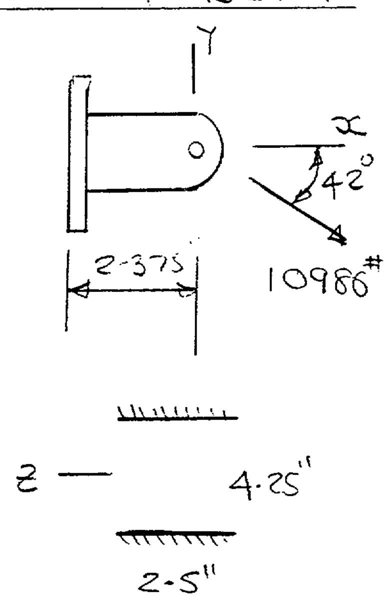
$Fx = 10986 \times \cos 42^\circ = 8164\#$

$Fy = 10986 \times \sin 42^\circ = 7351\#$

$Mz = 7351 \times 2.375 = 17459''\#$

$Aw = 2.5 + 2.5 = 5''$

$S = 4.25 \times 2.5 = 10.625''^2$



altran

Calculation Sheet

ATT B

Calc. No. 96227-TR-03 By: [illegible] Date: 2-24-98 Sheet B182

Rev. No. Ø1 Chk: N Patel Date: 2-25-98

Reference

1-GN02-C007 (CONT.D)

$$fr = \left[\left(\frac{8164}{5} + \frac{17459}{10.625}\right)^2 + \left(\frac{7351}{5}\right)^2\right]^{1/2} =$$

$= 3591$ #/in

$$\omega \text{ req.} = \frac{3591}{.707 \times (.3 \times 70000)}$$

2 normal allow (cons)

#23

$= .24'' < .25''$ ∴ ok

other weld is ok by comparision

∴ SUPPORT IS ADEQUATE

altran

Calculation Sheet

ATT. B

Calc. No. 96227-TR-03 By: [illegible] Date: 2-13-98 Sheet B133

Rev. No. Ø 1 Chk: N. Pelt Date: 2-16-98

	Reference
0-GN02-C009 / 242 (0)	
Ref'd calc. GN02-39 Rev. 5	#14
Loads used in ref'd calc. to qualify support:	
Flat = 36300#	
Fy = 13100#	
Faxial = 24200#	
New loads	
Flat = 10097#	
Fy = 6199#	
Faxial = 18931#	
New loads are lower than loads used in Ref'd calc. to qualify support.	
∴ SUPPORT IS ADEQUATE	

Calculation Sheet
ATT. 6

Calc. No. 96227-TR-03 By: [signature] Date: 2-14-98 Sheet 6 134

Rev. No. ~~0~~ 1 Chk: N. Patel Date: 2-16-98

Reference

1-GN02-C011/242(Q)

Loads increased new PD Strudl Run made. (For PDSTRUDL model see next sht.)

All members passed AISC code check ok

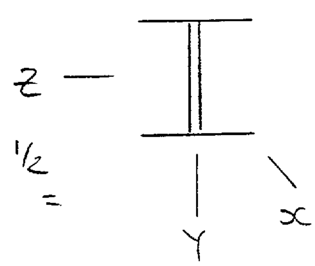
CHECK WELD AT ALL W6x20

Use following enveloped loads & moment:

$F_x = 6242^{\#}$ $\quad M_z = 41903^{''\#}$

$F_y = 4750$

$A_w = 22.5''$ $\quad S_w = 41.5''^2$ #17



$$f_R = \left[\left(\frac{6242}{22.5} + \frac{41903}{41.5}\right)^2 + \left(\frac{4750}{22.5}\right)^2\right]^{1/2} =$$

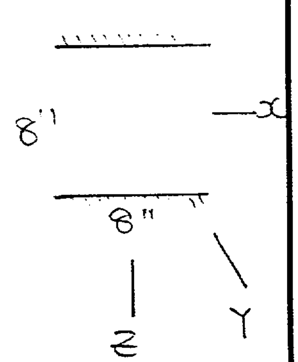
$= 1304\ ^{\#}/in$

$$\omega_{req.} = \frac{1304}{.707 \times (.3 \times 70000)} = .09'' < .25'' \therefore OK$$ #22

{normal allow.

CHECK WELD BETWEEN W8x40 & EXISTING BEAM

use enveloped loads from JT. 1 & 5



$F_x = 7546^{\#}$

$F_y = 12285^{\#}$

$M_z = 34493^{''\#}$

$A_w = 16''$

$S_{w_z} = 8^2/3 = 21.33''^2$ #17

altran

Calculation Sheet

ATT. 6

Calc. No. 96227-TR-03 By: [illegible] Date: 2-14-98 Sheet B185

Rev. No. Ø1 Chk: N. Patel Date: 2-16-98

Reference

1-GN02-C011/242 (Q) (CONT.D)

$$f_r = \left[\left(\frac{12285}{16} + \frac{34493}{21.33}\right)^2 + \left(\frac{7546}{16}\right)^2\right]^{1/2}$$

$\doteq$ 2431 #/in

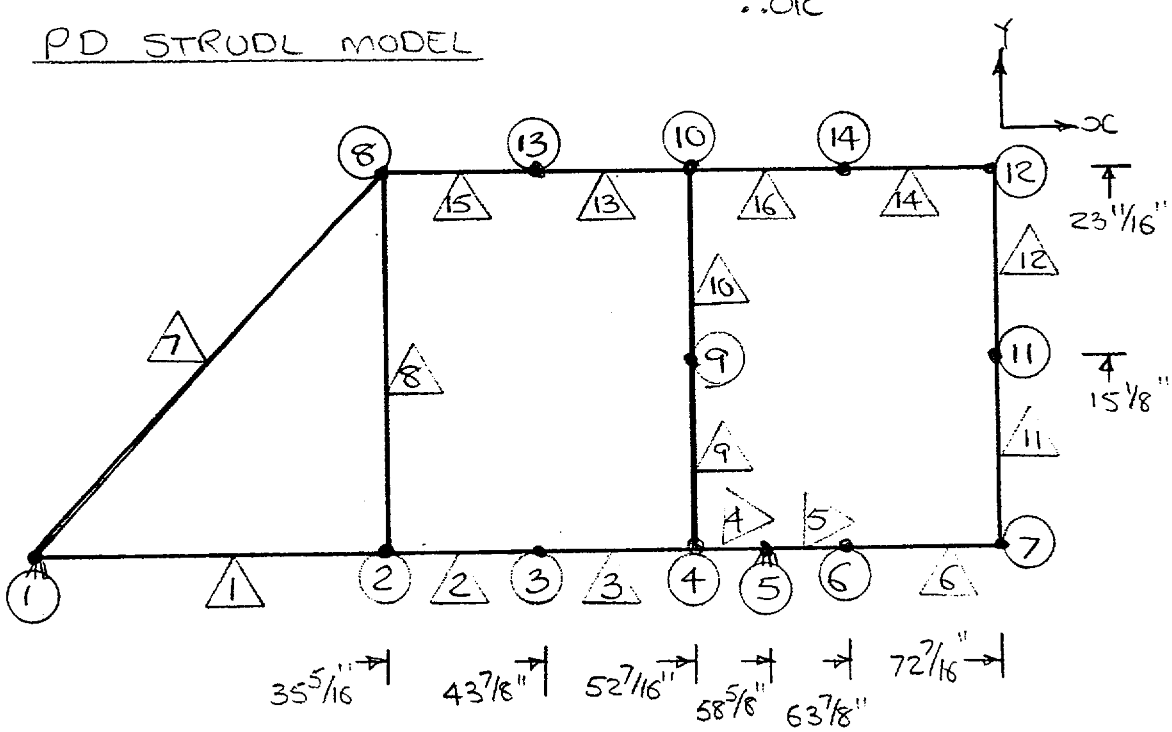
$$W_{req} = \frac{2431}{.707 \times (.3 \times 70{,}000) 2} = 0.164'' < .25'' \therefore OK$$ # 23

normal allow

All other welds are OK by comparison.

Note: Friction force not considered in analysis. As enough margin exist in weld size & mom. stresses. ∴ OK

PD STRUDL MODEL



All dimensions & model extracted from Calc. GN02.38 Rev. 3 # 14

For PDSTRUDL output see following pages.

SUPPORT IS ADEQUATE

```
       PPPPPPPPPP  DDDDDDDDDD         SSSSSSSSSSS TTTTTTTTTTT RRRRRRRRRR  UU       UU DDDDDDDDDD  LL
      PPPPPPPPPPP DDDDDDDDDDD        SSSSSSSSSSS TTTTTTTTTTT RRRRRRRRRRR UU       UU DDDDDDDDDDD LL
     PP       PP DD       DD        SS              TT      RR       RR UU       UU DD       DD LL
    PP       PP DD       DD        SS              TT      RR       RR UU       UU DD       DD LL
   PPPPPPPPPPP DD       DD HHHHHH SSSSSSSSSSS     TT      RRRRRRRRRRR UU       UU DD       DD LL
  PPPPPPPPPP  DD       DD HHHHHH SSSSSSSSSSS     TT      RRRRRRRRRR  UU       UU DD       DD LL
 PP          DD       DD                  SS    TT      RRRRR       UU       UU DD       DD LL
PP          DD       DD                  SS    TT      RR   RR     UU       UU DD       DD LL
PP         DDDDDDDDDDD        SSSSSSSSSSS     TT      RR      RR  UUUUUUUUUUU DDDDDDDDDDD LLLLLLLLLLL
PP         DDDDDDDDDD        SSSSSSSSSSS     TT      RR        RR UUUUUUUUUU DDDDDDDDDD  LLLLLLLLLLL
```

```
*****************************************************************
*                                                               *
*                       PHI-DELTA STRUDL                        *
*                         VERSION 0496                          *
*                            PC DOS                             *
*                                                               *
*                  A PROPRIETARY PRODUCT OF                     *
*                        PHI-DELTA, INC.                        *
*                       42 HOLBROOK AVE.                        *
*               BRAINTREE, MASSACHUSETTS  02184                 *
*                     TEL. (617) 356-0400                       *
*                                                               *
*                   COPYRIGHT (C) 1989-1995                     *
*                     ALL RIGHTS RESERVED                       *
*                                                               *
*****************************************************************
```

BY: [signature] 2.14.98
CHK: [signature] 2.16.98

ALTRAN CORPORATION
IS AUTHORIZED BY PHI-DELTA TO USE PD-STRUDL AT THE ESTABLISHED RATE OF PROGRAM SURCHARGE.

ACCOUNT ....
PASSWORD .... PDELTA-STRUDL
JOB LOG NO 00000420
JOB STARTED AT ... 11-FEB-1998 18:09:52.00

ALTRAN
CALC NO. 96227-TR-[illegible] REV. 0/1
ATT. B SHEET B186

1
JB
[signature] 11/13/00

```
              +++++++++++++++++++++++++++++++++++++++++++++++++++
              +     THIS IS PD STRUDL INPUT FILE FOR THE        +
$             +              SUPPORT C011                       +
$             +               STORED UNDER                      +
$             +              WC\C011.DAT                        +
$             +                                                 +
$             +  CORRESPONDING OUTPUT FILE IS STORED UNDER      +
$             +              WC\C011.OUT                        +
$             +++++++++++++++++++++++++++++++++++++++++++++++++++
$
STRUDL 'SUPPORT C011'
$
TYPE SPACE FRAME
UNITS INCHES DEGREES POUND FAHRENH LBM SECONDS
ALPHANUMERIC IDENTIFIER TREATMENT WILD
$
JOINT COORDINATES
1        0.0       0.0        0.0    S
2       35.3       0.0        0.0
3       43.9       0.0        0.0
4       52.4       0.0        0.0
5       58.6       0.0        0.0    S
6       63.9       0.0        0.0
7       72.4       0.0        0.0
8       35.3      23.7        0.0
        52.4      15.1        0.0
        52.4      23.7        0.0
11      72.4      15.1        0.0
12      72.4      23.7        0.0
13      43.9      23.7        0.0
14      63.9      23.7        0.0
UNITS DEGREES
MEMBER INCIDENCE
1     1      2
2     2      3
3     3      4
4     4      5
5     5      6
6     6      7
7     1      8
8     2      8
9     4      9
10    9      10
11    7      11
12    11     12
13    13     10
14    14     12
15    8      13
16    10     14
MEMBER PROPERTY
1 TO 6  TABLE 'STEELW'    'W8X40'
     16 TABLE 'STEELW'    'W6X20'

CONSTANTS
E 29.0E6 ALL ;G 11.15E6 ALL; DENSITY 0.283 ALL
POISSON 0.3 ALL
```

ALTRAN
CALC NO. 96227-TR-03 REV. ~~Ø~~ 1
ATT. B SHEET ~~B18~~ B17 | JB
12/13/00

```
$
   ATE JOINTS ALL
..TIVATE MEMBER ALL
$
$ LOADING DATA IS INSERTED HERE
$
UNITS INCHES DEGREES POUND
LOADING 'F1'
JOINT LOAD
3    FORCE Y  -5396
6    FORCE Y  -5150
9    FORCE X   8254
11   FORCE X   4500
DEAD LOAD COMP GLOBAL Y -1.0
LOADING 'F2'
JOINT LOAD
13   FORCE Y   4170
14   FORCE Y   5150
9    FORCE X   8254
11   FORCE X   4500
DEAD LOAD COMP GLOBAL Y -1.0
QUERY
```

ALTRAN

CALC NO 96227-TR-03 REV ~~0~~ 1

ATT. B SHEET B18~~8~~

12/13/0

****
* RESULTS OF LATEST QUERY *
****

JOB ID - SUPPORT JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

NUMBER OF JOINTS	: TOTAL	14 ACTIVE	14 INACTIVE	0
NUMBER OF MEMBERS	: TOTAL	16 ACTIVE	16 INACTIVE	0
NUMBER OF FINITE ELEMENTS	: TOTAL	0 ACTIVE	0 INACTIVE	0
NUMBER OF SUBSTRUCTURES	: TOTAL	0 ACTIVE	0 INACTIVE	0
NUMBER OF INDEPENDENT LOADS	: TOTAL	2 ACTIVE	2 INACTIVE	0
NUMBER OF DEPENDENT LOADS	: TOTAL	0 ACTIVE	0 INACTIVE	0
NUMBER OF DYNAMIC LOADS	: TOTAL	0 ACTIVE	0 INACTIVE	0

LIMIT ON MAXIMUM NUMBER OF JOINTS : 3000
MEMBERS AND ELEMENTS : 6000
LOADINGS : 500

INPUT MODE IS : ADDITION
SCAN MODE IS : OFF

$
PRINT STRUCTURAL DATA

ALTRAN
CALC NO. 96227-TR-03 REV. Ø1
ATT. 6 SHEET B18

JB 12/13/0

****
* PROBLEM DATA FROM INTERNAL STORAGE *
****

JOB ID - SUPPORT JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

********** STRUCTURAL DATA **********

JOINT COORDINATES----------------------------------/-CONDITION-/--STATUS--/

JOINT	X	Y	Z	CONDITION	STATUS
1	0.000	0.000	0.000	SUPPORT	ACTIVE
2	35.300	0.000	0.000		ACTIVE
3	43.900	0.000	0.000		ACTIVE
	52.400	0.000	0.000		ACTIVE
	58.600	0.000	0.000	SUPPORT	ACTIVE
6	63.900	0.000	0.000		ACTIVE
7	72.400	0.000	0.000		ACTIVE
8	35.300	23.700	0.000		ACTIVE
9	52.400	15.100	0.000		ACTIVE
10	52.400	23.700	0.000		ACTIVE
11	72.400	15.100	0.000		ACTIVE
12	72.400	23.700	0.000		ACTIVE
13	43.900	23.700	0.000		ACTIVE
14	63.900	23.700	0.000		ACTIVE

ALTRAN
CALC NO 96227-TR-03 REV Ø1
ATT. B SHEET B19.0
JB
12/13/00

JOINT RELEASES------------------------------------/ELASTIC SUPPORT RELEASES---/

JOINT	FORCE	MOMENT	THETA 1	THETA 2	THETA 3	KFX	KFY	KFZ	KMX	KMY	KMZ

MEMBER INCIDENCES----------/ LENGTH PROJECTIONS ON GLOBAL AXES----/ RELEASES--------------------/ STATUS--/

MEMBER	START	END	LENGTH	X	Y	Z	START FORCE	START MOMENT	END FORCE	END MOMENT	STATUS		
	1	2	35.300	35.300	0.000	0.000					ACTIVE	SPACE	FRAME
	2	3	8.600	8.600	0.000	0.000					ACTIVE	SPACE	FRAME
3	3	4	8.500	8.500	0.000	0.000					ACTIVE	SPACE	FRAME
4	4	5	6.200	6.200	0.000	0.000					ACTIVE	SPACE	FRAME
5	5	6	5.300	5.300	0.000	0.000					ACTIVE	SPACE	FRAME
6	6	7	8.500	8.500	0.000	0.000					ACTIVE	SPACE	FRAME

7	1	8	42.518	35.300	23.700	0.000	ACTIVE	SPACE	FRAME
-	2	8	23.700	0.000	23.700	0.000	ACTIVE	SPACE	FRAME
	4	9	15.100	0.000	15.100	0.000	ACTIVE	SPACE	FRAME
10	9	10	8.600	0.000	8.600	0.000	ACTIVE	SPACE	FRAME
11	7	11	15.100	0.000	15.100	0.000	ACTIVE	SPACE	FRAME
12	11	12	8.600	0.000	8.600	0.000	ACTIVE	SPACE	FRAME
13	13	10	8.500	8.500	0.000	0.000	ACTIVE	SPACE	FRAME
14	14	12	8.500	8.500	0.000	0.000	ACTIVE	SPACE	FRAME
15	8	13	8.600	8.600	0.000	0.000	ACTIVE	SPACE	FRAME
16	10	14	11.500	11.500	0.000	0.000	ACTIVE	SPACE	FRAME

ELEMENT INCIDENCES--

ELEMENT NODES

ALTRAN
CALC NO. 96887-TC-03 REV. 01
ATT. 6 SHEET 6191

MEMBER PROPERTIES---

MEM/SEG,LEN	TYPE		AX	AY	AZ	IX	IY	IZ	SY	SZ	YC	ZC	EY	EZ
	TABLE			YD	ZD	OD	ID	SFX	RAD	ALP	TYP	SPA	GEN	IYZ
				FLTK	WBTK	RY	RZ							
1	TABLE		11.800	3.011	6.009	1.120	49.000	146.000	12.100	35.500	4.125	4.038	0.000	0.000
	STEELW	W8X40		8.250	8.077	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.558	0.365	2.040	3.530							
2	TABLE		11.800	3.011	6.009	1.120	49.000	146.000	12.100	35.500	4.125	4.038	0.000	0.000
	STEELW	W8X40		8.250	8.077	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.558	0.365	2.040	3.530							
3	TABLE		11.800	3.011	6.009	1.120	49.000	146.000	12.100	35.500	4.125	4.038	0.000	0.000
	STEELW	W8X40		8.250	8.077	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.558	0.365	2.040	3.530							
4	TABLE		11.800	3.011	6.009	1.120	49.000	146.000	12.100	35.500	4.125	4.038	0.000	0.000
	STEELW	W8X40		8.250	8.077	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.558	0.365	2.040	3.530							
5	TABLE		11.800	3.011	6.009	1.120	49.000	146.000	12.100	35.500	4.125	4.038	0.000	0.000
	STEELW	W8X40		8.250	8.077	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.558	0.365	2.040	3.530							
6	TABLE		11.800	3.011	6.009	1.120	49.000	146.000	12.100	35.500	4.125	4.038	0.000	0.000
	STEELW	W8X40		8.250	8.077	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.558	0.365	2.040	3.530							
7	TABLE		5.880	1.600	2.945	0.243	13.300	41.500	4.430	13.400	3.100	3.009	0.000	0.000
	STEELW	W6X20		6.200	6.018	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.367	0.258	1.510	2.660							
	TABLE		5.880	1.600	2.945	0.243	13.300	41.500	4.430	13.400	3.100	3.009	0.000	0.000
	STEELW	W6X20		6.200	6.018	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.367	0.258	1.510	2.660							

	TABLE		5.880	1.600	2.945	0.243	13.300	41.500	4.430	13.400	3.100	3.009	0.000	0.000
	STEELW	W6X20		6.200	6.018	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.367	0.258	1.510	2.660							
10	TABLE		5.880	1.600	2.945	0.243	13.300	41.500	4.430	13.400	3.100	3.009	0.000	0.000
	STEELW	W6X20		6.200	6.018	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.367	0.258	1.510	2.660							
11	TABLE		5.880	1.600	2.945	0.243	13.300	41.500	4.430	13.400	3.100	3.009	0.000	0.000
	STEELW	W6X20		6.200	6.018	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.367	0.258	1.510	2.660							
12	TABLE		5.880	1.600	2.945	0.243	13.300	41.500	4.430	13.400	3.100	3.009	0.000	0.000
	STEELW	W6X20		6.200	6.018	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.367	0.258	1.510	2.660							
13	TABLE		5.880	1.600	2.945	0.243	13.300	41.500	4.430	13.400	3.100	3.009	0.000	0.000
	STEELW	W6X20		6.200	6.018	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.367	0.258	1.510	2.660							
14	TABLE		5.880	1.600	2.945	0.243	13.300	41.500	4.430	13.400	3.100	3.009	0.000	0.000
	STEELW	W6X20		6.200	6.018	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.367	0.258	1.510	2.660							
15	TABLE		5.880	1.600	2.945	0.243	13.300	41.500	4.430	13.400	3.100	3.009	0.000	0.000
	STEELW	W6X20		6.200	6.018	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.367	0.258	1.510	2.660							
16	TABLE		5.880	1.600	2.945	0.243	13.300	41.500	4.430	13.400	3.100	3.009	0.000	0.000
	STEELW	W6X20		6.200	6.018	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.367	0.258	1.510	2.660							

MEMBER CONSTANTS---/

CONSTANT	STANDARD VALUE	DOMAIN,	VALUE	MEMBER LIST
E	0.290000E+08	ALL		
G	0.111500E+08	ALL		
CTE	0.650000E-05	ALL		
DENSITY	0.283000E+00	ALL		
POISSON	0.300000E+00	ALL		
FYLD	0.360000E+05	ALL		
BETA	0.000000E+00	ALL		
CBETA	0.000000E+00	ALL		
FULT	0.600000E+05	ALL		

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EC	0.280000E+08	ALL
.LDH	0.300000E+05	ALL
SC	0.150000E+05	ALL
SH	0.150000E+05	ALL
FULTH	0.500000E+05	ALL

****
* END OF DATA FROM INTERNAL STORAGE *
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12/13/

* LOADING DATA

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****
* PROBLEM DATA FROM INTERNAL STORAGE *
****

JOB ID - SUPPORT JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

********** LOADING DATA **********

LOADING - F1 STATUS - ACTIVE

/----------NON-SELECTIVE DEAD LOAD COMPONENTS GIVEN----------/

COMPONENTS : X 0.0000 Y -1.0000 Z 0.0000 BY JOINTS GLOBAL

MEMBER AND ELEMENT LOADS--/
MEMBER/ELEMENT

JOINT LOADS--/ ---------------------------------/

JOINT	STEP	FORCE X	Y	Z	MOMENT X	Y	Z
3		0.000	-5396.000	0.000	0.000	0.000	0.000
6		0.000	-5150.000	0.000	0.000	0.000	0.000
9		8254.000	0.000	0.000	0.000	0.000	0.000
11		4500.000	0.000	0.000	0.000	0.000	0.000

JOINT DISPLACEMENTS--------------------------------/ ---------------------------------/

JOINT	STEP	DISP. X	Y	Z	ROT. X	Y	Z

JOINT FORCE ASSUMPTIONS --/

JOINT	THETA 1	2	3	FORCE X	Y	Z	MOMENT X	Y	Z

NO ASSUMPTIONS GIVEN FOR THIS LOADING

MEMBER FORCE ASSUMPTIONS ---------------------/ ---------------------------------/

·· ~ER	COMPONENT	DISTANCE	VALUE	COMPONENT	DISTANCE	VALUE

SUMPTIONS GIVEN FOR THIS LOADING

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CALC NO. 96227-TC-03 REV. ∅ 1
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12/15/

LOADING - F2 STATUS - ACTIVE

/----------NON-SELECTIVE DEAD LOAD COMPONENTS GIVEN----------/

COMPONENTS : X 0.0000 Y -1.0000 Z 0.0000 BY JOINTS GLOBAL

MEMBER AND ELEMENT LOADS---/
MEMBER/ELEMENT

JOINT LOADS---/ ---------------------------------/

JOINT	STEP	FORCE X	Y	Z	MOMENT X	Y	Z
9		8254.000	0.000	0.000	0.000	0.000	0.000
11		4500.000	0.000	0.000	0.000	0.000	0.000
13		0.000	4170.000	0.000	0.000	0.000	0.000
14		0.000	5150.000	0.000	0.000	0.000	0.000

JOINT DISPLACEMENTS--------------------------------/ ---------------------------------/

JOINT	STEP	DISP. X	Y	Z	ROT. X	Y	Z

JOINT FORCE ASSUMPTIONS ---/

JOINT	THETA 1	2	3	FORCE X	Y	Z	MOMENT X	Y	Z

NO ASSUMPTIONS GIVEN FOR THIS LOADING

MEMBER FORCE ASSUMPTIONS ---------------------/ --------------------------------/

MEMBER	COMPONENT	DISTANCE	VALUE	COMPONENT	DISTANCE	VALUE

NO ASSUMPTIONS GIVEN FOR THIS LOADING

****
* END OF DATA FROM INTERNAL STORAGE *
****

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DSS 12/15/...

LIST ALL
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STIFFNESS ANALYSIS REDUCE BANDWIDTH

BANDWIDTH USING INITIAL JOINT NUMBERING :

THE MAXIMUM BANDWIDTH IS 5 AND OCCURS AT JOINT 8
THE AVERAGE BANDWIDTH IS 2.250
THE STANDARD DEVIATION OF THE BANDWIDTH IS 1.960

BANDWIDTH AFTER INTERNALLY RENUMBERING STRUCTURE :

THE MAXIMUM BANDWIDTH IS 2 AND OCCURS AT JOINT 2
THE AVERAGE BANDWIDTH IS 1.333
STANDARD DEVIATION OF THE BANDWIDTH IS 0.651

****
* TOTAL DEAD WEIGHT OF STRUCTURE = 0.492573290D+03 LBF *
****

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OUTPUT BY JOINTS
OUTPUT DECIMAL 3
LIST DISPLACEMENTS JOINTS 3 6 9 11 13 14

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CALC NO. 96227-TR-03 REV. Ø1
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12/15/

****
RESULTS OF LATEST ANALYSIS
****

JOB ID - SUPPORT JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

JOINT DISPLACEMENTS - SUPPORTS

JOINT		LOADING	X DISP	Y DISP	Z DISP	X ROT	Y ROT	Z ROT

JOINT DISPLACEMENTS - FREE JOINTS

JOINT		LOADING	X DISP	Y DISP	Z DISP	X ROT	Y ROT	Z ROT
3	GLOBAL							
		F1	0.000	-0.003	0.000	0.000	0.000	0.000
		F2	0.000	0.000	0.000	0.000	0.000	0.000
6	GLOBAL							
		F1	0.000	-0.001	0.000	0.000	0.000	-0.003
		F2	0.000	0.000	0.000	0.000	0.000	0.001
9	GLOBAL							
		F1	0.006	-0.001	0.000	0.000	0.000	-0.004
		F2	0.005	0.001	0.000	0.000	0.000	-0.001
11	GLOBAL							
		F1	0.005	-0.002	0.000	0.000	0.000	-0.006
		F2	0.003	0.001	0.000	0.000	0.000	-0.004
13	GLOBAL							
		F1	0.004	-0.002	0.000	0.000	0.000	0.002
		F2	0.002	0.002	0.000	0.000	0.000	0.003
14	GLOBAL							
		F1	0.004	-0.001	0.000	0.000	0.000	0.000
		F2	0.003	0.003	0.000	0.000	0.000	0.000

THE MAXIMUM DISPLACEMENT VALUES ARE AS FOLLOWS :

VALUE FOR X TRANS. IS = 0.0057187 AND IT OCCURS AT JOINT 9 FOR LOADING F1
VALUE FOR Y TRANS. IS = 0.0032841 AND IT OCCURS AT JOINT 14 FOR LOADING F2
VALUE FOR Z ROT. IS = -0.0062940 AND IT OCCURS AT JOINT 11 FOR LOADING F1

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ATT. B SHEET 198

JB

OU..UT BY MEMBERS
OUTPUT DECIMAL 2
LIST REACTIONS ALL

ALTRAN
CALC NO 96227-TR-03 REV ∅1
ATT. 6 SHEET 8/199

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RESULTS OF LATEST ANALYSIS
****

JOB ID - SUPPORT JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

REACTIONS AT SUPPORT JOINTS

JOINT		LOADING	FORCES X FORCE	FORCES Y FORCE	FORCES Z FORCE	MOMENTS X MOMENT	MOMENTS Y MOMENT	MOMENTS Z MOMENT
1	GLOBAL							
		F1	-5208.20	-1246.82	0.00	0.00	0.00	34492.75
		F2	-6159.74	-3440.46	0.00	0.00	0.00	1984.76
5	GLOBAL							
		F1	-7545.80	12285.40	0.00	0.00	0.00	23777.22
		F2	-6594.26	-5386.97	0.00	0.00	0.00	13768.35

THE MAXIMUM REACTION VALUES ARE AS FOLLOWS :

VALUE FOR X FORCE IS = -7545.7993164 AND IT OCCURS AT JOINT 5 FOR LOADING F1
VALUE FOR Y FORCE IS = 12285.3964844 AND IT OCCURS AT JOINT 5 FOR LOADING F1
VALUE FOR Z MOMENT IS = 34492.7460938 AND IT OCCURS AT JOINT 1 FOR LOADING F1

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FORCES ALL MEMBERS

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ATT. B SHEET B20 | 1
JB
12/15/00

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RESULTS OF LATEST ANALYSIS
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JOB ID - SUPPORT JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

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ATT. B SHEET B202

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12/13/0

MEMBER FORCES

MEMBER	LOADING	JOINT	FORCES: AXIAL	FORCES: SHEAR Y	FORCES: SHEAR Z	MOMENTS: TORSION(CG)	MOMENTS: MOMENT Y	MOMENTS: MOMENT Z
1								
	F1	1	-885.47	1069.09	0.00	0.00	0.00	24106.91
		2	885.47	-1069.09	0.00	0.00	0.00	13632.12
	F2	1	-774.58	-140.38	0.00	0.00	0.00	-1492.97
		2	774.58	140.38	0.00	0.00	0.00	-3462.34
2								
	F1	2	77.34	-239.19	0.00	0.00	0.00	-25877.67
		3	-77.34	239.19	0.00	0.00	0.00	23820.67
	F2	2	82.40	-1307.22	0.00	0.00	0.00	-5512.87
		3	-82.40	1307.22	0.00	0.00	0.00	-5729.27
3								
	F1	3	77.34	-5663.74	0.00	0.00	0.00	-23820.67
		4	-77.34	5663.74	0.00	0.00	0.00	-24321.11
	F2	3	82.40	-1335.78	0.00	0.00	0.00	5729.27
		4	-82.40	1335.78	0.00	0.00	0.00	-17083.36
4								
	F1	4	4828.15	-7060.64	0.00	0.00	0.00	-17582.17
		5	-4828.15	7060.64	0.00	0.00	0.00	-26193.80
	F2	4	4182.85	2598.87	0.00	0.00	0.00	-13337.65
		5	-4182.85	-2598.87	0.00	0.00	0.00	29450.62
5								
	F1	5	-2717.65	5205.55	0.00	0.00	0.00	49971.02
		6	2717.65	-5205.55	0.00	0.00	0.00	-22381.58
	F2	5	-2411.41	-2807.30	0.00	0.00	0.00	-15682.27
		6	2411.41	2807.30	0.00	0.00	0.00	803.56
6								
	F1	6	-2717.65	32.51	0.00	0.00	0.00	22381.58
		7	2717.65	-32.51	0.00	0.00	0.00	-22105.24
	F2	6	-2411.41	-2830.34	0.00	0.00	0.00	-803.56
		7	2411.41	2830.34	0.00	0.00	0.00	-23254.37
[illegible]								
	F1	1	-4932.38	408.47	0.00	0.00	0.00	10385.84
		8	4932.38	-408.47	0.00	0.00	0.00	6981.62
	F2	1	-6363.03	183.60	0.00	0.00	0.00	3477.73

		8	6363.03	-183.60	0.00	0.00	0.00	4328.40
	F1	2	1215.26	962.81	0.00	0.00	0.00	12245.55
		8	-1215.26	-962.81	0.00	0.00	0.00	10573.09
	F2	2	1073.83	856.97	0.00	0.00	0.00	8975.20
		8	-1073.83	-856.97	0.00	0.00	0.00	11335.09
9								
	F1	4	1359.80	4750.81	0.00	0.00	0.00	41903.28
		9	-1359.80	-4750.81	0.00	0.00	0.00	29833.97
	F2	4	-3971.75	4100.45	0.00	0.00	0.00	30421.02
		9	3971.75	-4100.45	0.00	0.00	0.00	31495.82
10								
	F1	9	1340.08	-3503.19	0.00	0.00	0.00	-29833.97
		10	-1340.08	3503.19	0.00	0.00	0.00	-293.46
	F2	9	-3991.47	-4153.55	0.00	0.00	0.00	-31495.82
		10	3991.47	4153.55	0.00	0.00	0.00	-4224.69
11								
	F1	7	5.75	2717.65	0.00	0.00	0.00	22105.24
		11	-5.75	-2717.65	0.00	0.00	0.00	18931.21
	F2	7	-2857.10	2411.41	0.00	0.00	0.00	23254.37
		11	2857.10	-2411.41	0.00	0.00	0.00	13157.92
12								
	F1	11	-13.96	-1782.35	0.00	0.00	0.00	-18931.21
		12	13.96	1782.35	0.00	0.00	0.00	3602.97
	F2	11	-2876.82	-2088.59	0.00	0.00	0.00	-13157.92
		12	2876.82	2088.59	0.00	0.00	0.00	-4803.95
-								
	F1	13	-5285.54	-1271.45	0.00	0.00	0.00	-6742.60
		10	5285.54	1271.45	0.00	0.00	0.00	-4064.73
	F2	13	-6242.14	1772.95	0.00	0.00	0.00	4828.77
		10	6242.14	-1772.95	0.00	0.00	0.00	10241.34
14								
	F1	14	-1782.35	28.19	0.00	0.00	0.00	3842.60
		12	1782.35	-28.19	0.00	0.00	0.00	-3602.97
	F2	14	-2088.59	2891.05	0.00	0.00	0.00	19769.95
		12	2088.59	-2891.05	0.00	0.00	0.00	4803.95
15								
	F1	8	-5285.54	-1257.22	0.00	0.00	0.00	-17554.71
		13	5285.54	1257.22	0.00	0.00	0.00	6742.60
	F2	8	-6242.14	-2382.82	0.00	0.00	0.00	-15663.49
		13	6242.14	2382.82	0.00	0.00	0.00	-4828.77
16								
	F1	10	-1782.35	44.83	0.00	0.00	0.00	4358.18
		14	1782.35	-44.83	0.00	0.00	0.00	-3842.60
	F2	10	-2088.59	-2242.31	0.00	0.00	0.00	-6016.65
		14	2088.59	2242.31	0.00	0.00	0.00	-19769.95

THE MAXIMUM MEMBER FORCE VALUES ARE AS FOLLOWS :

VALUE FOR AXIAL IS = -6363.0346680 AND IT OCCURS IN MEMBER 7 AT JOINT 1 FOR LOADING F2
VALUE FOR SHEAR Y IS = -7060.6435547 AND IT OCCURS IN MEMBER 4 AT JOINT 4 FOR LOADING F1
VALUE FOR BEND. Z IS = 49971.0195312 AND IT OCCURS IN MEMBER 5 AT JOINT 5 FOR LOADING F1

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ATT. B SHEET B203

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LIST SECTION STRESS ALL
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CALC NO 96227-TR-03 REV Ø 1

ATT. B SHEET B204

1 JB

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RESULTS OF LATEST ANALYSIS
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JOB ID - SUPPORT JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

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ATT. B SHEET B205
JB
12/13/00

INTERNAL MEMBER RESULTS - SECTIONAL STRESSES

***** MEMBER 1 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	75.04	-355.03	0.00	0.00	679.07	679.07	754.11
1.000FR	75.04	-355.03	0.00	0.00	384.00	384.00	459.04
LOADING F2							
0.000FR	65.64	46.62	0.00	0.00	42.06	42.06	107.70
1.000FR	65.64	46.62	0.00	0.00	97.53	97.53	163.17

***** MEMBER 2 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	-6.55	79.43	0.00	0.00	728.95	728.95	-735.50
1.000FR	-6.55	79.43	0.00	0.00	671.00	671.00	-677.56
LOADING F2							
0.000FR	-6.98	434.11	0.00	0.00	155.29	155.29	-162.27
1.000FR	-6.98	434.11	0.00	0.00	161.39	161.39	-168.37

***** MEMBER 3 ***** SECTION STRESSES

!- DISTANCE --!-- STRESS --!

FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	-6.55	1880.86	0.00	0.00	671.00	671.00	-677.56
1.000FR	-6.55	1880.86	0.00	0.00	685.10	685.10	-691.66
LOADING F2							
0.000FR	-6.98	443.60	0.00	0.00	161.39	161.39	-168.37
1.000FR	-6.98	443.60	0.00	0.00	481.22	481.22	-488.20

***** MEMBER 4 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	-409.17	2344.76	0.00	0.00	495.27	495.27	-904.44
1.000FR	-409.17	2344.76	0.00	0.00	737.85	737.85	-1147.02
LOADING F2							
0.000FR	-354.48	-863.05	0.00	0.00	375.71	375.71	-730.19
1.000FR	-354.48	-863.05	0.00	0.00	829.59	829.59	-1184.07

***** MEMBER 5 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	230.31	-1728.70	0.00	0.00	1407.63	1407.63	1637.94
1.000FR	230.31	-1728.70	0.00	0.00	630.47	630.47	860.78
LOADING F2							
0.000FR	204.36	932.27	0.00	0.00	441.75	441.75	646.11
1.000FR	204.36	932.27	0.00	0.00	22.64	22.64	226.99

***** MEMBER 6 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	230.31	-10.80	0.00	0.00	630.47	630.47	860.78
1.000FR	230.31	-10.80	0.00	0.00	622.68	622.68	852.99
LOADING F2							

ALTRAN
CALC NO 96227-TR-03 REV Ø1
ATT. B SHEET B206
JB

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
0.000FR	204.36	939.92	0.00	0.00	22.64	22.64	226.99
1.000FR	204.36	939.92	0.00	0.00	655.05	655.05	859.41

***** MEMBER 7 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	838.84	-255.36	0.00	0.00	775.06	775.06	1613.90
1.000FR	838.84	-255.36	0.00	0.00	521.02	521.02	1359.86
LOADING F2							
0.000FR	1082.15	-114.78	0.00	0.00	259.53	259.53	1341.68
1.000FR	1082.15	-114.78	0.00	0.00	323.01	323.01	1405.16

***** MEMBER 8 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	-206.68	-601.91	0.00	0.00	913.85	913.85	-1120.52
1.000FR	-206.68	-601.91	0.00	0.00	789.04	789.04	-995.71
LOADING F2							
0.000FR	-182.62	-535.74	0.00	0.00	669.79	669.79	-852.42
1.000FR	-182.62	-535.74	0.00	0.00	845.90	845.90	-1028.53

***** MEMBER 9 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	-231.26	-2970.00	0.00	0.00	3127.11	3127.11	-3358.37
1.000FR	-231.26	-2970.00	0.00	0.00	2226.42	2226.42	-2457.67
LOADING F2							
0.000FR	675.47	-2563.43	0.00	0.00	2270.23	2270.23	2945.69
1.000FR	675.47	-2563.43	0.00	0.00	2350.43	2350.43	3025.90

***** MEMBER 10 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED

ALTRAN
CALC NO. 96227-TR-03 REV. 01
ATT. B SHEET B207

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	-227.90	2190.04	0.00	0.00	2226.42	2226.42	-2454.32
1.000FR	-227.90	2190.04	0.00	0.00	21.90	21.90	-249.80
LOADING F2							
0.000FR	678.82	2596.62	0.00	0.00	2350.43	2350.43	3029.26
1.000FR	678.82	2596.62	0.00	0.00	315.28	315.28	994.10

***** MEMBER 11 ***** SECTION STRESSES

DISTANCE FROM START	STRESS: AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	-0.98	-1698.95	0.00	0.00	1649.65	1649.65	-1650.62
1.000FR	-0.98	-1698.95	0.00	0.00	1412.78	1412.78	-1413.76
LOADING F2							
0.000FR	485.90	-1507.51	0.00	0.00	1735.40	1735.40	2221.30
1.000FR	485.90	-1507.51	0.00	0.00	981.93	981.93	1467.84

***** MEMBER 12 ***** SECTION STRESSES

DISTANCE FROM START	STRESS: AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	2.37	1114.25	0.00	0.00	1412.78	1412.78	1415.15
1.000FR	2.37	1114.25	0.00	0.00	268.88	268.88	271.25
LOADING F2							
0.000FR	489.26	1305.70	0.00	0.00	981.93	981.93	1471.19
1.000FR	489.26	1305.70	0.00	0.00	358.50	358.50	847.76

***** MEMBER 13 ***** SECTION STRESSES

DISTANCE FROM START	STRESS: AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	898.90	794.86	0.00	0.00	503.18	503.18	1402.08
1.000FR	898.90	794.86	0.00	0.00	303.34	303.34	1202.24
LOADING F2							
0.000FR	1061.59	-1108.37	0.00	0.00	360.36	360.36	1421.94

ALTRAN
CALC NO. 96227-TR-03 REV. Ø1
ATT. B SHEET B208

JB

1.000FR	1061.59	-1108.37	0.00	0.00	764.28	764.28	1825.87

***** MEMBER 14 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	303.12	-17.62	0.00	0.00	286.76	286.76	589.88
1.000FR	303.12	-17.62	0.00	0.00	268.88	268.88	572.00
LOADING F2							
0.000FR	355.20	-1807.36	0.00	0.00	1475.37	1475.37	1830.57
1.000FR	355.20	-1807.36	0.00	0.00	358.50	358.50	713.71

***** MEMBER 15 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	898.90	785.96	0.00	0.00	1310.05	1310.05	2208.95
1.000FR	898.90	785.96	0.00	0.00	503.18	503.18	1402.08
LOADING F2							
0.000FR	1061.59	1489.64	0.00	0.00	1168.92	1168.92	2230.50
1.000FR	1061.59	1489.64	0.00	0.00	360.36	360.36	1421.94

***** MEMBER 16 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	303.12	-28.03	0.00	0.00	325.24	325.24	628.36
1.000FR	303.12	-28.03	0.00	0.00	286.76	286.76	589.88
LOADING F2							
0.000FR	355.20	1401.80	0.00	0.00	449.00	449.00	804.21
1.000FR	355.20	1401.80	0.00	0.00	1475.37	1475.37	1830.57

ALTRAN
CALC NO 96227-TR-03 REV 01
ATT. B SHEET B209

OVERALL MAXIMUM STRESSES OCCUR AS FOLLOWS

STRESS	APPEARING IN	AT SECTION	FOR LOAD	OPTION

			MEMBER			
AXIMUM AXIAL STRESS	=	1082.14893	7	42.5180	F2	2
MAXIMUM SHEAR Y STRESS	=	-2970.00122	9	15.1000	F1	2
MAXIMUM Z BENDING TENSION	=	3127.11060	9	0.0000	F1	2
MAXIMUM Z BENDING COMPRESSION	=	-3127.11060	9	0.0000	F1	2
MAXIMUM COMBINED BENDING TENSION	=	3127.11060	9	0.0000	F1	2
MAXIMUM COMB. BEND. COMPRESSION	=	3127.11060	9	0.0000	F1	2
MAXIMUM ABS. COMBINED BENDING	=	3127.11060	9	0.0000	F1	2
MAXIMUM COMB. AXIAL AND BENDING	=	3358.36865	9	0.0000	F1	2

WHERE,

OPTION=1 - SECTION IS UNSYMMETRIC AND ITS 'TYPE' IS NOT KNOWN. BENDING Y AND Z MAY NOT BE COMBINED AND FURTHERMORE BENDING STRESSES MAY NOT BE COMBINED WITH AXIAL STRESSES.

2 - BENDING Y IS COMBINED WITH BENDING Z BY TAKING SIGN OF STRESSES (COMPRESSION OR TENSION) INTO ACCOUNT. ALSO COMBINED BENDING STRESS IS FURTHER COMBINED WITH AXIAL STRESS WITH PROPER SIGNS.

LIST MAXIMUM STRESS ALL

ALTRAN
CALC NO 96227-TR-03 REV Ø1
ATT. B SHEET B2-10

DSB
12/13/00

****
RESULTS OF LATEST ANALYSIS
****

JOB ID - SUPPORT JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

INTERNAL MEMBER RESULTS - MAXIMUM STRESSES

	STRESS					
MEMBER	BEND YZ	AT SECTION	AT LOADING	BEND YZ + AXIAL	AT SECTION	AT LOADING
1	679.07	0.000 FR	F1	754.11	0.000 FR	F1
2	728.95	0.000 FR	F1	-735.50	0.000 FR	F1
	685.10	1.000 FR	F1	-691.66	1.000 FR	F1
	829.59	1.000 FR	F2	-1184.07	1.000 FR	F2
5	1407.63	0.000 FR	F1	1637.94	0.000 FR	F1
6	655.05	1.000 FR	F2	860.78	0.000 FR	F1
7	775.06	0.000 FR	F1	1613.90	0.000 FR	F1
8	913.85	0.000 FR	F1	-1120.52	0.000 FR	F1
9	3127.11	0.000 FR	F1	-3358.37	0.000 FR	F1
10	2350.43	0.000 FR	F2	3029.26	0.000 FR	F2
11	1735.40	0.000 FR	F2	2221.30	0.000 FR	F2
12	1412.78	0.000 FR	F1	1471.19	0.000 FR	F2
13	764.28	1.000 FR	F2	1825.87	1.000 FR	F2
14	1475.37	0.000 FR	F2	1830.57	0.000 FR	F2
15	1310.05	0.000 FR	F1	2230.50	0.000 FR	F2
16	1475.37	1.000 FR	F2	1830.57	1.000 FR	F2

ALTRAN
CALC NO. 96227-TR-03 REV. Ø1
ATT. B SHEET B241

TSS 12/13/00

OVERALL MAXIMUM STRESSES OCCUR AS FOLLOWS

STRESS			APPEARING IN MEMBER	AT SECTION	FOR LOAD	OPTION
MAXIMUM AXIAL STRESS	=	1082.14893	7	42.5180	F2	2
MAXIMUM SHEAR Y STRESS	=	-2970.00122	9	15.1000	F1	2
MAXIMUM Z BENDING TENSION	=	3127.11060	9	0.0000	F1	2
MAXIMUM Z BENDING COMPRESSION	=	-3127.11060	9	0.0000	F1	2
MAXIMUM COMBINED BENDING TENSION	=	3127.11060	9	0.0000	F1	2
MAXIMUM COMB. BEND. COMPRESSION	=	3127.11060	9	0.0000	F1	2
MAXIMUM ABS. COMBINED BENDING	=	3127.11060	9	0.0000	F1	2

MAXIMUM COMB. AXIAL AND BENDING = 3358.36865 9 0.0000 F1 2

WHERE,

OPTION=1 - SECTION IS UNSYMMETRIC AND ITS 'TYPE' IS NOT KNOWN. BENDING Y AND Z MAY NOT BE COMBINED AND FURTHERMORE BENDING STRESSES MAY NOT BE COMBINED WITH AXIAL STRESSES.

2 - BENDING Y IS COMBINED WITH BENDING Z BY TAKING SIGN OF STRESSES (COMPRESSION OR TENSION) INTO ACCOUNT. ALSO COMBINED BENDING STRESS IS FURTHER COMBINED WITH AXIAL STRESS WITH PROPER SIGNS.

```
$
$  CODE CHECK
$
PARAMETERS
'CODE'  'AISC'  ALL
'VERSION' '69U1' ALL
'TORSION' 'YES' ALL
'WARPING' 'YES' ALL
'ASF'  1.60 LOADS ALL
'FSHMAX'  0.55 ALL
$
CHECK CODE MEMBER 1 TO 16
```

****
* STRUDL CODE CHECK RESULTS *
****

JOB ID - SUPPORT JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

			CONTROLLING CHECKS		CONTROLLING SECTION FORCES			
MEMBER	PROFILE	RESULT	PRIMARY	RATIO(P)	FX	FY	FZ	CODE
LOAD	TABLE	SECTION	SECONDARY	RATIO(S)	TORSION	MY	MZ	TYPE
1	W8X40	PASS	TSLNDRNS	0.072	885.47	-1069.09	0.00	AISC
F1	STEELW	0.00	PAR1.6.2	0.021	0.00	0.00	-24106.91	I-SYM
2	W8X40	PASS	SHEAR Y	0.022	-82.40	1307.22	0.00	AISC
F2	STEELW	0.00	CSLNDRNS	0.021	0.00	0.00	5512.87	I-SYM
3	W8X40	PASS	SHEAR Y	0.095	-77.34	5663.74	0.00	AISC
F1	STEELW	0.00	CSLNDRNS	0.021	0.00	0.00	23820.67	I-SYM
	W8X40	PASS	SHEAR Y	0.118	-4828.15	7060.64	0.00	AISC
F1	STEELW	0.00	FM 1.6-2	0.033	0.00	0.00	17582.17	I-SYM
5	W8X40	PASS	SHEAR Y	0.087	2717.65	-5205.55	0.00	AISC
F1	STEELW	0.00	PAR1.6.2	0.046	0.00	0.00	-49971.02	I-SYM
6	W8X40	PASS	SHEAR Y	0.047	2411.41	2830.34	0.00	AISC
F2	STEELW	0.00	PAR1.6.2	0.024	0.00	0.00	803.56	I-SYM
7	W6X20	PASS	TSLNDRNS	0.117	4932.38	-408.47	0.00	AISC
F1	STEELW	0.00	PAR1.6.2	0.046	0.00	0.00	-10385.84	I-SYM
8	W6X20	PASS	CSLNDRNS	0.078	-1215.26	-962.81	0.00	AISC
F1	STEELW	0.00	FM 1.6-2	0.032	0.00	0.00	-12245.55	I-SYM
9	W6X20	PASS	SHEAR Y	0.150	-1359.80	-4750.81	0.00	AISC
F1	STEELW	0.00	FM 1.6-2	0.094	0.00	0.00	-41903.28	I-SYM
10	W6X20	PASS	SHEAR Y	0.131	3991.47	4153.55	0.00	AISC
F2	STEELW	0.00	PAR1.6.2	0.085	0.00	0.00	31495.82	I-SYM
11	W6X20	PASS	SHEAR Y	0.086	-5.75	-2717.65	0.00	AISC
F1	STEELW	0.00	PAR1.6.2	0.062	0.00	0.00	-22105.24	I-SYM
12	W6X20	PASS	SHEAR Y	0.066	2876.82	2088.59	0.00	AISC
	STEELW	0.00	PAR1.6.2	0.041	0.00	0.00	13157.92	I-SYM

ALTRAN
CALC NO. 96227-TR-03 REV. Ø1
B SHEET B213
JB
12/3/..

MEMBER LOAD	PROFILE TABLE	RESULT SECTION	CONTROLLING CHECKS PRIMARY SECONDARY	RATIO(P) RATIO(S)	CONTROLLING SECTION FORCES FX TORSION	FY MY	FZ MZ	CODE TYPE
13	W6X20	PASS	SHEAR Y	0.056	6242.14	-1772.95	0.00	AISC
F2	STEELW	0.00	PAR1.6.2	0.052	0.00	0.00	-4828.77	I-SYM
14	W6X20	PASS	SHEAR Y	0.091	2088.59	-2891.05	0.00	AISC
F2	STEELW	0.00	PAR1.6.2	0.051	0.00	0.00	-19769.95	I-SYM
15	W6X20	PASS	SHEAR Y	0.075	6242.14	2382.82	0.00	AISC
F2	STEELW	0.00	PAR1.6.2	0.063	0.00	0.00	15663.49	I-SYM
16	W6X20	PASS	SHEAR Y	0.071	2088.59	2242.31	0.00	AISC
F2	STEELW	0.00	PAR1.6.2	0.051	0.00	0.00	6016.65	I-SYM

********** FOLLOWING IS A SUMMARY OF THE CODE CHECKS PERFORMED ABOVE **********

ALL 16 MEMBERS, THAT ARE CHECKED, PASSED CODE CHECKS.

PLANE XY THRU JOI 7

ALTRAN

CALC NO. 96277-TR-03 REV. Ø1

B SHEET B214

JB

```
                                              X        HORIZONTAL SCALE        2.700 UNITS PER INCH
                                              *
                                              *
                                              *
                                              *        VERTICAL   SCALE        4.600 UNITS PER INCH
                               ORIENTATION    *****Y



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           -X*12*************************11*X*****************************************************7*X
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    68.7 +*                                                                                         *
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    59.5 +*                                                                                         *
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    54.9 +*                                                                                         *
           -*                                                                                       *
           -*                                                                                       *
           -X*10**************************9*X*****************************************************4*X
           -*                                                                                       *
           -*                                                                                       *
    50.3 +*                                                                                         *
           -*                                                                                       *
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           -*                                                                                       *
           -*                                                                                       *
           -*                                                                                       *
    45.7 +*                                                                                         *
           -*                                                                                       *
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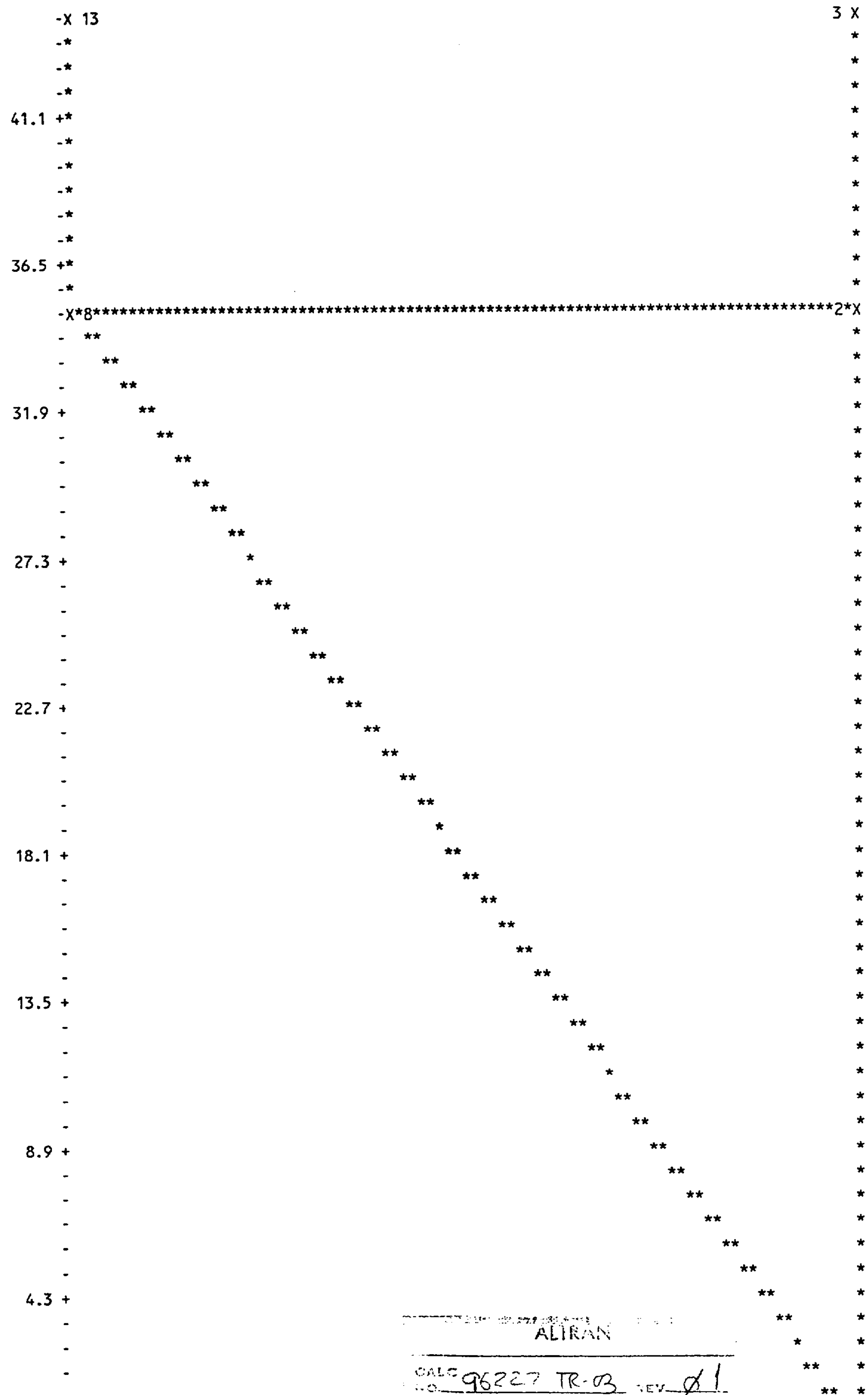
ALTRAN
CALC NO. 96227-TR-03 REV. Ø1
B215

JB
12/13/00

* PHI-DELTA/MPDS * NONE GIVEN

* JOB 00000420 * 11-FEB-1998 18:09:52 * P00031 *



ALTRAN

CALC NO. 96227 TR-03 REV. Ø1

B SHEET B216

JB

12/15/00

* PHI-DELTA/MPDS * NONE GIVEN

* JOB 00000420 * 11-FEB-1998 18:09:52 * P00032 *

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    -4.9 +

           ---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+-
                  21.6      18.9      16.2      13.5      10.8       8.1       5.4       2.7       0.0      -2.7
```

FINISH

ALTRAN

CALC NO. 96227-TR-03 REV. ~~Ø~~1

ATT. B PAGE NO. B217

JB

JB 12/13/00

```
********************************************************************
*                                                                  *
*  THIS IS VERSION TEST OF PHI-DELTA STRUDL PROGRAM.  FOR          *
*  INFORMATION (ENHANCEMENTS, BUGS, ETC.) REGARDING THIS           *
*  PHI-DELTA STRUDL VERSION, THE USER SHOULD REFER TO              *
*  PHI-DELTA STRUDL ADVISORY NO. 25, DATED APR 19, 1993.           *
*  FOR ANY QUESTIONS, PLEASE CALL PHI-DELTA AT 617-356-0400        *
*                                                                  *
********************************************************************
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T A B L E   O F   C O N T E N T S

ALTRAN
CALC NO. 96227-TC-13 REV. 01
PAGE B218
1
JB
12/15/98

altran **Calculation Sheet**

ATT. B

Calc. No. 96227-TR-03 By: A Patel Date: 2-14-98 Sheet B219

Rev. No. Ø 1 Chk: N Patel Date: 2-16-98

Reference

1-GN02-C013/242 (B)

Ref'd. Calc. GN02-34 Rev. 4 — # 14

Loads per Ref'd calc. (used in calc)

FY = 5000#

FXL = 2450#

New loads (max.)

FY = -7032#, 826# (upward)

FXL = 2254#

Load increased / Decreased factor

FY = 7032/5000 = +1.4

FXL = 2254/2450 = 0.92

CHECK WELDS:

@ JTS 7, 10, 11 (See Ref'd calc.) — # 14

New t min = .06 x 1.4 = .084 < .25" ∴ OK

Consv. use increase factor

@ JT.S 1, 2, 4, 12, 13

new t min = .08 x 1.4 = 0.112" < .25" ∴ OK

@ Stanchion weld

new t min = .1 x 1.4 = 0.14 < .25" ∴ OK

altran

Calculation Sheet

ATT. B

Calc. No. 96227-TR-03 By: [signature] Date: 2-14-98 Sheet B220

Rev. No. Ø 1 Chk: N Palit Date: 2-16-98

Reference

1-GN02-C013 (Contd)

@ JT.'s 1 & 5

new t min = $\frac{0.27 \times \overset{\text{Load increase factor}}{1.4}}{\underset{\text{Factored allow.}}{1.33}} = 0.28'' < 5/16''$ ∴ OK

∴ ALL WELDS ARE ADEQUATE.

All member passed code chk. with normal allowable & as forces, moments are small (from stress output) & since all welds are well within allowable limits with load increase factor (load decrease factor not used conservatively) all members will be adequate with new loads.

∴ SUPPORT IS ADEQUATE

Calculation Sheet

AT-B

altran

Calc. No. 96227-TR-03 By: [illegible signature] Date: 2-14-98 Sheet B22

Rev. No. ⌀1 Chk: N Patel Date: 2-16-98

	Reference
1-GN02-R003 / 242 (0)	
Ref-d Calc. GN02-6 Rev. 3	#14

Loads used in Ref-d Calc. to qualify suppt.

Flat = $-2150^{\#}$
$+2100^{\#}$

New loads =

Flat = $-2596^{\#}$
$+2532^{\#}$

Load increased factor (WORST CASE)

$2596/2100 = 1.24$

Per ref'd Calc. max. weld thickness req'd = 0.15" with load increased factor

new t req'd = $0.15 \times 1.24 = 0.186'' < .25''$

∴ all welds are adequate

All members passed code chk. with normal allowable and load increased factor is $1.24 < 1.33$ faulted allowable ratio

∴ SUPPORT IS ADEQUATE

altran

Calculation Sheet

ATT. 6

Calc. No. 96227-TR-03 By: [illegible] Date: 2.14.98 Sheet 6222

Rev. No. ~~0~~ 1 Chk: N Palit Date: 2-16-98

Reference

1-GN02-R005/252 (Q)

Ref'd calc. P-GN02-19 Rev. 5 #14

Loads used in Ref'd calc. to qualify support:

$F_x = 15514^{\#}$

$F_z = 7286^{\#}$

New loads: (max.)

$F_x = 3910^{\#}$

$F_z = 1782^{\#}$

New loads are lower than loads in Ref'd calc.

∴ SUPPORT IS ADEQUATE

altran

Calculation Sheet

ATT. B

Calc. No. 96227-TR-03 By: dPatel Date: 2-14-98 Sheet B223

Rev. No. Ø 1 Chk: N Patel Date: 2-16-98

	Reference
1-GN02-H001/252(Q)	
Ref'd Calc. GN02-29 Rev. 2	#14
Load used in Ref'd calc. to qualify member & weld:	
FY = 17000#	
New loads (max):	
FY = 16677#	
new loads < load used in Ref'd. calc to qualify member & weld ∴ OK	
CHECK STRUT, ITT GRINNELL 211 - SIZE 4	
16677# < 20700# (Normal Allow) ∴ STRUT IS OK.	#19
∴ SUPPORT IS ADEQUATE	

Calculation Sheet

ATT. B

altran

Calc. No. 96227-TR-03 By: [signature] Date: 2-14-98 Sheet G224

Rev. No. ∅ 1 Chk: N. Patel Date: 2-16-98

Reference
#14

1-GN02-C015/252 (0)

Ref.'d Calc. P-GN02-14 Rev. 4

Loads used in ref.'d calc. to qualify support:

$F_Z = 7554^{\#}$

$F_Y = 22810^{\#}$

New loads: (max.)

$F_Z = 2972^{\#}$

$F_Y = 5771^{\#}$

New loads are lower than loads used in ref.'d calc. to qualify support

∴ SUPPORT IS ADEQUATE

altran

Calculation Sheet

ATT B

Calc. No. 96227-TR-03 By: N. Patel Date: 2-14-98 Sheet B225

Rev. No. ϕ 1 Chk: S. Patel Date: 2-16-98

Reference

1-GN02-C019 / 231 CQ)

MAX. LOAD (NEW)

F_y : +0, −11962#

F_Z : 3330# / −3224#

REF CALC GN02-27 REV. 2 — 14

FOR THIS SUPPORT LOADS USED TO QUALIFY:

F_y = −12600# F_Z = 2800#

NEW LOAD. F_Z INCREASE BY: 3330 − 2800 = 530#

BUT F_y DECREASED BY = 12600 − 11962 = 638#

BY VIEWING SUPPORT CONFIGURATION IT IS CLEAR THAT MOST CRITICAL LOAD IS F_y WHICH IS REDUCED. THEREFOR INCREASE IN F_Z LOAD BY 530# WILL NOT AFFECT ANALYSIS RESULT SIGNIFICANTLY FOR MEMBER STRESSES & CODE CHECK.

∴ MEMBERS ARE ACCEPTABLE.

IN REF. CALC. WELD ALLOW USED ARE NORMAL ALLOWABLE FOR FLTD CASE IT CAN BE INCREASE TO 1.33 TIME

1.33 > LOAD INCREASE FACTOR: $\frac{3330}{2800}$ = 1.19 (CONS.)

∴ EXISTING WELDS ARE ACCEPTABLE.

∴ SUPPORT IS ACCEPTABLE.

altran

Calculation Sheet

ATT. B

Calc. No. 96227-TR-03 By: N. Patel Date: 2-14-98 Sheet B226

Rev. No. 01 Chk: [illegible] Date: 2-16-98

	Reference
1-GN02-R009/241(Q)	
NEW LOAD MAX. FZ = 3725#	
REF. CALC. GN02-25 REV. 1. IN THIS CALC.	14
SUPPORT IS QUALIFIED FOR LOAD FZ = 2140#	
WORST IR FOR WELD = $\frac{0.085}{0.25}$ = 0.34	
DUE TO NEW LOAD. NEW IR = $\frac{0.34 \times 3725}{2140}$	
IR = 0.59 < 1 O.K.	
NEW BENDING STRESS ON W4×13	
$2.55 \times \frac{3.725}{2.140} = 4.44$ KSI < 18.6 KSI OK	
∴ SUPPORT IS ACCEPTABLE.	

altran

Calculation Sheet

ATT-B

Calc. No. 96227-TR-03 By: N Patil Date: 2-14-98 Sheet B 227

Rev. No. ∅ 1 Chk: [illegible] Date: 2-16-98

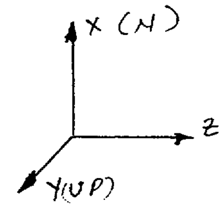
Reference

1-GN02-C021/241 (0)

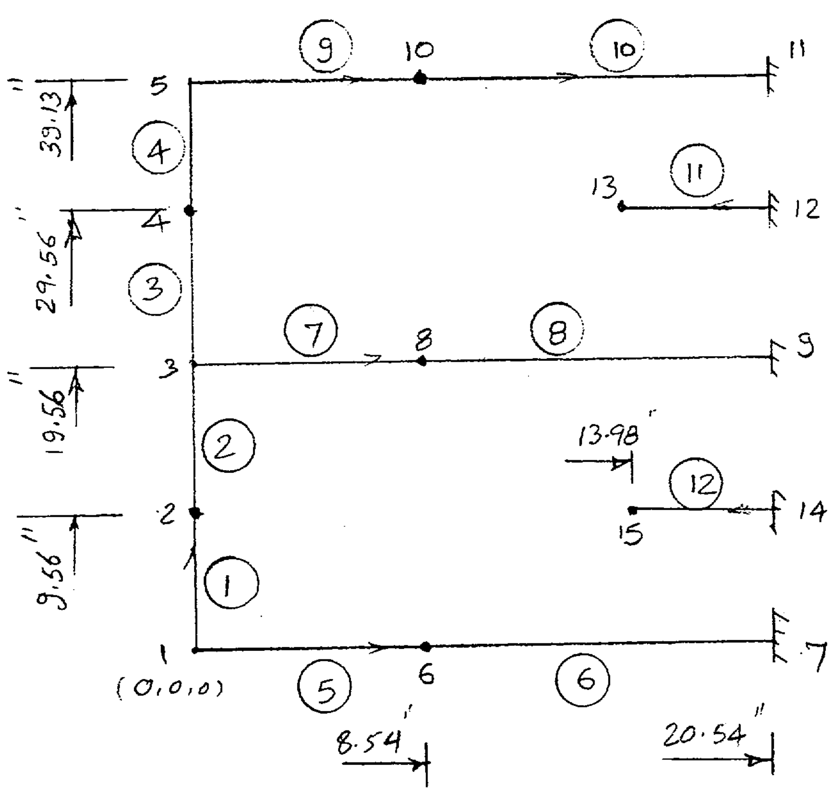
THIS SUPPORT IS GANGED WITH SUPPORT NO

1-GN02-C024/241 (0)
DWG. OF 1-GN02 C024/241(0)
ATTACHED IN THIS ATT. FOR REF.

PD STRUDL MODEL



GLOBAL AXES.



JTS. 2, 6, 8 & 15 FOR SUPT # 1-GN02-C021

JTS 4, 8, 10 & 13 FOR SUPT # 1-GN02-C024

FOR SUPT # 1-GN02-C024 LOADS FROM DRAWING

1-GN02-C024/241 (0) REV. 4 ARE USED.

FOR PD STRUDL output SEE following Pages.

Calculation Sheet

ATT. B

altran

Calc. No. 96227-TR-03 By: N Patil Date: 2-14-98 Sheet B228

Rev. No. ϕ 1 Chk: dRubi Date: 2-16-98

Reference

1-GN02-C021/241 (C) (CONT'D)

FOR STRUDL OUTPUT (SEE PGS. B TO)

ALL MEMBERS PASSES CODE CHECK ∴ OK.

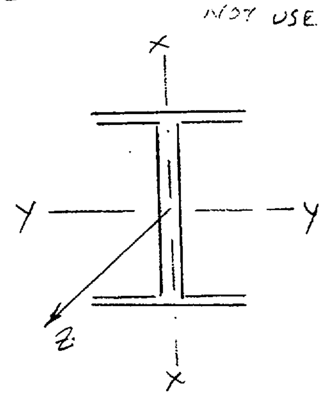
CHECK WELD.

WORST LOAD @ SUPPORT JT 9. (FROM STRUDL OUT)

$F_x = 5899^{\#}$ $F_y = 6706^{\#}$ $F_z = 1620^{\#}$

$M_x = 76153''^{\#}$ $M_y = 48631''^{\#}$ $M_z = 47''^{\#}$ (NEGLIGIBLE) NOT USED.

FOR ALL AROUND WELD @ W8X40



WELD PROPERTIES 17

$A_w = 48.81$ in $S_{wy} = 155.96$ in^2

$S_{wx} = 46.5$ in^2

$$f_r = \left[\left(\frac{1620}{48.81} + \frac{76153}{46.5} + \frac{48631}{155.96}\right)^2 + \left(\frac{5899}{48.81}\right)^2 + \left(\frac{6706}{48.81}\right)^2\right]^{1/2} = 1991^{\#}/\text{in}$$

$$\text{WELD REQ'D} : \frac{.1991}{.4 \times 31000 \times 1.33} = 0.12'' < 0.3125'' \text{ (O.K.)}$$

← FLTD.

ALL OTHER WELDS of SUPPORTS ARE O.K

By COMPARISION WITH ABOVE WELD.

∴ SUPPORT IS ACCEPTABLE.

```
     PPPPPPPPPP  DDDDDDDDDD        SSSSSSSSSSS TTTTTTTTTTT RRRRRRRRRR  UU       UU DDDDDDDDDD  LL
    PPPPPPPPPPP DDDDDDDDDDD       SSSSSSSSSSS TTTTTTTTTTT RRRRRRRRRRR UU       UU DDDDDDDDDDD LL
   PP       PP DD       DD       SS               TT      RR       RR UU       UU DD       DD LL
  PP       PP DD       DD       SS               TT      RR       RR UU       UU DD       DD LL
 PPPPPPPPPPP DD       DD HHHHHH SSSSSSSSSSS      TT      RRRRRRRRRRR UU       UU DD       DD LL
PPPPPPPPPP  DD       DD HHHHHH SSSSSSSSSSS      TT      RRRRRRRRRR  UU       UU DD       DD LL
PP          DD       DD                 SS      TT      RRRRR      UU       UU DD       DD LL
PP          DD       DD                 SS      TT      RR  RR     UU       UU DD       DD LL
PP          DDDDDDDDDDD        SSSSSSSSSSS      TT      RR    RR   UUUUUUUUUUU DDDDDDDDDDD LLLLLLLLLL
PP          DDDDDDDDDD         SSSSSSSSSSS      TT      RR      RR UUUUUUUUUUU DDDDDDDDDD  LLLLLLLLLL
```

```
*****************************************************************
*                                                               *
*                      PHI-DELTA STRUDL                         *
*                        VERSION 0496                           *
*                           PC DOS                              *
*                                                               *
*                 A PROPRIETARY PRODUCT OF                      *
*                      PHI-DELTA, INC.                          *
*                     42 HOLBROOK AVE.                          *
*             BRAINTREE, MASSACHUSETTS  02184                   *
*                   TEL. (617) 356-0400                         *
*                                                               *
*                  COPYRIGHT (C) 1989-1995                      *
*                    ALL RIGHTS RESERVED                        *
*                                                               *
*****************************************************************
```

ALTRAN

CALC NO. 96227-TR-03 REV. ~~0~~1

ATT. B SHEET B229

ALTRAN CORPORATION
IS AUTHORIZED BY PHI-DELTA TO USE PD-STRUDL AT THE ESTABLISHED
RATE OF PROGRAM SURCHARGE.

BY: N. Patel 2-12-98
CHK: [signature] 2-16-98

ACCOUNT ....
PASSWORD .... PDELTA-STRUDL
JOB LOG NO 00000423
JOB STARTED AT ... 12-FEB-1998 13:00:32.00

ALTRAN
CALC NO. 96227-TR-03 REV. 01
ATT. 13 SHEET B230
12/13/00

```
              ++++++++++++++++++++++++++++++++++++++++++++++++++++
              +     THIS IS PD STRUDL INPUT FILE FOR THE        +
$             +              SUPPORT C021                       +
$             +               STORED UNDER                      +
$             +               WC\C021.DAT                       +
$             +                                                 +
$             +  CORRESPONDING OUTPUT FILE IS STORED UNDER      +
$             +               WC\C021.OUT                       +
$             ++++++++++++++++++++++++++++++++++++++++++++++++++++
$
STRUDL 'SUPPORT C021'
$
TYPE SPACE FRAME
UNITS INCHES DEGREES POUND FAHRENH LBM SECONDS
ALPHANUMERIC IDENTIFIER TREATMENT WILD
$
JOINT COORDINATES
1        0.0      0.0       0.0
2        9.56     0.0       0.0
3       19.56     0.0       0.0
4       29.56     0.0       0.0
5       39.13     0.0       0.0
6        0.0      0.0       8.54
7        0.0      0.0      20.54  S
8       19.56     0.0       8.54
        19.56     0.0      20.54  S
        39.13     0.0       8.54
11      39.13     0.0      20.54  S
12      29.56     0.0      20.54  S
13      29.56     0.0      13.98
14       9.56     0.0      20.54  S
15       9.56     0.0      13.98
UNITS DEGREE
MEMBER INCIDENCE
1     1     2
2     2     3
3     3     4
4     4     5
5     1     6
6     6     7
7     3     8
8     8     9
9     5     10
10    10    11
11    12    13
12    14    15
MEMBER PROPERTY
5 TO 10 TABLE 'STEELW'    'W8X40'
1 TO 4  TABLE 'STEELW'    'W6X20'
11 12   TABLE 'AISCPIPE'  '5.258'
$
    ANTS
 9.0E6 ALL ;G 11.15E6 ALL; DENSITY 0.283 ALL
POISSON 0.3 ALL
BETA 90 1 TO 10
BETA 0 11 12
```

```
$
    ATE JOINTS ALL
..."IVATE MEMBER ALL
$
$ LOADING DATA IS INSERTED HERE
$
UNITS INCHES DEGREES POUND
LOADING 'F1'
JOINT LOAD
2    FORCE Z  -916
4    FORCE Z  -2450
6    FORCE Y  -2077
8    FORCE X   7820   FORCE Y   -7127
10   FORCE X   3450   FORCE Y   -5050
DEAD LOAD COMP GLOBAL Y -1.0
LOADING 'F2'
JOINT LOAD
6    FORCE X  -5946   FORCE Y -2077
8    FORCE X  -3400   FORCE Y -7127
10   FORCE Y  -5050
13   FORCE Z   2600
15   FORCE Z   2166
DEAD LOAD COMP GLOBAL Y -1.0
QUERY
```

ALTRAN	
CALC NO. 96227-TR-03	REV. ϕ1
ATT. B	SHEET B23

1 B

DSS 12/13/...

```
*****************************
* RESULTS OF LATEST QUERY *
*****************************

JOB ID -    SUPPORT       JOB TITLE - NONE GIVEN

ACTIVE UNITS -  LENGTH      WEIGHT      ANGLE      TEMPERATURE     TIME          MASS
                 INCH         LBF         DEG           FAH          SEC           LBM

NUMBER OF JOINTS             : TOTAL      15 ACTIVE     15 INACTIVE      0
NUMBER OF MEMBERS            : TOTAL      12 ACTIVE     12 INACTIVE      0
NUMBER OF FINITE ELEMENTS    : TOTAL       0 ACTIVE      0 INACTIVE      0
NUMBER OF SUBSTRUCTURES      : TOTAL       0 ACTIVE      0 INACTIVE      0
NUMBER OF INDEPENDENT LOADS  : TOTAL       2 ACTIVE      2 INACTIVE      0
NUMBER OF DEPENDENT LOADS    : TOTAL       0 ACTIVE      0 INACTIVE      0
NUMBER OF DYNAMIC LOADS      : TOTAL       0 ACTIVE      0 INACTIVE      0
LIMIT ON MAXIMUM NUMBER OF JOINTS :  3000
             MEMBERS AND ELEMENTS :  6000
                         LOADINGS :   500
INPUT MODE IS : ADDITION
SCAN MODE IS  : OFF
```

ALTRAN	
CALC NO. 96227-TR-03	REV. Ø1
ATT. B	SHEET B232

TS
12/13/?

```
$
PRINT STRUCTURAL DATA
```

* PHI-DELTA/MPDS * NONE GIVEN

* JOB 00000423 * 12-FEB-1998 13:00:32 * P00005 *

****
* PROBLEM DATA FROM INTERNAL STORAGE *
****

JOB ID - SUPPORT   JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

********** STRUCTURAL DATA **********

ALTRAN
CALC NO. 96227-TR-03 REV. 01
ATT. B SHEET B23

JOINT COORDINATES----------------------------------/-CONDITION-/--STATUS--/

JOINT	X	Y	Z	CONDITION	STATUS
1	0.000	0.000	0.000		ACTIVE
2	9.560	0.000	0.000		ACTIVE
3	19.560	0.000	0.000		ACTIVE
[illegible]	29.560	0.000	0.000		ACTIVE
[illegible]	39.130	0.000	0.000		ACTIVE
6	0.000	0.000	8.540		ACTIVE
7	0.000	0.000	20.540	SUPPORT	ACTIVE
8	19.560	0.000	8.540		ACTIVE
9	19.560	0.000	20.540	SUPPORT	ACTIVE
10	39.130	0.000	8.540		ACTIVE
11	39.130	0.000	20.540	SUPPORT	ACTIVE
12	29.560	0.000	20.540	SUPPORT	ACTIVE
13	29.560	0.000	13.980		ACTIVE
14	9.560	0.000	20.540	SUPPORT	ACTIVE
15	9.560	0.000	13.980		ACTIVE

JOINT RELEASES------------------------------------/ELASTIC SUPPORT RELEASES---/

JOINT	FORCE	MOMENT	THETA 1	THETA 2	THETA 3	KFX	KFY	KFZ	KMX	KMY	KMZ

MEMBER INCIDENCES----------/ LENGTH PROJECTIONS ON GLOBAL AXES----/ RELEASES--------------------/ STATUS--/

MEMBER	START	END	LENGTH	X	Y	Z	START FORCE	START MOMENT	END FORCE	END MOMENT	STATUS		
	1	2	9.560	9.560	0.000	0.000					ACTIVE	SPACE	FRAME
	2	3	10.000	10.000	0.000	0.000					ACTIVE	SPACE	FRAME
3	3	4	10.000	10.000	0.000	0.000					ACTIVE	SPACE	FRAME
4	4	5	9.570	9.570	0.000	0.000					ACTIVE	SPACE	FRAME
5	1	6	8.540	0.000	0.000	8.540					ACTIVE	SPACE	FRAME

	6	7	12.000	0.000	0.000	12.000	ACTIVE	SPACE	FRAME
	3	8	8.540	0.000	0.000	8.540	ACTIVE	SPACE	FRAME
8	8	9	12.000	0.000	0.000	12.000	ACTIVE	SPACE	FRAME
9	5	10	8.540	0.000	0.000	8.540	ACTIVE	SPACE	FRAME
10	10	11	12.000	0.000	0.000	12.000	ACTIVE	SPACE	FRAME
11	12	13	6.560	0.000	0.000	-6.560	ACTIVE	SPACE	FRAME
12	14	15	6.560	0.000	0.000	-6.560	ACTIVE	SPACE	FRAME

ELEMENT INCIDENCES---

ELEMENT NODES

ALTRAN
CALC NO. 96227-TR 03 REV. ~~0~~ 1
ATT. B SHEET B23 4

JB

MEMBER PROPERTIES---

MEM/SEG,LEN	TYPE		AX	AY	AZ	IX	IY	IZ	SY	SZ	YC	ZC	EY	EZ
	TABLE			YD	ZD	OD	ID	SFX	RAD	ALP	TYP	SPA	GEN	IYZ
				FLTK	WBTK	RY	RZ							
1	TABLE		5.880	1.600	2.945	0.243	13.300	41.500	4.430	13.400	3.100	3.009	0.000	0.000
	STEELW	W6X20		6.200	6.018	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.367	0.258	1.510	2.660							
	TABLE		5.880	1.600	2.945	0.243	13.300	41.500	4.430	13.400	3.100	3.009	0.000	0.000
	STEELW	W6X20		6.200	6.018	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.367	0.258	1.510	2.660							
3	TABLE		5.880	1.600	2.945	0.243	13.300	41.500	4.430	13.400	3.100	3.009	0.000	0.000
	STEELW	W6X20		6.200	6.018	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.367	0.258	1.510	2.660							
4	TABLE		5.880	1.600	2.945	0.243	13.300	41.500	4.430	13.400	3.100	3.009	0.000	0.000
	STEELW	W6X20		6.200	6.018	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.367	0.258	1.510	2.660							
5	TABLE		11.800	3.011	6.009	1.120	49.000	146.000	12.100	35.500	4.125	4.038	0.000	0.000
	STEELW	W8X40		8.250	8.077	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.558	0.365	2.040	3.530							
6	TABLE		11.800	3.011	6.009	1.120	49.000	146.000	12.100	35.500	4.125	4.038	0.000	0.000
	STEELW	W8X40		8.250	8.077	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.558	0.365	2.040	3.530							
7	TABLE		11.800	3.011	6.009	1.120	49.000	146.000	12.100	35.500	4.125	4.038	0.000	0.000
	STEELW	W8X40		8.250	8.077	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.558	0.365	2.040	3.530							
8	TABLE		11.800	3.011	6.009	1.120	49.000	146.000	12.100	35.500	4.125	4.038	0.000	0.000
	STEELW	W8X40		8.250	8.077	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.558	0.365	2.040	3.530							
9	TABLE		11.800	3.011	6.009	1.120	49.000	146.000	12.100	35.500	4.125	4.038	0.000	0.000
	STEELW	W8X40		8.250	8.077	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.558	0.365	2.040	3.530							

	TABLE		11.800	3.011	6.009	1.120	49.000	146.000	12.100	35.500	4.125	4.038	0.000	0.000
	STEELW	W8X40		8.250	8.077	0.000	0.000	0.000	0.000	0.000	I-SYM	0.000	YES	0.000
				0.558	0.365	2.040	3.530							
11	TABLE		4.300	2.150	2.150	30.324	15.162	15.162	5.451	5.451	2.782	2.782	0.000	0.000
	AISCPIPE	5.258		5.563	5.563	5.563	5.047	11.405	0.000	0.000	PIPE	0.000	YES	0.000
				0.258	0.258	1.878	1.878							
12	TABLE		4.300	2.150	2.150	30.324	15.162	15.162	5.451	5.451	2.782	2.782	0.000	0.000
	AISCPIPE	5.258		5.563	5.563	5.563	5.047	11.405	0.000	0.000	PIPE	0.000	YES	0.000
				0.258	0.258	1.878	1.878							

MEMBER CONSTANTS--/

CONSTANT	STANDARD VALUE	DOMAIN,	VALUE	MEMBER LIST					
E	0.290000E+08	ALL							
G	0.111500E+08	ALL							
CTE	0.650000E-05	ALL							
DENSITY	0.283000E+00	ALL							
.SON	0.300000E+00	ALL							
FYLD	0.360000E+05	ALL							
BETA	0.000000E+00	ALL BUT							
			0.900000E+02	1	2	3	4	5	6
				7	8	9	10		
			0.100000E-19	11	12				
CBETA	0.000000E+00	ALL							
FULT	0.600000E+05	ALL							
EC	0.280000E+08	ALL							
FYLDH	0.300000E+05	ALL							
SC	0.150000E+05	ALL							
SH	0.150000E+05	ALL							
FULTH	0.500000E+05	ALL							

ALTRAN
CALC NO. 96227-TQ-03 REV. 01
ATT. B SHEET B235

****
* END OF DATA FROM INTERNAL STORAGE *
****

LOADING DATA

ALTRAN
CALC NO. 96227-TR-03 REV. ~~0~~ 1
ATT. B SHEET ~~B23~~ 6
B23 1 JB
11/13/00

ALTRAN
CALC NO. 96227-TR-03 REV. 01
ATT. B SHEET B237

JB
12/15/10

****
* PROBLEM DATA FROM INTERNAL STORAGE *
****

JOB ID - SUPPORT JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

********** LOADING DATA **********

LOADING - F1 STATUS - ACTIVE

/----------NON-SELECTIVE DEAD LOAD COMPONENTS GIVEN----------/

COMPONENTS : X 0.0000 Y -1.0000 Z 0.0000 BY JOINTS GLOBAL

MEMBER AND ELEMENT LOADS--/
MEMBER/ELEMENT

JOINT LOADS--/ ----------------------------------/

JOINT	STEP	FORCE X	Y	Z	MOMENT X	Y	Z
2		0.000	0.000	-916.000	0.000	0.000	0.000
4		0.000	0.000	-2450.000	0.000	0.000	0.000
6		0.000	-2077.000	0.000	0.000	0.000	0.000
8		7820.000	-7127.000	0.000	0.000	0.000	0.000
10		3450.000	-5050.000	0.000	0.000	0.000	0.000

JOINT DISPLACEMENTS--------------------------------/ ----------------------------------/

JOINT	STEP	DISP. X	Y	Z	ROT. X	Y	Z

JOINT FORCE ASSUMPTIONS ---/

JOINT	THETA 1	2	3	FORCE X	Y	Z	MOMENT X	Y	Z

NO ASSUMPTIONS GIVEN FOR THIS LOADING

MEMBER FORCE ASSUMPTIONS ---------------------/ ----------------------------------/

MEMBER	COMPONENT	DISTANCE	VALUE	COMPONENT	DISTANCE	VALUE

NO ASSUMPTIONS GIVEN FOR THIS LOADING

NG - F2 STATUS - ACTIVE

/----------NON-SELECTIVE DEAD LOAD COMPONENTS GIVEN----------/

COMPONENTS : X 0.0000 Y -1.0000 Z 0.0000 BY JOINTS GLOBAL

MEMBER AND ELEMENT LOADS---/
MEMBER/ELEMENT

JOINT LOADS--/ ----------------------------------/

JOINT	STEP	FORCE X	Y	Z	MOMENT X	Y	Z
6		-5946.000	-2077.000	0.000	0.000	0.000	0.000
8		-3400.000	-7127.000	0.000	0.000	0.000	0.000
10		0.000	-5050.000	0.000	0.000	0.000	0.000
13		0.000	0.000	2600.000	0.000	0.000	0.000
15		0.000	0.000	2166.000	0.000	0.000	0.000

JOINT DISPLACEMENTS--------------------------------/ ----------------------------------/

JOINT	STEP	DISP. X	Y	Z	ROT. X	Y	Z

JOINT FORCE ASSUMPTIONS --/

JOINT	THETA 1	2	3	FORCE X	Y	Z	MOMENT X	Y	Z

SUMPTIONS GIVEN FOR THIS LOADING

MEMBER FORCE ASSUMPTIONS ----------------------/ ---------------------------------/

MEMBER	COMPONENT	DISTANCE	VALUE	COMPONENT	DISTANCE	VALUE

NO ASSUMPTIONS GIVEN FOR THIS LOADING

****
* END OF DATA FROM INTERNAL STORAGE *
****

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LIST ALL

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STIFFNESS ANALYSIS REDUCE BANDWIDTH

BANDWIDTH USING INITIAL JOINT NUMBERING :

THE MAXIMUM BANDWIDTH IS 10 AND OCCURS AT JOINT 15

THE AVERAGE BANDWIDTH IS 3.500

THE STANDARD DEVIATION OF THE BANDWIDTH IS 3.536

BANDWIDTH AFTER INTERNALLY RENUMBERING STRUCTURE :

THE MAXIMUM BANDWIDTH IS 10 AND OCCURS AT JOINT 13

T"E AVERAGE BANDWIDTH IS 2.600

TANDARD DEVIATION OF THE BANDWIDTH IS 3.688

****

* TOTAL DEAD WEIGHT OF STRUCTURE = 0.286852941D+03 LBF *

****

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OUTPUT BY JOINTS

OUTPUT DECIMAL 3

LIST DISPLACEMENTS JOINTS 2 4 6 8 10 13 15

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****
RESULTS OF LATEST ANALYSIS
****

JOB ID - SUPPORT JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

JOINT DISPLACEMENTS - SUPPORTS

JOINT	LOADING	X DISP	Y DISP	Z DISP	X ROT	Y ROT	Z ROT

'OINT DISPLACEMENTS - FREE JOINTS

JOINT		LOADING	X DISP	Y DISP	Z DISP	X ROT	Y ROT	Z ROT
2	GLOBAL							
		F1	0.002	-0.005	0.000	-0.013	-0.001	-0.010
		F2	-0.002	-0.005	0.000	-0.013	0.001	-0.010
4	GLOBAL							
		F1	0.002	-0.006	-0.001	-0.017	-0.001	0.001
		F2	-0.002	-0.006	0.000	-0.017	0.001	0.001
6	GLOBAL							
		F1	0.001	-0.002	0.000	-0.008	-0.003	-0.007
		F2	-0.002	-0.002	0.000	-0.008	0.002	-0.007
8	GLOBAL							
		F1	0.003	-0.004	0.000	-0.017	-0.002	-0.003
		F2	-0.002	-0.004	0.000	-0.017	0.002	-0.003
10	GLOBAL							
		F1	0.002	-0.003	0.000	-0.017	-0.003	0.002
		F2	-0.001	-0.003	0.000	-0.017	0.003	0.002
13	GLOBAL							
		F1	0.000	0.000	0.000	0.000	0.000	0.000
		F2	0.000	0.000	0.000	0.000	0.000	0.000
15	GLOBAL							
		F1	0.000	0.000	0.000	0.000	0.000	0.000
		F2	0.000	0.000	0.000	0.000	0.000	0.000

HE MAXIMUM DISPLACEMENT VALUES ARE AS FOLLOWS :

VALUE FOR X TRANS. IS = 0.0025340 AND IT OCCURS AT JOINT 8 FOR LOADING F1
VALUE FOR Y TRANS. IS = -0.0063190 AND IT OCCURS AT JOINT 4 FOR LOADING F1

VALUE FOR Z TRANS. IS =	-0.0009442	AND IT OCCURS AT JOINT 4	FOR LOADING F1
VALUE FOR X ROT. IS =	-0.0174366	AND IT OCCURS AT JOINT 8	FOR LOADING F1
VALUE FOR Y ROT. IS =	-0.0033444	AND IT OCCURS AT JOINT 10	FOR LOADING F1
VALUE FOR Z ROT. IS =	-0.0099955	AND IT OCCURS AT JOINT 2	FOR LOADING F1

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T BY MEMBERS
OUTPUT DECIMAL 2
LIST REACTIONS ALL

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ALTRAN
CALC NO. 96227-7R-C3 REV 0 1
B SHEET B243

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****
RESULTS OF LATEST ANALYSIS
****

JOB ID - SUPPORT JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

REACTIONS AT SUPPORT JOINTS

JOINT		LOADING	X FORCE	Y FORCE	Z FORCE	X MOMENT	Y MOMENT	Z MOMENT
			FORCES			MOMENTS		
7	GLOBAL							
		F1	-1886.38	2426.59	867.21	31419.63	30008.95	123.87
		F2	4593.73	2426.59	-279.62	31419.63	-41077.57	123.87
	GLOBAL							
		F1	-5898.77	6705.95	1619.58	76152.81	48630.68	46.63
		F2	3309.30	6705.95	-133.39	76152.81	-33196.42	46.63
11	GLOBAL							
		F1	-3484.85	5392.35	879.21	66926.30	41503.94	-31.35
		F2	1442.97	5392.35	413.01	66926.30	-24326.12	-31.35
12	GLOBAL							
		F1	0.00	7.98	0.00	26.18	0.00	0.00
		F2	0.00	7.98	-2600.00	26.18	0.00	0.00
14	GLOBAL							
		F1	0.00	7.98	0.00	26.18	0.00	0.00
		F2	0.00	7.98	-2166.00	26.18	0.00	0.00

THE MAXIMUM REACTION VALUES ARE AS FOLLOWS :

VALUE FOR X FORCE IS = -5898.7729492 AND IT OCCURS AT JOINT 9 FOR LOADING F1
VALUE FOR Y FORCE IS = 6705.9487305 AND IT OCCURS AT JOINT 9 FOR LOADING F1
VALUE FOR Z FORCE IS = -2600.0000000 AND IT OCCURS AT JOINT 12 FOR LOADING F2
VALUE FOR X MOMENT IS = 76152.8125000 AND IT OCCURS AT JOINT 9 FOR LOADING F1
VALUE FOR Y MOMENT IS = 48630.6796875 AND IT OCCURS AT JOINT 9 FOR LOADING F1
VALUE FOR Z MOMENT IS = 123.8664932 AND IT OCCURS AT JOINT 7 FOR LOADING F1

* PHI-DELTA/MPDS * NONE GIVEN

* JOB 00000423 * 12-FEB-1998 13:00:32 * P00016 *

''ST FORCES ALL MEMBERS

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CALC NO. 96227-7R-03 REV. Ø1
ATT. B SHEET B245

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RESULTS OF LATEST ANALYSIS
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JOB ID - SUPPORT JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

MEMBER FORCES

MEMBER	LOADING	JOINT	/----FORCES---- AXIAL	SHEAR Y	SHEAR Z	//----MOMENTS---- TORSION(CG)	MOMENT Y	MOMENT Z
1								
	F1	1	-1886.38	867.21	-273.04	19.52	123.87	8737.31
		2	1886.38	-867.21	273.04	-19.52	2486.42	-446.79
	F2	1	-1352.27	-279.62	-273.04	19.52	123.87	-2498.88
		2	1352.27	279.62	273.04	-19.52	2486.42	-174.27
	F1	2	-1886.38	-48.79	-256.77	19.52	-2486.42	446.79
		3	1886.38	48.79	256.77	-19.52	5054.11	-934.71
	F2	2	-1352.27	-279.62	-256.77	19.52	-2486.42	174.27
		3	1352.27	279.62	256.77	-19.52	5054.11	-2970.45
3								
	F1	3	34.85	1570.79	249.51	1.15	-5007.48	6682.04
		4	-34.85	-1570.79	-249.51	-1.15	2512.33	9025.86
	F2	3	-1442.97	-413.01	249.51	1.15	-5007.48	-2770.15
		4	1442.97	413.01	-249.51	-1.15	2512.33	-1359.93
4								
	F1	4	34.85	-879.21	265.80	1.15	-2512.33	-9025.86
		5	-34.85	879.21	-265.80	-1.15	-31.35	611.81
	F2	4	-1442.97	-413.01	265.80	1.15	-2512.33	1359.93
		5	1442.97	413.01	-265.80	-1.15	-31.35	-5312.41
5								
	F1	1	-867.21	-1886.38	295.26	-123.87	19.52	-8737.31
		6	867.21	1886.38	-295.26	123.87	-2541.01	-7372.38
	F2	1	279.62	-1352.27	295.26	-123.87	19.52	2498.88
		6	-279.62	1352.27	-295.26	123.87	-2541.01	-14047.24
6								
	F1	6	-867.21	-1886.38	2406.55	-123.87	2541.01	7372.38
		7	867.21	1886.38	-2406.55	123.87	-31419.63	-30008.95
	F2	6	279.62	4593.73	2406.55	-123.87	2541.01	14047.24
		7	-279.62	-4593.73	-2406.55	123.87	-31419.63	41077.57
	F1	3	-1619.58	1921.23	-475.38	-46.63	-18.37	-5747.33
		8	1619.58	-1921.23	475.38	46.63	4078.14	22154.61
	F2	3	133.39	-90.70	-475.38	-46.63	-18.37	5740.61

		8	-133.39	90.70	475.38	46.63	4078.14	-6515.19
	F1	8	-1619.58	-5898.77	6685.91	-46.63	-4078.14	-22154.61
		9	1619.58	5898.77	-6685.91	46.63	-76152.81	-48630.68
	F2	8	133.39	3309.30	6685.91	-46.63	-4078.14	6515.19
		9	-133.39	-3309.30	-6685.91	46.63	-76152.81	33196.42
9								
	F1	5	-879.21	-34.85	288.02	31.35	-1.15	-611.81
		10	879.21	34.85	-288.02	-31.35	-2458.53	314.22
	F2	5	-413.01	1442.97	288.02	31.35	-1.15	5312.41
		10	413.01	-1442.97	-288.02	-31.35	-2458.53	7010.52
10								
	F1	10	-879.21	-3484.85	5372.31	31.35	2458.53	-314.22
		11	879.21	3484.85	-5372.31	-31.35	-66926.30	-41503.94
	F2	10	-413.01	1442.97	5372.31	31.35	2458.53	-7010.52
		11	413.01	-1442.97	-5372.31	-31.35	-66926.30	24326.12
11								
	F1	12	0.00	3.99	0.00	0.00	0.00	26.18
		13	0.00	-3.99	0.00	0.00	0.00	0.00
	F2	12	2600.00	3.99	0.00	0.00	0.00	26.18
		13	-2600.00	-3.99	0.00	0.00	0.00	0.00
12								
	F1	14	0.00	3.99	0.00	0.00	0.00	26.18
		15	0.00	-3.99	0.00	0.00	0.00	0.00
	F2	14	2166.00	3.99	0.00	0.00	0.00	26.18
		15	-2166.00	-3.99	0.00	0.00	0.00	0.00

THE MAXIMUM MEMBER FORCE VALUES ARE AS FOLLOWS :

VALUE FOR AXIAL IS =	2600.0000000	AND IT OCCURS IN MEMBER 11	AT JOINT 12	FOR LOADING F2
VALUE FOR SHEAR Y IS =	-5898.7729492	AND IT OCCURS IN MEMBER 8	AT JOINT 8	FOR LOADING F1
VALUE FOR SHEAR Z IS =	6685.9121094	AND IT OCCURS IN MEMBER 8	AT JOINT 8	FOR LOADING F1
VALUE FOR TORSION IS =	-123.8664932	AND IT OCCURS IN MEMBER 5	AT JOINT 1	FOR LOADING F1
VALUE FOR BEND. Y IS =	-76152.8125000	AND IT OCCURS IN MEMBER 8	AT JOINT 9	FOR LOADING F1
VALUE FOR BEND. Z IS =	-48630.6796875	AND IT OCCURS IN MEMBER 8	AT JOINT 9	FOR LOADING F1

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LIST SECTION STRESS ALL

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RESULTS OF LATEST ANALYSIS
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ALTRAN
CALC NO. 96227-TR-03 REV. 01
ATT. B SHEET B248
1 JB
12/13/0

JOB ID - SUPPORT JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

INTERNAL MEMBER RESULTS - SECTIONAL STRESSES

***** MEMBER 1 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	320.81	-542.14	92.72	27.96	652.04	680.00	1000.81
1.000FR	320.81	-542.14	92.72	561.27	33.34	594.61	915.43
LOADING F2							
0.000FR	229.98	174.81	92.72	27.96	186.48	214.44	444.42
1.000FR	229.98	174.81	92.72	561.27	13.01	574.27	804.25

***** MEMBER 2 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	320.81	30.50	87.19	561.27	33.34	594.61	915.43
1.000FR	320.81	30.50	87.19	1140.88	69.75	1210.64	1531.45
LOADING F2							
0.000FR	229.98	174.81	87.19	561.27	13.01	574.27	804.25
1.000FR	229.98	174.81	87.19	1140.88	221.68	1362.56	1592.54

***** MEMBER 3 ***** SECTION STRESSES

!- DISTANCE --!---- STRESS ----!

FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	-5.93	-981.99	-84.73	1130.36	498.66	1629.02	-1634.94
1.000FR	-5.93	-981.99	-84.73	567.12	673.57	1240.69	-1246.62
LOADING F2							
0.000FR	245.40	258.19	-84.73	1130.36	206.73	1337.08	1582.49
1.000FR	245.40	258.19	-84.73	567.12	101.49	668.60	914.01

***** MEMBER 4 ***** SECTION STRESSES

DISTANCE FROM START	STRESS AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	-5.93	549.64	-90.26	567.12	673.57	1240.69	-1246.62
1.000FR	-5.93	549.64	-90.26	7.08	45.66	52.73	-58.66
LOADING F2							
0.000FR	245.40	258.19	-90.26	567.12	101.49	668.60	914.01
1.000FR	245.40	258.19	-90.26	7.08	396.45	403.52	648.93

***** MEMBER 5 ***** SECTION STRESSES

DISTANCE FROM START	STRESS AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	73.49	626.44	-49.13	1.61	246.12	247.73	321.23
1.000FR	73.49	626.44	-49.13	210.00	207.67	417.67	491.17
LOADING F2							
0.000FR	-23.70	449.07	-49.13	1.61	70.39	72.00	-95.70
1.000FR	-23.70	449.07	-49.13	210.00	395.70	605.70	-629.39

***** MEMBER 6 ***** SECTION STRESSES

DISTANCE FROM START	STRESS AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	73.49	626.44	-400.47	210.00	207.67	417.67	491.17
1.000FR	73.49	626.44	-400.47	2596.66	845.32	3441.99	3515.48
LOADING F2							

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DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
0.000FR	-23.70	-1525.52	-400.47	210.00	395.70	605.70	-629.39
1.000FR	-23.70	-1525.52	-400.47	2596.66	1157.11	3753.78	-3777.48

***** MEMBER 7 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	137.25	-638.02	79.11	1.52	161.90	163.41	300.67
1.000FR	137.25	-638.02	79.11	337.04	624.07	961.11	1098.36
LOADING F2							
0.000FR	-11.30	30.12	79.11	1.52	161.71	163.23	-174.53
1.000FR	-11.30	30.12	79.11	337.04	183.53	520.56	-531.87

***** MEMBER 8 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	137.25	1958.91	-1112.60	337.04	624.07	961.11	1098.36
1.000FR	137.25	1958.91	-1112.60	6293.62	1369.88	7663.50	7800.75
LOADING F2							
0.000FR	-11.30	-1098.98	-1112.60	337.04	183.53	520.56	-531.87
1.000FR	-11.30	-1098.98	-1112.60	6293.62	935.11	7228.73	-7240.04

***** MEMBER 9 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	74.51	11.57	-47.93	0.10	17.23	17.33	91.84
1.000FR	74.51	11.57	-47.93	203.18	8.85	212.04	286.54
LOADING F2							
0.000FR	35.00	-479.19	-47.93	0.10	149.65	149.74	184.74
1.000FR	35.00	-479.19	-47.93	203.18	197.48	400.66	435.66

***** MEMBER 10 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED

LOADING F1							
0.000FR	74.51	1157.28	-894.00	203.18	8.85	212.04	286.54
1.000FR	74.51	1157.28	-894.00	5531.10	1169.12	6700.22	6774.73
LOADING F2							
0.000FR	35.00	-479.19	-894.00	203.18	197.48	400.66	435.66
1.000FR	35.00	-479.19	-894.00	5531.10	685.24	6216.34	6251.34

***** MEMBER 11 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	0.00	-1.86	0.00	0.00	4.80	4.80	4.80
1.000FR	0.00	-1.86	0.00	0.00	0.00	0.00	0.00
LOADING F2							
0.000FR	-604.67	-1.86	0.00	0.00	4.80	4.80	-609.47
1.000FR	-604.67	-1.86	0.00	0.00	0.00	0.00	-604.67

***** MEMBER 12 ***** SECTION STRESSES

DISTANCE FROM START	AXIAL	Y SHEAR	Z SHEAR	Y BENDING	Z BENDING	Y AND Z BEND. COMBINED	BEND. AND AXIAL COMBINED
LOADING F1							
0.000FR	0.00	-1.86	0.00	0.00	4.80	4.80	4.80
1.000FR	0.00	-1.86	0.00	0.00	0.00	0.00	0.00
LOADING F2							
0.000FR	-503.74	-1.86	0.00	0.00	4.80	4.80	-508.54
1.000FR	-503.74	-1.86	0.00	0.00	0.00	0.00	-503.74

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OVERALL MAXIMUM STRESSES OCCUR AS FOLLOWS

STRESS			APPEARING IN MEMBER	AT SECTION	FOR LOAD	OPTION
MAXIMUM AXIAL STRESS	=	-604.66974	11	6.5600	F2	2
MAXIMUM SHEAR Y STRESS	=	1958.91174	8	12.0000	F1	2
MAXIMUM SHEAR Z STRESS	=	-1112.59717	8	12.0000	F2	2
MAXIMUM Y BENDING TENSION	=	6293.62109	8	12.0000	F2	2
MAXIMUM Z BENDING TENSION	=	1369.87830	8	12.0000	F1	2

MAXIMUM Y BENDING COMPRESSION	=	-6293.62109	8	12.0000	F2	2
MAXIMUM Z BENDING COMPRESSION	=	-1369.87830	8	12.0000	F1	2
'AXIMUM COMBINED BENDING TENSION	=	7663.49951	8	12.0000	F1	2
MAXIMUM COMB. BEND. COMPRESSION	=	7663.49951	8	12.0000	F1	2
MAXIMUM ABS. COMBINED BENDING	=	7663.49951	8	12.0000	F1	2
MAXIMUM COMB. AXIAL AND BENDING	=	7800.75195	8	12.0000	F1	2

WHERE,

OPTION=1 - SECTION IS UNSYMMETRIC AND ITS 'TYPE' IS NOT KNOWN. BENDING Y AND Z MAY NOT BE COMBINED AND FURTHERMORE BENDING STRESSES MAY NOT BE COMBINED WITH AXIAL STRESSES.

2 - BENDING Y IS COMBINED WITH BENDING Z BY TAKING SIGN OF STRESSES (COMPRESSION OR TENSION) INTO ACCOUNT. ALSO COMBINED BENDING STRESS IS FURTHER COMBINED WITH AXIAL STRESS WITH PROPER SIGNS.

LIST MAXIMUM STRESS ALL

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ATT. B SHEET B252

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RESULTS OF LATEST ANALYSIS
****

JOB ID - SUPPORT JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

INTERNAL MEMBER RESULTS - MAXIMUM STRESSES

	STRESS					
MEMBER	BEND YZ	AT SECTION	AT LOADING	BEND YZ + AXIAL	AT SECTION	AT LOADING
1	680.00	0.000 FR	F1	1000.81	0.000 FR	F1
2	1362.56	1.000 FR	F2	1592.54	1.000 FR	F2
	1629.02	0.000 FR	F1	-1634.94	0.000 FR	F1
	1240.69	0.000 FR	F1	-1246.62	0.000 FR	F1
5	605.70	1.000 FR	F2	-629.39	1.000 FR	F2
6	3753.78	1.000 FR	F2	-3777.48	1.000 FR	F2
7	961.11	1.000 FR	F1	1098.36	1.000 FR	F1
8	7663.50	1.000 FR	F1	7800.75	1.000 FR	F1
9	400.66	1.000 FR	F2	435.66	1.000 FR	F2
10	6700.22	1.000 FR	F1	6774.73	1.000 FR	F1
11	4.80	0.000 FR	F2	-609.47	0.000 FR	F2
12	4.80	0.000 FR	F2	-508.54	0.000 FR	F2

OVERALL MAXIMUM STRESSES OCCUR AS FOLLOWS

STRESS			APPEARING IN MEMBER	AT SECTION	FOR LOAD	OPTION
MAXIMUM AXIAL STRESS	=	-604.66974	11	6.5600	F2	2
MAXIMUM SHEAR Y STRESS	=	1958.91174	8	12.0000	F1	2
MAXIMUM SHEAR Z STRESS	=	-1112.59717	8	12.0000	F2	2
MAXIMUM Y BENDING TENSION	=	6293.62109	8	12.0000	F2	2
MAXIMUM Z BENDING TENSION	=	1369.87830	8	12.0000	F1	2
MAXIMUM Y BENDING COMPRESSION	=	-6293.62109	8	12.0000	F2	2
MAXIMUM Z BENDING COMPRESSION	=	-1369.87830	8	12.0000	F1	2
MAXIMUM COMBINED BENDING TENSION	=	7663.49951	8	12.0000	F1	2
MAXIMUM COMB. BEND. COMPRESSION	=	7663.49951	8	12.0000	F1	2
MAXIMUM ABS. COMBINED BENDING	=	7663.49951	8	12.0000	F1	2
MAXIMUM COMB. AXIAL AND BENDING	=	7800.75195	8	12.0000	F1	2

WHERE,

OPTION=1 - SECTION IS UNSYMMETRIC AND ITS 'TYPE' IS NOT KNOWN. BENDING Y AND Z MAY NOT BE COMBINED AND FURTHERMORE BENDING STRESSES MAY NOT BE COMBINED WITH AXIAL STRESSES.
2 - BENDING Y IS COMBINED WITH BENDING Z BY TAKING SIGN OF STRESSES (COMPRESSION OR TENSION) INTO ACCOUNT. ALSO COMBINED BENDING STRESS IS FURTHER COMBINED WITH AXIAL STRESS WITH PROPER SIGNS.

```
$
$  CODE CHECK
$
PARAMETERS
'CODE'  'AISC'  ALL
'VERSION' '69U1' ALL
'TORSION' 'YES' ALL
'WARPING' 'YES' ALL
'ASF'  1.60 LOADS ALL
'FSHMAX'  0.55 ALL
$
CHECK CODE MEMBER 1 TO 12
```

ALTRAN
CALC NO. 96227-TR-03 REV. Ø1
ATT. B SHEET B254

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ALTRAN
CALC NO. 96227-TR-03 REV. 1
B B255

****
* STRUDL CODE CHECK RESULTS *
****

JOB ID - SUPPORT JOB TITLE - NONE GIVEN

ACTIVE UNITS -	LENGTH	WEIGHT	ANGLE	TEMPERATURE	TIME	MASS
	INCH	LBF	DEG	FAH	SEC	LBM

			CONTROLLING CHECKS		CONTROLLING SECTION FORCES			
MEMBER	PROFILE	RESULT	PRIMARY	RATIO(P)	FX	FY	FZ	CODE
LOAD	TABLE	SECTION	SECONDARY	RATIO(S)	TORSION	MY	MZ	TYPE
1	W6X20	PASS	PAR1.6.2	0.028	1886.38	-867.21	273.04	AISC
F1	STEELW	0.00	SHEAR Y	0.027	-19.52	-123.87	-8737.31	I-SYM
2	W6X20	PASS	PAR1.6.2	0.044	1352.27	279.62	256.77	AISC
F2	STEELW	10.00	MOM YZ-C	0.038	-19.52	5054.11	-2970.45	I-SYM
3	W6X20	PASS	SHEAR Y	0.050	-34.85	-1570.79	-249.51	AISC
F1	STEELW	0.00	FM 1.6-2	0.045	-1.15	5007.48	-6682.04	I-SYM
4	W6X20	PASS	FM 1.6-2	0.035	-34.85	879.21	-265.80	AISC
	STEELW	0.00	MOM YZ-C	0.034	-1.15	2512.33	9025.86	I-SYM
5	W8X40	PASS	SHEAR Y	0.032	867.21	1886.38	-295.26	AISC
F1	STEELW	0.00	CSLNDRNS	0.021	123.87	-19.52	8737.31	I-SYM
6	W8X40	PASS	MOM ZY-T	0.105	-279.62	-4593.73	-2406.55	AISC
F2	STEELW	12.00	FM 1.6-2	0.105	123.87	-31419.63	41077.57	I-SYM
7	W8X40	PASS	SHEAR Y	0.032	1619.58	-1921.23	475.38	AISC
F1	STEELW	0.00	PAR1.6.2	0.031	46.63	18.37	5747.33	I-SYM
8	W8X40	PASS	PAR1.6.2	0.217	1619.58	5898.77	-6685.91	AISC
F1	STEELW	12.00	MOM YZ-C	0.213	46.63	-76152.81	-48630.68	I-SYM
9	W8X40	PASS	SHEAR Y	0.024	413.01	-1442.97	-288.02	AISC
F2	STEELW	0.00	TSLNDRNS	0.017	-31.35	1.15	-5312.41	I-SYM
10	W8X40	PASS	PAR1.6.2	0.188	879.21	3484.85	-5372.31	AISC
F1	STEELW	12.00	MOM ZY-T	0.186	-31.35	-66926.30	-41503.94	I-SYM
11	5.258	PASS	FM 1.6-2	0.018	-2600.00	-3.99	0.00	AISC
F2	AISCPIPE	0.00	COMPRESS	0.018	0.00	0.00	-26.18	PIPE
12	5.258	PASS	CSLNDRNS	0.017	-2166.00	-3.99	0.00	AISC
F2	AISCPIPE	0.00	FM 1.6-2	0.015	0.00	0.00	-26.18	PIPE

********** FOLLOWING IS A SUMMARY OF THE CODE CHECKS PERFORMED ABOVE **********

ALL 12 MEMBERS, THAT ARE CHECKED, PASSED CODE CHECKS.

ALTRAN
CALC NO. 96227-TR-03 REV. 01
REV. B SHEET B256

PLOT PLANE XZ THRU JOI 1

HORIZONTAL SCALE 2.400 UNITS PER INCH

VERTICAL SCALE 2.600 UNITS PER INCH

ORIENTATION

ALTRAN

CALC NO. 96227-TR-03 REV. 01

ATT. B SHEET B257

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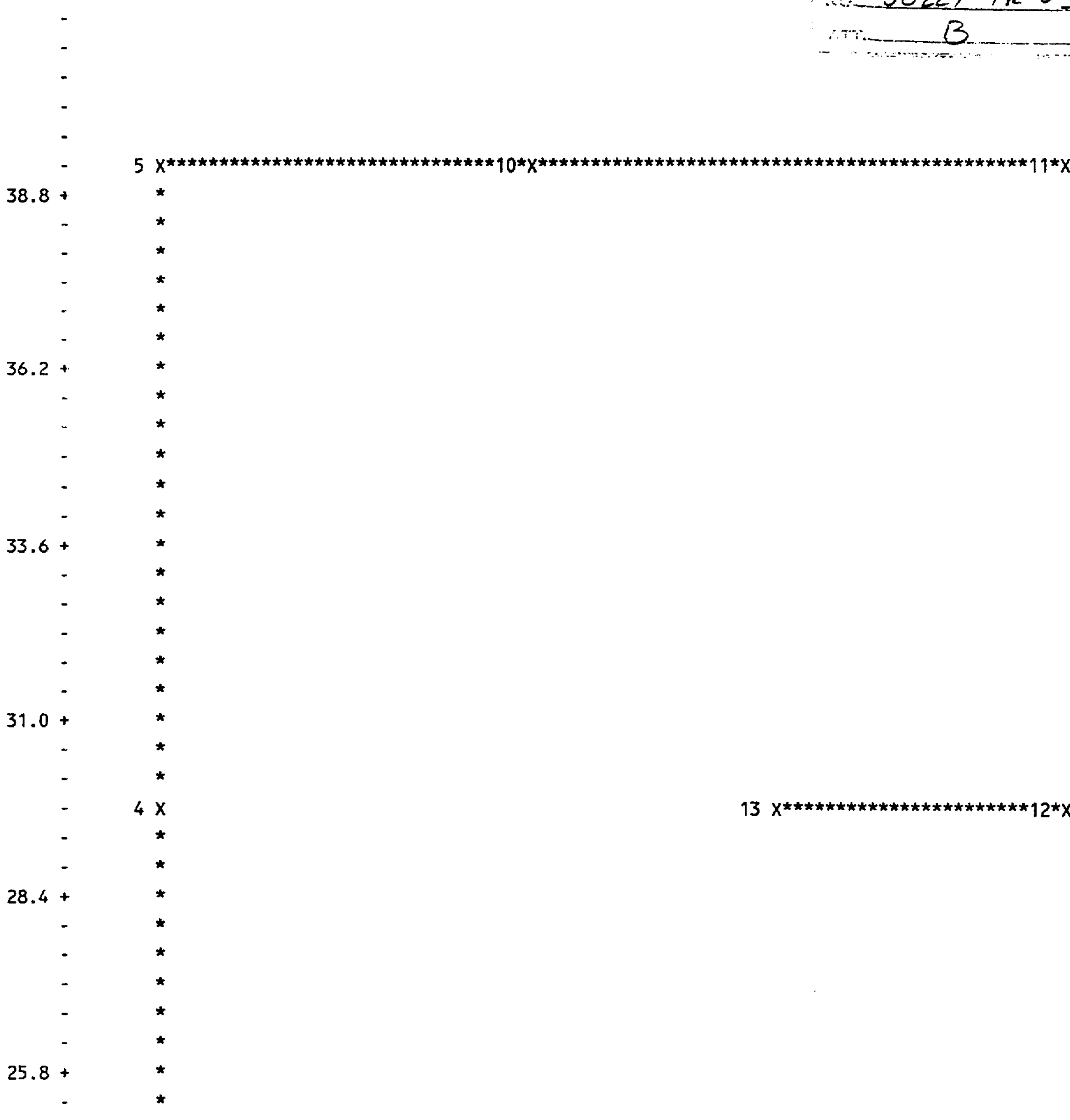

```
       -        *
       -        *
       -        *
  23.2 +        *
       -        *
       -        *
       -        *
       -        *
       -        *
  20.6 +        *
       -        *
       -      3 X*********************************8*X*************************************************9*X
       -        *
       -        *
       -        *
  18.0 +        *
       -        *
       -        *
       -        *
       -        *
       -        *
  15.4 +        *
       -        *
       -        *
       -        *
       -        *
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  12.8 +        *
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       -        *
  10.2 +        *
       -      2 X                                                        15 X************************14*X
       -        *
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       -        *
       -        *
   7.6 +        *
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   5.0 +        *
       -        *
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       -        *
       -        *
       -        *
   2.4 +        *
       -        *
       -        *
       -        *
       -        *
       -        *
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ALTRAN
96227-TR-03 REV. Ø1
B B258
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```
  -.2 +     1 X**********************************6*X*************************************************7*X
        -
        -
        -
        -
        -
 -2.8 +

      ---------+---------+---------+---------+---------+---------+---------+---------+---------+---------
              0.0       2.5       4.9       7.3       9.7      12.1      14.5      16.9      19.3
```

FINISH

ALTRAN
CALC NO. 96227-TR-03 REV. ∅1
ATT. B SHEET B259

JB
12/13/0

```
*****************************************************************
*                                                               *
*  THIS IS VERSION TEST OF PHI-DELTA STRUDL PROGRAM.  FOR       *
*  INFORMATION (ENHANCEMENTS, BUGS, ETC.) REGARDING THIS        *
*  PHI-DELTA STRUDL VERSION, THE USER SHOULD REFER TO           *
*  PHI-DELTA STRUDL ADVISORY NO. 25, DATED APR 19, 1993.        *
*  FOR ANY QUESTIONS, PLEASE CALL PHI-DELTA AT 617-356-0400     *
*                                                               *
*****************************************************************
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ALTRAN
CALC NO. 96227-TR-03 REV. Ø1
B SHEET B260

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TSS 12/13/

T A B L E   O F   C O N T E N T S

altran — Calculation Sheet

ATT. B.

Calc. No. 96227-TR-03 By: N Patel Date: 2-14-98 Sheet B261

Rev. No. ø 1 Chk: [illegible] Date: 2-16-98

	Reference
1-GN02-R015 / 251 (Q)	
REF: CALC. NO. GN02-45-W REV 0	14
MAX. NEW LOAD $F_x = 4622^{\#}$	
STRUT CAPACITY FOR FIG 211 SIZE 2	
$= 11630^{\#}$ N&U COND. (CONS.) $> 4622^{\#}$ (O.K.)	19
PER ABOVE REF CALC. REST of THE SUPPORT IS QUALIFIED FOR LOAD $F_x = 2800^{\#}$	
WORST INTERACTION RATIO IS FOR BEAM WELD	
$IR = \frac{0.13}{0.25} = 0.52$	
LOAD INCREASE FACTOR $= \frac{4622}{2800} = 1.651$	
$\therefore$ NEW IR (WORST) $= 0.52 \times 1.651 = 0.86 < 1$ O.K.	
BY COMPARISION REST OF COMPONENTS IR WILL BE LESS THAN 1.	
$\therefore$ SUPPORT IS ACCEPTABLE.	

ITEM NO	NO REQ'D	PART NO.	SIZE	DESCRIPTION	MATERIAL
1	1	211	1	SWAY STRUT, CLAMP MAT'L = C.S. O.D = 10 3/4", W = 18 3/4" (BY M-218B SUPPLIER)	
2	1	211	1	SWAY STRUT, CLAMP MAT'L = C.S. O.D = 10 3/4" W = 3' 4 1/4" (BY M-218B SUPPLIER)	

Return B

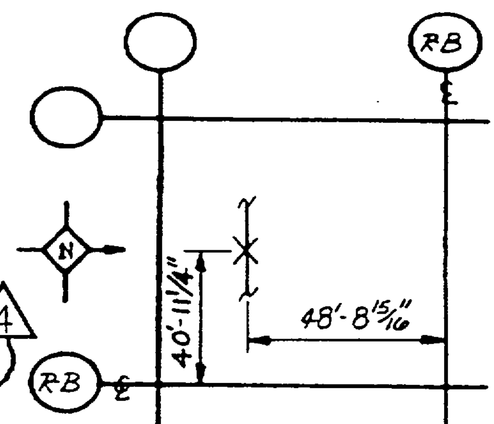
Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B262

1B
12/15/01

FORCES • POS. / NEG.	FX	FY	FZ
POS.	6450	3900	-
NEG.	7950	4050	-

MVMTS. • THERMAL / SEISMIC	X	Y	Z
THERMAL	-	-	0.024 -0.153
SEISMIC	-	-	0.193

4

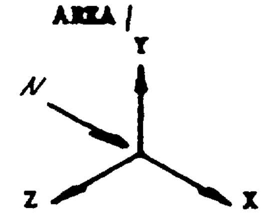


PROBLEM NO. P-201 STRESS NO. -

ISSUE 5

DATA PT. 40 NUCLEAR CLASS 3

LOCATION PLAN
AREA 1



NOTE: 1. All welds for nuclear supports to be visually inspected unless noted otherwise
2. THIS DWG. REPLACES 0-GN02-C001/231 (Q) REV. 1
3. FOR DOCUMENT CLARITY, REV. 0 & 1 OMITTED.
4. USE ITEMS 1 & 2 FROM 0-GN02-C001/231 (Q) REV. 1

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	4	DC2 8/24/94	REV. TO INC. PMPCN M-798-W-M-16GN02(Q)- 24-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	[illegible]	[illegible]	[illegible] 7/26/94

WOLF CREEK NUCLEAR OPERATING CORPORATION

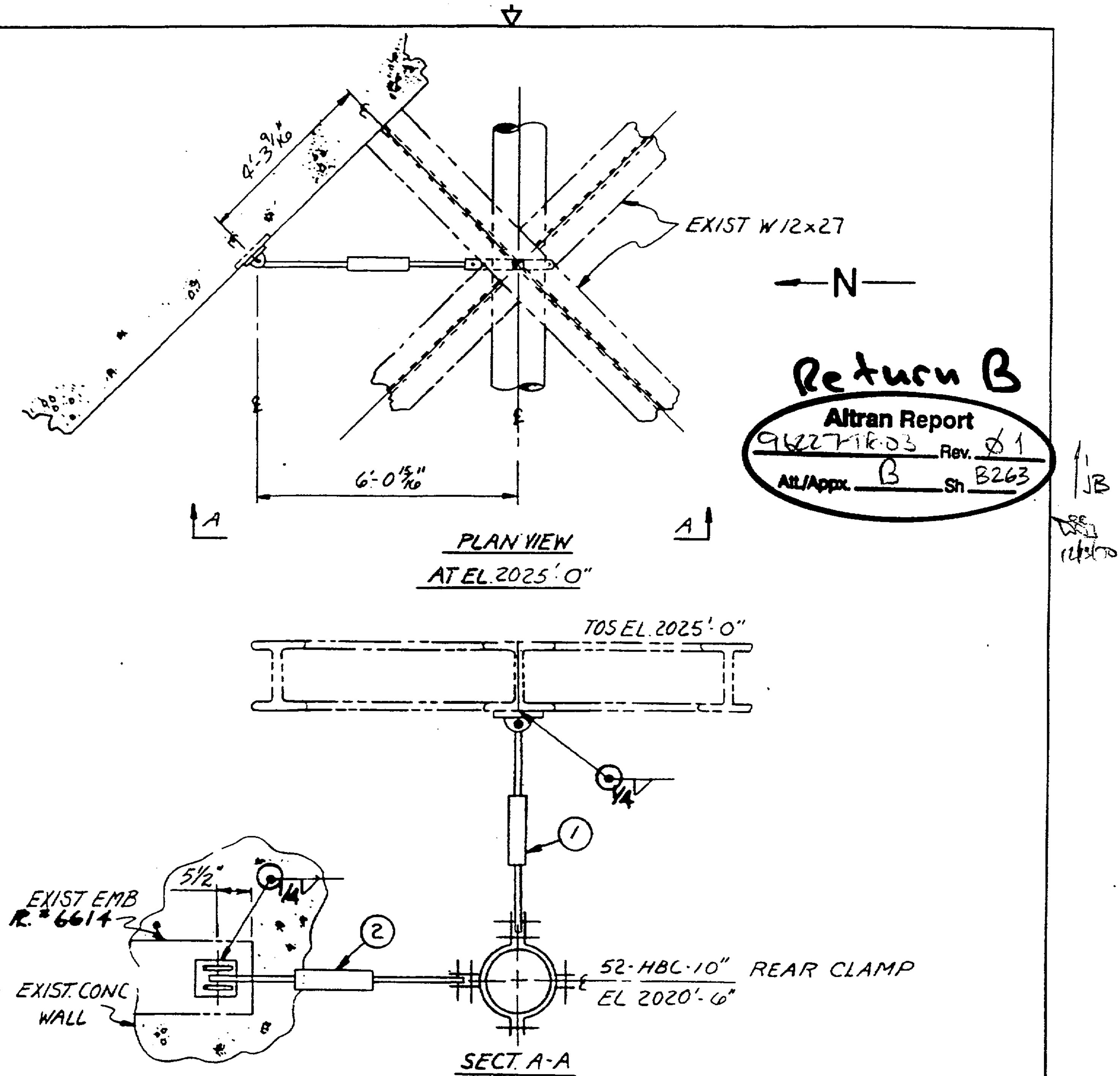
REF. DWGS. ISO M-13GN02
PIPE
STEEL C-0S2411

DRAWING NO. M-16GN02

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

HANGER NO. 1-GN02-C001/231(Q)
REV. 4

PAGE 1 OF 2



WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN02 PIPE STEEL C-0S2411
DRAWING NO.		HANGER NO.	REV.
M-16GN02			
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"		1-GN02-C001/231(Q) PAGE 2 OF 2	4

ITEM NO.	NO REQD.	PART NO.	DESCRIPTION	MATERIAL
1	1	211	3 SWAY STRUT, PIPE O.D.=10¾"	
			W=2'-6" CLAMP MAT'L=C.S. (BY M-218B SUPPLIER)	
2	1	211	3 SWAY STRUT, PIPE O.D.=10¾"	
			W=16½" CLAMP MAT'L=C.S.	
3	2		½" x 5⅝" x 11 9/16" BAR (BY M-216 SUPPLIER)	SA-515 GR.65
4	2		½" x 3⅛" x 11⅛" BAR	SA-36
5	2		¾" x 7⅜" x 8⅝" BAR	SA-515 GR.65

Return B

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Att./Appx. B Sh B264

FORCES#	FX	FY	FZ
POSITIVE	10562	1000	—
NEGATIVE	4700	4308	—

5

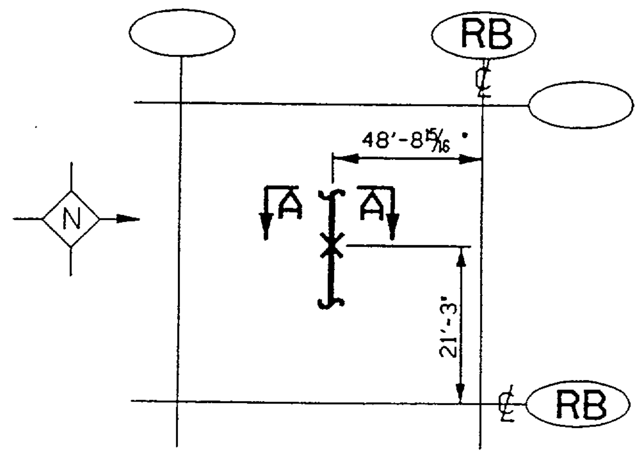
MVMTS "	X	Y	Z
THERMAL	—	—	-0.031 0.177
SEISMIC	—	—	0.191

PROBLEM NO. P-201

STRESS NO. —

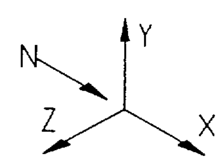
ISSUE 5 DATA PT. 57

NUCLEAR CLASS 3



NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN02-C003/231(Q) REV.3
3. FOR DOCUMENT CLARITY REV.0 TO 3 OMITTED.
4. USE ITEMS 1 TO 5 FROM 0-GN02-C003/231(Q) R/3

LOCATION PLAN
AREA 1



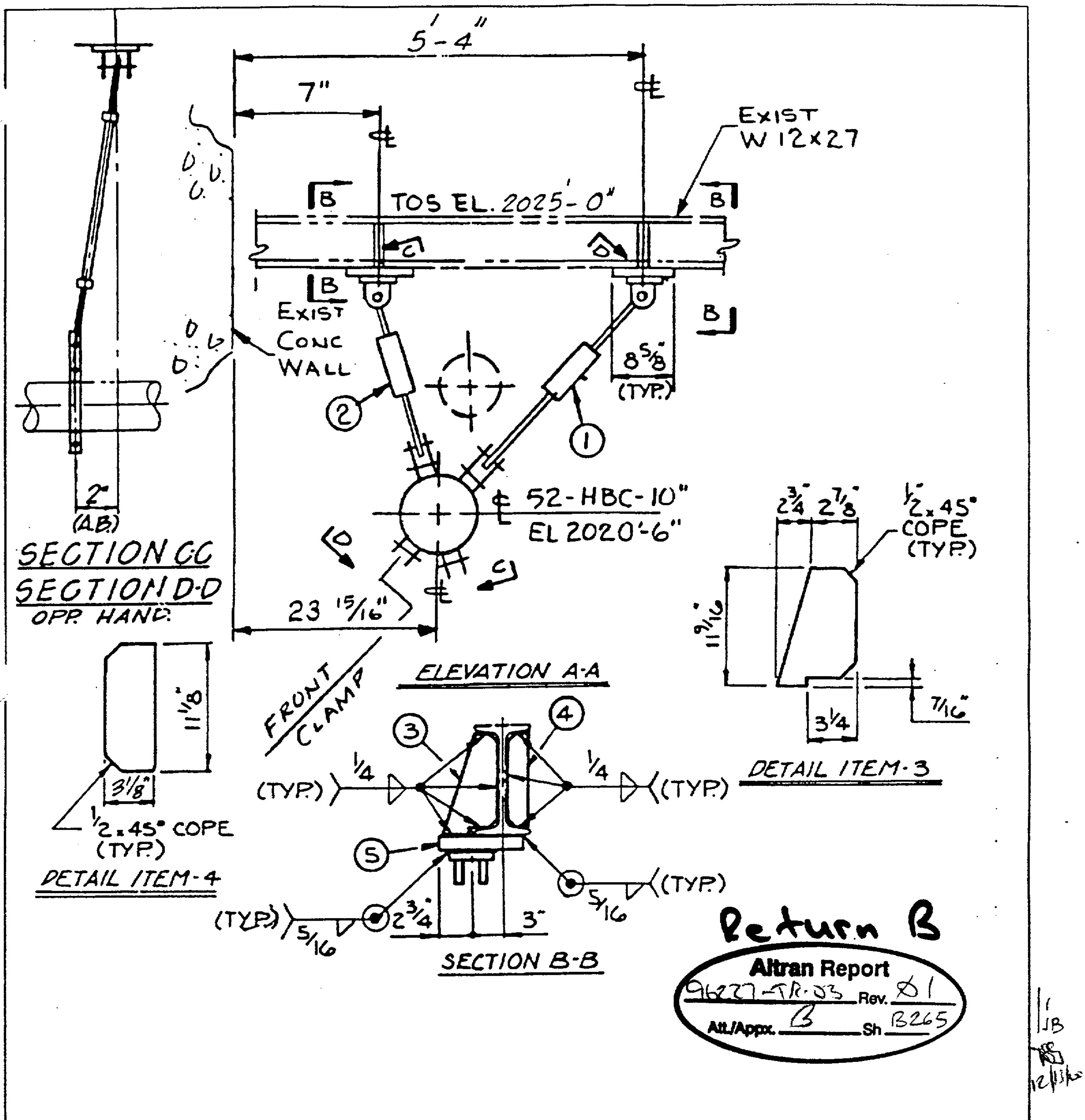
REV ORG	REV.	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	5	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN01(Q)-28-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD RESTORED.	KAM	RP	RP	ELA 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS.
ISO M-13GN02
PIPE
STEEL C-0S2411

DRAWING NO.
M-16GN02
PIPE SUPPORTS
CONTAINMENT COOLING SYS.
REACTOR BLDG. TRAIN "B"

HANGER NO. 1-GN02-C003/231(Q)
REV. 5
PAGE 1 OF 2



WOLF CREEK NUCLEAR OPERATING CORPORATION	REF. DWGS.	ISO M-13GN02 PIPE STEEL C-0S2411
DRAWING NO. M-16GN02	HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"	1-GN02-C003/231(Q) PAGE 2 OF 2	5

ITEM NO	NO REQ'D	PART NO.	SIZE	DESCRIPTION	MATERIAL
1	1	2000	R/1-10	SWAY STRUT, P-P=16" (BY M-218 A SUPPLIER)	
	1	2600-10	R/1-10"	PIPE CLAMP	

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Att./Appx. B Sh B266

Return B

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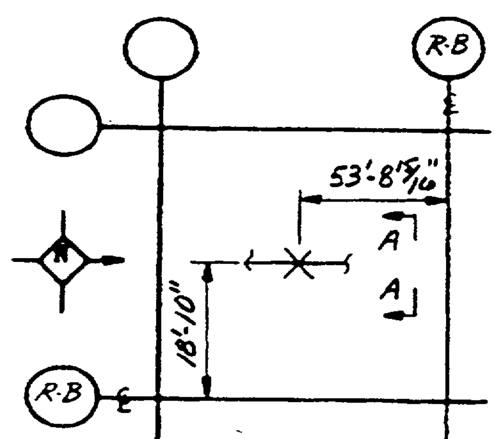
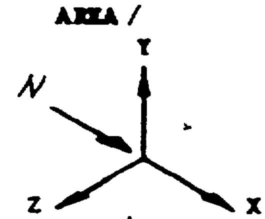
3

FORCES #	FX	FY	FZ
POS.	—	—	8150
NEG.	—	—	8800

MVMTS. "	X	Y	Z
[T]HERMAL	-0.076	-0.082	—
	0.013	0.014	
SEISMIC	0.066	0.037	—



LOCATION PLAN
AREA /



PROBLEM NO. P-201 STRESS NO. —

ISSUE 5

DATA PT. 65 NUCLEAR CLASS 3

NOTES:
1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN02-R001/231(Q), REV.2
3. FOR DOCUMENT CLARITY REV.0,1 & 2 OMITTED.
4. USE ITEMS 1 &2 FROM 0-GN02-R001/231(Q). REV.2

3

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	3	DCZ 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN02(Q)-24-01 PER PMR 03478 CLOSE OUT & AS NOTED. CAD DWG.	KAM	SP	SP	ELO 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS.
ISO M-13GN02
PIPE
STEEL C-1C2913

DRAWING NO.
M-16GN02

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

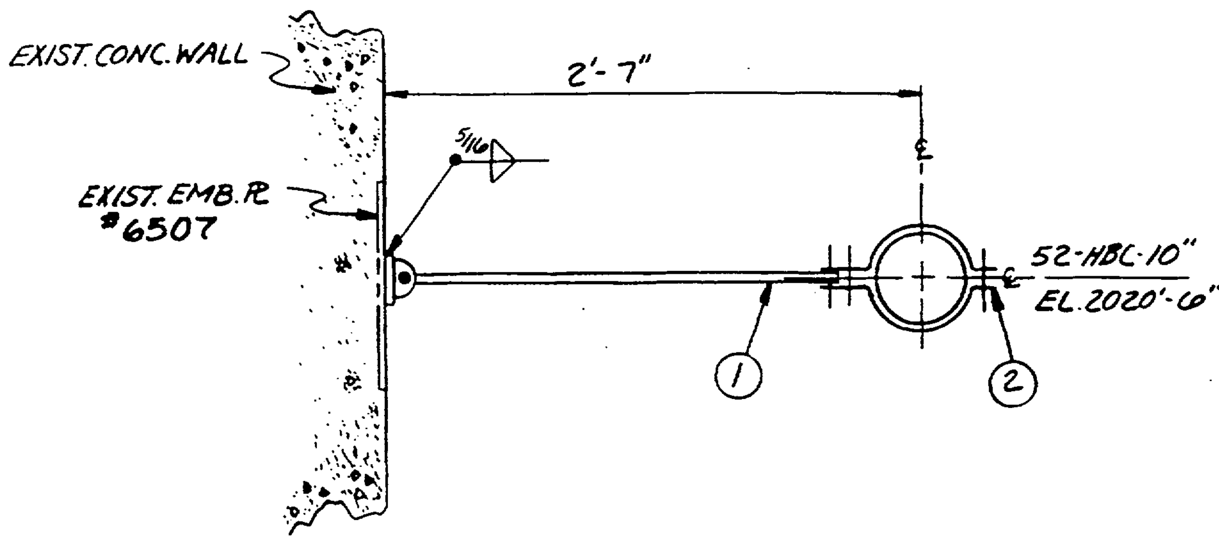
HANGER NO.
1-GN02-R001/231(Q)
PAGE 1 OF 2

REV.
3

Return B

Altran Report 96227-TR-02 Rev. 01
Att./Appx. B Sh B267

JB 12/13/00



ELEVATION A-A

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN02 PIPE STEEL C-1C2913
DRAWING NO. M-16GN02		HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN"B"		1-GN02-R001/231(Q) PAGE 2 OF 2	3

ITEM NO	NO. REQU'D	PART NO.	SIZE DESCRIPTION	MATERIAL
1	2	211	3 SWAY STRUT, CLAMP MAT'L=C.S., O.D=10¾", W=11"	
			(BY M-218B SUPPLIER)	
2	1		W6 x 20 x 16" LG. (BY M-216 SUPPLIER)	
3	1		PLATE 2" x 6¼" x 5 (BY M-216 SUPPLIER)	SA 515 GR.65

Altran Report
96227-10-03 Rev. Ø1
Att./Appx. B Sh B268

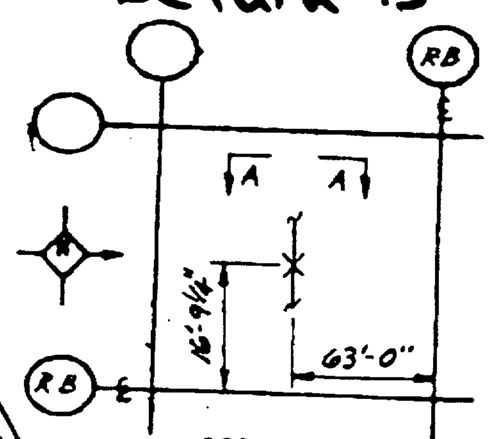
Return B

LB
12/5/00

3

FORCES •	FX	FY	FZ
POS.	4350	1350	-
NEG.	9849	3400	-

MVMTS. •	X	Y	Z
THERMAL	-	-	-0.536 / 0.09
SEISMIC	-	-	0.165



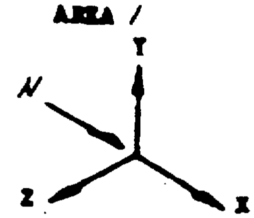
PROBLEM NO. P-201 STRESS NO. -

ISSUE 5

3

DATA PT. 85 NUCLEAR CLASS 3

LOCATION PLAN
AREA /



NOTES: 1 All welds for nuclear supports to be visually inspected unless noted otherwise
2. THIS DWG. REPLACES 0-GN02-C005/231(Q). REV. 1.
3. FOR DOCUMENT CLARITY REV. 0 AND 1 OMITTED.
4. USE ITEM 1 FROM 0-GN02-C005/231(Q). REV. 1.

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	3	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN02(Q)- 24-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD RESTORED.	KAH	RP	RR	EPA 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

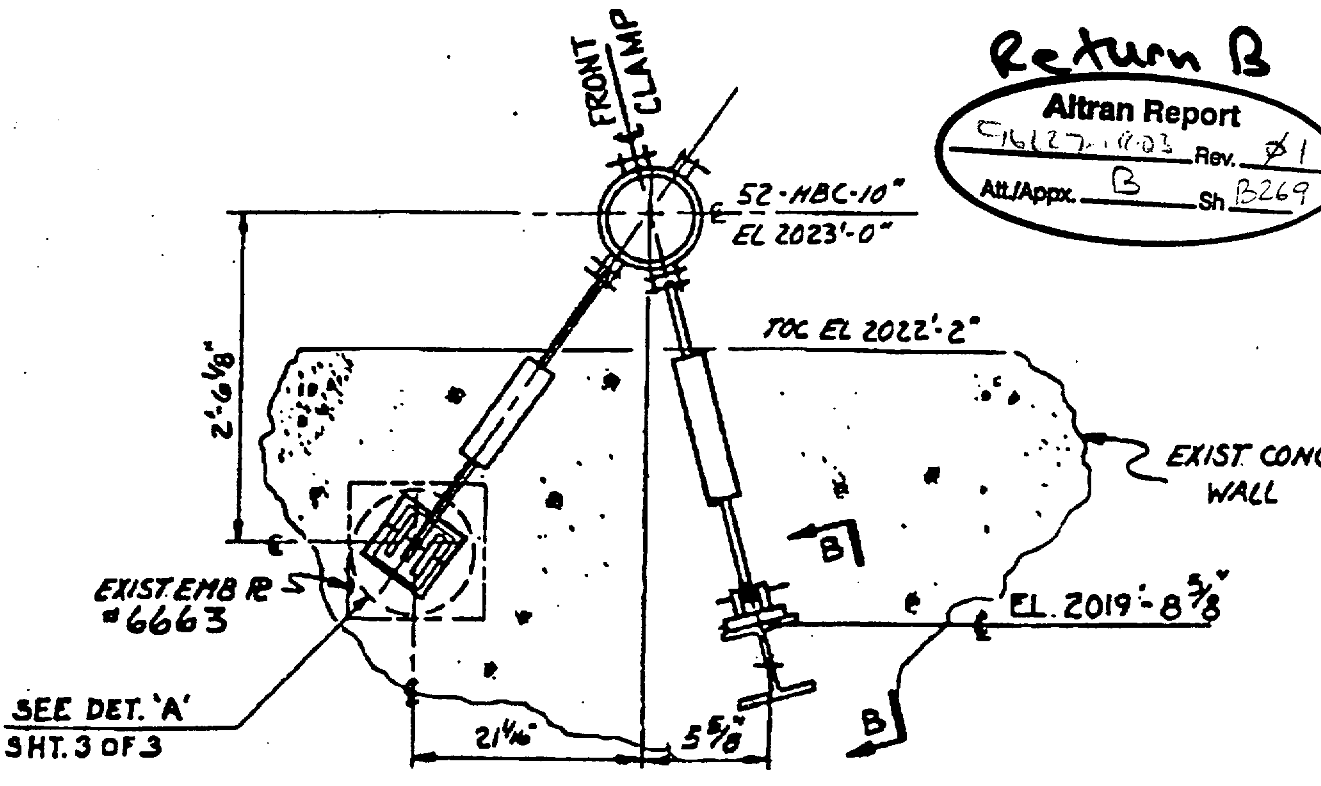
REF. DWGS. ISO M-13GN02
PIPE
STEEL C-1C2913

DRAWING NO.
M-16GN02
PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

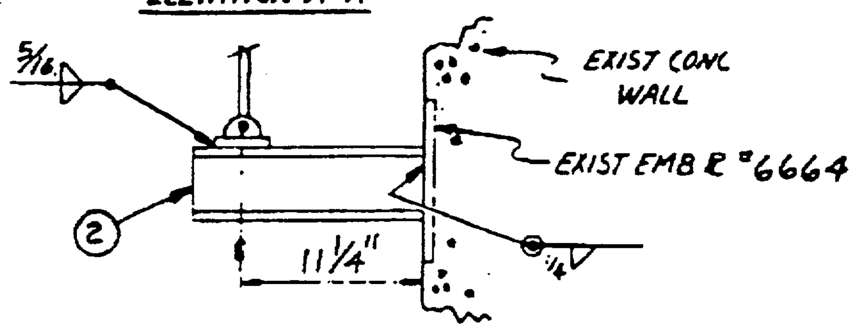
HANGER NO. 1-GN02-C005/231(Q) REV. 3

Return B

Altran Report
96127-11-03 Rev. Ø1
Att./Appx. B Sh B269



ELEVATION A-A



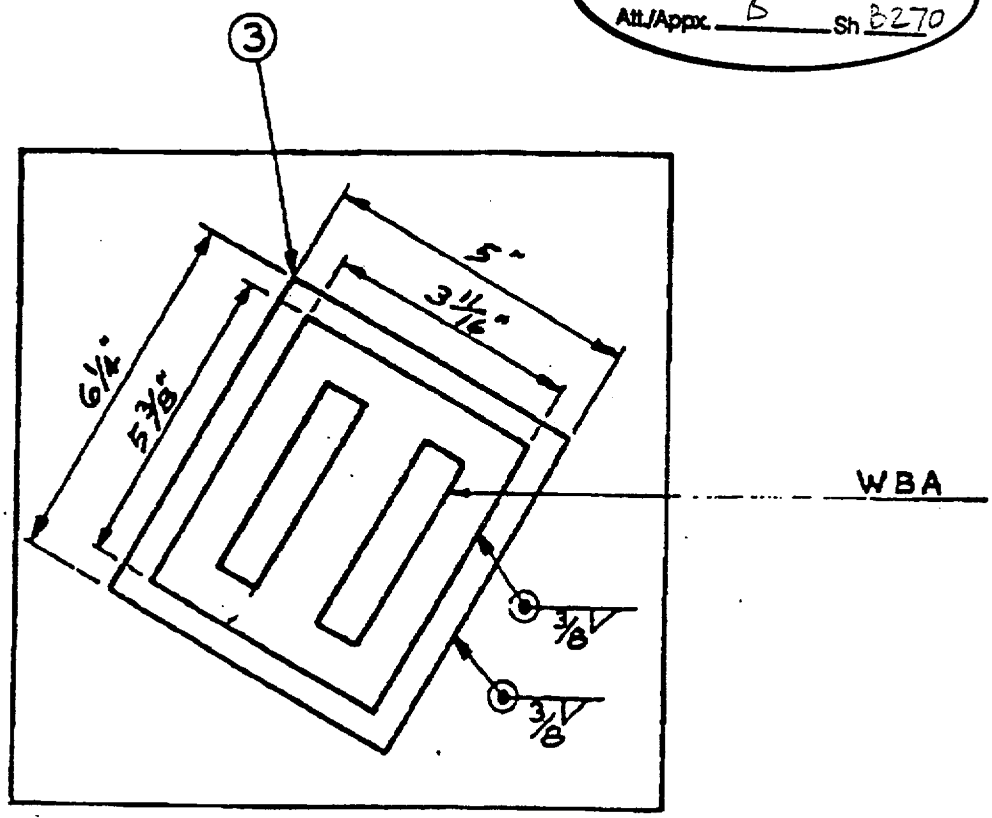
SECT B B

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN02 PIPE STEEL C-1C2913
DRAWING NO. M-16GN02		HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"		1-GN02-C005/231(Q) PAGE 2 OF 3	3

Return B

Altran Report 96227-IR-03 Rev. Ø1
Att./Appx. 6 Sh B270

JB 12/1



DETAIL 'A'

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS. ISO M-13GN02 PIPE STEEL C-1C2913
DRAWING NO. M-16GN02		HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"		1-GN02-C005/231(Q) PAGE 3 OF 3	3

ITEM NO	NO. REQU'D	PART NO.	SIZE DESCRIPTION	MATERIAL
1	1	2100	R/2-7 SWAY STRUT P-P=2'-1⅛" (BY M-218A SUPPLIER)	
2	1	2100	R/2-7 SWAY STRUT P-P=4'-8"	
	2	2600-7	R/1- 10" PIPE CLAMP	

Return B

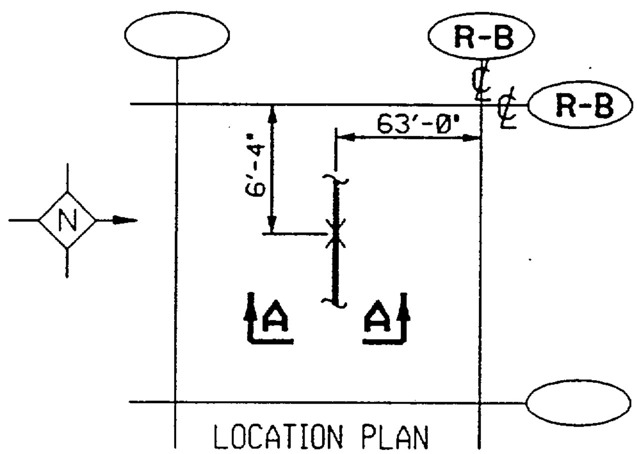
Altran Report
96227-AR-03 Rev. 0 1
Att/Appx. B Sh B271

JB
DSS 12/13/00

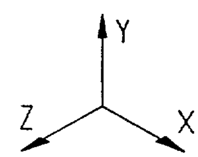
FORCES*	FX	FY	FZ
POSITIVE	3500	1050	—
NEGATIVE	3811	4839	—

2

MVMTS *	X	Y	Z
THERMAL	—	—	-0.162 ~~0.028~~
SEISMIC	—	—	0.166



LOCATION PLAN
AREA 2



PROBLEM NO. P-201

STRESS NO. ______

ISSUE 5 DATA PT. 100

NUCLEAR CLASS 3

LOAD ______

2

NOTES: 1 All welds for nuclear supports to be visually inspected unless noted otherwise
2. THIS DWG. REPLACES 0-GN02-C007/232(Q). REV. 1.
3. FOR DOCUMENT CLARITY REV. 0 AND 1 OMITTED.
4. USE ITEM 1 TO 3 FROM 0-GN02-C007/232(Q). REV. 1.

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	2	DC2 8/24/94	REV. TO INC. PMPCN M-798-W-M-16GN02(Q)- 24-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD RESTORED.	KAM	RR	RR	ELU 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS. ISO M-13GN02
PIPE ______
STEEL C-0S2421

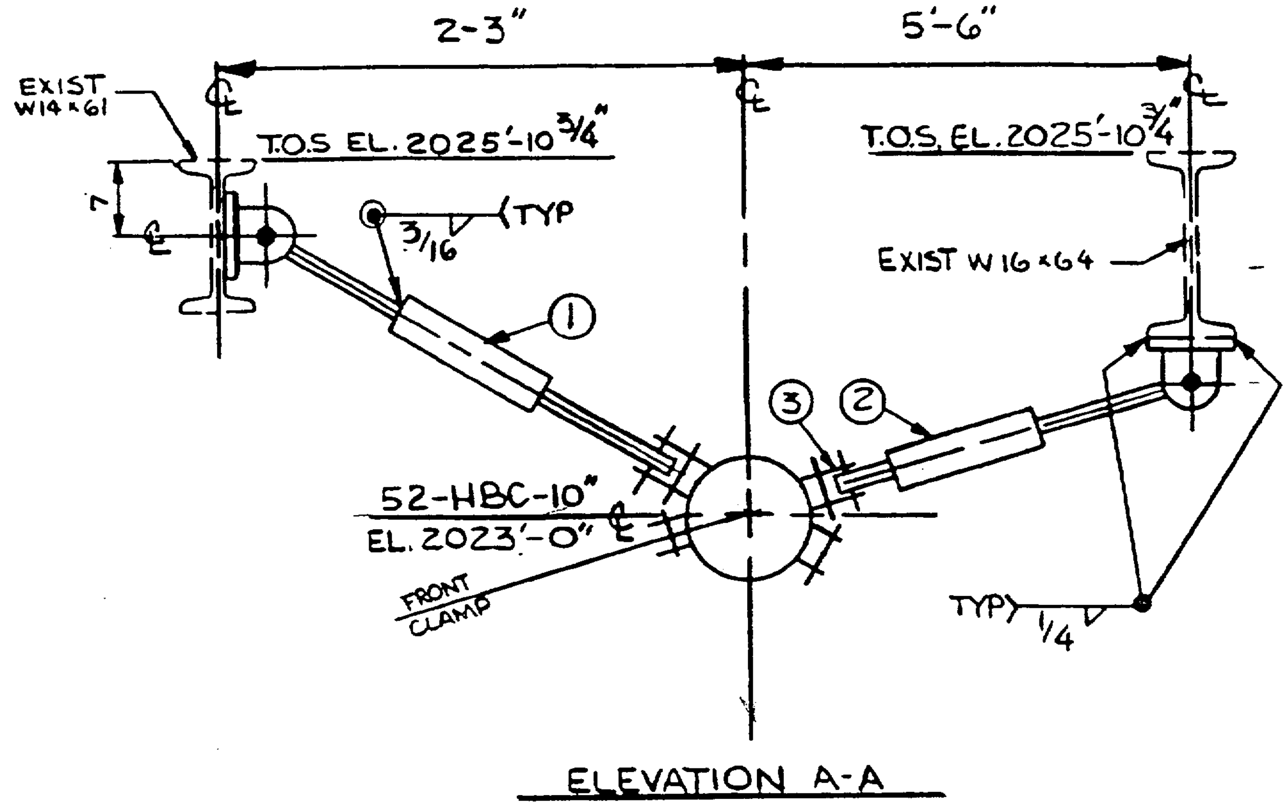
DRAWING NO. M-16GN02

HANGER NO. 1-GN02-C007/232(Q)

REV. 2

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

PAGE 1 OF 2



Return B

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B272

JB
12/13/00

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN02 PIPE STEEL C-0S2421	
DRAWING NO. M-16GN02	-	HANGER NO.		REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"		1-GN02-C007/232(Q) PAGE 2 OF 2		2

ITEM NO	NO REQ'D	PART NO	SIZE	DESCRIPTION		MATERIAL
1	1		W6x20 3'-9" LG.	(BY M-216 SUPPLIER)		
2	1		W6x20 2'-9" LG.			
3	1		W6x20 2'-4" LG.			
4	2		W6x20 10 7/8" LG.			
5	2		∠ 3x3x3/8 4" LG.			
6	4		1/4"x2 5/8"x5 7/16"	BAR		
7	4		1 1/4 x 2 1/2 x 3 3/4	LUG		SA515 GR65
8	1		1/2"x3 5/8"x19 11/16"	PLATE		SA515 GR65
9	1		1/2"x3 5/8"x6 1/16"	PLATE	CUT PER DETAIL	SA515 GR65
10	1		1/2"x3 5/8"x16 1/8"	PLATE	CUT PER DETAIL	SA515 GR65
11	2		W4x13 4'-1" LG.			
12	2		1/2"x4"x19 3/16"	PLATE		SA515 GR65
13	1		W4x13 16 1/2 "LG			

Altran Report
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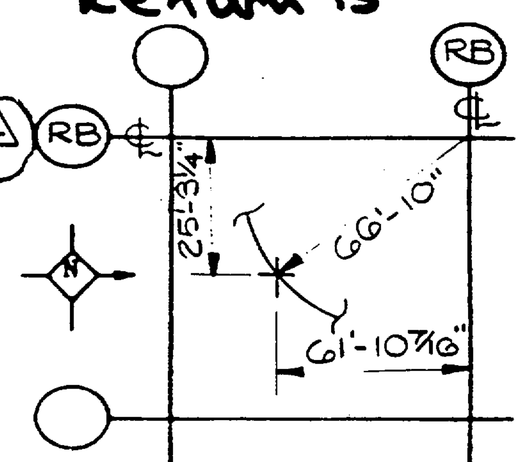
Att./Appx. B Sh B273

Return B

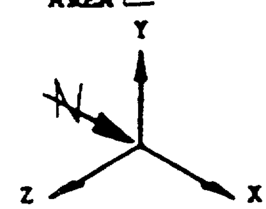
FORCES #	LATERAL	FY	AXIAL
POS.	2750	1100	8350
NEG.	3100	3800	7400

4 RB

MVMTS. "	X	Y	Z
THERMAL	/	/	/
SEISMIC	/	/	/



LOCATION PLAN
AREA 2



PROBLEM NO. 201 STRESS NO. —

ISSUE 1 4

DATA PT. 117 NUCLEAR CLASS 3

NOTE: All welds for nuclear supports to be visually inspected unless noted otherwise

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
△								
4	11/23/81	REV. REF. DWG'S. LOADS & ISSUE. NO.	MT DL	KR	BH	BL		
△	8/3/78	ISSUED FOR CONSTRUCTION	RD JB	BT				

SNUPPS

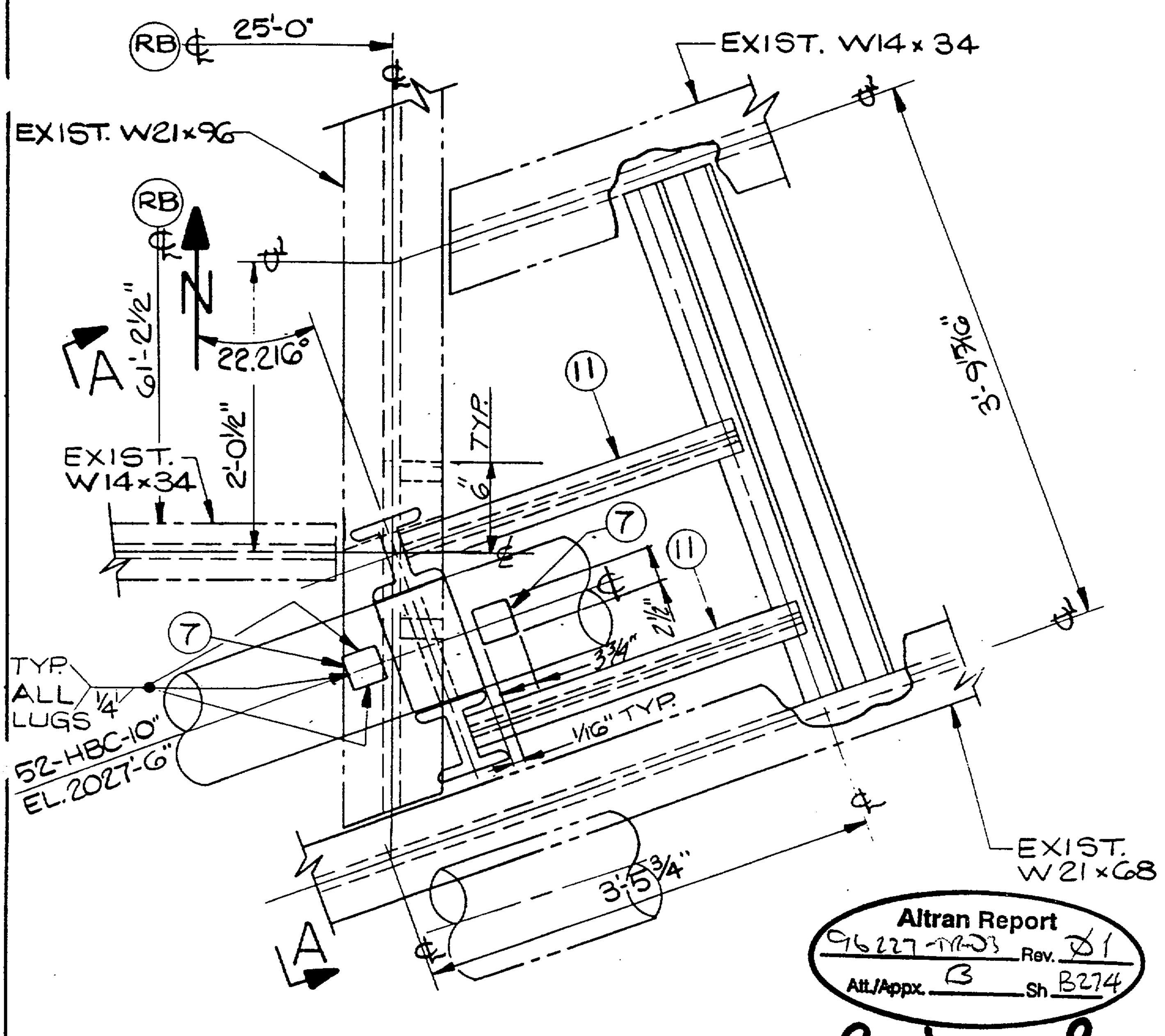
DRAWING NO.
M-06GN02

BECHTEL
GAITHERSBURG

REF. DWGS.
ISO M-03GN02 REV 6
PIPE 4
STEEL C-0S242I REV 8

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-C009/242(Q) SHT. 1 OF 5	4



Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh. B274

Return B

PLAN VIEW AT EL. 2028'-6"

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENG'R	APPR
△								
4	11/23/81	REV. REF. DWG'S.	MT/DL	KB/FA	BY	RL		
3	9/3/80	ISSUED FOR CONSTRUCTION	RDL/JB	VD/BH	DS			

SNUPPS

DRAWING NO. M-06GN02

BECHTEL GAITHERSBURG

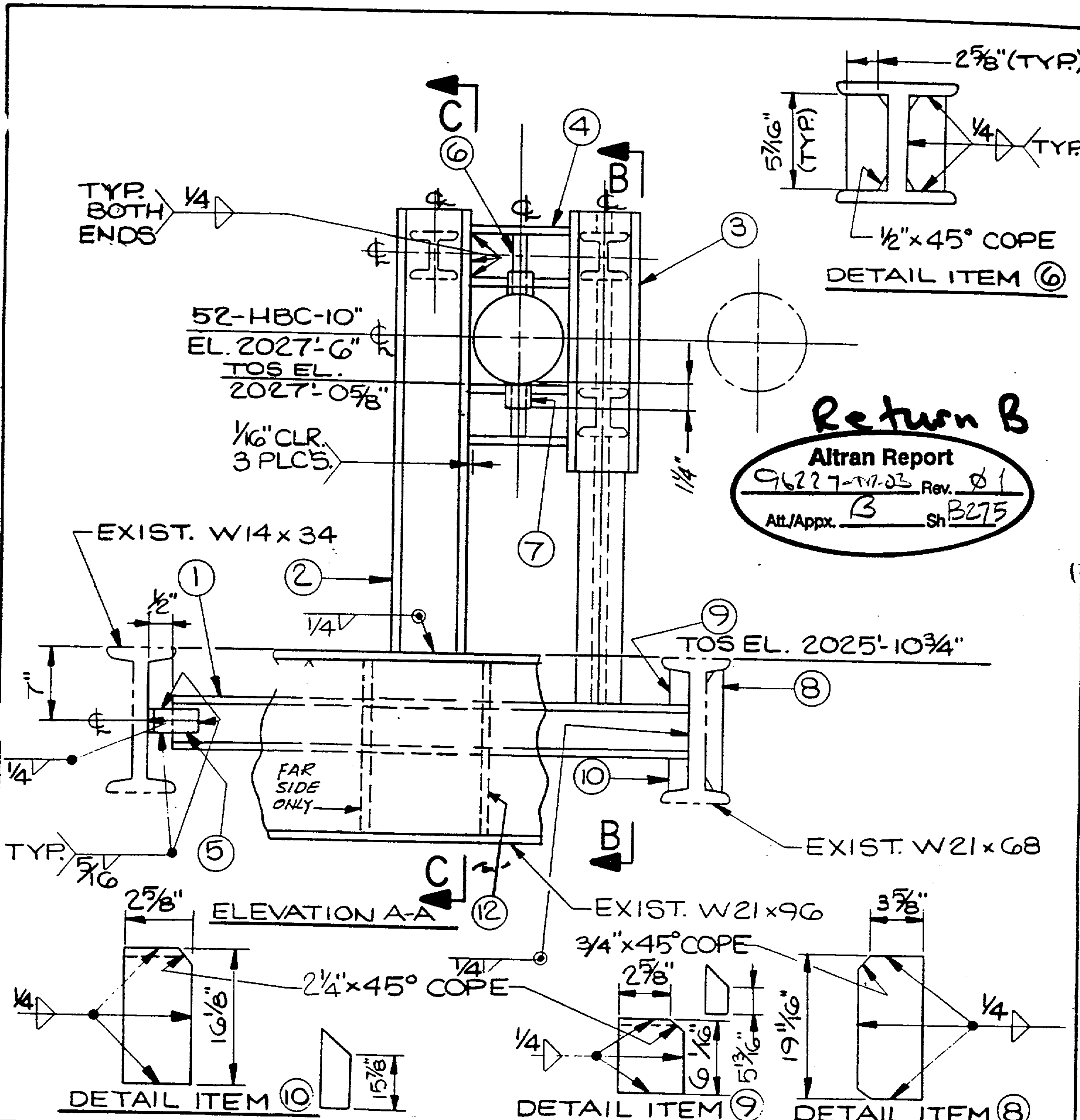
REF. DWGS. ISO M-03GN02 REV 6; PIPE; STEEL C-OS2421 REV 8

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-C009/242(Q) SHT. 2 OF 5	4

N47049

DRAWING APPLICABLE TO UNITS 1 2 3 4 5 6 7 8



REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APP'R
5								
4	4/23/81	REV. REF. DWG'S.	JDL	KAA	BY	RJ		
3	8/3/80	ISSUED FOR CONSTRUCTION	JB	BH				

SNUPPS

DRAWING NO. M-06GN02

BECHTEL GAITHERSBURG

REF. DWGS.
ISO M-03GN02 REV 6 (4)
PIPE
STEEL C-0S2421 REV 8

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

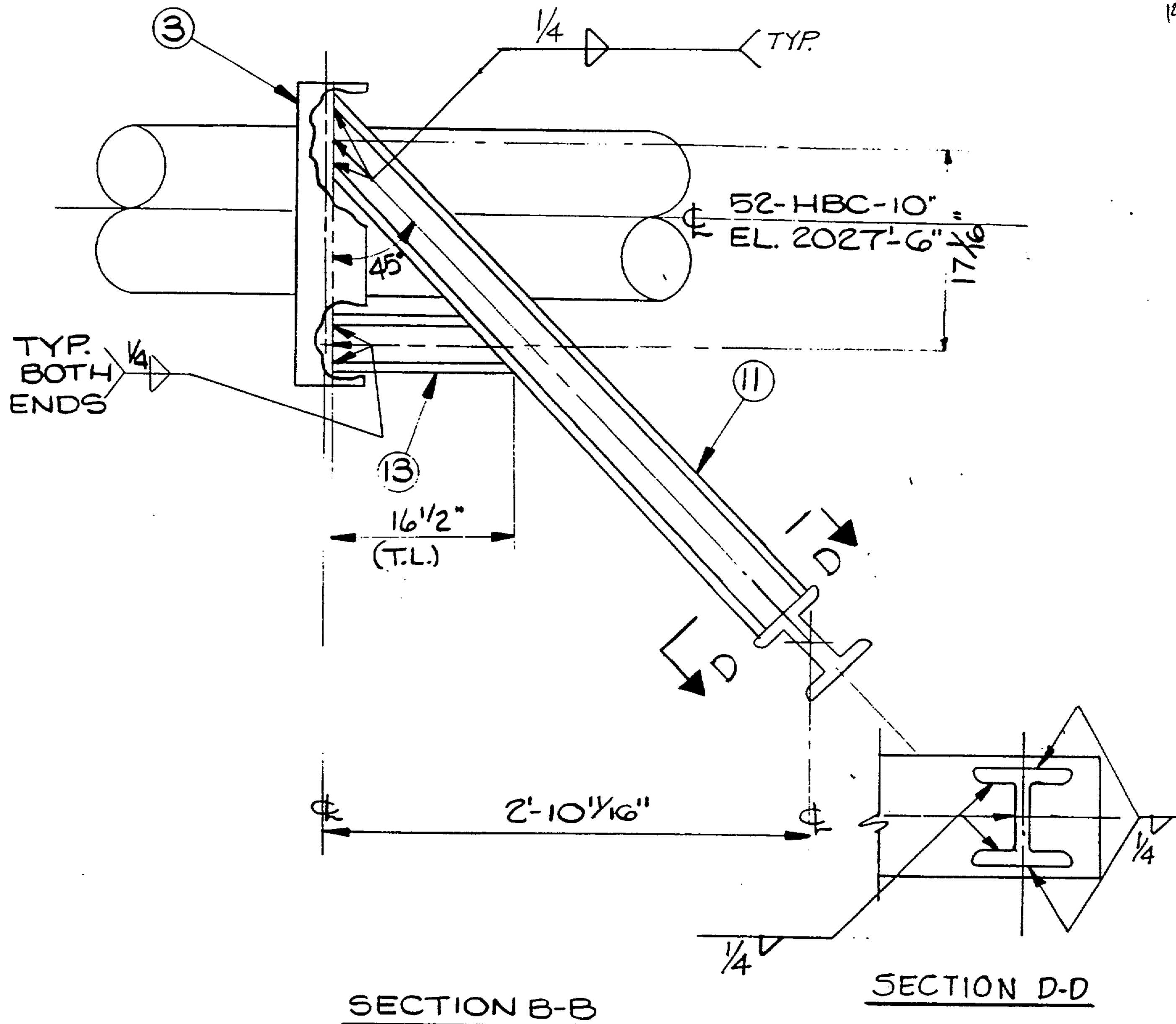
JOB. NO.	HANGER NO.	REV.
10466	0-GN02-C009/242(Q) SHT. 3 OF 5	4

N47049

DRAWING APPLICABLE TO UNITS

Return B

Altran Report 96227-TR.03 Rev. Ø1
Att./Appx. B Sh B276



REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
△								
1	11/23/81	REV. REF. DWG'S	AT DL		BH	RL		
0	3/3/80	ISSUED FOR CONSTRUCTION	JB					

B

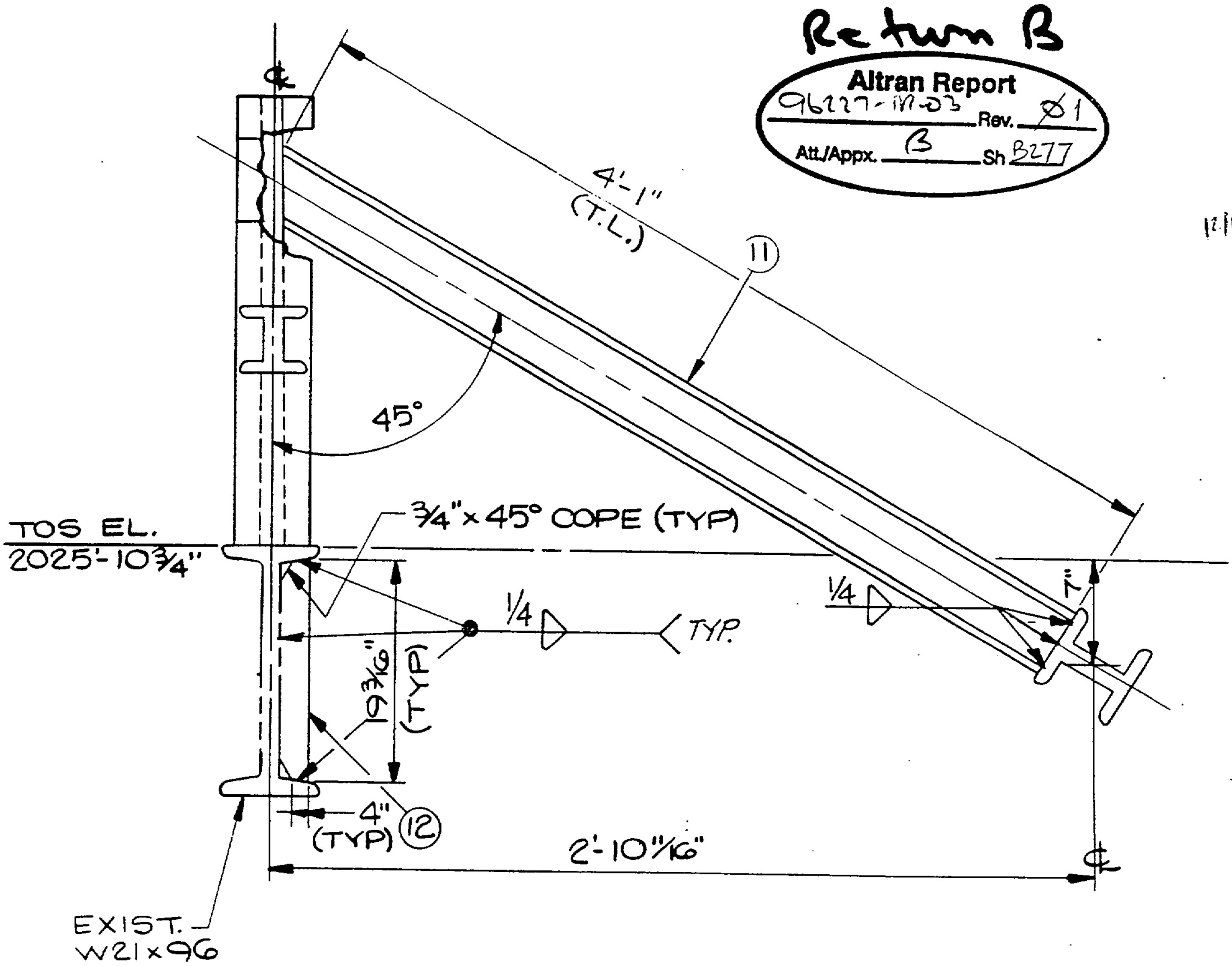
SNUPPS DRAWING NO. M-06GN02	BECHTEL GAITHERSBURG	REF. DWGS.	ISO M-03GN02 REV 6 PIPE STEEL C-0S2421 REV 8
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"	JOB. NO. 10466	HANGER NO. 0-GN02-C009/242(Q) SHT. 4 OF 5	REV. 4

N47049

DRAWING APPLICABLE TO UNITS

Return B

Altran Report
96227-M-03 Rev. Ø1
Att./Appx. B Sh B277



SECTION C-C

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
△								
▲	11/23/8	REV. REF. DWG'S						
▲	8/3/86	ISSUED FOR CONSTRUCTION						

SNUPPS	BECHTEL GAITHERSBURG	REF. DWGS.	ISO M-03GN02 REV 6
DRAWING NO. M-06GN02			PIPE
			STEEL C-OS2421 REV 8
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"	JOB. NO.	HANGER NO.	REV.
	10466	0-GN02-C009/242(Q) SHT. 5 OF 5	4

N47049

DRAWING APPLICABLE TO UNITS

ITEM NO	NO. REQU'D	PART NO.	SIZE DESCRIPTION	MATERIAL
1	1		W8×40 7'-2" LG. (BY M-216 SUPPLIER)	
	8		3/8"×3 5/8"×7 1/16" PLATE	SA515 GR65
3	3		W6×20 2'-2" LG.	
4	1		W6×20 10 7/8" LG.	
5	1		W6×20 3'-8 1/2" LG.	
6	2		4"φ PIPE STANCHION SCH. 40 5 3/8" LG.	SA106 GRB
7	2		1/4"×6"×6" BAR	SA 36
8	1		W6×20 13 3/4" LG.	
9	2		3/8"×4 1/2"×12 9/16" PLATE	SA515 GR65
10	2		1/2"×3 7/8"×19 1/16" PLATE	SA515 GR65
11	1		WT6×11 6"LG. D=2 7/8" (CUT TO SUIT)	

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Att./Appx. B Sh B278

Return B

JB 12/13/00

FORCES*	LATERAL	FY	FZ
POSITIVE	2850	2150	—
NEGATIVE	3100	3750	—

MVMTS *	X	Y	Z
THERMAL	~~-0.028~~ 0.168	—	~~-0.037~~ 0.223
SEISMIC	0.035	—	0.030

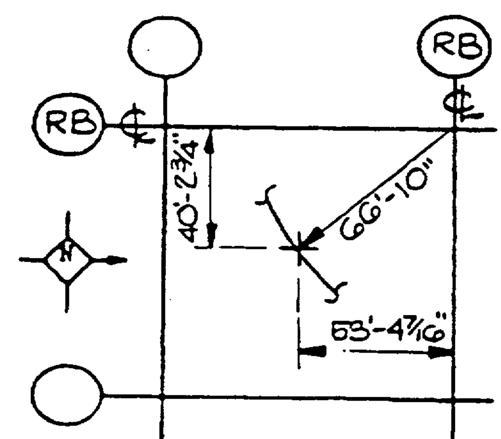
3

PROBLEM NO. P-201

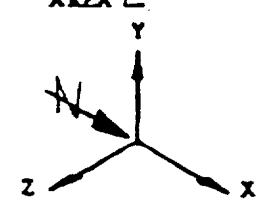
STRESS NO.

ISSUE 5 DATA PT. 140

NUCLEAR CLASS 3



LOCATION PLAN
AREA 2



NOTES: 1 All welds for nuclear supports to be visually inspected unless noted otherwise

2. THIS DWG. REPLACES 0-GN02-C011/242(Q). REV. 2.
3. FOR DOCUMENT CLARITY REV. 0 THRU 2 OMITTED.
4. USE ITEM 1 TO 11 FROM 0-GN02-C011/242(Q). REV. 2.

3

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	3	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN02(Q)- 24-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	BR	BR	ERU 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

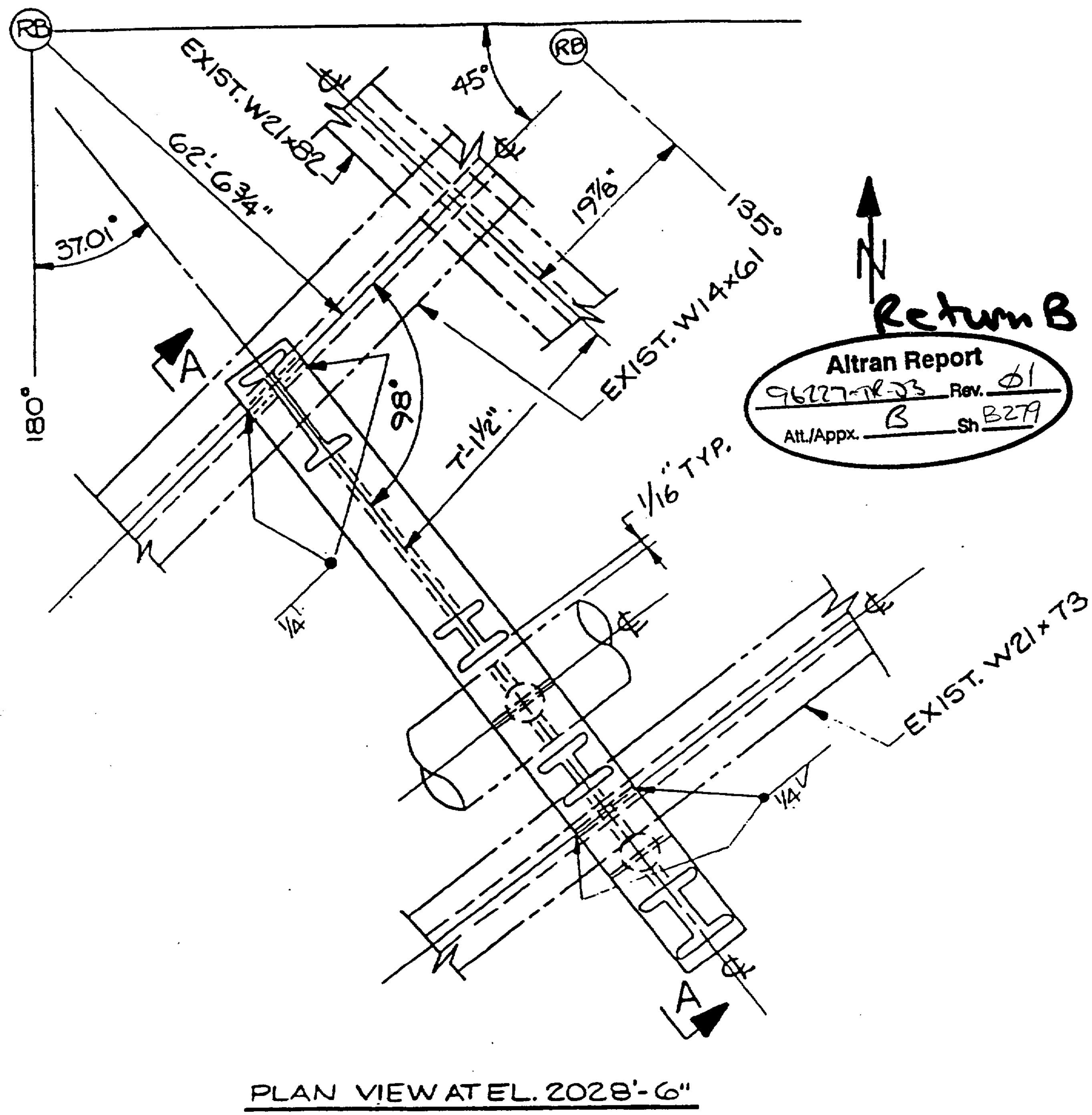
DRAWING NO.
M-16GN02

REF. DWGS. ISO M-13GN02
PIPE
STEEL C-0S2421

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

HANGER NO. 1-GN02-C011/242(Q)
REV. 3

PAGE 1 OF 3

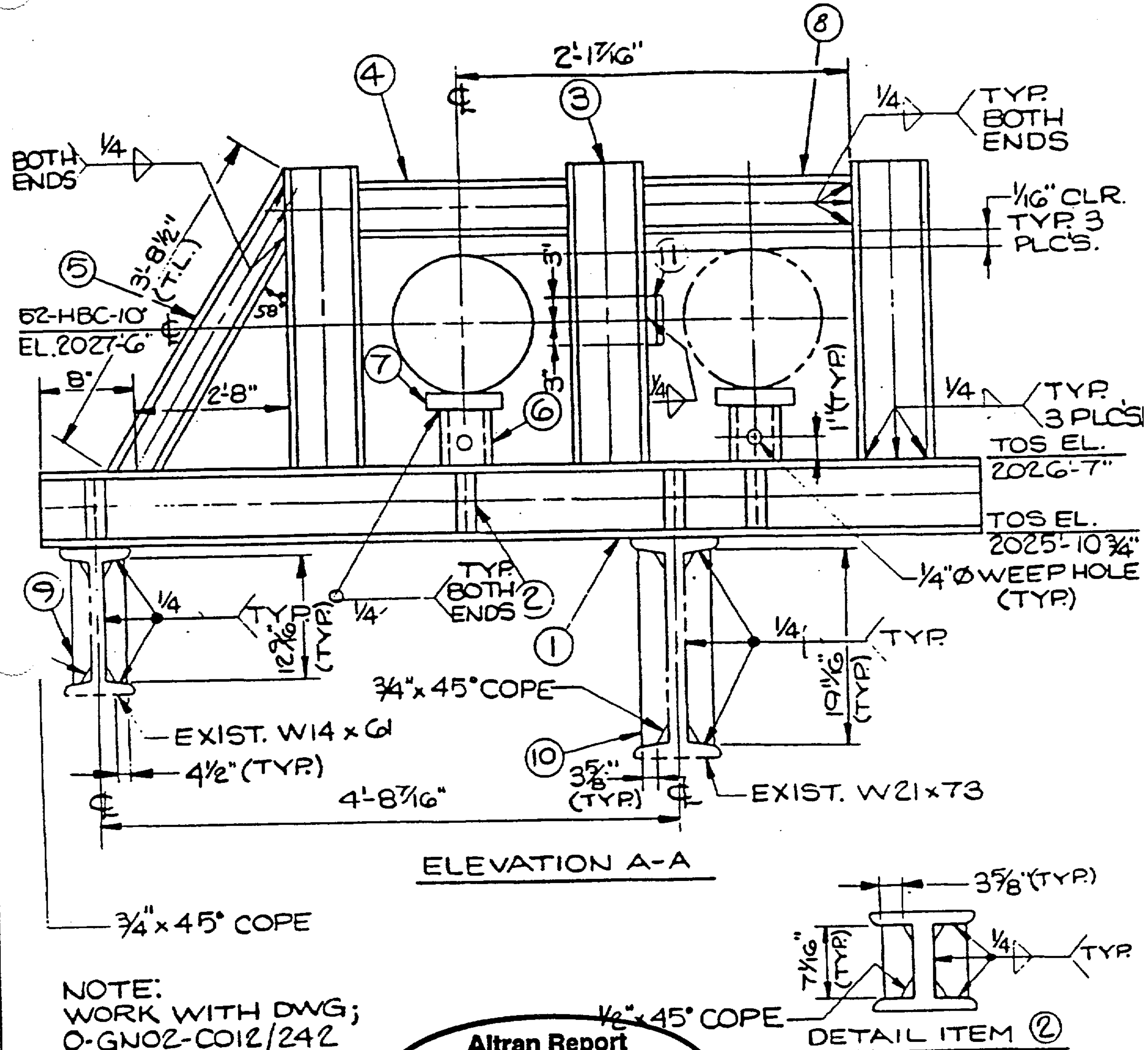


Return B

Altran Report
96227-TR-03 Rev. 01
Att./Appx. B Sh B279

JB
R 1/1/00

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS. ISO M-13GN02 PIPE STEEL C-0S2421
DRAWING NO. M-16GN02		HANGER NO. / REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"		1-GN02-C011/242(Q) PAGE 2 OF 3 / 3



ELEVATION A-A

3/4"x45° COPE

DETAIL ITEM ②

NOTE:
WORK WITH DWG;
0-GN02-C012/242

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh. B280

Return B

JB
DSS 12/13/00

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS. ISO M-13GN02; PIPE; STEEL C-0S2421
DRAWING NO. M-16GN02		HANGER NO. 1-GN02-C011/242(Q) — REV. 3
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"		PAGE 3 OF 3

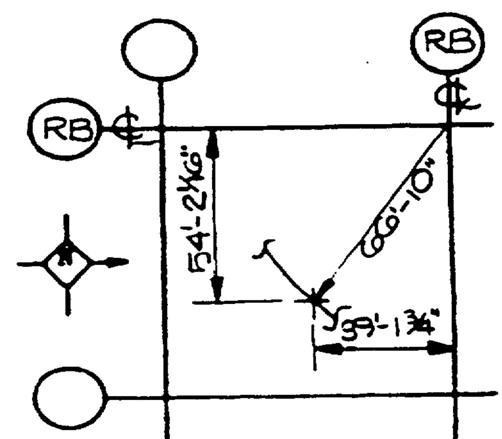
ITEM NO	NO REQ'D	PART NO	SIZE	DISCRIPTION		MATERIAL
1	1		W8x40	7'-2" LG. (BY M-216 SUPPLIER		-
2	8		3/8"x3 5/8"x7 1/16"	PLATE		SA515 GR65
3	2		W6x20	2'-2" LG.		
4	1		W6x20	10 7/8" LG.		
5	1		W 4 x 13	13 3/4" LG.		
6	1		W6x20	3'-8 1/2 LG.		
7	2		1/4"x6"x6"	BAR		SA 36
8	2		4" PIPE STANCHION SCH. 40	5 3/8" LG.		SA106 GRB
9	1		WT.6x11	6"LG D=2 7/8" (CUT TO SUIT)		
11	2		3/8"x4 1/2"x12 9/16	PLATE		SA515 GR65
12	1		W 4x 13,	21" LG.		

NOTES: 1) THIS DWG. REPLACES O-GN02-C013/242(Q) R/3
2) FOR DOCUMENT CLARITY, REV. 0-3 OMITTED
3) ITEM 1-9, 11 & 12 FROM O-GN02-C013/242(Q) R/3
4) FOR AS BUILT CONDITION OF ITEM 7, REFER TO NCR #ISN 8730-P

FORCES #	LATERAL	FY	FZ
POS.	2300	1000	/
NEG.	2450	5043	/

MVMTS. "	X	Y	Z
THERMAL	-0.082	/	-0.059
	0.490		0.354
SEISMIC	0.045	/	0.027

6



LOCATION PLAN
AREA 2

PROBLEM NO. P-201 STRESS NO. -

ISSUE 5

DATA PT. 160 NUCLEAR CLASS 3

NOTE: All welds for nuclear supports to be visually inspected unless noted otherwise.

Altran Report 96227-NR-03 Rev. Ø1
Att./Appx. B Sh B281

Return B

JB 11/15/00

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	6	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN02(Q)-24-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM			7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

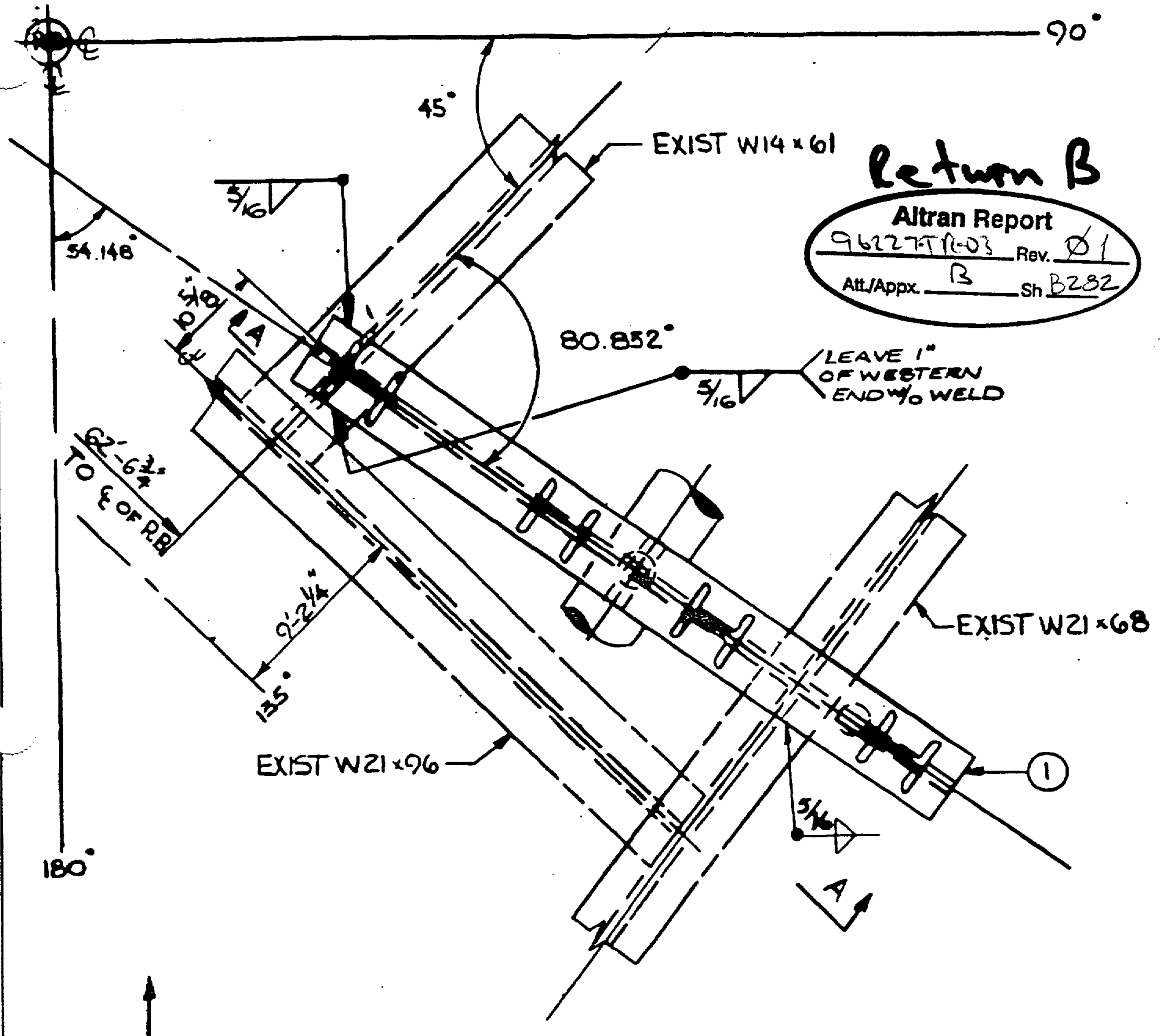
REF. DWGS. ISO M-13GN02
PIPE
STEEL C-0S2421

DRAWING NO.
M-16GN02

HANGER NO. 1-GN02-C013/242(Q)
REV. 6

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

PAGE 1 OF 3



Return B

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B282

UB
DBS 12/13/00

PLAN VIEW AT EL. 2028'-6"

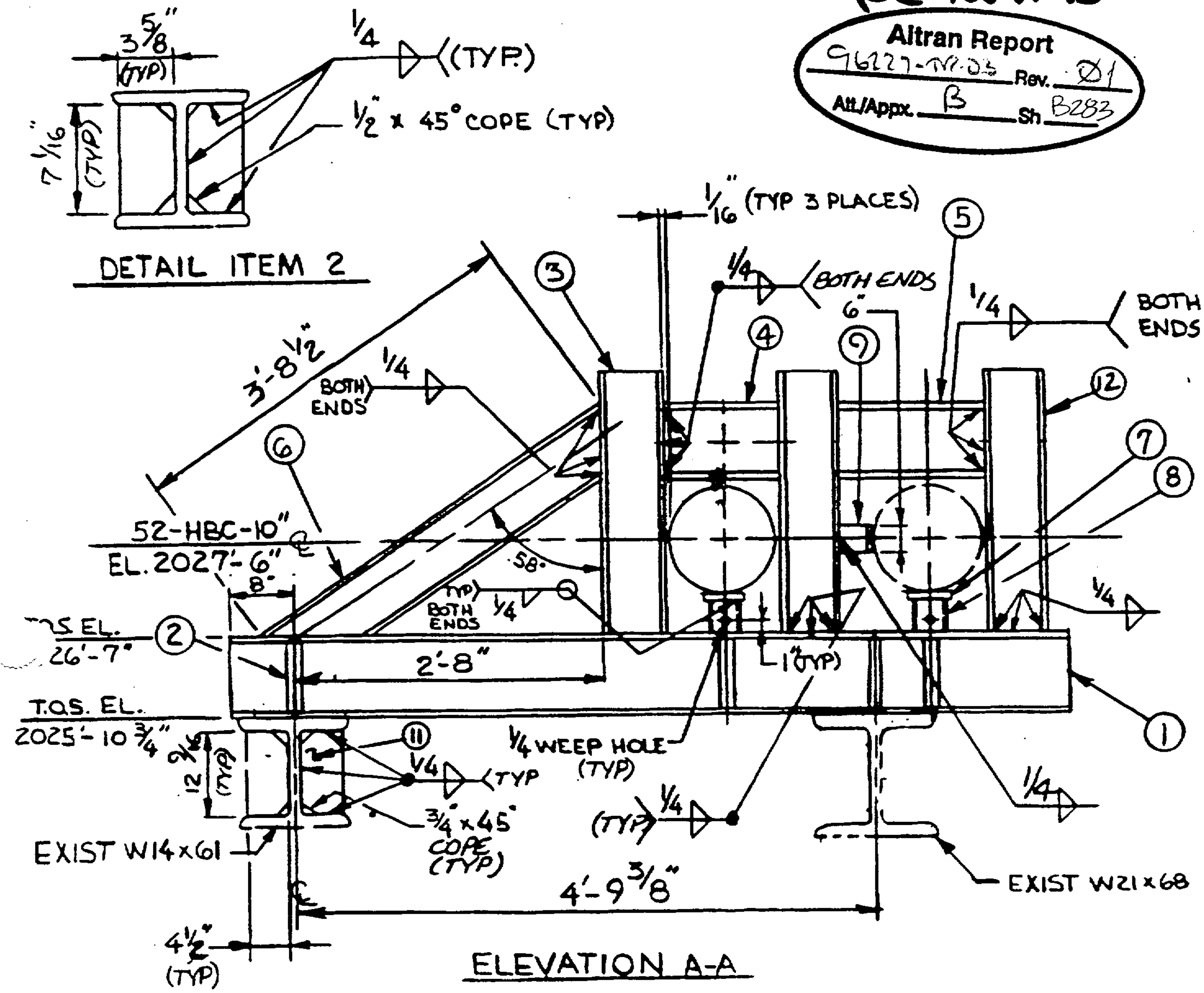
WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN02 PIPE STEEL C-0S2421
DRAWING NO. M-16GN02	-	HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"		1-GN02-C013/242(Q) PAGE 2 OF 3	6

NOTE: WORK WITH DWG, 0-GN02-C014/242 (Q)

Return B

Altran Report 96227-TR-03 Rev. Ø1 Att/Appx. B Sh B283

JB 12/13/00



WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN02 PIPE STEEL C-0S2421
DRAWING NO. M-16GN02	-	HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"		1-GN02-C013/242(Q) PAGE 3 OF 3	6

ITEM NO	NO REQ'D	PART NO.	SIZE DESCRIPTION	MATERIAL
1	1		W6x20, 2-11" LONG (BY M-216 SUPPLIER)	
2	1		W8X40 5'-1 7/16" LONG	
3	1		W4X13 14" LONG	
4	2		W4X13 17" LONG	
5	2		L 3X3X3/8 5 5/8" LONG	
6	1		3/8" X 4 1/2 X 12 9/16" LONG PLATE	SA515 GR-55

Return B

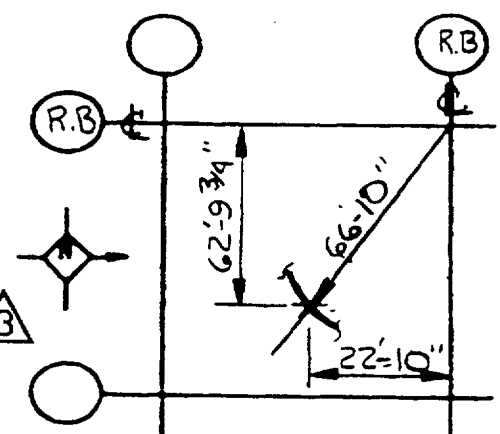
Altran Report 96227-TR-03 Rev. 01
Att./Appx. B Sh B284

JB
DS 12/13/00

FORCES #	LATERAL	FY	FZ
POS.	2100	—	—
NEG.	2150	—	—

MVMTS. "	X	Y	Z
THERMAL	-0.142 0.850	-0.564 0.091	-0.052 0.309
SEISMIC	0.049	0.167	0.016

3

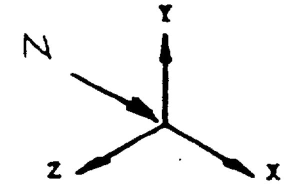


PROBLEM NO. P-201 STRESS NO.

ISSUE 5

DATA PT. 172 NUCLEAR CLASS 3

LOCATION PLAN
AREA 2



NOTE: 1. All welds for nuclear supports to be visually inspected unless noted otherwise
2. THIS DWG. LACES 0-GN02-R003/242 (Q), REV. 1.
3. FOR DOCUMENT CLARITY REV. 0 & 1 OMITTED.
4. USE ITEMS 2 TO 6 FROM 0-GN02-R003/242(Q) REV. 1.

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	3	DCR 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN02(Q)-24-01 PER PMR 03478 CLOSE OUT & AS NOTED. CAD DWG.	KAM	SR	SR	RLQ 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS. ISO M-13GN02
PIPE
STEEL C-0S2421

DRAWING NO.
M-16GN02

HANGER NO. REV.

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

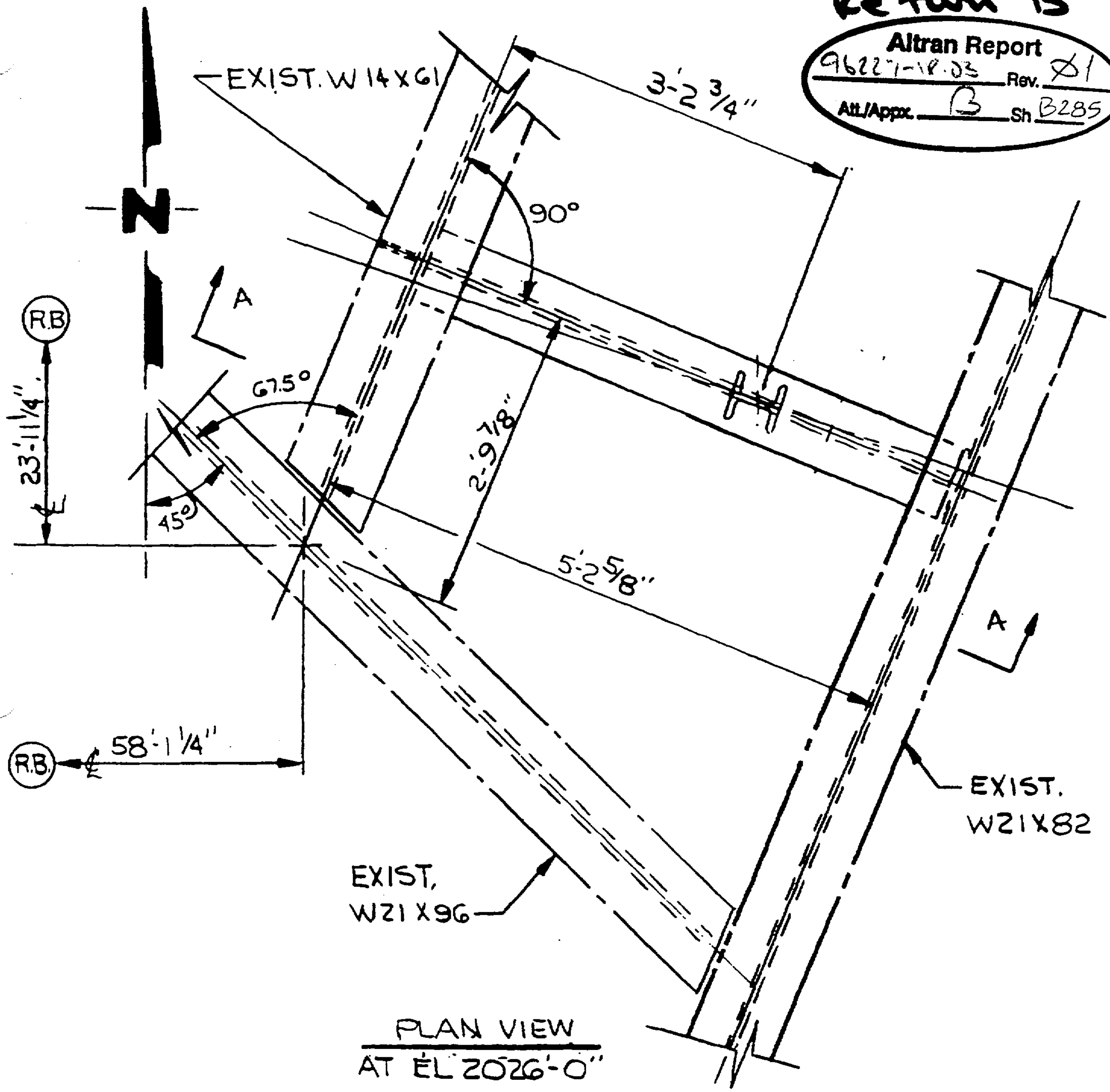
1-GN02-R003/242(Q) 3

PAGE 1 OF 3

Return B

Altran Report 96227-18.03 Rev. Ø1
Att./Appx. B Sh B285

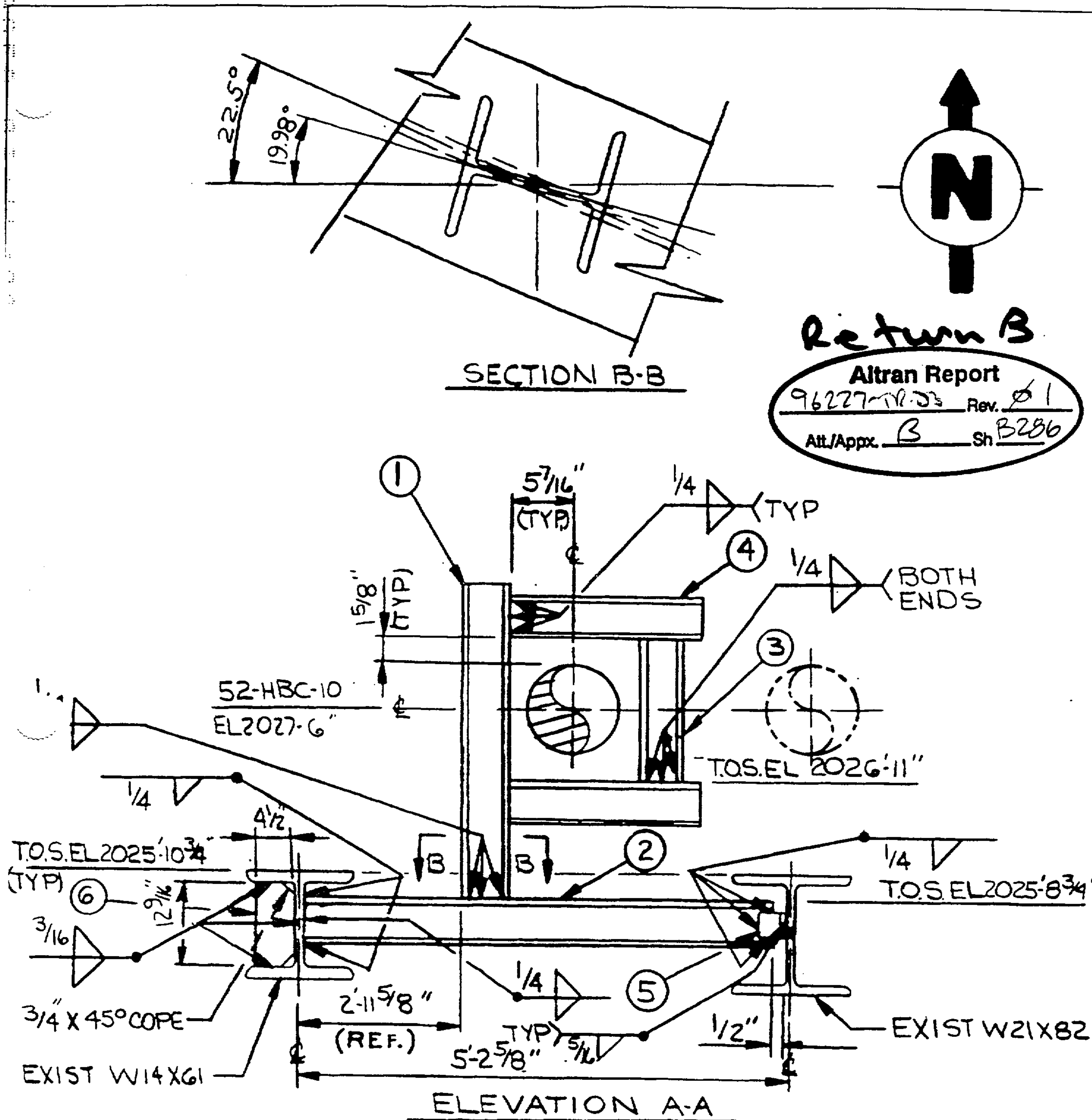
JB 12/7/00



PLAN VIEW
AT EL 2026'-0"

WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO. M-16GN02	REF. DWGS.	ISO M-13GN02
		PIPE
		STEEL C-0S2421
PIPE SUPPORTS	HANGER NO. 1-GN02-R003/242(Q)	REV. 3
CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"	PAGE 2 OF 3	



Return B

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B286

JB
12/13/00

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN02 PIPE STEEL C-1S2421
DRAWING NO. M-16GN02		HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"		1-GN02-R003/242(Q) PAGE 3 OF 3	3

ITEM NO	NO REQ'D	PART NO.	SIZE	DESCRIPTION	MATERIAL
	2	211	C	SWAY STRUT, PIPE OD=10 3/4" W=10 5/8"	
				CLAMP MAT'L= C.S. (BY M-218B SUPPLIER)	
C	2			W4X13 17 LONG (BY M-216 SUPPLIER)	

Altran Report 96227-TR-03 Rev. ~~0~~ 1
Att./Appx. B Sh B287

Return B

JB
DSS 12/13/00

FORCES #	FX	FY	FZ
POS.	3350	—	3650
NEG.	2750	—	3300

MVMTS. "	X	Y	Z
MAL	—	-0.243	—
	—	0.041	—
SEISMIC	—	0.173	—

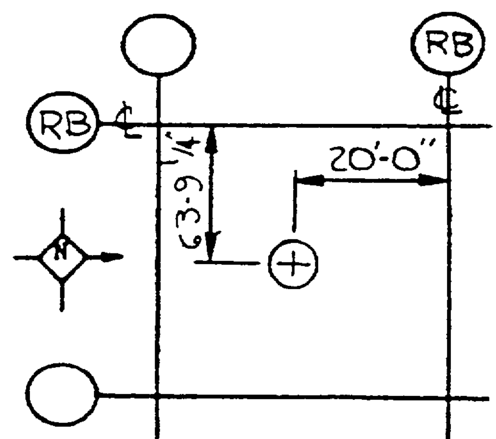
PROBLEM NO. P-201 STRESS NO. —

ISSUE 5

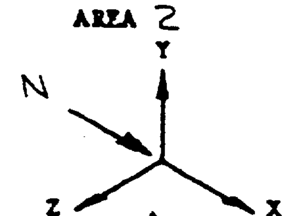
DATA PT. 187 NUCLEAR CLASS 3

NOTES:
1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN02-R005/252(Q), REV.1
3. FOR DOCUMENT CLARITY REV.0, & 1 OMITTED.
4. USE ITEMS 1 &2 FROM 0-GN02-R005/252(Q). REV.1

2



LOCATION PLAN
AREA 2



REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	2	RISD: DCZ 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN02(Q)-24-01 PER PMR 03478 CLOSE OUT & AS NOTED. CAD DWG.	KAM	SP	SP	ELA 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

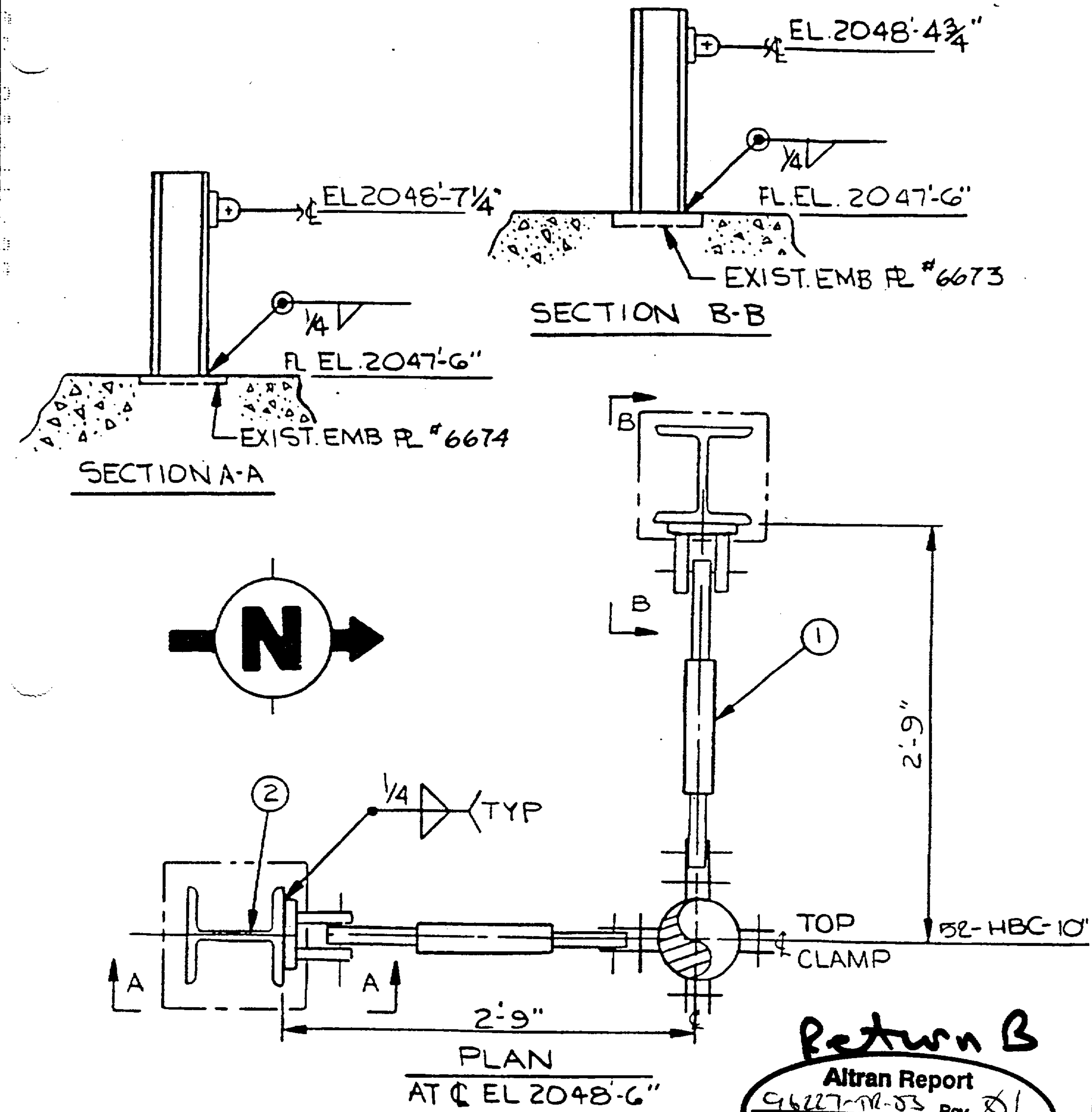
DRAWING NO.
M-16GN02

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN"B"

REF. DWGS.
ISO M-13GN02
PIPE
STEEL C-1C2511

HANGER NO. 1-GN02-R005/252(Q)
REV. 2

PAGE 1 OF 2



Return B

Altran Report G6227-TR-03 Rev. 01
Att./Appx. B Sh B288

JB
TBS 12/13/00

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN02 PIPE STEEL C-1C2511
DRAWING NO. M-16GN02		HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"		1-GN02-R005/252(Q) PAGE 2 OF 2	2

ITEM NO	NO REQ'D	PART NO.	SIZE	DESCRIPTION	MATERIAL
1	1	211	4	SWAY STRUT CLAMP MAT'L = CS OD = 10 3/4" (BY M-218B SUPPLIER) W: 7'-6 1/4"	
3	1			W8 x 40 5'-11" LG. (BY M-216 SUPPLIER)	
4	1			1" x 9" x 9" PLATE	SA-515 GR.65

Return B

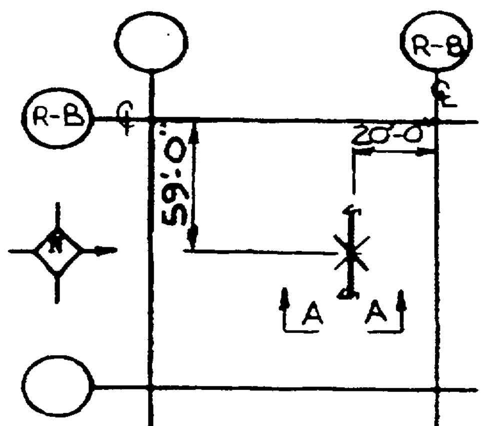
Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B289

JB 12/1/00

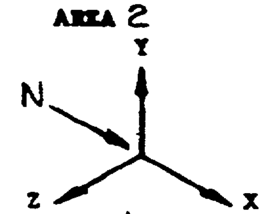
2

FORCES #	FX	FY	FZ
POS.	—	4750	—
NEG.	—	16050	—

MVMTS. "	X	Y	Z
THERMAL	-0.489	—	-0.015
SEISMIC	0.082 / 0.064	— / —	0.089 / 0.033



LOCATION PLAN
AREA 2



PROBLEM NO. P-201 STRESS NO. —

ISSUE 5

DATA PT. 215 NUCLEAR CLASS 3

NOTES:
1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN02-H001/252(Q). REV.1
3. FOR DOCUMENT CLARITY REV.0 & 1 OMITTED.
4. USE ITEMS 1.3&4 FROM 0-GN02-H001/252(Q). REV.1

2

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	2	DCZ 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN02(Q)-24-01 PER PMR 03478 CLOSE OUT & AS NOTED. CAD DWG.	KAM	RP	RP	EPO 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS. ISO M-13GN02
PIPE
STEEL C-1S2511

DRAWING NO.
M-16GN02
PIPE SUPPORTS

CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

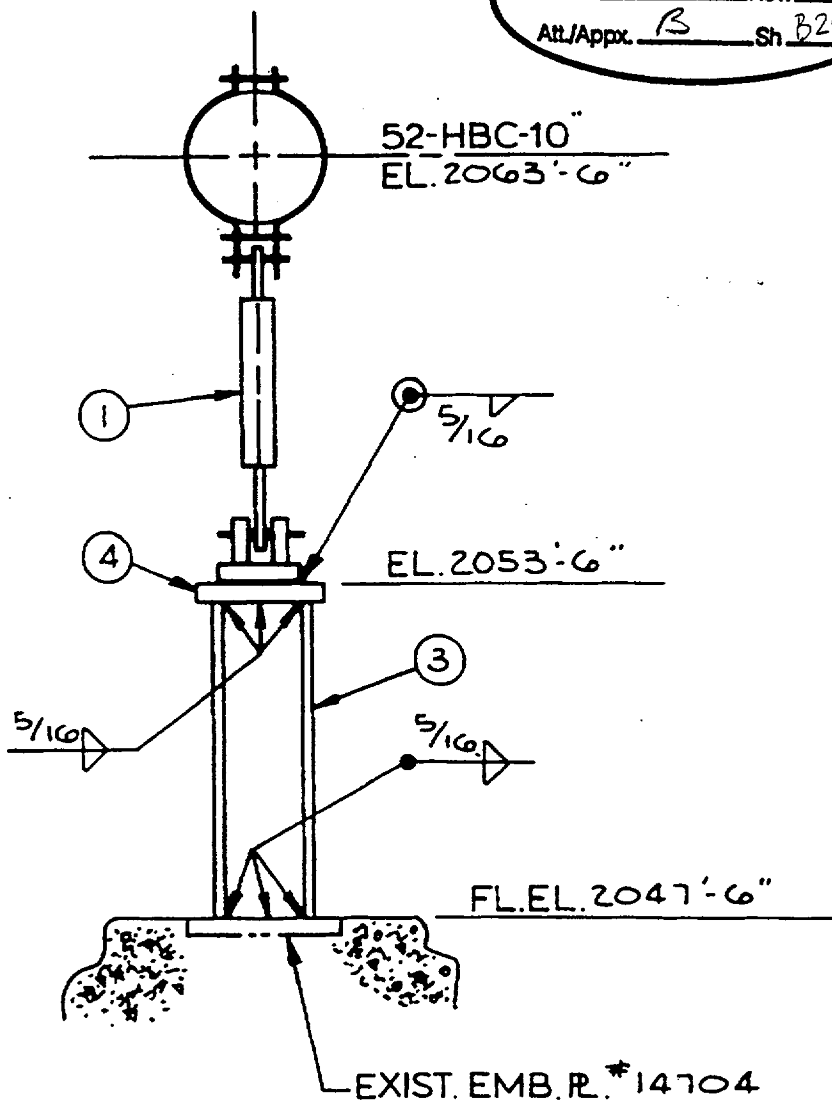
HANGER NO. 1-GN02-H001/252(Q)
REV. 2

PAGE 1 OF 2

Return B

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh. B290

JB
12/13/00



ELEVATION A-A

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS. ISO M-13GN02 PIPE STEEL C-1S2511	
DRAWING NO. M-16GN02		HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"		1-GN02-H001/252(Q) PAGE 2 OF 2	2

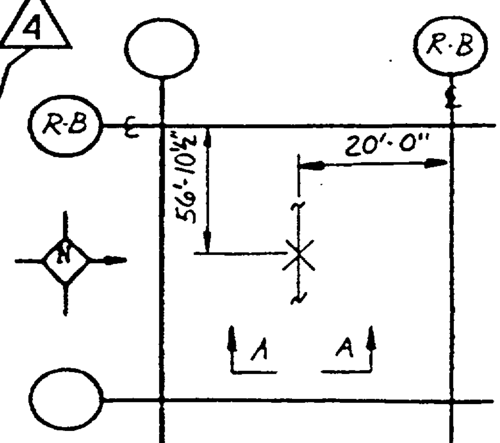
ITEM NO	NO REQ'D	PART NO.	SIZE / DESCRIPTION	MATERIAL
1	1		W6x20 5'-4" LG. (BY M-216 SUPPLIER)	
	1		W6x20 7'-2 1/8" LG.	
	2	2540	R/1-6 SNUBBER, STROKE: 5", L: 16 7/8", P-P: 3'-0 1/8", MVMT: 0.440(T) (BY M-218A SUPPLIER)	
4	2	2640-6	R/1-6" PIPE CLAMP	
5	2		6"Ø PIPE STANCHION, SCH 40, D: 12", R: 5 3/8", E: 5 1/8" (BY M-218A SUPPLIER)	SA 106, GR.B
6	2		3/8"x8 1/2"x8" PL (BY M-218A SUPPLIER)	SA 515, GR.65

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B291

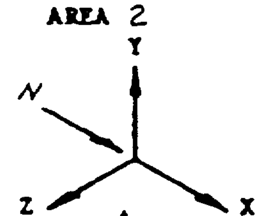
Return B

FORCES #	FX SNUB	FY	FZ
POS.	6000	—	—
NEG.	6000	—	—

MVMTS. "	X	Y	Z
THERMAL	-0.471 / 0.079	0.001 / -0.003	-0.009 / 0.054
SEISMIC	—	0.005	0.033



LOCATION PLAN
AREA 2



PROBLEM NO. P-201 STRESS NO. —

ISSUE 5

DATA PT. 217 NUCLEAR CLASS 3

NOTES:
1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN02-R007/252(Q), REV.3
3. FOR DOCUMENT CLARITY REV.0 & 3 OMITTED.
4. USE ITEMS 1 TO 6 FROM 0-GN02-R007/252(Q). REV.3 (4)

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPV'L DATE
	4	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN02(Q)-24-01 PER PMR 03478 CLOSE OUT & AS NOTED. CAD DWG.	KAM	RP	RP	7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

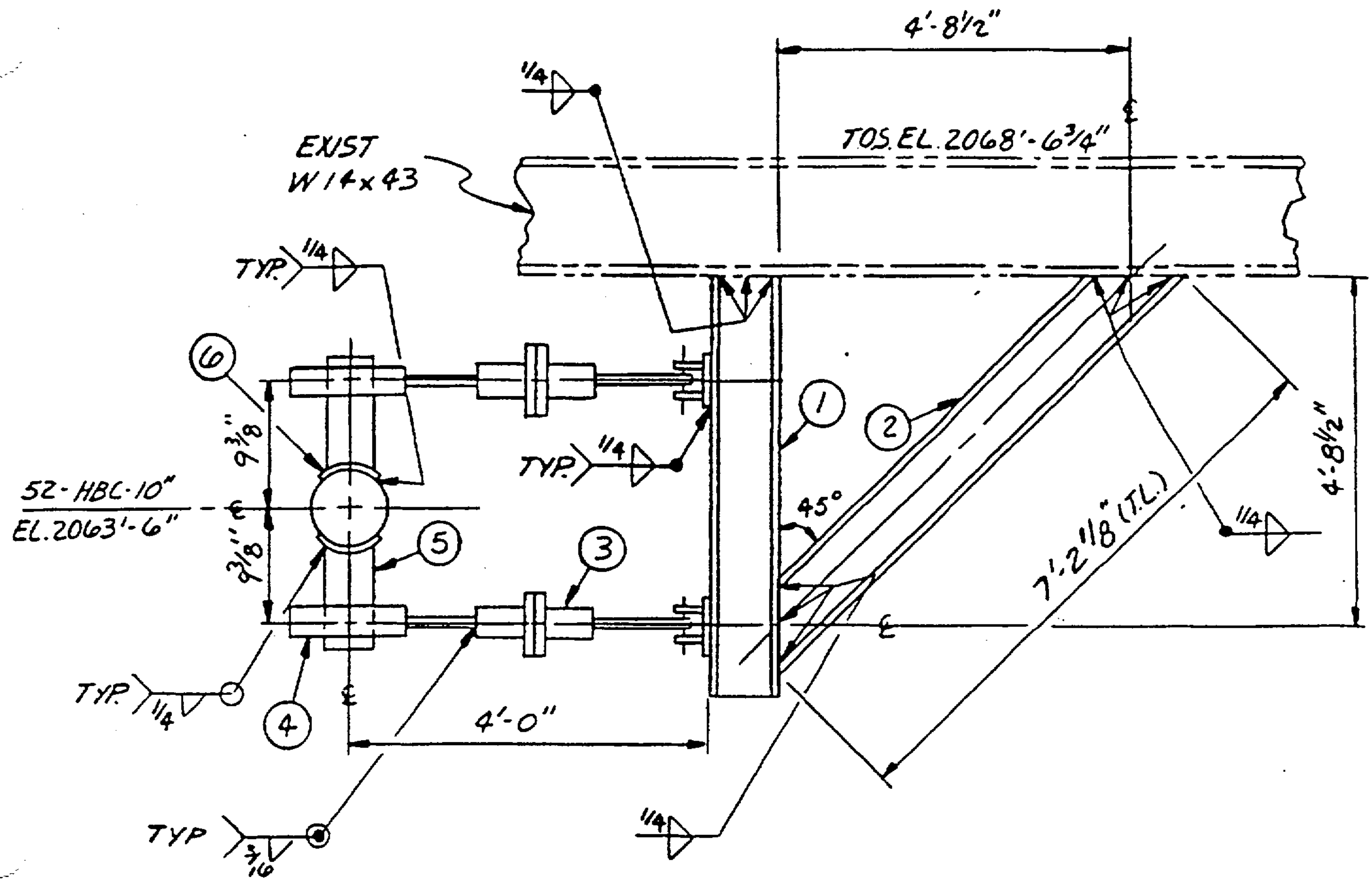
REF. DWGS. ISO M-13GN02
PIPE
STEEL C-1S2621

DRAWING NO. M-16GN02

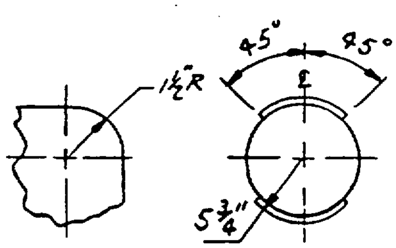
PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

HANGER NO. 1-GN02-R007/252(Q)
REV. 4

PAGE 1 OF 2



ELEVATION A-A



DETAIL OF ITEM 6

Return B

Altran Report
96227-TR-03 Rev. Ø1
Att./Appx. B Sh B292

JB
12/19/00

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN02 PIPE STEEL C-1S2621
DRAWING NO. M-16GN02		HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"		1-GN02-R007/252(Q) PAGE 2 OF 2	4

ITEM NO	NO REQ'D	PART NO	SIZE	DISCRIPTION	MATERIAL
1	1	211	1	SWAY STRUT PIPE O.D. = 10 3/4" W= 15 3/8" (BY M-218 B SUPPLIER)	
2	1	211	1	SWAY STRUT PIPE O.D.-10 3/4" W=2'-4 3/4"	

Return B

Altran Report 96227-TR-03 Rev. Ø1
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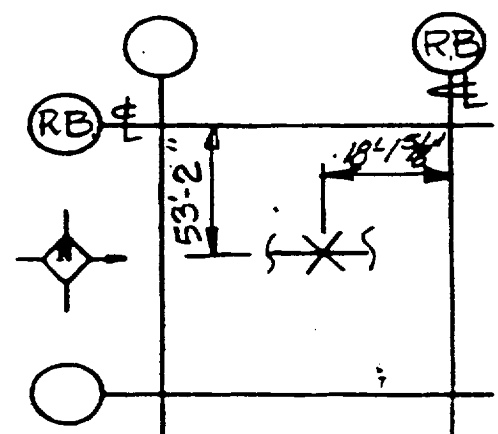
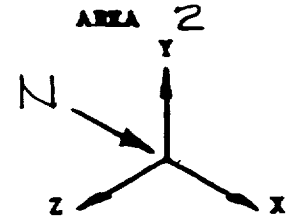
JB 12/13/

FORCES #	FX	FY	FZ
POS.	—	5550	3250
NEG.	—	2850	3450

MVMTS. "	X	Y	Z
THERMAL	~~-0.413~~ 0.069	—	—
SEISMIC	0.100	—	—



LOCATION PLAN
AREA 2



PROBLEM NO. P-201 4 STRESS NO. —
ISSUE 5
DATA PT. 223 NUCLEAR CLASS 3

NOTE: 1. All welds for nuclear supports to be visually inspected unless noted otherwise
2. THIS DWG. REPLACES 0-GN02-C015/252 (Q), REV. 2.
3. FOR DOCUMENT CLARITY REV. 0 THRU 2 OMITTED.
4. USE ITEMS 1 AND 2 FROM 0-GN02-C015/252 (Q), REV. 2

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	4	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN02(Q)-24-01 PER PMR 03478 CLOSE OUT AND AS NOTED. CAD DWG.	KAM	RP	RP	EFA 7/26/94

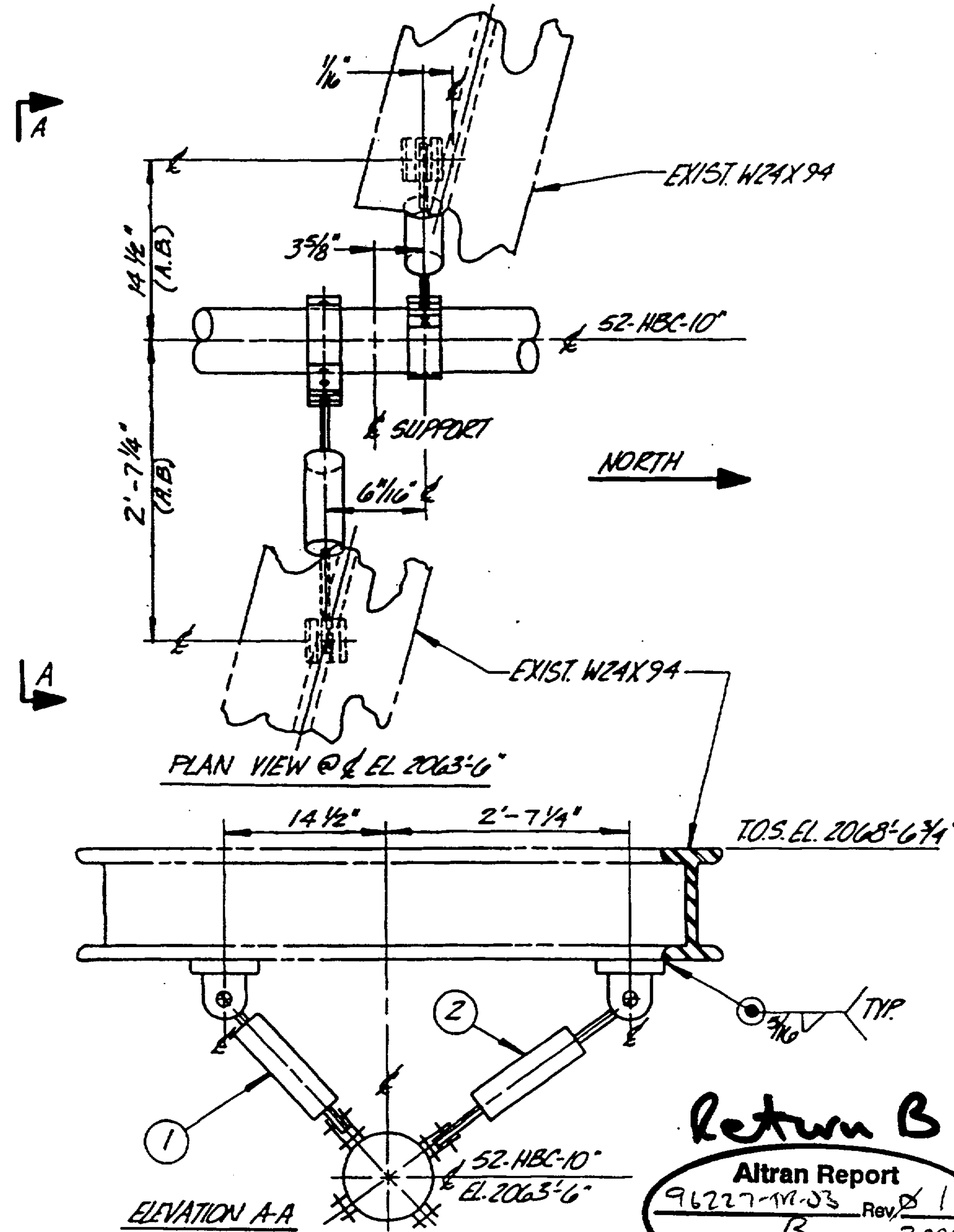
WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO.
M-16GN02

REF. DWGS.
ISO M-13GN02
PIPE
STEEL C-1S2621

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

HANGER NO. 1-GN02-C015/252(Q)
REV. 4
PAGE 1 OF 2



Return B

Altran Report 96227-M-03 Rev. Ø 1
Att./Appx. B Sh. B294

DS 12/15/00

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN02 PIPE STEEL C-1S2621
DRAWING NO. M-16GN02	-	HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"		1-GN02-C015/252(Q) PAGE 2 OF 2	4

Pg 2 rct 8-15-95

ITEM NO	NO REQ'D	PART NO	SIZE	DISCRIPTION	MATERIAL
1	1	211	1	SWAY STRUT PIPE O.D. = 8 5/8"	
			W= 2'-5 3/8"	CLAMP MAT'L = C.S	
				(BY M-218 B SUPPLIER)	
2	1	211	1	SWAY STRUT PIPE O.D. = 8 5/8"	
			W= 14 5/8"	CLAMP MAT'L = C.S.	
				(BY M-218 B SUPPLIER)	

Return B

Altran Report
96227-M-03 Rev. ~~0~~ 1
Att./Appx. B Sh B295

JB 12/13/

FORCES *	FX	FY	FZ
POS.	–	950	1900
NEG.	–	4294	2800

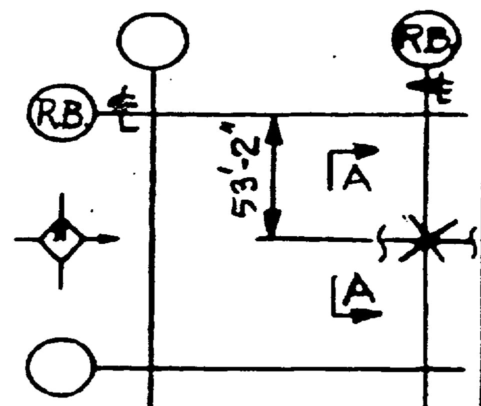
MVMTS. "	X	Y	Z
THERMAL	-0.119	–	–
	0.02		
SEISMIC	0.101	–	–

PROBLEM NO. P-201 STRESS NO. –

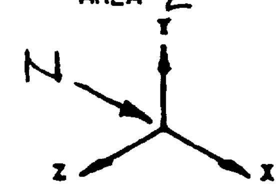
ISSUE 5

DATA PT. 240 NUCLEAR CLASS 3

NOTES: 1. All welds for nuclear supports to be visually inspected unless noted otherwise.
2. THIS DWG. REPLACES 0-GN02-C017/252(Q). REV.1.
3. FOR DOCUMENT CLARITY REV.0 AND 1 OMITTED.
4. USE ITEM 1 TO 2 FROM 0-GN02-C017/252(Q) REV.1.



LOCATION PLAN
AREA 2



REV	ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
3				REV. PER CCP 06017	JRP			

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS.
ISO M-13GN02
PIPE
STEEL C-1S2621

DRAWING NO.
M-16GN02

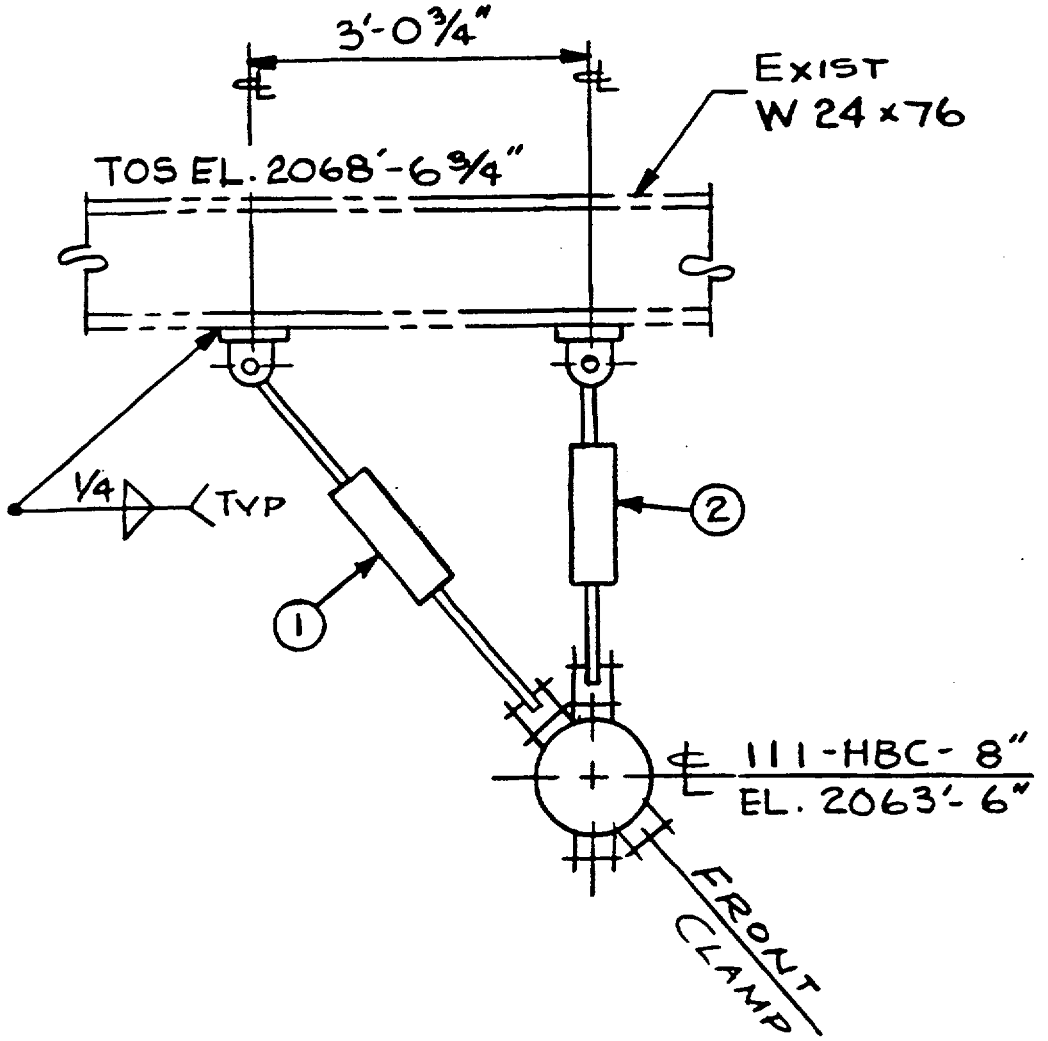
PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

HANGER NO. 1-GN02-C017/252(Q)
REV. 3

PAGE 1 OF 2

LEVEL

DFN-ATS/gn02c017_1.dgn
REF DFN-ATS/gn02c017_1.cit
8 1/2X11 A SIZE



ELEVATION A-A

Return B

Altran Report 96227-M.03 Rev. ~~X~~ 1
Att./Appx. B Sh B296

JB
DB 12/13/00

DATE

WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO.
M-16GN02

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

REF. DWGS.
ISO M-13GN02
PIPE
STEEL C-1S2621

HANGER NO.	REV.
1-GN02-C017/252(Q) PAGE 2 OF 2	2

ITEM NO	NO REQ'D	PART NO	SIZE	DESCRIPTION	MATERIAL
1	2		W6×20	2'-2" LG. (BYM-216 SUPPLIER)	
2	1		W6×20	10 13/16" LG.	
3	1		5" Ø PIPE	SCH 40 6 1/16 LG. (BYM-216 SUPPLIER	SA-106 GR B
4	1		5/8"×7"×7"	BAR (BYM-216 SUPPLIER)	SA-515 GR.65
5	2		1/4"×1 1/2"×3 1/2"	BAR	SA-36
6	2		1/2"×3"×4"	BAR	SA-36
7	1		W4×13	2'-2" LG.	
8	1		W6×20	10 7/8" LG	

Altran Report G6227-TM-03 Rev. Ø1
Att./Appx. B Sh. B297

Return B

JB
TBS 12/13/00

7

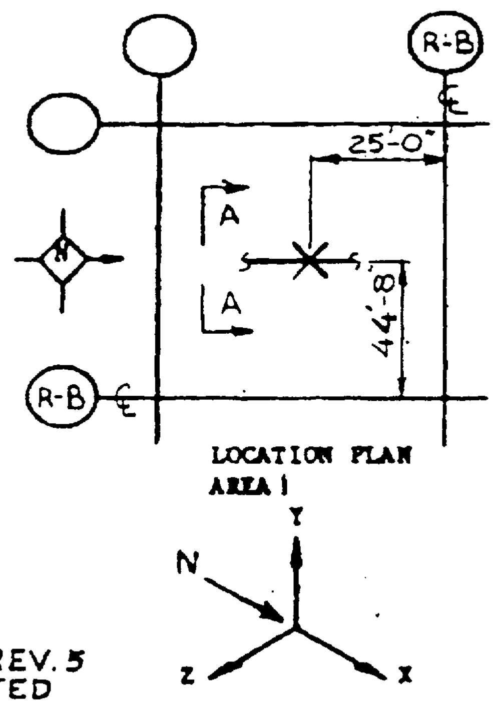
FORCES #	FX	FY	FZ
POS.	—	2550	2800
NEG.	—	13111	2800

MVMTS. "	X	Y	Z
THERMAL	-0.061	—	—
SEISMIC	0.326 / 0.155	—	—

PROBLEM NO. P-201 STRESS NO. ______

ISSUE 5

DATA PT. 320 NUCLEAR CLASS 3



NOTE: 1. All welds for nuclear supports to be visually inspected unless noted otherwise

2. THIS DWG. REPLACES O-GNO2-C019/231(Q) REV. 5
3. FOR DOCUMENT CLARITY REV. 0 THRU 5 OMITTED
4. USE ITEMS 1 TO 8 FROM O-GNO2-C019/231(Q) REV. 5

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	7	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN02(Q)-24-01 PER PMR 03478 CLOSE OUT & AS NOTED. CAD DWG.	KAM			7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

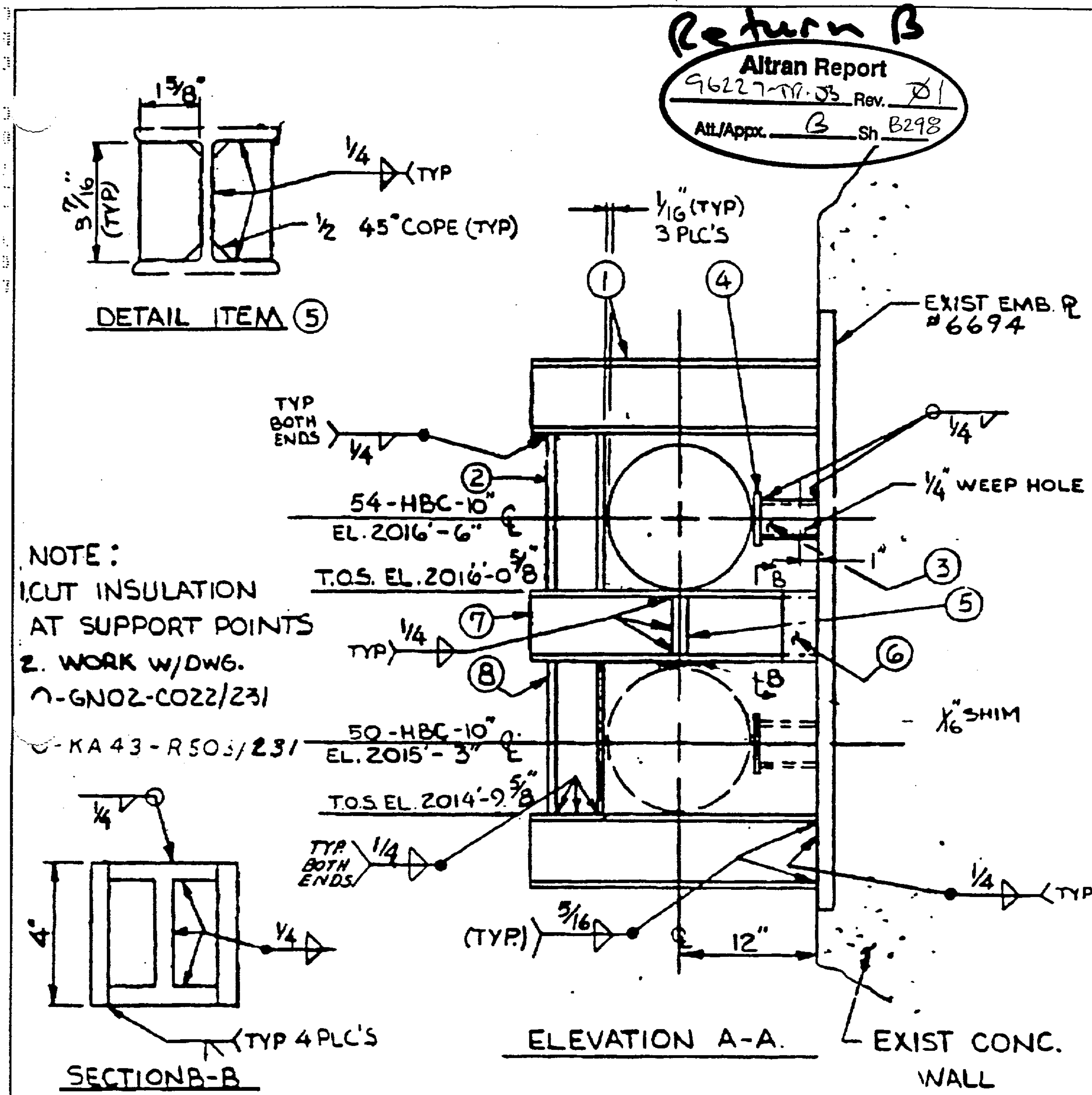
REF. DWGS. ISO M-13GN02
PIPE ______
STEEL C-0C2916

DRAWING NO. M-16GN02

HANGER NO. 1-GN02-C019/231(Q) REV. 7

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

PAGE 1 OF 2



WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO. M-16GN02	REF. DWGS.	ISO M-13GN02 PIPE STEEL C-0C2916
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"	HANGER NO. 1-GN02-C019/231(Q) PAGE 2 OF 2	REV. 7

ITEM NO	NO REQ'D	PART NO.	SIZE DESCRIPTION	MATERIAL
1	1		W4X13 2'-0" LONG (BY M-216 SUPPLIER)	
2	2		W4X13 15" LONG ↓	

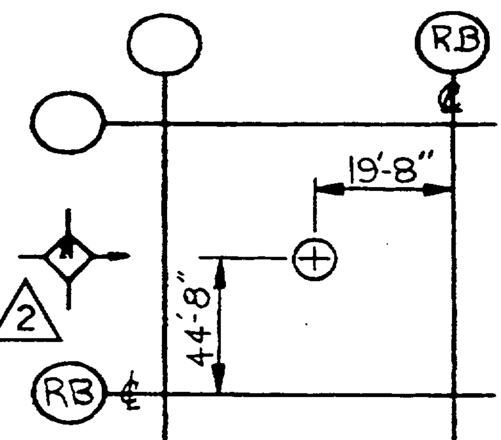
Return B

Altran Report 96227-TR.03 Rev. Ø1
Att./Appx. B Sh B299

JB 12/13/00

FORCES #	FX	FY	FZ
POS.	—	—	1700
NEG.	—	—	2002

MVMTS. "	X	Y	Z
TERMAL	-0.060	-0.200	—
	0.339	0.033	
SEISMIC	0.187	0.024	—

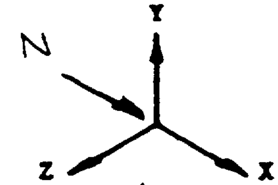


PROBLEM NO. P-201 STRESS NO. —

ISSUE 5

DATA PT. 335 NUCLEAR CLASS 3

LOCATION PLAN
AREA 1



NOTES:
1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN02-R009/241(Q), REV.1
3. FOR DOCUMENT CLARITY REV.0 & 1 OMITTED.
4. USE ITEMS 1 & 2 FROM 0-GN02-R009/241(Q), REV.1

2

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	2	DC2 8/24/94	REV. TO INC. PMPCN M-798-W-M-16GN02(Q)-24-01 PER PMR 03478 CLOSE OUT & AS NOTED. CAD DWG.	KAM			7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO.
M-16GN02

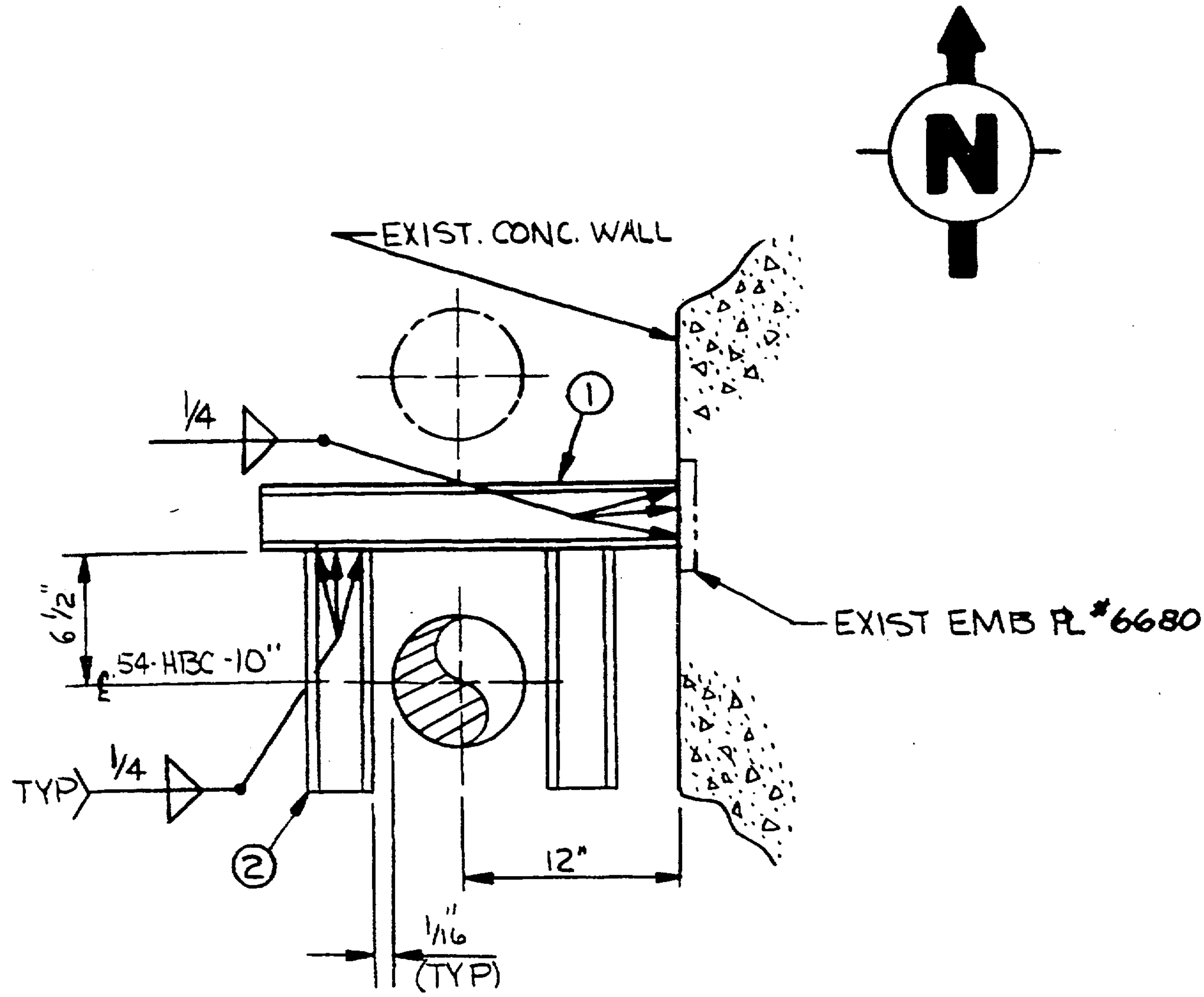
PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

REF. DWGS.
ISO M-13GN02
PIPE
STEEL C-0C2916

HANGER NO. 1-GN02-R009/241(Q)

REV. 2

PAGE 1 OF 2



PLAN VIEW
AT ℄ EL 2030'-0"

Return B

Altran Report
96227-TR-03 Rev. ~~0~~ 1
Att./Appx. B Sh. B300

JB
11/13/00

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN02 PIPE STEEL C-0C2916
DRAWING NO. M-16GN02		HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"		1-GN02-R009/241(Q) PAGE 2 OF 2	2

ITEM NO	NO REQ'D	PART NO.	DESCRIPTION SIZE	MATERIAL
1	1		5"ø PIPE STANCHION, SCH 40, 5'5/16" LG. (BY M-216 SUPPLIER)	SA 106, GR B
2	1		5/8"x7"x7" PL (BY M-216 SUPPLIER)	SA-515, GR 65
3	4		1 1/4"x 2 1/2"x 3 3/4" LUG	SA 515, GR 65
4	1		1/16" x 8" x 8" SHIM PL	↓

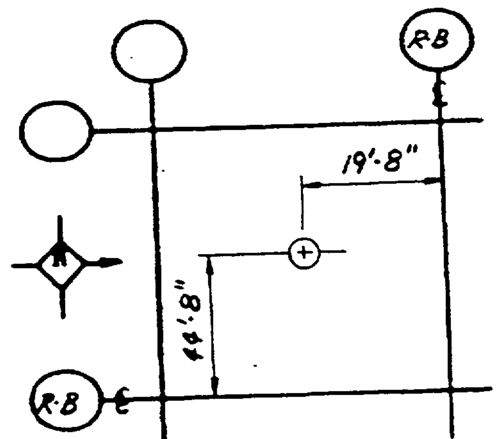
Return B

Altran Report
96227-TR-03 Rev. Ø1
Att./Appx. B Sh. B301

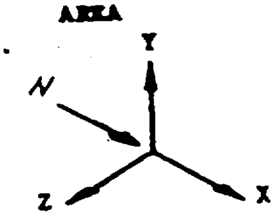
JB
DBB
12/13/00

FORCES #	FX	FY	FZ
POS.	4367	8200	2843
NEG.	3350	9950	2250

MVMTS. "	X	Y	Z
THERMAL	-	-	-
SEISMIC	-	-	-



LOCATION PLAN
AREA



PROBLEM NO. P-201 (3)   STRESS NO. –
ISSUE (5)
DATA PT. 347   NUCLEAR CLASS 3

NOTE: 1. All welds for nuclear supports to be visually inspected unless noted otherwise
2. THIS DWG. REPLACES 0-GN02-C021/241 (Q), REV. 1.
3. FOR DOCUMENT CLARITY REV. 0 & 1 OMITTED.
4. USE ITEMS 1, 2, & 3 FROM 0-GN02-C021/241 (Q), REV. 1.

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	3	DC2 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN02(Q)-24-01 PER PMR 03478 CLOSE OUT & AS NOTED. CAD DWG.	KAM	BP	BP	CLU 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

REF. DWGS. ISO M-13GN02
PIPE
STEEL C-1C2511

DRAWING NO.
M-16GN02
PIPE SUPPORTS
[C]ONTAINMENT COOLING SYSTEM
[RE]ACTOR BUILDING TRAIN "B"

HANGER NO. 1-GN02-C021/241(Q)   REV. 3
PAGE 1 OF 2

Return B

Altran Report
96227-TR.03 Rev. 01
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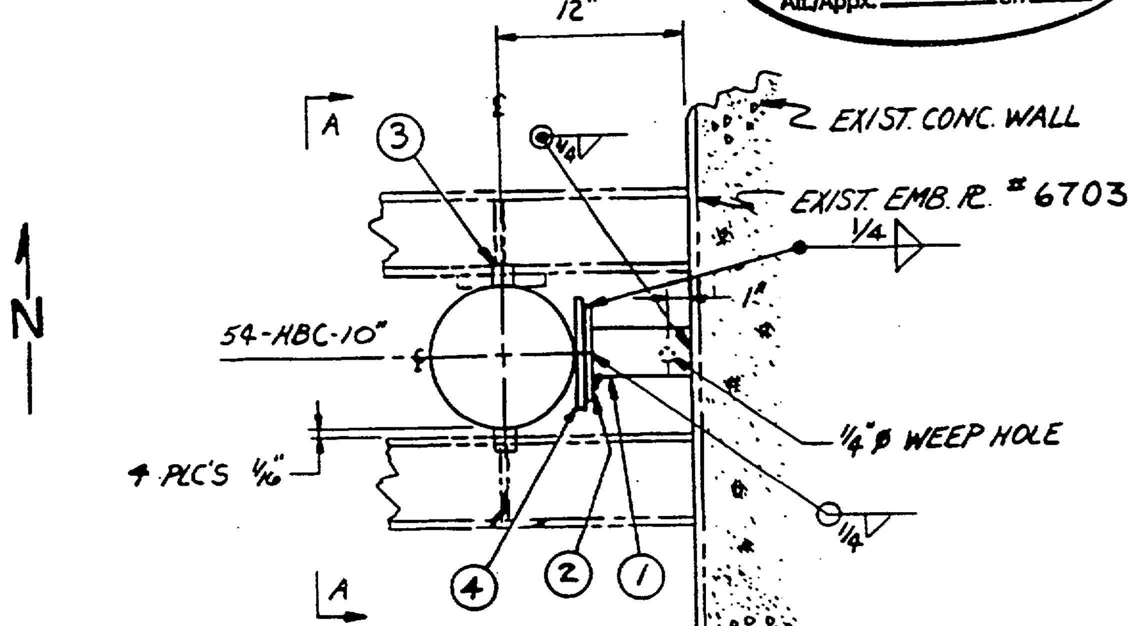
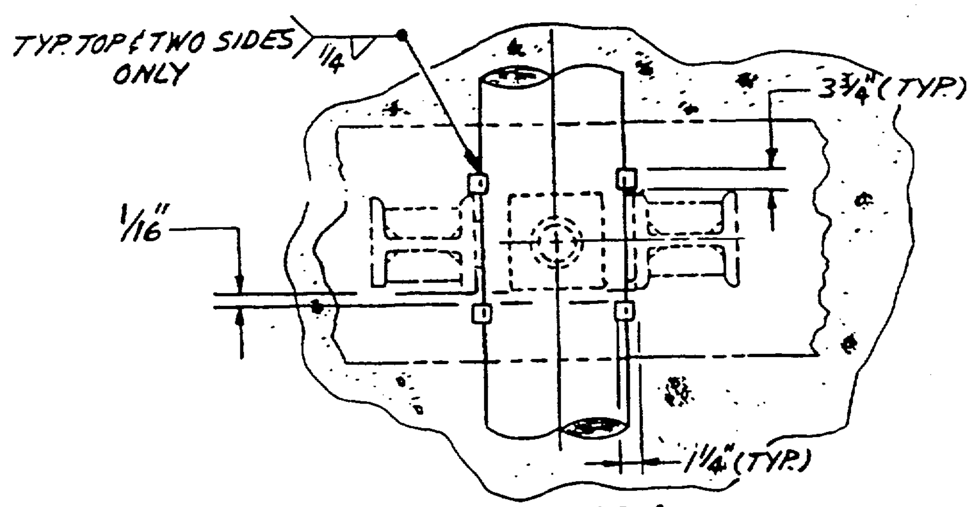
JB
12/13/00

NOTE: WORK WITH DWG.
0-GN02-C024 / 241



PLAN VIEW
AT ℄ EL 2042'-6"



SECT. A-A

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS. ISO M-13GN02 / PIPE / STEEL C-1C2511
DRAWING NO. M-16GN02		HANGER NO. / REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"		1-GN02-C021/241(Q) PAGE 2 OF 2 / 3

ITEM NO	NO REQ'D	PART NO	SIZE	DESCRIPTION	MATERIAL
1	3		W8×40	2'-2" LG. (BYM-216 SUPPLIER)	
2	2		W6×20	11 5/16" LG.	
3	1		5" Ø PIPE STANCHION SCH 40	5 15/16" LG.	SA 106 GR B
4	1		5/8×7"×7 1/8"	PLATE (BYM-216 SUPPLIER)	SA 515 GR 65
5	2		7/16×2 7/8"×8"	PLATE	SA 515 GR 65
6	4		1 1/4×2 1/2×3 3/4"	LUGS (BYM-216 SUPPLIER)	SA-515 GR 65
7	6		3/8×3 5/8×7 1/16"	PLATE	SA 515 GR 65

SUPPLY B

Altran Report
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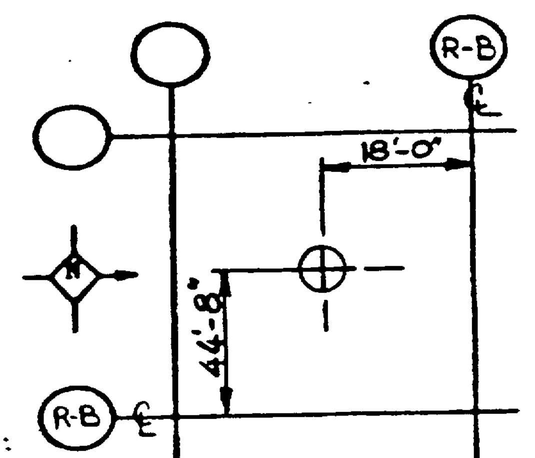
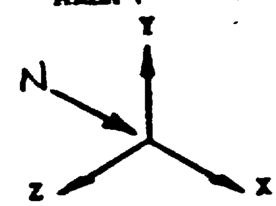
JB
DBS 11/11/00

FORCES #	FX	FY	FZ
POS. / NEG.	3450 / 3400	2950 / 10100	2600 / 2450

MVMTS. "	X	Y	Z
THERMAL / SEISMIC	— / —	— / —	— / —



LOCATION PLAN
AREA 1



PROBLEM NO. 200 STRESS NO. ____

ISSUE 1

DATA PT. 347 NUCLEAR CLASS 3

NOTE: 1. All welds for nuclear supports to be visually inspected unless noted otherwise

2. THIS DWG. REPLACES 0-GN02-C024/241 (Q) REV. 2

3. FOR DOCUMENT CLARITY, REV. 0 THRU 2 OMITTED

4. USE ITEMS 1, 2, 3, 6, & 7 FROM 0-GN02-C024/241 (Q) REV. 2

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
△								
4	10/8/84	INC. FCR 1-5530-P, & REV. REF. DWG.	MFT	SA	HDV	KKR	RJ	
3	8/9/83	ISSUED FOR CONSTRUCTION- SEE NOTES 2 & 3. -INC. NCR ISN 8157-P	RA	JED	KKR	TNF	RJ	

SNUPPS

DRAWING NO.
M-16GN02

BECHTEL
GAITHERSBURG

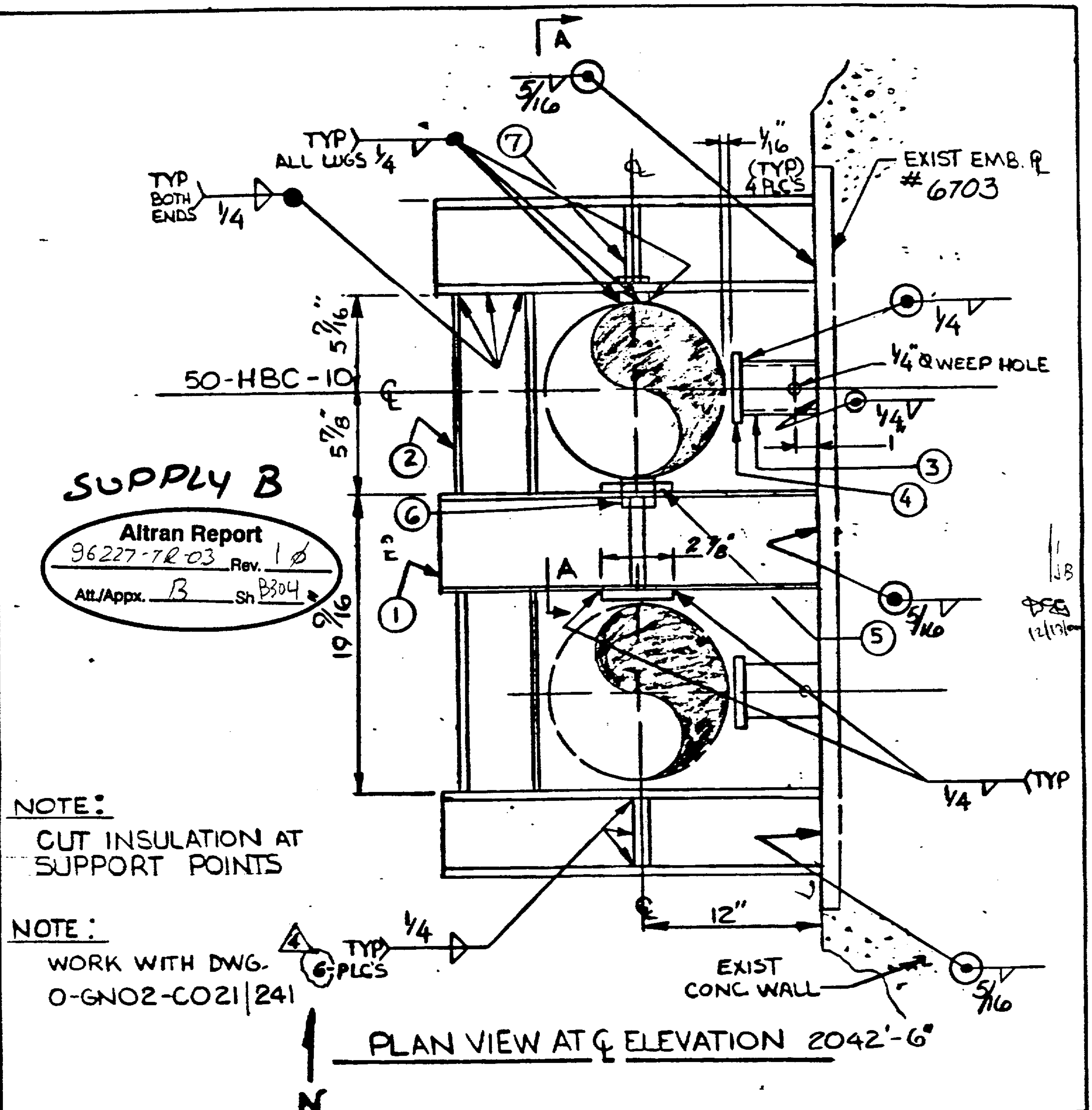
REF. DWGS.
ISO M-03GN02 REV. 7 (4)
PIPE
CONC. C-0C2511 REV 9

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	1-GN02-C024/241 (Q) SHT. 1 OF 3	4

DRAWING APPLICABLE TO UNITS 1

N40821



Altran Report 96227-TR-03 Rev. 1 Ø
Att./Appx. B Sh B304

NOTE:
CUT INSULATION AT SUPPORT POINTS

NOTE:
WORK WITH DWG. 0-GN02-C021|241

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENG'R	APPR
△								
4	9/6/84	INC. FCR 1-5530-P, & REV. REF. DWG.	MEY DA	HDV	KKR	RJ		
3	8/4/83	ISSUED FOR CONSTRUCTION - SEE NOTES 1 & 3. - INC. NCR 1SN 8157-P	RA JED	KKR TAG		RJ		

SNUPPS

DRAWING NO. M-16GN02

BECHTEL GAITHERSBURG

REF. DWGS. ISO M-03GN02 REV. 7 (4)
PIPE
CONC C-0C2511 REV. 9

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	1-GN02-C024/241(Q) SHT 2 OF 3	4

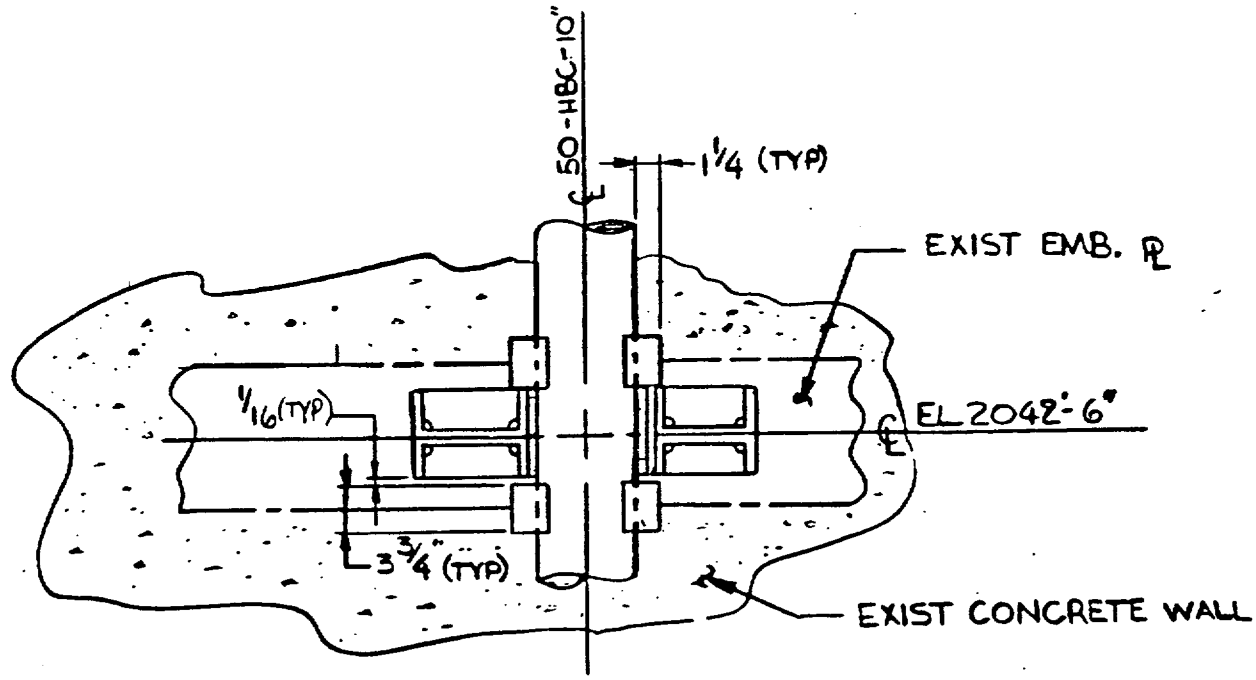
DRAWING APPLICABLE TO UNITS 1

N47049

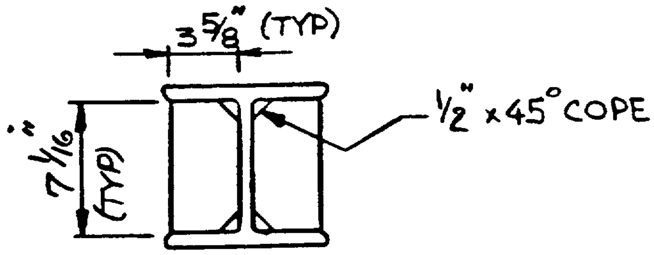
SUPPLY B

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. 5 Sh B305

JB



SECTION A-A



DETAIL ITEM 7

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
5								
4	10/26/84	INC. FCR 1-5530-P, & REV. REF. DWG.	MFY / SA	HDY	KKR	RZ		
3	8/9/83	ISSUED FOR CONSTRUCTION. SEE NOTES 2 & 3. - INC. NCR ISN 8157-P	RM / JED	WB / TAE		RZ		

SNUPPS

DRAWING NO.

M-16GN02

BECHTEL GAITHERSBURG

REF. DWGS.
ISO M-036N02, REV. 7
PIPE
CONC. C-OC2511, REV 9

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	1-GN02-C024/241 (Q) SHT. 3 OF 3	4

N47049

DRAWING APPLICABLE TO UNITS 1

ITEM NO	NO REQ'D	PART NO.	SIZE	DESCRIPTION	MATERIAL
1	1		W8x35	2'-11" LONG (BY M-216 SUPPLIER)	
2	1	211	2	SWAY STRUT, CLAMP MATL.=C.S, W=3'-0 1/8" PIPE O.D.=10 3/4" (BY M-218B SUPPLIER)	

NOTES CONT.

3. THIS DWG. REPLACES 0-GN02-R015/251(Q) REV. 0
4. FOR DOCUMENT CLARITY REV. 0, OMITTED.
5. USE ITEM 2, FROM 0-GN02-R015/251(Q) REV. 0

Return B

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Att./Appx. B Sh B306

JB

FORCES #	FX	FY	FZ
POS.	2050	—	—
NEG.	2852	—	—

MOVES "	X	Y	Z
THERMAL	—	-0.052 / 0.313	-0.024 / 0.143
SEISMIC	—	0.025	0.09

2

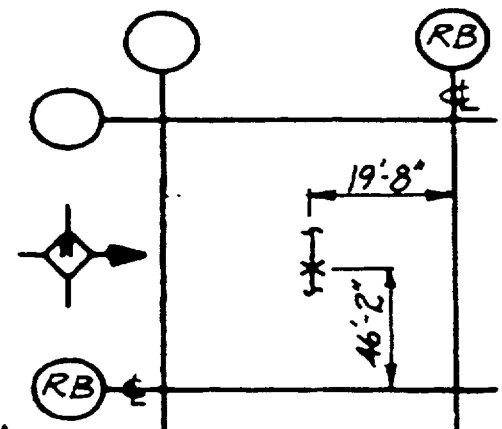
PROBLEM NO. P-201 STRESS NO. ____

ISSUE 5

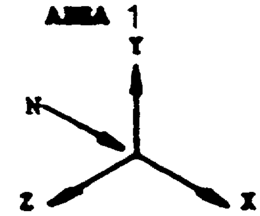
DATA PT. 390 NUCLEAR CLASS 3

NOTE: 1.) All welds for nuclear supports to be visually inspected unless noted otherwise

2.) DELETED



LOCATION PLAN
AREA 1



REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	2	DCZ 8/26/94	REV. TO INC. PMPCN M-798-W-M-16GN02(O)-24-01 PER PMR 03478 CLOSE OUT & AS NOTED. CAD DWG.	KAM	JP	JP	CRG 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

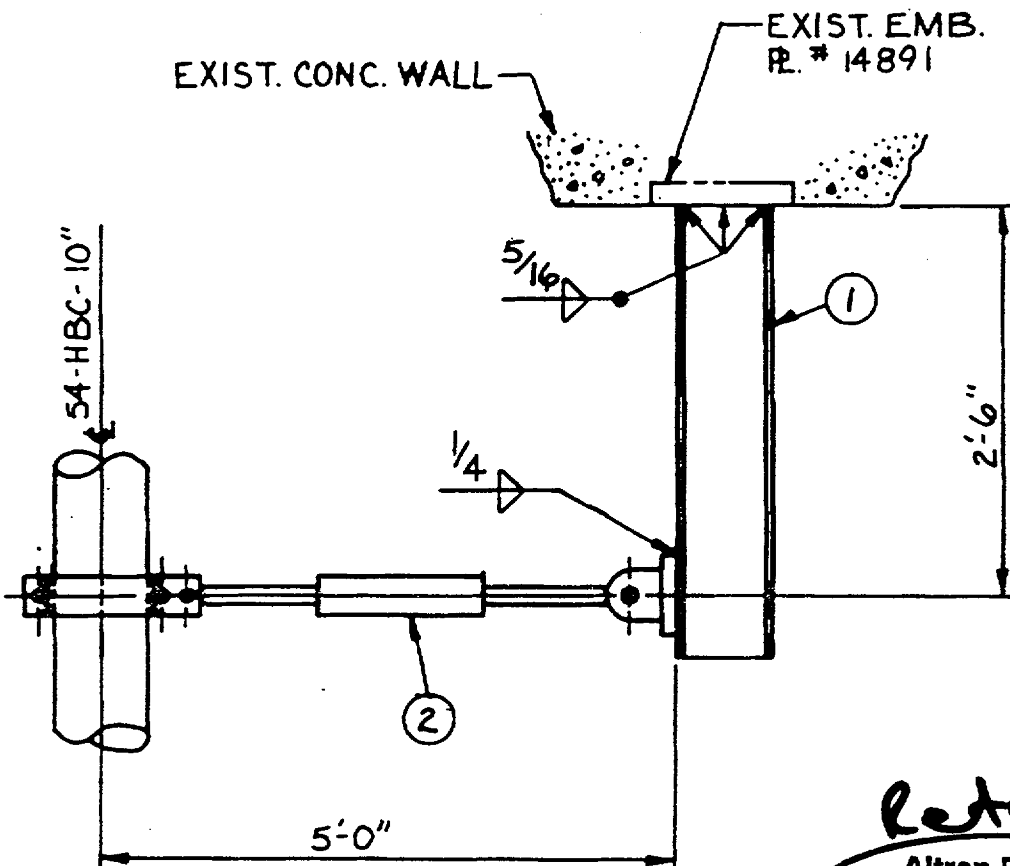
REF. DWGS.
ISO M-13GN02
CONC. C-1C2511
CONC. C-0C2916

DRAWING NO.
M-16GN02

HANGER NO. 1-GN02-R015/251(Q)
REV. 2

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

PAGE 1 OF 2



Return B

Altran Report
96227-TR-03 Rev. Ø1
Att./Appx. B Sh B307

JB
12/13/00

PLAN VIEW AT ℄ EL.2063'-6"

← N

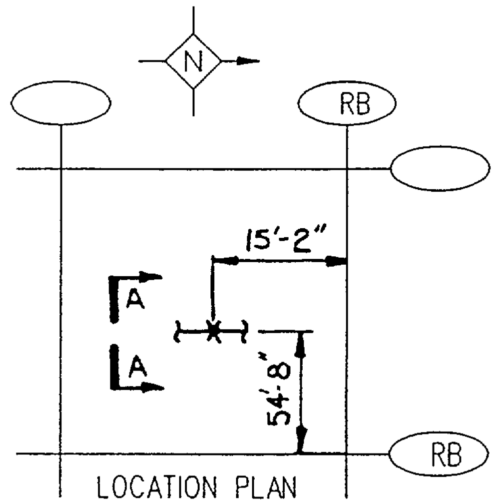
WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN02 CONC. C-1C2511 CONC. C-0C2916	
DRAWING NO. M-16GN02		HANGER NO.		REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN"B"		1-GN02-R015/251(Q) PAGE 2 OF 2		2

ITEM NO	NO REQ'D	PART NO.	SIZE	DESCRIPTION	MATERIAL
1	1	211	C	SWAY STRUT CLAMP MAT'L = C.S., O.D. = 10 3/4"	
			L.H. THRD.	W = 3-3 1/2" (BY M-218B SUPPLIER)	
2	1		W4x13	3'-5" LONG (BY M-216 SUPPLIER)	
3	1		W4x13	5'-8 3/4" LONG	
4	1	211	C	SWAY STRUT CLAMP MAT'L. = C.S., O.D. = 10 3/4"	
				W = 10 5/8" (BY M-218B SUPPLIER)	
5	1		W4x13, 21 5/16" LONG	(BY M-216 SUPPLIER)	
6	1		1/2"x6"x6" BAR		SA-515 GR. 65

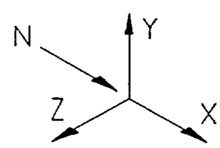
2

FORCES #	FX	FY	FZ
POS.	—	1400	3950
NEG.	—	3200	3800

MVMTS. "	X	Y	Z
TERMAL	-0.115	—	
SEISMIC	0.019 / 0.055	—	—



LOCATION PLAN
AREA



PROBLEM NO. P-201 STRESS NO. —

ISSUE 5

DATA PT. 399 NUCLEAR CLASS 3

NOTES: 1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN02-C028/251(Q). REV.0
3. FOR DOCUMENT CLARITY REV. 0 OMITTED.
4. USE ITEMS 1 THRU 6 FROM 0-GN02-C028/251(Q). REV.0

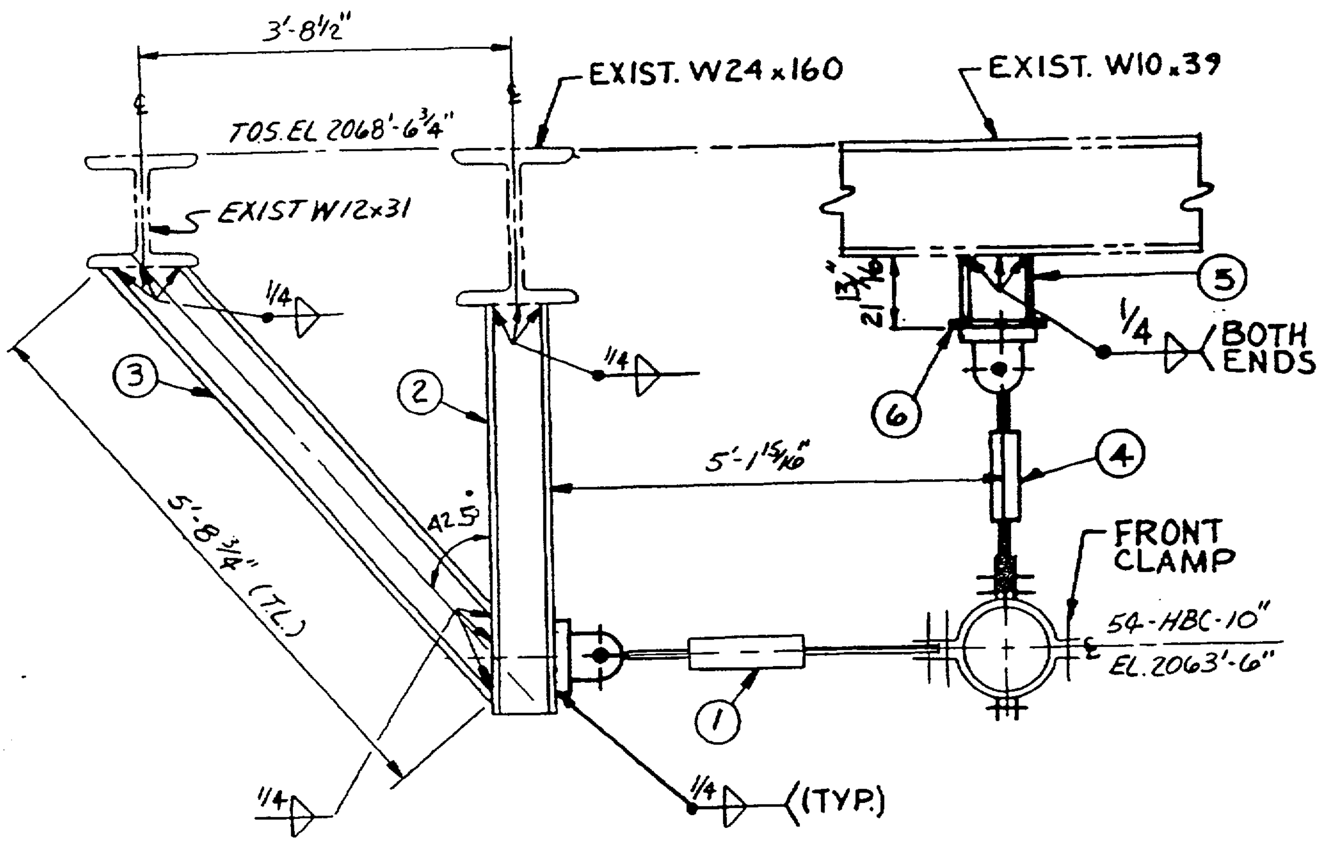
Return B

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B308

1B
DS
12/13/00

M-16GN02	REFERENCE DWGS.	PIPE SUPPORT NO.	
WOLF CREEK NUCLEAR OPERATING CORPORATION	M-13GN02 C-1S2611	C028/251 PAGE 1 OF 2	2 REV.

8 1/2X11 A SIZE



ELEVATION A-A

Return B

Altran Report
96227-TR-03 Rev. ~~0~~ 1
Att./Appx. B Sh. B309

JB
12/13/00

WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN02 PIPE STEEL C-1S2611
DRAWING NO. M-16GN02		HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN"B"		1-GN02-C028/251(Q) PAGE 2 OF 2	1

LEVEL 1 5 1 3 3 3 6 0

DFN-ATS/ga02c028 2.dga
REF DFN-ATS/ga02c028 2.cit

8 1/2X11 A SIZE
PSC-

ITEM NO	NO REQ'D	PART NO	SIZE	DESCRIPTION	MATERIAL
1	2	211	C	SWAY STRUT PIPE OD = 6 5/8"	
				W = 17 1/8" CLAMP MAT'L = C.S.	
				(0) (M-218 B SUPPLIER)	

Return B

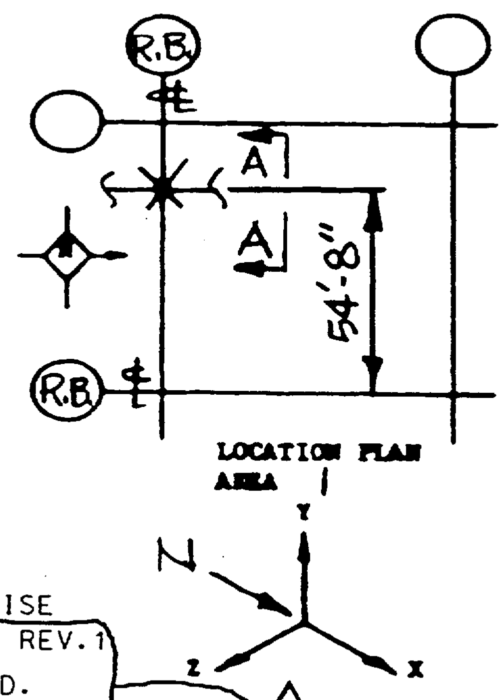
Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B310

1 JB DSB 12/13/00

△2

FORCES #	FX	FY	FZ
POS.	—	600	1700
NEG.	—	2079	1100

MVMTS. "	X	Y	Z
THERMAL	-0.022 / 0.131	—	
SEISMIC	0.053	—	—



PROBLEM NO. P-201 STRESS NO. —

ISSUE 5

DATA PT. 407 NUCLEAR CLASS 3

NOTES:
1. ALL WELDS FOR NUCLEAR SUPPORTS TO BE VISUALLY INSPECTED UNLESS NOTED OTHERWISE
2. THIS DWG. REPLACES 0-GN02-C025/251(Q), REV.1
3. FOR DOCUMENT CLARITY REV. 0 & 1 OMITTED.
4. USE ITEM 1 FROM 0-GN02-C025/251(Q), REV.1

△2

REV ORG	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPVL DATE
	△2	DC2 8/24/94	REV. TO INC. PMPCN M-798-W-M-16GN02(Q)-24-01 PER PMR 03478 CLOSE OUT & AS NOTED. CAD RESTORED.	KAM	RP	RP	PLO 7/26/94

WOLF CREEK
NUCLEAR OPERATING CORPORATION

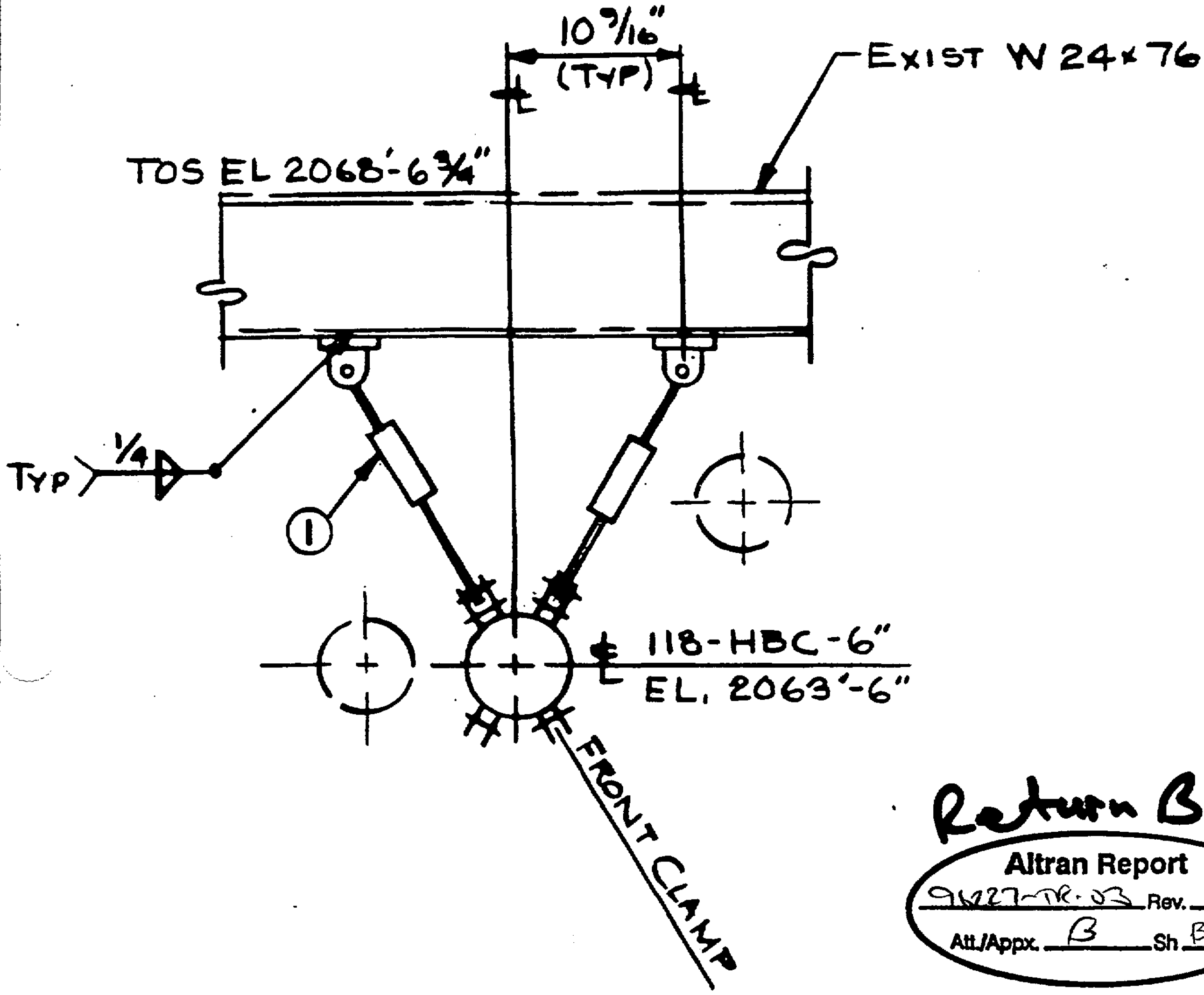
REF. DWGS. ISO M-13GN02 PIPE STEEL C-1S2611

DRAWING NO. M-16GN02

HANGER NO. 1-GN02-C025/251(Q) REV. 2

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

PAGE 1 OF 2



ELEVATION A-A

Return B

Altran Report
96227-TR-03 Rev. Ø1
Att./Appx. B Sh. B311

WOLF CREEK NUCLEAR OPERATING CORPORATION	REF. DWGS.	ISO M-13GN02 PIPE STEEL C-1S2611	
DRAWING NO. M-16GN02		HANGER NO.	REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN"B"		1-GN02-C025/251(Q) PAGE 2 OF 2	2

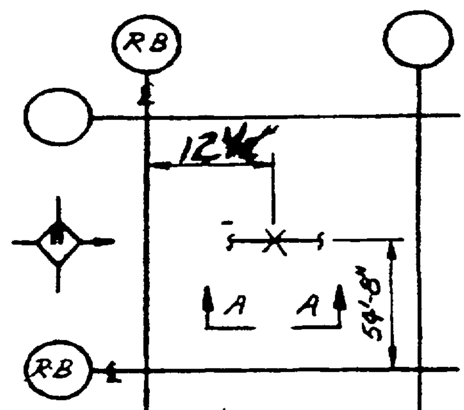
Pg 3 mt 8-15-95

ITEM NO	NO REQ'D	PART NO.	SIZE / DESCRIPTION	MATERIAL
1	2	2540	R11-6 SNUBBER, STROKE = 5", L = 17 1/8", MVMT = 1/4" (C)	
			P-P = 3'-2 3/8" (BY M-218 A SUPPLIER)	
2	1	C.S.	6" SPECIAL RISER CLAMP, C-C = 18", TEMP = 265°	
			O.D. = 6.625, CLAMP MAT'L = C.S. (BY M-218 A SUPPLIER)	
3	2		W6x20 3'-10" LG. (BY M-216 SUPPLIER)	
4	2		W6x20 4'-8 1/2" LG.	
5	2		W8x40 3'-9" LG.	
6	2		1/4"x12"x12" PL	SA 515, GR 65
7	8		1"x1 1/4"x1 1/4" LUG	
8	8		3/8"x 3 5/8"x 7 1/16" PL	

NOTES: 1) THIS DWG REPLACES 0-GN02-R013/251(Q) R/3
2) FOR DOCUMENT CLARITY, REV. 0-3 OMITTED
3) USE ITEMS 1-3 & 5-8 FROM 0-GN02-R013/251(Q) R/3

FORCES #	FX(SNUB)	FY	FZ
POS.	3200	-	-
NEG.	3200	-	-

MVMTS. "	X	Y	Z
THERMAL	-0.025 / 0.148	-0.001	0.001
SEISMIC	-	0.019	0.033



LOCATION PLAN
AREA 1

PROBLEM NO. P-201 STRESS NO. -
ISSUE 5
DATA PT. 409 NUCLEAR CLASS 3

NOTE: All welds for nuclear supports to be visually inspected unless noted otherwise

Return B

Altran Report 96227-TR-03 Rev. 1 Att./Appx. B Sh. B312

JB 11/1/00

REV	CRD	REV	RLSD	DESCRIPTION	DWN	CHK	ENG	APPV'L DATE
	7			REV. PER CCP 06017	JRP			

WOLF CREEK NUCLEAR OPERATING CORPORATION

REF. DWGS. ISO M-13GN02
PIPE
STEEL C-1C2611

DRAWING NO. M-16GN02

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

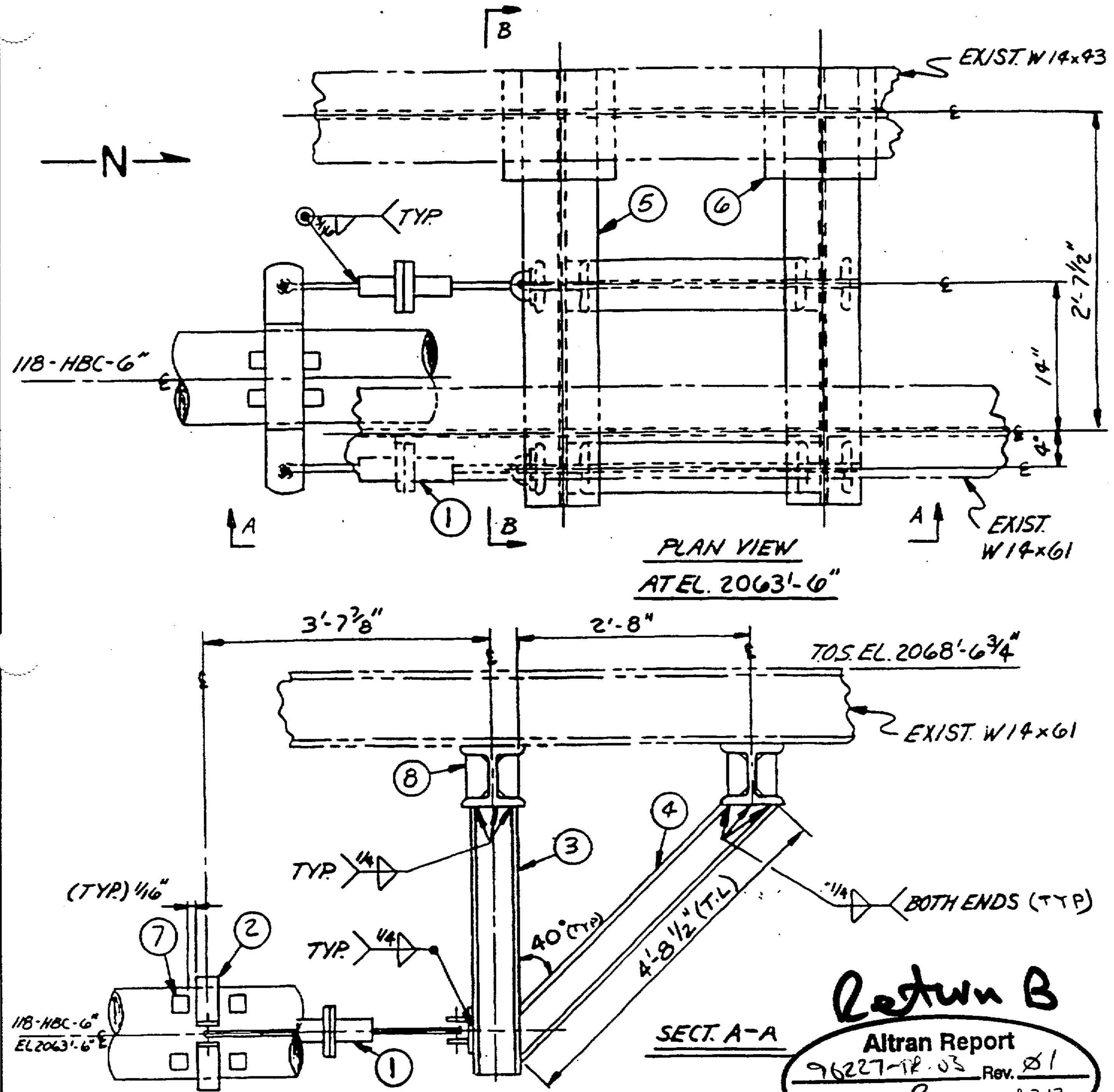
HANGER NO. 1-GN02-R013/251(Q) REV. 7

PAGE 1 OF 3

LEVEL 1 5 1 3 3 3 6 0

DFN-ATS/gn02r013_1.dgn
REF DFN-ATS/gn02r013_1.cit

8 1/2X11 A SIZE
PSC-

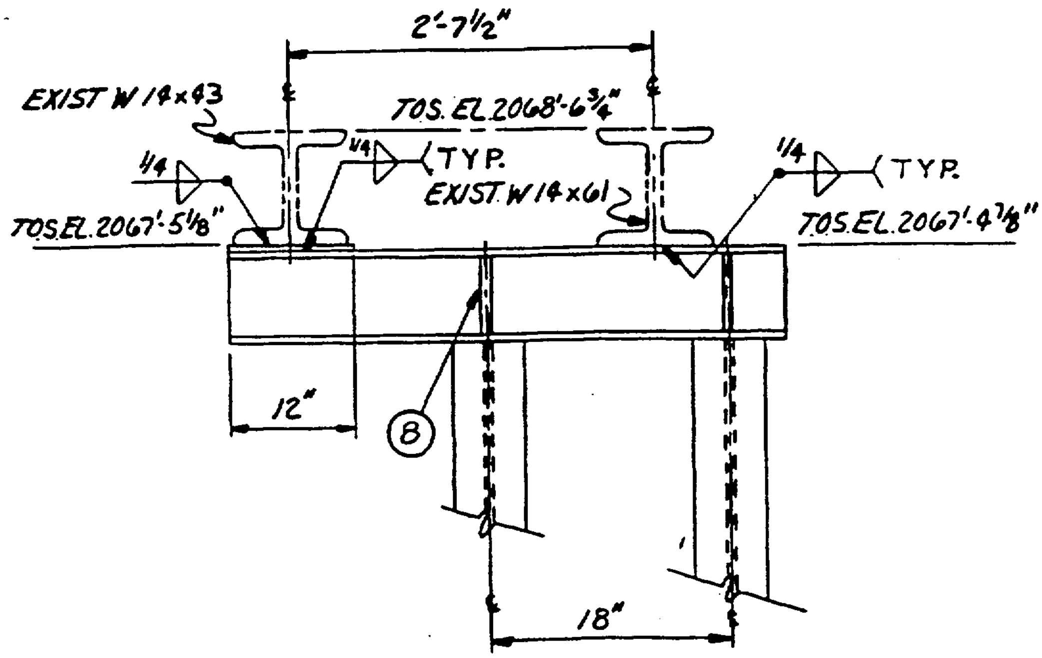


Return B

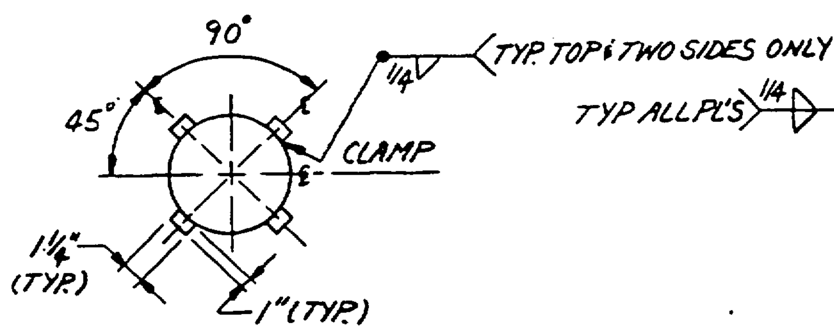
Altran Report
96227-TR-03 Rev. Ø1
Att./Appx. B Sh. B313

JB
12/13/...

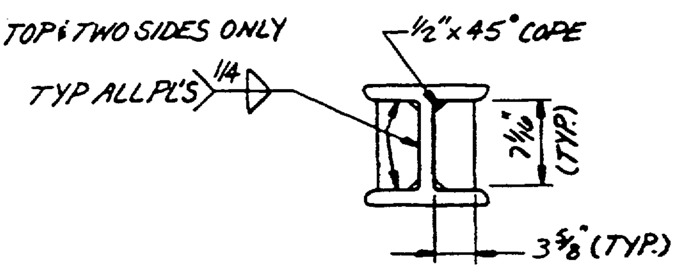
WOLF CREEK NUCLEAR OPERATING CORPORATION		REF. DWGS.	ISO M-13GN02 PIPE STEEL C-1C2611	
DRAWING NO. M-16GN02	-	HANGER NO.		REV.
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"		1-GN02-R013/251(Q) PAGE 2 OF 3		6



SECT. B-B



LUG DETAIL



DETAIL OF ITEM B

Return B

Altran Report
96227-TR-03 Rev. ~~0~~ 1
Att./Appx. B Sh. B314

1B
12/17/00

WOLF CREEK
NUCLEAR OPERATING CORPORATION

DRAWING NO.
M-16GN02
PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

REF. DWGS.
ISO M-13GN02
PIPE
STEEL C-1C2611

HANGER NO. 1-GN02-R013/251(Q)
PAGE 3 OF 3
REV. 6

02/18/98 08:15 ☎781 935 7664 TPG 001/003
FEB-17-1998 15:23 ALTRAN CORP. 1 617 330 1055 P.01/03

fax cover sheet

From cc:
~~TO:~~ Fred Doew / Bill Dunleavy

DATE: 2-17-98

To
~~FROM:~~ Ashwin Patel

ALTRAN CORPORATION
200 HIGH STREET
BOSTON, MA
TEL.: 617-330-1130 x367
FAX: 617-330-1055

TOTAL PAGES

3

MESSAGE:

As per our telephone conversation I am sending you following two pages, please provide @ your earliest convenience.

Thanks,

Ashwin

ALTRAN	
CALC NO. 96227-TR-03	REV. Ø1
ATT. B	SHEET B3 15

1
JB
11/3/00

Pls reference attached part dwg. & load rating

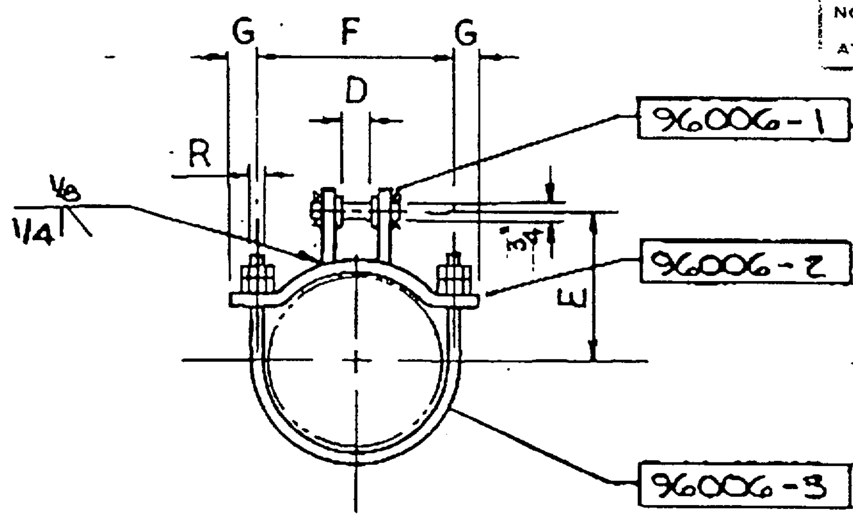
Your sketch is not a 96006, but a part 6525 or 6526 & does not come in 10" size.

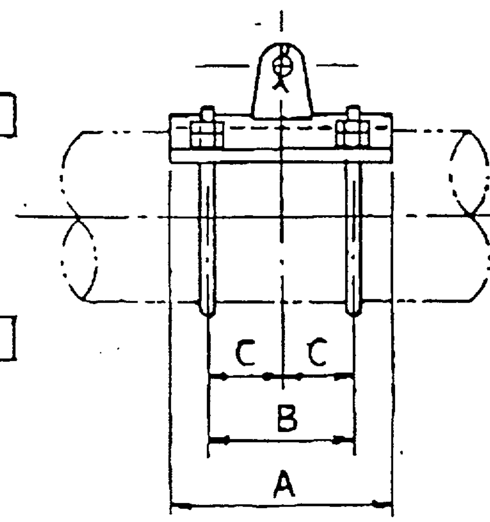
altran Engineering & Management Consultants

OFF AXIS STRUT PIPE CLAMP

3 KIP

ALTRAN
CALC NO. 96227-TR-03 REV. Ø1
ATT. B SHEET B316





PART NO.	A	B	C	D	E	F	G	R	TORQUE FT.-LBS	MIN. PIPE WALL *
96006-3-2"	8	6	3	21/32	5 9/16	2 7/8	1	1/2	15	SCH. 40
2½"	8	6	3	21/32	5 3/4	3 3/8	1	1/2		
3"	8	6	3	21/32	6	4	1	1/2		
4"	8	6	3	21/32	7	5	1	1/2		
6"	8½	6	3	21/32	8	7¼	1¼	5/8	20	
8"	8½	6	3	21/32	9½	9¼	1¼	5/8		
10"	8½	6	3	21/32	11	11½	1¼	3/4	30	
12"	11	8½	4¼	21/32	12	13 5/8	1¼	7/8	35	STD.
14"	11	8½	4¼	21/32	14	14 7/8	1¼	7/8		
16"	11	8½	4¼	21/32	15	16 7/8	1¼	7/8		
18"	11½	8½	4¼	21/32	16	19	1½	1	35	
20"	11½	8½	4¼	21/32	17	21	1½	1		
24"	11½	8½	4¼	21/32	19	25	1½	1		

96006 - 3 - 2½
- PIPE SIZE
- LOAD RATING IN KIPS
- PART NO.

* FOR THINNER PIPE WALL TORQUE AND KIP RATING MUST BE REVIEWED.

REV.	DATE	DESCRIPTION	APP.
1	3-22	ADDED PIN SIZE	
2	12/84	ADDED 24" PIPE SIZE DIM'S	
3	4-10-85	ADDED 2" PIPE SIZE DIM'S	
4			

BERGEN-PATERSON PIPESUPPORT CORP.

DRAWN	CHK'D.	APPVD.	DATE
SJD	ATm	NJN	3-18-83

JOB NO.

DWG. NO. 96006 REV. 3

BP Part no. 2100 SIZE 7

Allowable for P-P 2'-1 1/8"

11,900 #

ALTRAN
CALC NO. 96227-TR-03 REV. Ø1
ATT. B SHEET B3/17

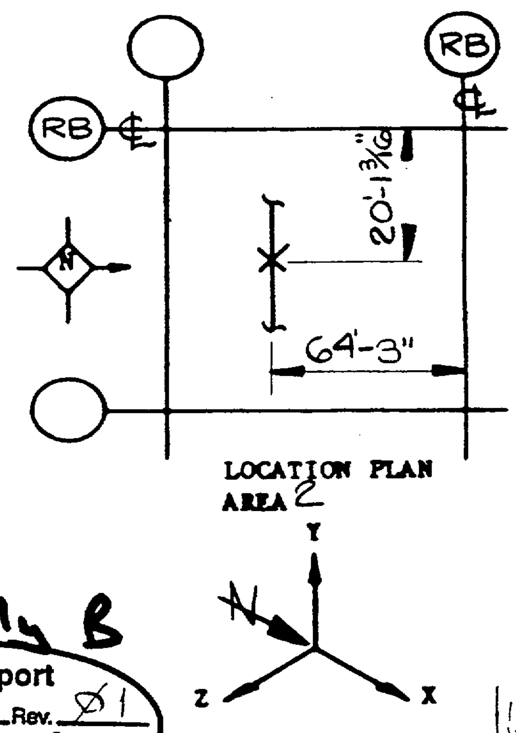
JB

DBE 12/13/00

ITEM NO	NO REQ'D	PART NO	SIZE	DESCRIPTION	MATERIAL
1	1		W6×20	4'-0 3/16" LG. (BY M-216 SUPPLIER)	
2	1		W6×20	3'-1" LG.	
3	1		W6×20	2'-9" LG.	
4	2		W6×20	15 7/16" LG.	
5	1		W6×20	2'-10 3/4" LG.	
6	1		4" PIPE STANCHION SCH. 40	4 3/16" LG.	SA106 GRB
7	1		3/8"×6"×6"	BAR	SA36
8	4		1/4"×2 5/8"×5 7/16"	BAR	SA 36
9	4		1 1/4"×2 1/2"×3 3/4"	LUG	SA515 GR65
10	1		1/2"×3 5/8"×10 5/16"	PLATE	SA515 GR65
11	1		1/2"×3 5/8"×3 3/16"	BAR	SA 36
12	1		1/2"×3 5/8"×19 7/16"	PLATE	SA515 GR65
13	2		∠3×3×3/8	4" LG.	
14	2		W4×13	5'-1 1/4" LG.	

FORCES #	FX	FY	FZ
POS.	3500	1000 △2	6000
NEG.	4250	3550	7850

MVMTS. "	X	Y	Z
THERMAL	/	/	/
SEISMIC	/	/	/



PROBLEM NO. 200

STRESS NO. –

ISSUE 1 △2

DATA PT. 117

NUCLEAR CLASS 3

NOTE: All welds for nuclear supports to be visually inspected unless noted otherwise

Supply B

Altran Report 96227-TR-05 Rev. Ø1
Att./Appx. B Sh. B318

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENG'R	APPR
△								
△2	11/23/81	REV. REF. DWGS., LOADS, MVMT, & ISSUE NO	MT KA	KKR DL	BJ	RL		
△	9/3/81	ISSUED FOR CONSTRUCTION	RV JB					

SNUPPS

DRAWING NO. M-06GN02

BECHTEL GAITHERSBURG

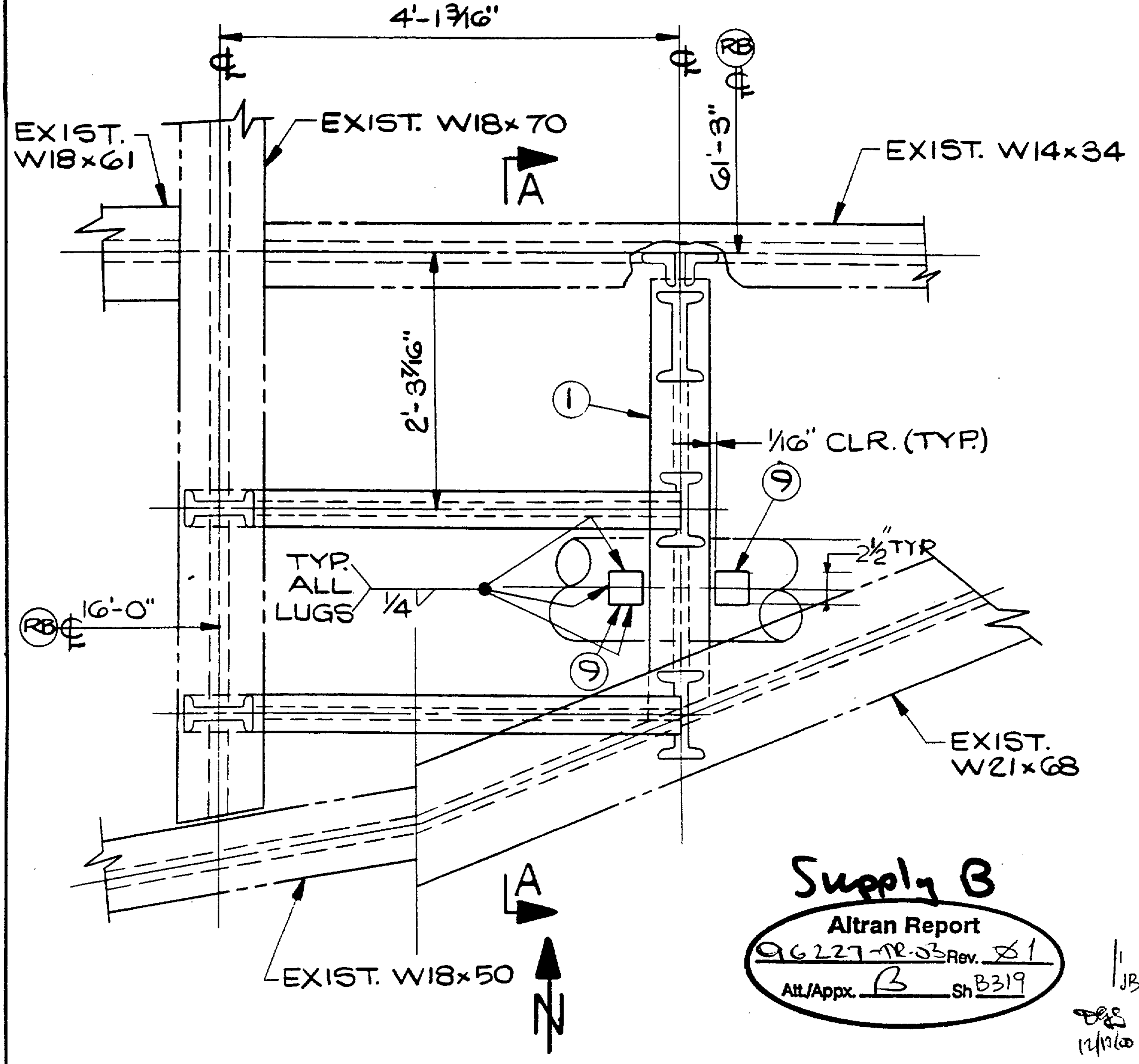
REF. DWGS. ISO M-03GN02 REV 6 △2
PIPE
STEEL C-OS2421 REV 8

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-C010/242(Q) SHT. 1 OF 4	2

N4087

DRAWING APPLICABLE TO UNITS 1 2 3 4 5 6 7 8



Supply B

Altran Report
96227-TR-03 Rev. Ø1
Att./Appx. B Sh B319

JB
DGS
12/13/00

PLAN VIEW AT EL. 2028'-6"

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
△								
△ 2	11/23/81	REV. REF. DWGS.	MT / KA	KKR / DL	BW	RL		
△	7/7/80	ISSUED FOR CONSTRUCTION	RV / JB	VD / BH	DS			

SNUPPS

DRAWING NO.

M-06GN02

BECHTEL

GAITHERSBURG

REF. DWGS.

ISO M-03GN02 REV. 6

PIPE

STEEL C-0S2421 REV. 8

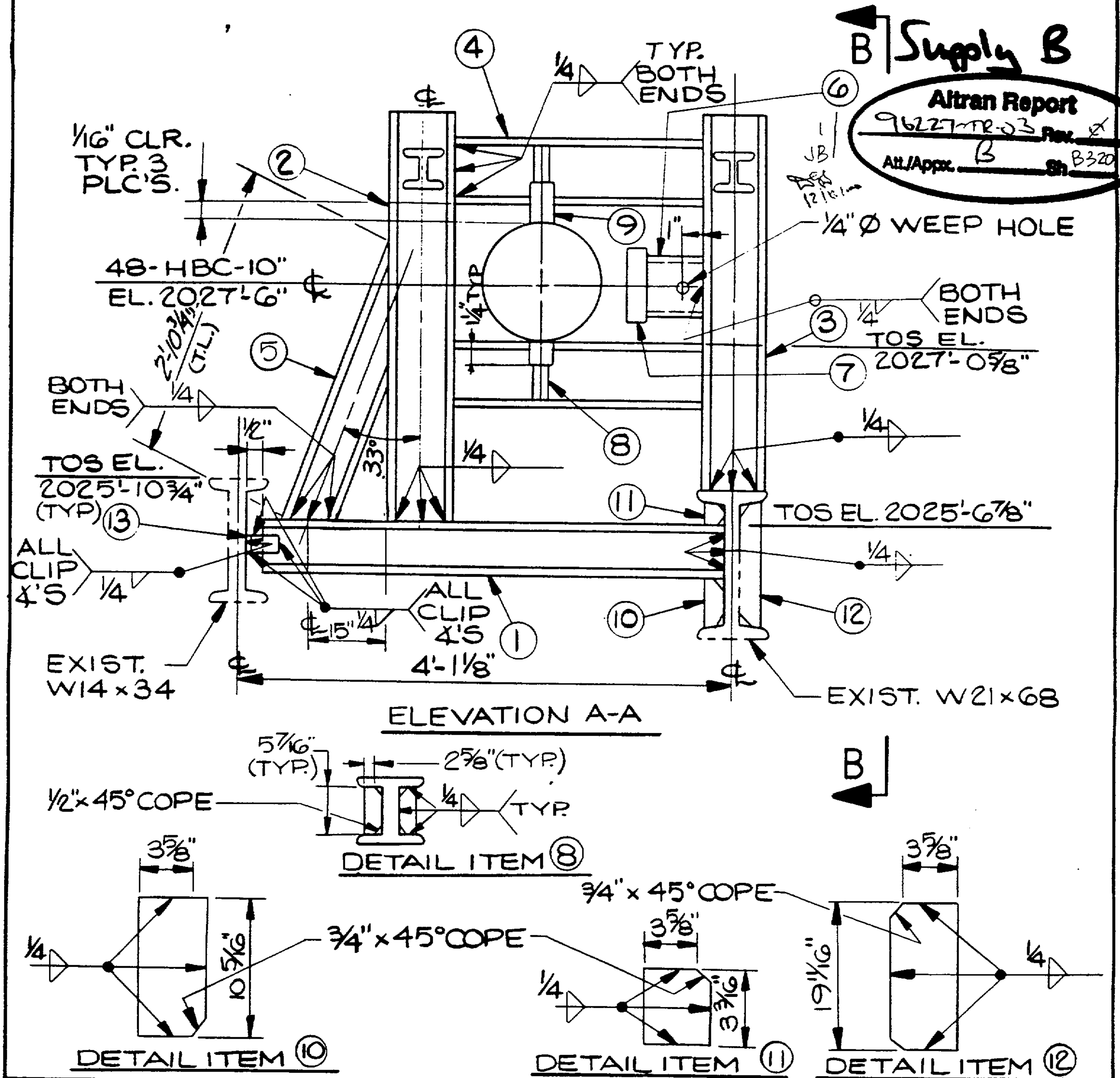
PIPE SUPPORTS

CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"

JOB NO.	HANGER NO.	REV.
10466	0-GN02-C010/242(Q) SHT. 2 OF 4	2

N47049

DRAWING APPLICABLE TO UNITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |



REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
△								
▲	11/23/81	REV. REF. DWGS.	MT / RD	KB	DL / BH	BJ	RJ	
△	9/3/81	ISSUED FOR CONSTRUCTION	JB	VB	DL / BH	JB	JB	3

SNUPPS

DRAWING NO. M-06GN02

BECHTEL GAITHERSBURG

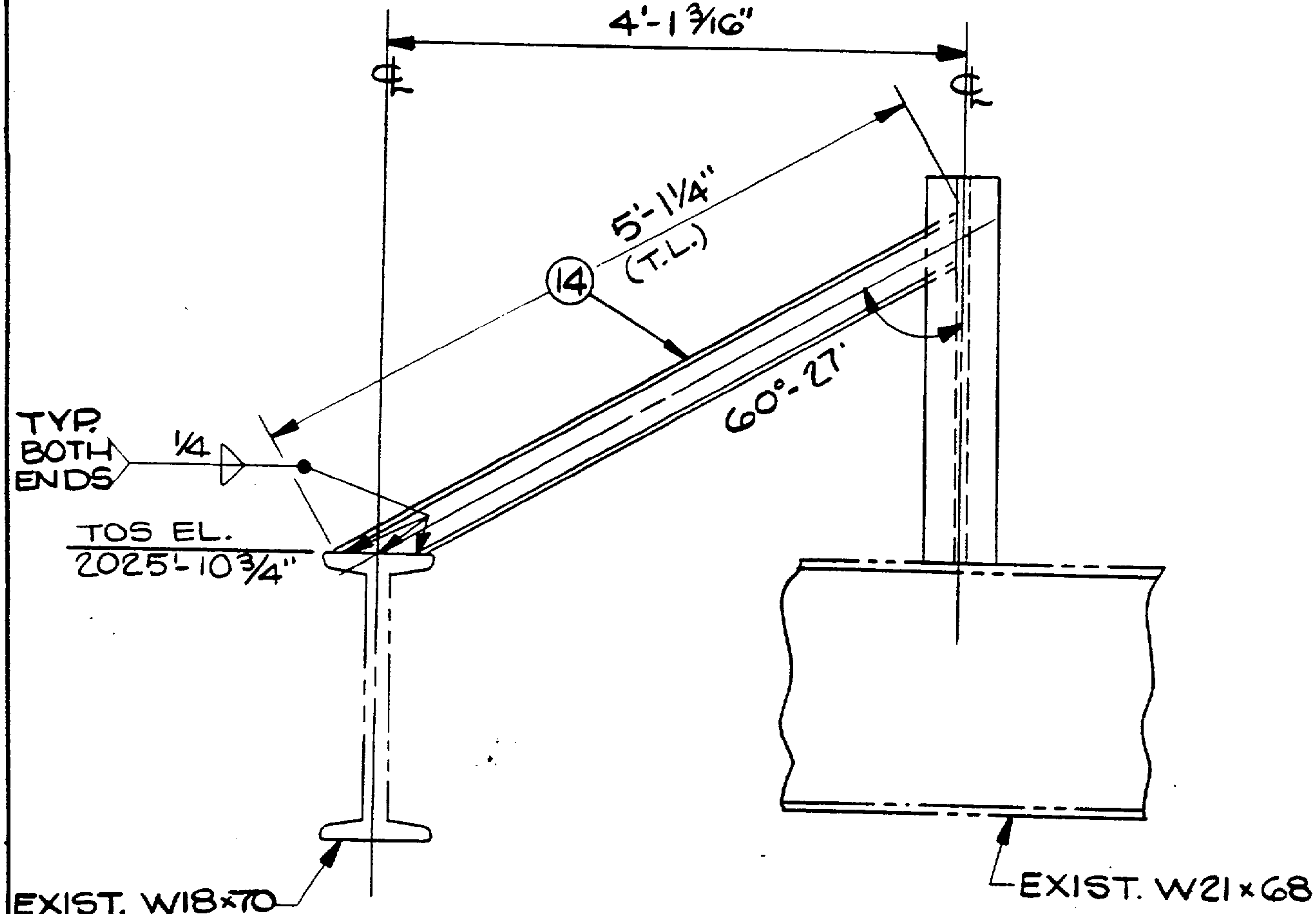
REF. DWGS.: ISO M-03GN02 REV. 6; PIPE ____; STEEL C-0S2421 REV 8 (2)

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	O-GN02-C019/242(Q) SHT. 3 OF 4	2

N47049

DRAWING APPLICABLE TO UNITS	1	2	3	4	5	6	7	8



SECTION B-B

Supply B

Altran Report 96227-TR-03 Rev. 01
Att./Appx. B Sh B321

JB

12/10/?

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENG'R	APPR
3								
2	11/23/81	REV. REF. DWGS.	MT / JA	KAP / DL	BY	RZ		
1	5/3/80	ISSUED FOR CONSTRUCTION	FJB	BH				B

SNUPPS

DRAWING NO.

M-06GN02

PIPE SUPPORTS

CONTAINMENT COOLING SYSTEM

REACTOR BUILDING TRAIN "B"

BECHTEL

GAITHERSBURG

REF. DWGS.

ISO M-03GN02 REV. 6

PIPE ____ (2)

STEEL C-0S2421 REV. 8

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-C010/242(Q) SHT. 4 OF 4	2

N47049

DRAWING APPLICABLE TO UNITS	1	2	3	4	5	6	7	8

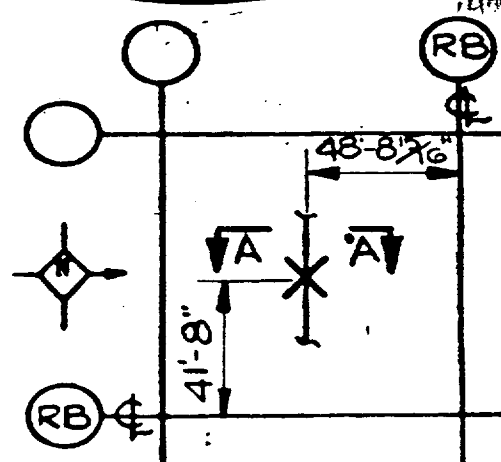
ITEM NO	NO REQD	PART NO	SIZE	DESCRIPTION	MATERIAL
1	1	211	3	SWAY STRUT, PIPE OD= 10¾"	
				W=4'-9 7/16", CLAMP MAT'L = C.S.	
				(BY M-218B SUPPLIER)	
2	1	211	3	SWAY STRUT, PIPE OD= 10¾"	
				W=3'-8 7/16", CLAMP MAT'L = C.S.	

Supply B

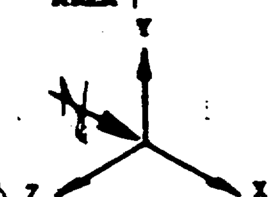
Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B322

FORCES #	FX	FY	FZ
POS.	5500	3200	–
NEG.	5650	6150	–

MVMTS. "	X	Y	Z
THERMAL	–	–	0.027
SEISMIC	–	–	0.164



LOCATION PLAN
AREA 1



PROBLEM NO. 200 STRESS NO. –

ISSUE 1

DATA PT. 40 NUCLEAR CLASS 3

NOTE: 1. All welds for nuclear supports to be visually inspected unless noted otherwise
2. THIS DWG. REPLACES 0-GN02-C002/231 (Q) REV. 1.
3. FOR DOCUMENT CLARITY, REV. 0 & 1 OMITTED
4. USE ITEMS 1 & 2 FROM HGR. 0-GN02-C002/231(Q) REV. 1.

2

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
2	10/8/84	ISSUED FOR CONST. (SEE NOTES 2 & 3) INC. FCR 1-5541-P	MFY BA	HDV	TV	KKR	RL	

SNUPPS

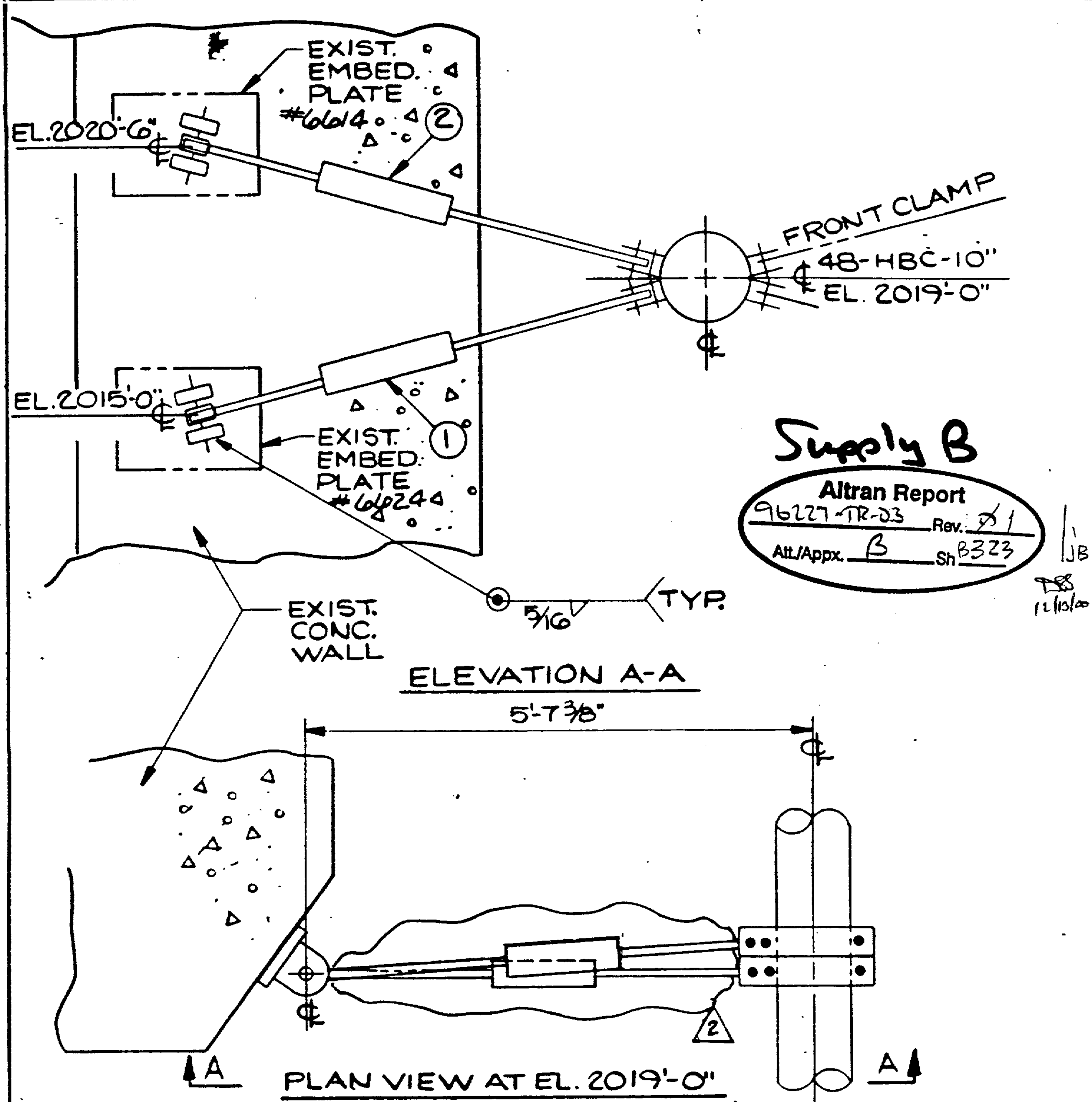
DRAWING NO. M-16GN02

BECHTEL GAITHERSBURG

REF. DWGS. ISO M-03GN02 REV. 7
PIPE
CONC. C-OC2311 REV. 17

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	1-GN02-C002/231(Q) SHT. 1 OF 2	2



Supply B

Altran Report 96227-TR-03 Rev. 01
Att./Appx. B Sh B323

JB 12/10/00

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
2								
1								
0	10/4/84	ISSUED FOR CONST. INC. FCR 1-5541-P	BA	HDV	PV	KKR	RZ	

SNUPPS

DRAWING NO. M-16GN02

BECHTEL GAITHERSBURG

REF. DWGS. ISO M-03GN02 REV. 7; PIPE; CONC. C-0C2311 REV. 17

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	1-GN02-C002/231 (Q) SHT. 2 OF 2	2

N47049

DRAWING APPLICABLE TO UNITS 1

NC	REQ'D	NO	SIZE	DESCRIPTION	MATERIAL
1	1		W4×13	5'-3 3/8" LG. (BY M-216 SUPPLIER)	
2	1		W4×13	4'-11" LG.	
3	1	211	1	SWAY STRUT, PIPE O.D = 10 3/4" W = 13 1/8", CLAMP MAT'L. = C.S. (BY M-218B SUPPLIER)	
4	1		W 8×40,	4'-8 9/16" (BY M-216 SUPPLIER)	
5	1		W 8×40,	4'-1 7/8" LG.	
6	4		PL 3/8"×6 7/16"×5 1/2"		SA-515 GR.65
7	1		W 4 × 13,	2'-8 3/8" LONG △3	△3
8	2		PL 3/8"×6 7/16"×2 1/4"		SA-515 GR.65

Supply B

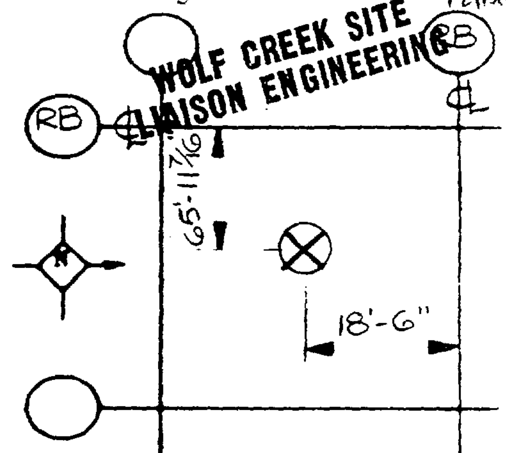
Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B324

RECEIVED
JUN 20 1983
WOLF CREEK SITE
LIAISON ENGINEERING

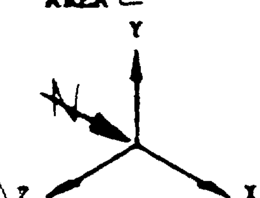
JB
DBS 12/1/00

FORCES ⇄ POS. / NEG.	FX	FY	FZ
POS.	7750	—	—
NEG.	5600	—	—

MVMTS. THERMAL / SEISMIC	X	Y	Z
THERMAL	—	-0.036	0.222
SEISMIC	—	0.177	0.233



LOCATION PLAN
AREA 2



PROBLEM NO. 200 STRESS NO. —

ISSUE 1

DATA PT. 177 NUCLEAR CLASS 3

NOTE: 1. All welds for nuclear supports to be visually inspected unless noted otherwise
2. THIS DRAWING REPLACES 0-GN02-R008/242(Q) REV.2 △3
3 FOR DOCUMENT CLARITY-REVISION 0-2 OMITTED.
4 USE ITEMS 1-5 & 7 FROM HGR. 0-GN02-R008/242(Q) REV.2

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APP'D
△								
△								
△3	4/5/83	ISSUED FOR CONSTR. SEE NOTES 2-4, INC. FCR 1-2567P R/1	AS EHB				RI	

SNUPPS

DRAWING NO. M-16GN02

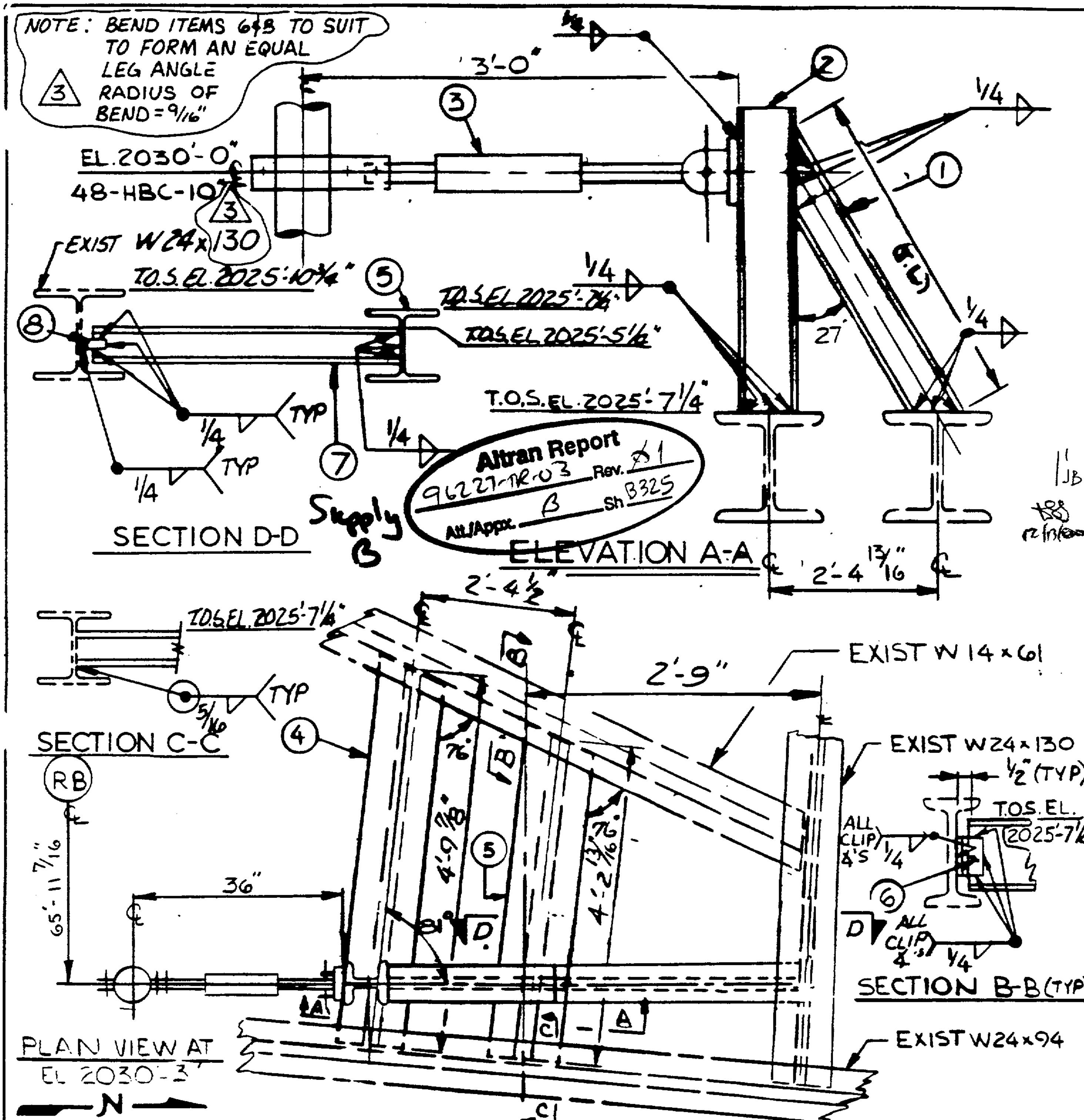
BECHTEL GAITHERSBURG

REF. DWGS. ISO M-03GN02 REV 7
PIPE
STEEL C-0S2421 REV 8

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	1-GN02-R008/242(Q) SHT. 1 OF 2	3

DRAWING APPLICABLE TO UNITS 1



REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
3	5/25/83	ISSUED FOR CONSTR. SEE NOTES 2-4, INC FCR1-2567P R/1	AS					

SNUPPS	GAITHERSBURG	REF. DWGS. ISO M-03GN02 REV. 7
DRAWING NO. M-16GN02		PIPE
		STEEL C-0S2421 REV 8

PIPE SUPPORTS	JOB. NO.	HANGER NO.	REV.
CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"	10466	1-GN02-R008/242(Q) SHT. 2 OF 2	3

N47049

DRAWING APPLICABLE TO UNITS 1

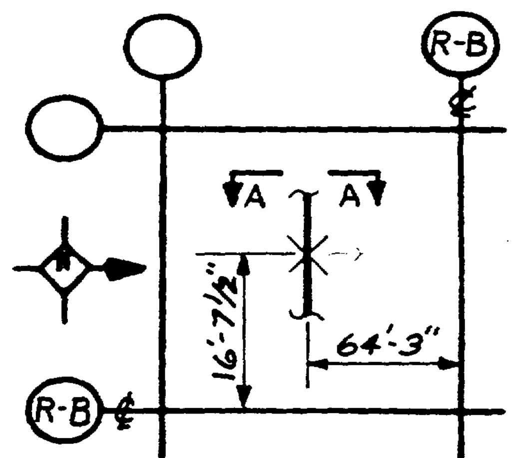
ITEM NO	NO REQ'D	PART NO.	SIZE	DESCRIPTION	MATERIAL
1	1	211	2	SWAY STRUT O.D.=10¾" W=16½"	
				(BY M-218B SUPPLIER)	
2	1	211	2	SWAY STRUT O.D.=10¾" W=16½"	
	1		W4×13, 11" LG.	(BY M-216 SUPPLIER)	

Supply B

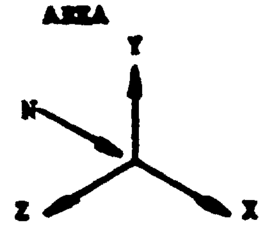
Altran Report
96227-TR-03 Rev. 01
Att./Appx. B Sh B326

FORCES #	FX	FY	FZ
POS.	1850	1700	—
NEG.	1800	4400	—

MVMTS. "	X	Y	Z
THERMAL	—	—	-0.044
SEISMIC	—	—	0.193



LOCATION PLAN
AREA



PROBLEM NO. 200 STRESS NO. —

ISSUE 1

DATA PT. 85 NUCLEAR CLASS 3

NOTE: 1. All welds for nuclear supports to be visually inspected unless noted otherwise

3
2. THIS DWG REPLACES 0-GN02-C006/231(Q) REV. 2
3. FOR DOCUMENT CLARITY REV. 0 TO 2 OMITTED
4. USE ITEMS 1 TO 3 FROM 0-GN02-C006/231 (Q) REV. 2

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
3	8/9/83	ISSUED FOR CONSTRUCTION (SEE NOTES 2 & 3) INC NCR ISN-7897-PW	RP					

SNUPPS

DRAWING NO.
M-16GN02

BECHTEL
GAITHERSBURG

REF. DWGS.
ISO M-03GN02 REV. 7
PIPE
CONC. C-0C2913 REV. 20

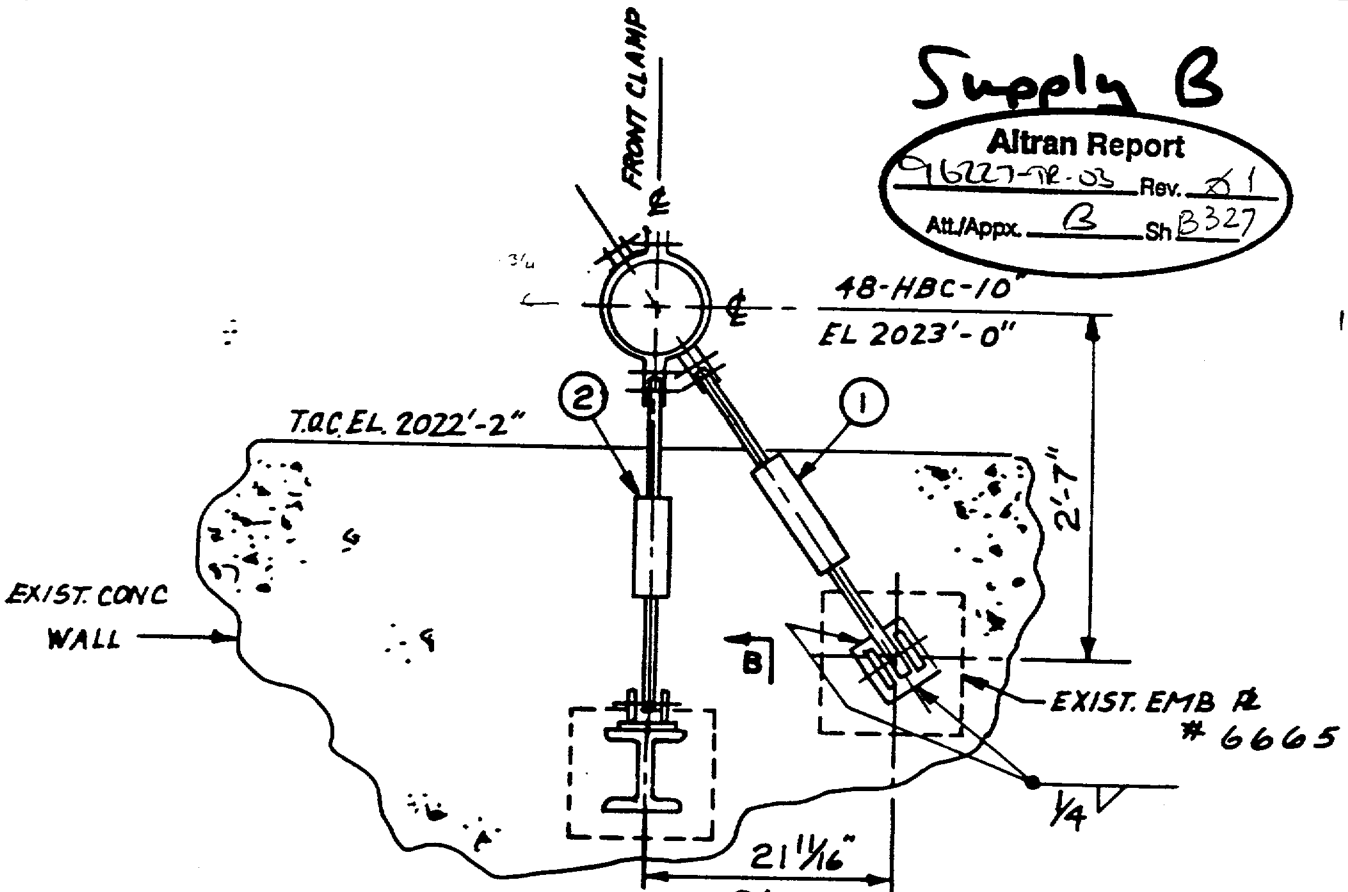
PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BLDG. TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	1-GN02-C006/231(Q) SHEET 1 OF 2	3

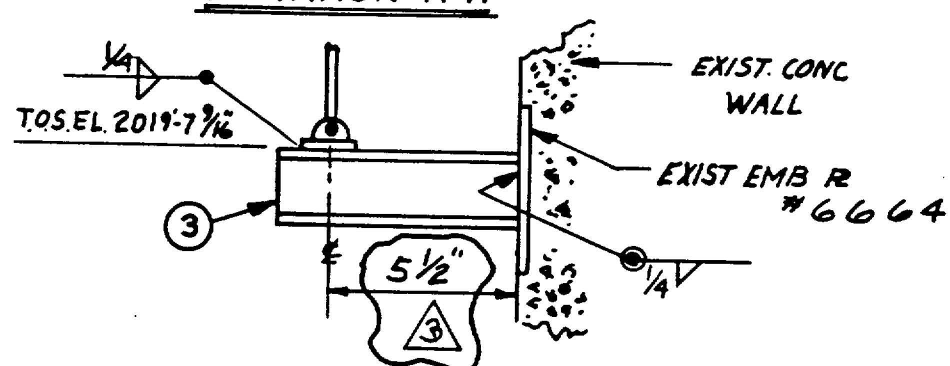
36069 K&E 19-1154

Supply B

Altran Report 96227-TR-03 Rev. 01
Att./Appx. B Sh B327



ELEVATION A-A



SECT. B-B

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
△								
△								
3	8/4/83	ISSUED FOR CONSTRUCTION (SEE NOTES 2 & 3) INC. NCR ISN-7897-PW	RP AR	[illegible]	[illegible]	RJ		

SNUPPS

DRAWING NO. M-16GN02

PIPE SUPPORTS

CONTAINMENT COOLING SYSTEM
REACTOR BLDG. TRAIN "B"

BECHTEL GAITHERSBURG

REF. DWGS. ISO M-03GN02 REV. 7
PIPE
CONC. C-0C2913 REV. 20

JOB. NO. 10466

HANGER NO. 1-GN02-C006/231(Q)
SHEET 2 OF 2

REV. 3

D-1045

DRAWING APPLICABLE TO UNITS 1

ITEM NO	NO REQ'D	PART NO	SIZE	DESCRIPTION	MATERIAL
1	1	2100	R/2-7 SWAY STRUT P-P=3'-3 1/4" (BYM-218A SUPPLIER)		
2	1	2100	R/2-7 SWAY STRUT P-P=2'-7 1/4"		
3	2	2600-7	R/1 - 10" PIPE CLAMP		
4	2 (3)		1/2" x 4 3/4" x 12 5/8" PLATE (BY M-216 SUPPLIER)		SA-515 GR. 65

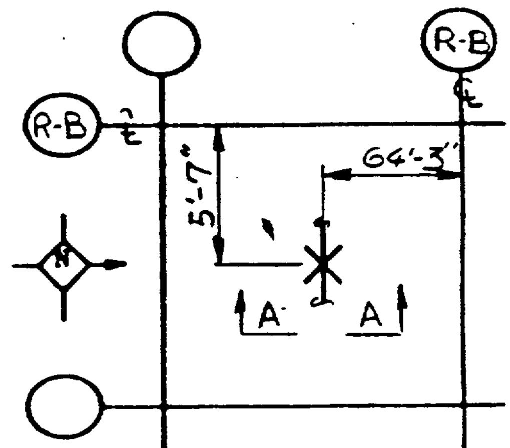
Supply B

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B328

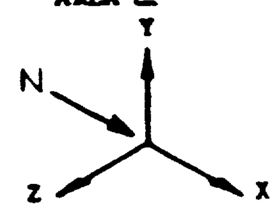
JB
DB 11/13/

FORCES #	FX	FY	FZ
POS.	1900	1250	/
NEG.	1950	2950	/

MVMTS. "	X	Y	Z
THERMAL	/	/	-0.021
SEISMIC	/	/	0.197



LOCATION PLAN
AREA 2



PROBLEM NO. 200 STRESS NO. ______

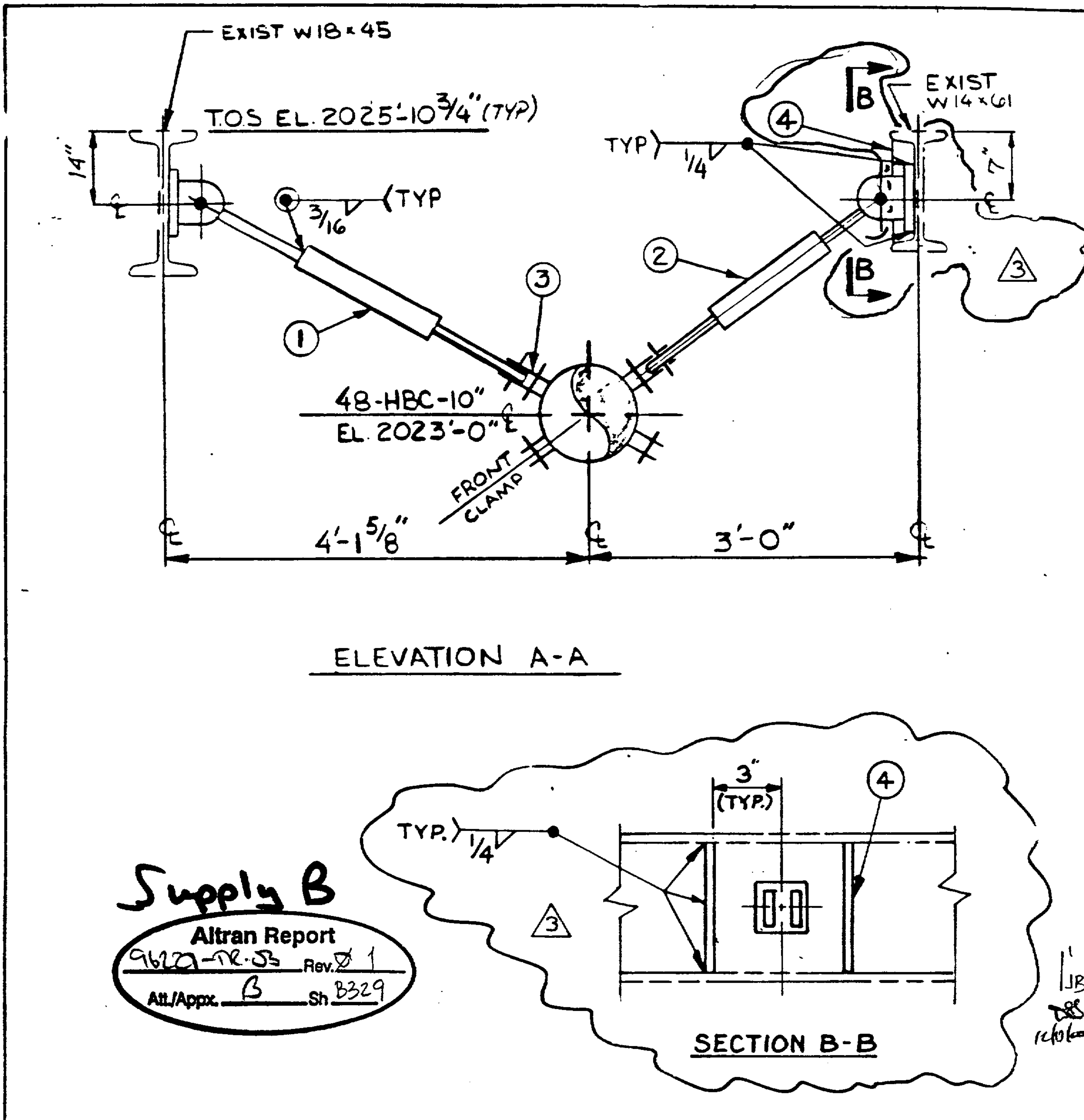
ISSUE 1

DATA PT. 100 NUCLEAR CLASS 3

NOTE; 1. All welds for nuclear supports to be visually inspected unless noted otherwise
2. THIS DRAWING REPLACES 0-GN02-C008/232 (Q) REV. 1
3. FOR DOCUMENT CLARITY-REVISIONS 0 & 1 OMITTED.
4. USE ITEMS 1-3 FROM HGR. 0-GN02-C008/232 (Q) REV. 1

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APP
3	10/4/84	INC. FCR 1-5386-P	SA	DK/SCP	KKR	RZ		
2	5/25/83	ISSUED FOR CONSTR., SEE NOTES 2-4, INC. FCR 1-2527 P & ADDED ITEM 4 PER CIVIL REQUEST	AS/RNB	DK/PH		RZ		

SNUPPS	BECHTEL GAITHERSBURG	REF. DWGS.	ISO M-03GN02 REV 7 PIPE ______ STEEL C-0S2421 REV 8
DRAWING NO. M-16GN02			
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN B	JOB. NO. 10466	HANGER NO. 1-GN02-C008/232(Q) SHT 1 OF 2	REV 3



Supply B

Altran Report 96229-TR-03 Rev. Ø 1
Att./Appx. B Sh B329

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
3	10/6/84	INC. FCR 1-5386-P	SF	BCP	KKR	RZ		
2	5/25/83	ISSUED FOR CONSTR., SEE NOTES 2-4, INC FCR 1-2527P & ADD ITEM 4 PER CIVIL REQUEST	AS RHB	PH		RZ		

SNUPPS

DRAWING NO. M-16GN02

BECHTEL GAITHERSBURG

REF. DWGS. ISO M-03GN02 REV 7; PIPE ____; STEEL C-0S2421 REV 8

PIPE SUPPORTS

CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN B

JOB. NO.	HANGER NO.	REV.
10466	1-GN02-C008 SHT 2 OF 2	3

DRAWING APPLICABLE TO UNITS 1

N47049

NO	NO REQ'D	PART NO.	SIZE	DESCRIPTION	MATERIAL
1	1	211	"C"	SWAY STRUT, PIPE O.D.=10 3/4" CLAMP MAT'L=C.S. W=10 5/8 (BY M-218B SUPPLIER)	
2	2			W4X13 17" LONG (BY M-216 SUPPLIER)	
3	1	211	"Z"	SWAY STRUT PIPE O.D.=10 3/4" CLAMP MAT'L=C.S. W=11" (BY SUPPLIER M-218B)	

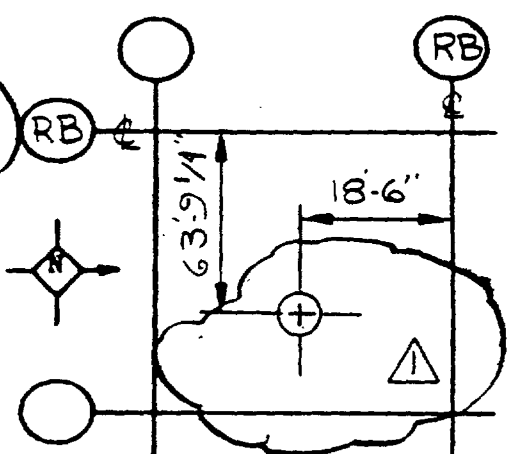
Supply B

Altran Report
96227-TR-03 Rev. Ø1
Att./Appx. B Sh B330

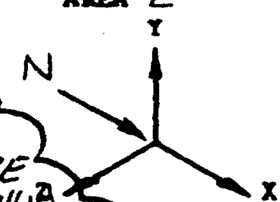
JB
DBS 12/13/00

FORCES #	FX	FY	FZ
POS.	4050	———	3350
NEG.	4750	———	3750

MVMTS. "	X	Y	Z
THERMAL	———	-0.028	———
SEISMIC	———	0.169	———



LOCATION PLAN
AREA 2



PROBLEM NO. 200 STRESS NO. ______

ISSUE 1

DATA PT. 187 NUCLEAR CLASS 3

NOTE: 1) All welds for nuclear supports to be visually inspected unless noted otherwise.

2) ONE OF THE ITEM # 1's OF THIS SUPPORT IS TO BE USED AS ITEM # 4 FOR GN02-C028/251 (FOR UNITS 1 & 2 ONLY)

3) ITEM #3 FOR THIS SUPPORT IS TO COME FROM ITEM #1 OF SUPPORT GN02-C023/251 (FOR UNITS 1 & 2 ONLY)

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
1	11/23/81	REV. REF. DWGS, LOADS, MVMTS, ISSUE NO, ITEM 1, LOC PLAN, ADD ITEM 3 & NOTES	MT	KA				
0	5/3/78	ISSUED FOR CONSTRUCTION	DBS	CEW				

SNUPPS

DRAWING NO.
M-06GN02

BECHTEL GAITHERSBURG

REF. DWGS.
ISO M-03GN02 REV 6
PIPE ______
STEEL C-0C2511 REV 9

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	O-GN02-R006/252(Q) SHT 1 OF 2	1

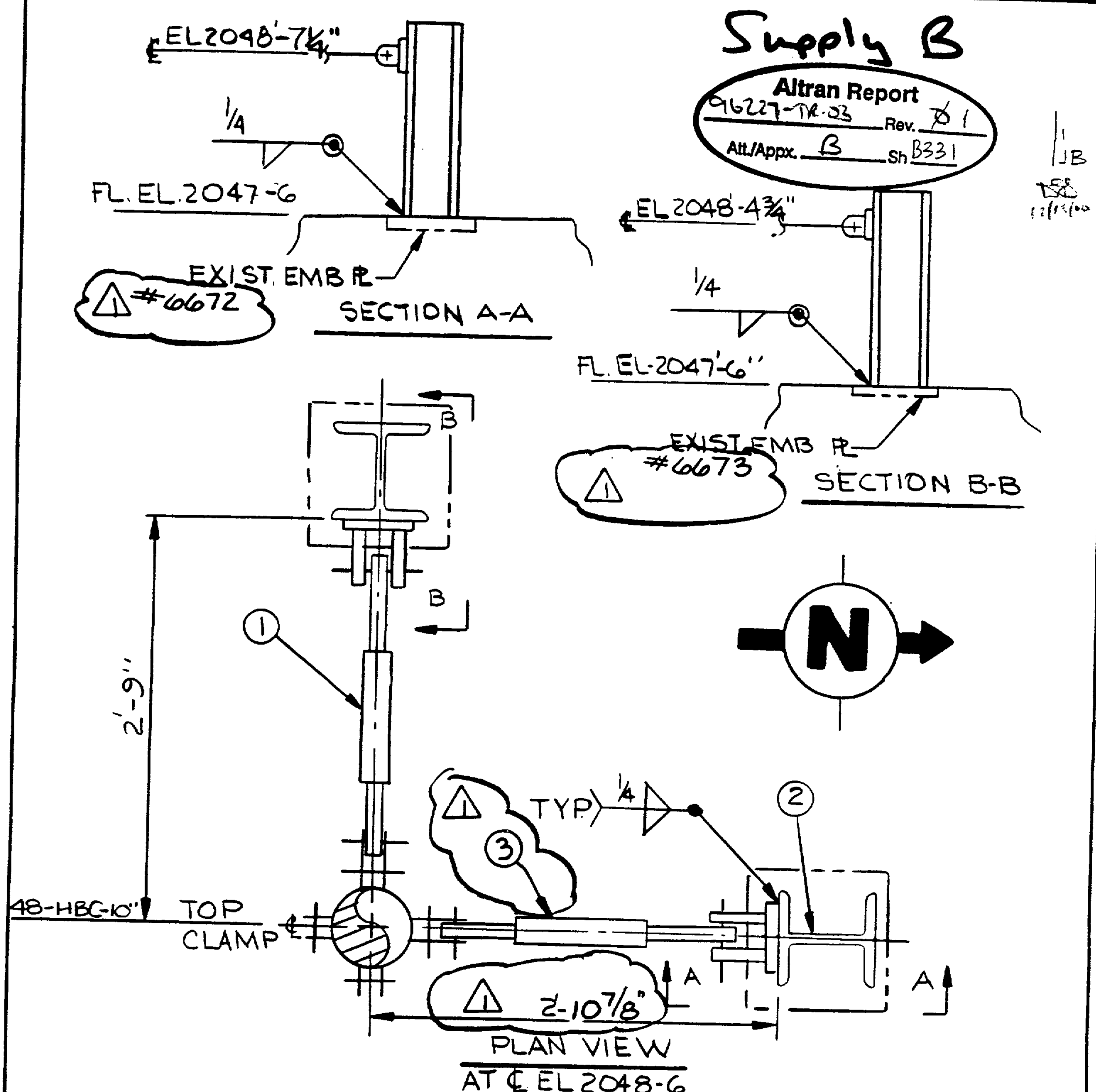
N40821

DRAWING APPLICABLE TO UNITS 1 2 3 4 5 6 7 8

Supply B

Altran Report 96227-TR-03 Rev. ~~0~~ 1
Att./Appx. B Sh B331

JB 11/13/00



REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENG'R	APPR
2								
1	11/23/81	REV. REF. DWGS., DIMENSION, ADD ITEM 3, & EXIST. EMB. PL NO	MT	KA / KKR	VZDL	BJ	RJ	
0	8/3/78	ISSUED FOR CONSTRUCTION	ZG	CEW	VZ / BU			

SNUPPS

DRAWING NO.

M-06GN01

PIPE SUPPORTS

CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

BECHTEL
GAITHERSBURG

REF. DWGS.
ISO M-03GN02 REV 6
PIPE
STEEL COC2511 REV 9

JOB. NO.	HANGER NO.	REV.
10466	O-GN02-R006/252(Q) SHT 2 OF 2	1

DRAWING APPLICABLE TO UNITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

N49846

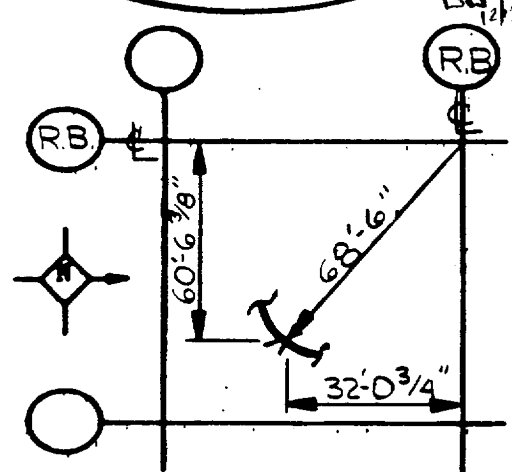
ITEM NO	NO REQ'D	PART NO.	SIZE / DESCRIPTION	MATERIAL
1.	1		W8X24 4'-7" LONG (BY M216 SUPPLIER)	
2	2		W4X13 20" LONG	
3	2		3/8"X2 7/8 X 7 1/16" PLATE	SA515 GR65
4	2		1/2" X 4" X 19 3/16" PLATE	SA-515, GR65

Supply B

Altran Report 96227-TR-03 Rev. 0 1
Att./Appx. B Sh B332

FORCES #	LATERAL	FY	FZ
POS.	1800	—	—
NEG.	3100	—	—

MVMTS. "	X	Y	Z
THERMAL	0.074	-0.028	0.039
SEISMIC	0.060	0.144	0.037



LOCATION PLAN
AREA 2

PROBLEM NO. 200 STRESS NO. ____

ISSUE 1

DATA PT. 170 NUCLEAR CLASS 3

NOTE: 1 All welds for nuclear supports to be visually inspected unless noted otherwise
2 THIS DWG REPLACES 0-GN02-R004/242 (Q) REV. 2
3. FOR DOCUMENT CLARITY, REV. 0 THRU 2 OMITTED
4. USE ITEMS 2 THRU 4 FROM 0-GN02-R004/242(Q) REV. 2

REV.	DATE	REVISIONS	BY	CH'K	DESGN SUPVR	ENG'R	PROJ. ENG'R	APPR
△								
△								
3	8/9/83	ISSUED FOR CONSTRUCTION- SEE NOTES 2 & 3. INC. NCR #ISN 8687 PW	WDV JED	RA THE	RO	RJ		

SNUPPS

DRAWING NO. M-16GN02

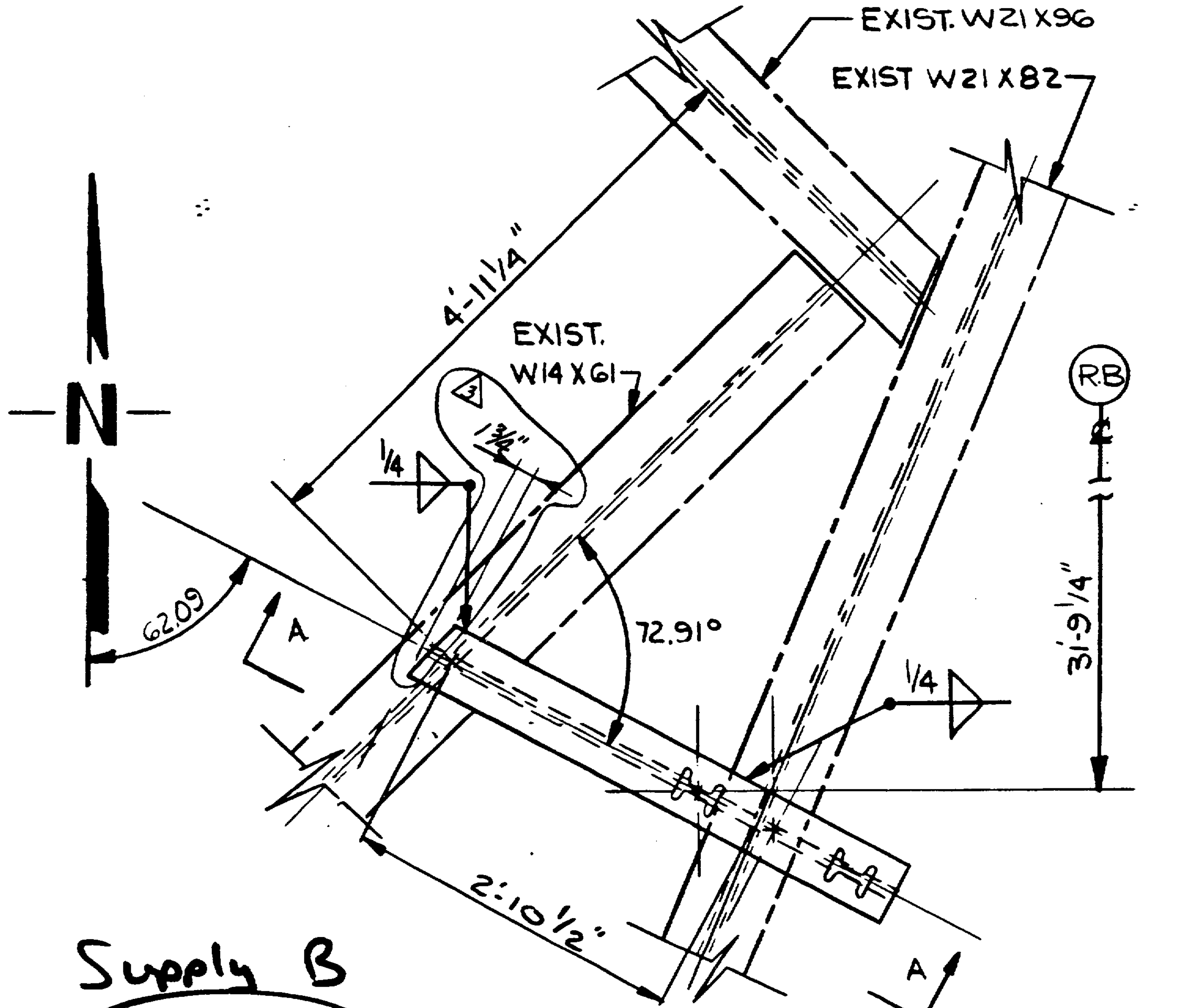
BECHTEL GAITHERSBURG

REF. DWGS. ISO M-03GN02 REV 7
PIPE ____
STEEL C-0S2421 REV 8

PIPE SUPPORTS

CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	1-GN02-R004/242 (Q) SHT 1 OF 3	3



Supply B

Altran Report
9627-TR-03 Rev. Ø1
Att./Appx. B Sh B333

PLAN VIEW
AT EL 2026'-7"

1'JB
[initials] 1/13/00

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
△								
△								
3	8/9/85	ISSUED FOR CONSTRUCTION – SEE NOTES 2 & 3, - INC. NCR ISN 8687-PW						

SNUPPS

DRAWING NO.
M-16GN02

BECHTEL
GAITHERSBURG

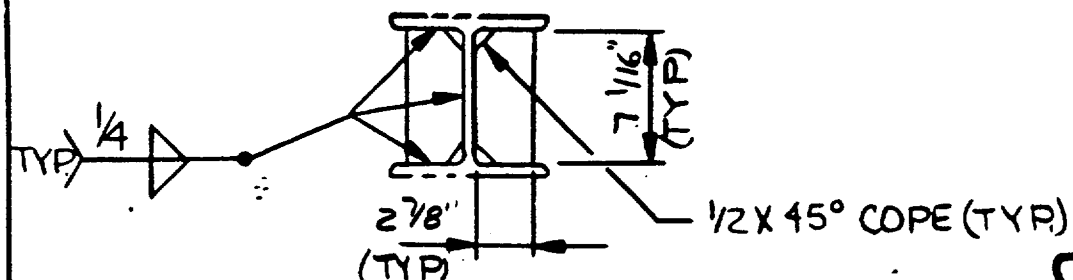
REF. DWGS.
ISO M-03GN02 REV. 7
PIPE
STEEL C-052421 REV 8

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	1-GN02-R004/242 (Q) SHT 2 OF 3	3

N47049

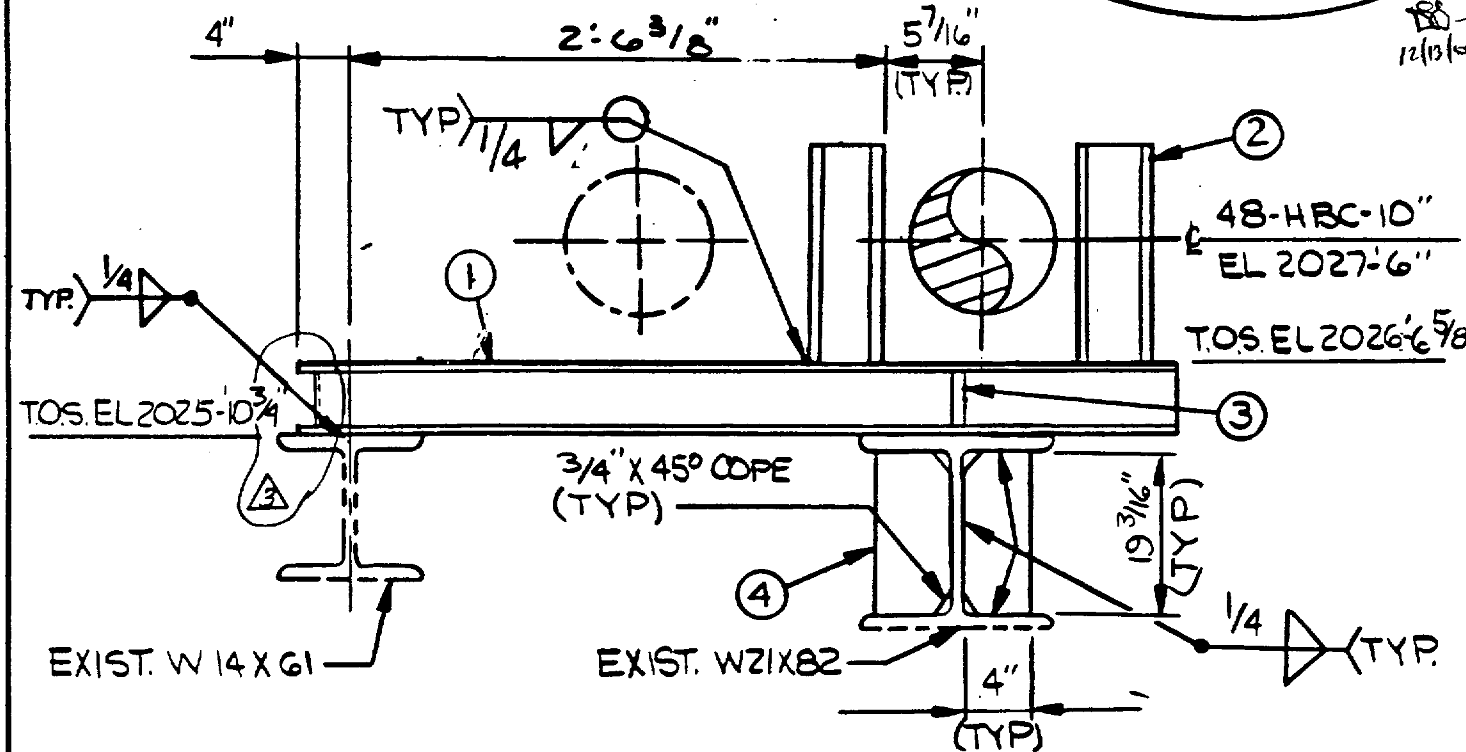
DRAWING APPLICABLE TO UNITS 1



DETAIL OF ITEM ③

Supply B

Altran Report
96227-TR-03 Rev. ~~0~~ 1
Att/Appx. B Sh B334



ELEVATION A-A

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
△								
△								
△3	5/4/89	ISSUED FOR CONSTRUCTION - SEE NOTES 2 & 3. - INC. NCR ISN 8687 PW	WDV JED	RA		RL		

SNUPPS

DRAWING NO.
M-16GN02

BECHTEL GAITHERSBURG

REF. DWGS.
ISO M-03GN02 REV. 7
PIPE
STEEL C-0S2421 REV 8

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	1-GN02-R004/242(Q) SHT 3 OF 3	3

DRAWING APPLICABLE TO UNITS 1

N49846

ITEM NO	NO REQ'D	PART NO	SIZE	DESCRIPTION	MATERIAL
1	1	211	C	SWAY STRUT, PIPE O.D. = 8 5/8" W = 16 3/4", CLAMP MAT'L = C.S (BY M 218 B SUPPLIER)	
2	1	211	C	SWAY STRUT, PIPE O.D = 8 5/8" W = 20 7/8", CLAMP MAT'L = C.S. (BY M-218 B SUPPLIER)	

Supply B

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh. B335

JB

DB 11/13/...

FORCES #	FX	FY	FZ
POS.	—	800	800
NEG.	—	2600	800

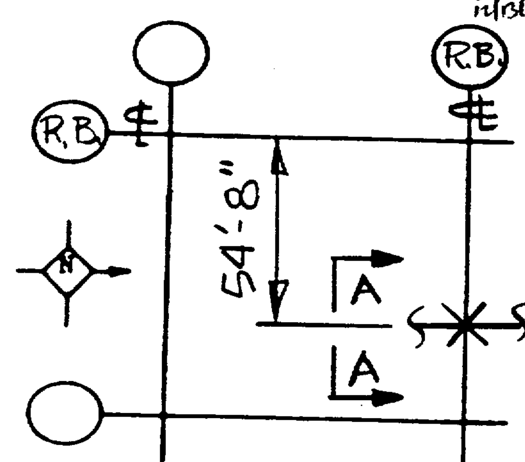
MVMTS. "	X ⚠1	Y	Z
THERMAL	0.037	—	—
SEISMIC	0.231	—	—

PROBLEM NO. 200 STRESS NO. —

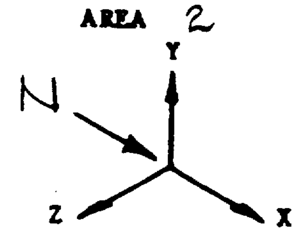
ISSUE 1 ⚠1

DATA PT. 240 NUCLEAR CLASS 3

NOTE: All welds for nuclear supports to be visually inspected unless noted otherwise



LOCATION PLAN
AREA 2



REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENG'R	APPR
2								
1	11/23/81	REV. REF. DWGS., LOADS, MVMTS, & ISSUE NO.						
0	5/3/??	ISSUED FOR CONSTRUCTION						

SNUPPS

DRAWING NO. M-06GN02

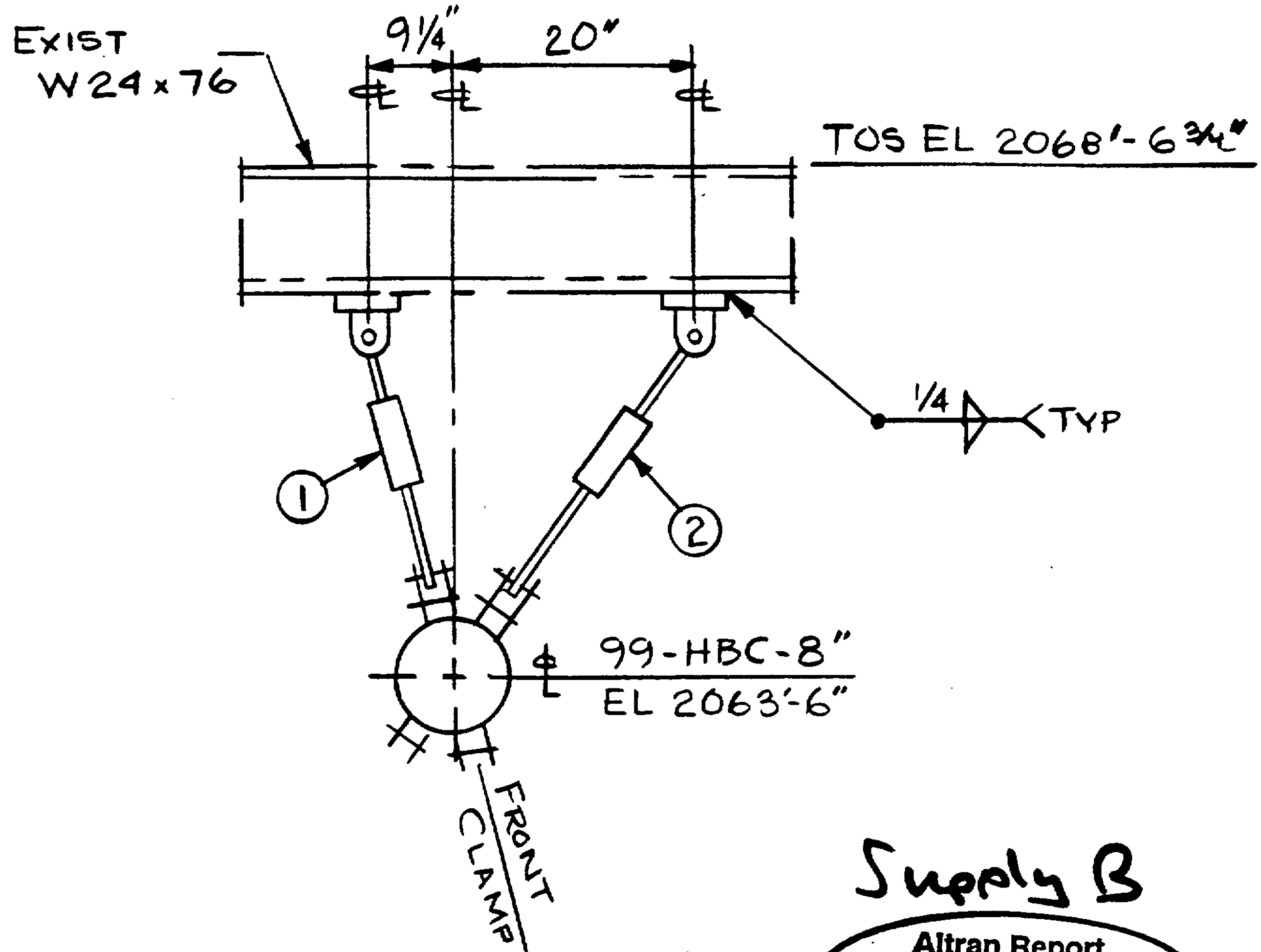
BECHTEL GAITHERSBURG

REF. DWGS. ISO M-03GN02 REV. 6 ⚠1
PIPE
STEEL C-0S2621 REV. 11

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-C020/252(Q) SHT 1 OF 2	1

N40821



ELEVATION A-A

Supply B

Altran Report 96227-TR-03 Rev. ~~0~~ 1
Att./Appx. B Sh B336

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
3								
2	11/23/81	REV. REF. DWGS.						
1	8/3/81	ISSUED FOR CONSTRUCTION						

SNUPPS DRAWING NO. M-06GN02	BECHTEL GAITHERSBURG	REF. DWGS.	ISO M-03GN02 Rev 6 PIPE STEEL C-0S2621 Rev 11
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BLDG. TRAIN "B"	JOB. NO. 10466	HANGER NO. 0-GN02-C020/252(Q) SHT 2 OF 2	REV. 1

DRAWING APPLICABLE TO UNITS

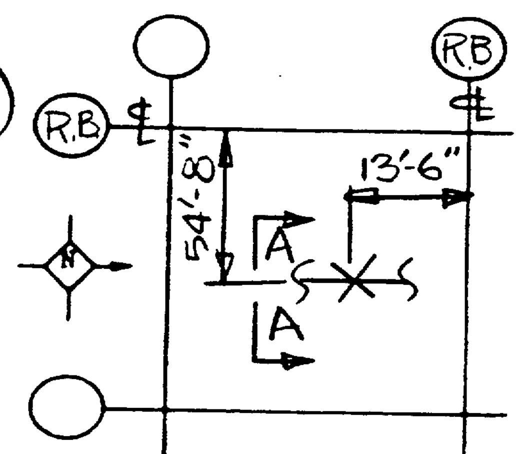
ITEM NO	NO REQ'D	PART NO	SIZE	DESCRIPTION	MATERIAL
1	1	211	2	SWAY STRUT PIPE O.D = 10 3/4"	
				W = 2'-6 5/8" CLAMP MAT'L = C.S.	
				(BY M-218B SUPPLIER)	
2	1	211	2	SWAY STRUT PIPE O.D. = 10 3/4"	
				W = 23 7/16" CLAMP MAT'L = C.S.	
				(BY M-218B SUPPLIER)	

Supply B

Altran Report 96227-TR03 Rev. Ø1
Att./Appx. B Sh B337

FORCES #	FX	FY	FZ
POS.	—	5450	2650
NEG.	—	2750	3000

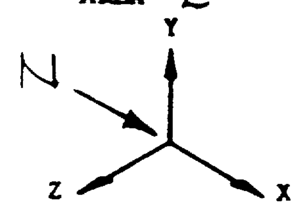
MVMTS. "	X	Y	Z
THERMAL	0.012	—	—
SEISMIC	0.231	—	—



PROBLEM NO. 200 STRESS NO. —
ISSUE 1
DATA PT. 223 NUCLEAR CLASS 3

NOTE: All welds for nuclear supports to be visually inspected unless noted otherwise

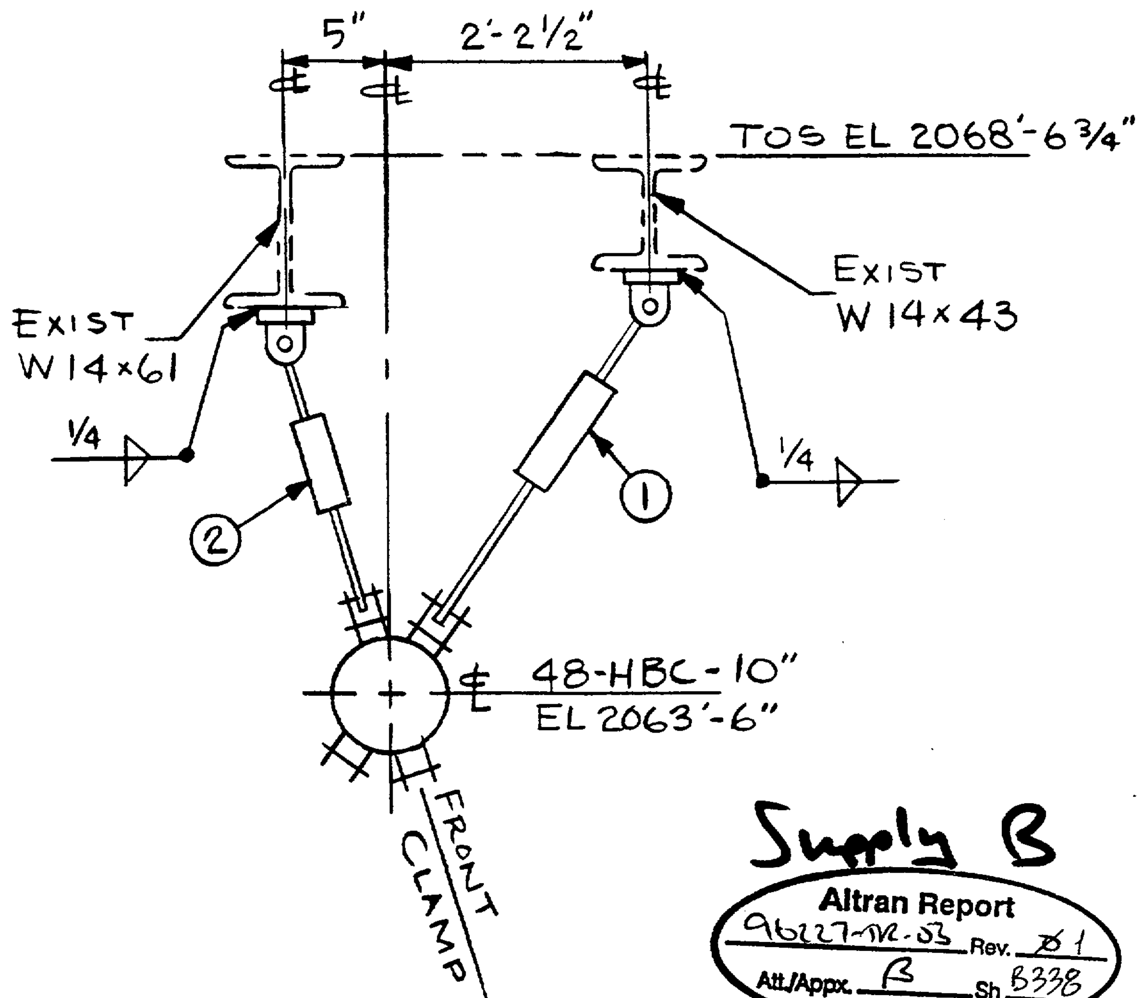
LOCATION PLAN
AREA 2



REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
△								
△1	11/23/91	REV. REF. DWGS., LOADS, MVMT, & ISSUE NO.	MT RA	KRB DL	BY	RL		
△0	5/3/85	ISSUED FOR CONSTRUCTION	AE PMM	WB SW	DB	BB		

SNUPPS	BECHTEL GAITHERSBURG	REF. DWGS.	ISO M-03GN02 REV. 6
DRAWING NO. M-06GN02			PIPE
			STEEL C-0S2621 REV. 11

PIPE SUPPORTS	JOB. NO.	HANGER NO.	REV.
CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"	10466	0-GN02-C018/252(Q) SHT 1 OF 2	1



Supply B

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B338

JB
DB
12/13/2000

ELEVATION A-A

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR.
2								
1	11/23/81	REV. REF. DWGS.	MT / KA	KKB / DL	BJ	RL		
0	5/3/78	ISSUED FOR CONSTRUCTION	AE / KBM	SW				

SNUPPS

DRAWING NO. M-06GN02

BECHTEL GAITHERSBURG

REF. DWGS. ISO M-03GN02 Rev 6; PIPE; STEEL C-052621 Rev 11

PIPE SUPPORTS

CONTAINMENT COOLING SYSTEM
REACTOR BLDG. TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-C018/252(Q) SHT 2 OF 2	1

N47049

DRAWING APPLICABLE TO UNITS

ITEM NO	NO REQ'D	PART NO.	SIZE	DESCRIPTION	MATERIAL

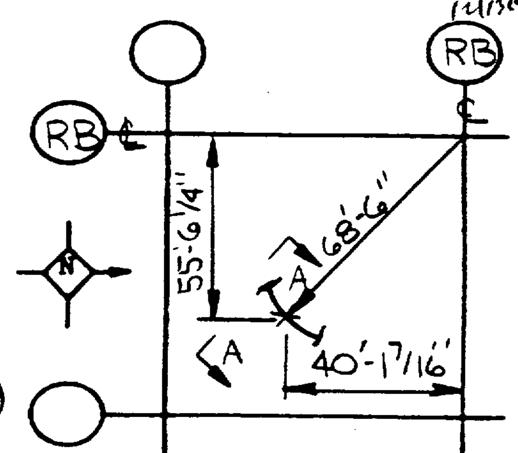
Supply B

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B339

JB
DB 12/13/00

FORCES #	LATERAL	FY	FZ
POS.	2950	2200	—
NEG.	2650	5900	—

MVMTS. "	X	Y	Z
THERMAL	0.054	—	0.039
SEISMIC	0.060	—	0.038



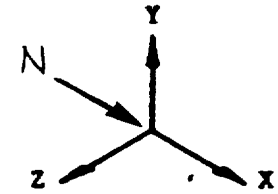
PROBLEM NO. 200 STRESS NO.

ISSUE 1

DATA PT. 160 NUCLEAR CLASS 3

NOTE: All welds for nuclear supports to be visually inspected unless noted otherwise

LOCATION PLAN
AREA 2



REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENG'R	APPR
2								
1	11/23/81	REV. REF. DWGS., LOAD, MVMTS, & ISSUE NO	MT	KWB	BJ	RJ		
0	8/3/78	ISSUED FOR CONSTRUCTION	RDS					

SNUPPS

DRAWING NO. M-06GN02

BECHTEL GAITHERSBURG

REF. DWGS. ISO M-03GN02 REV 6
PIPE
STEEL C-0S2421 REV 8

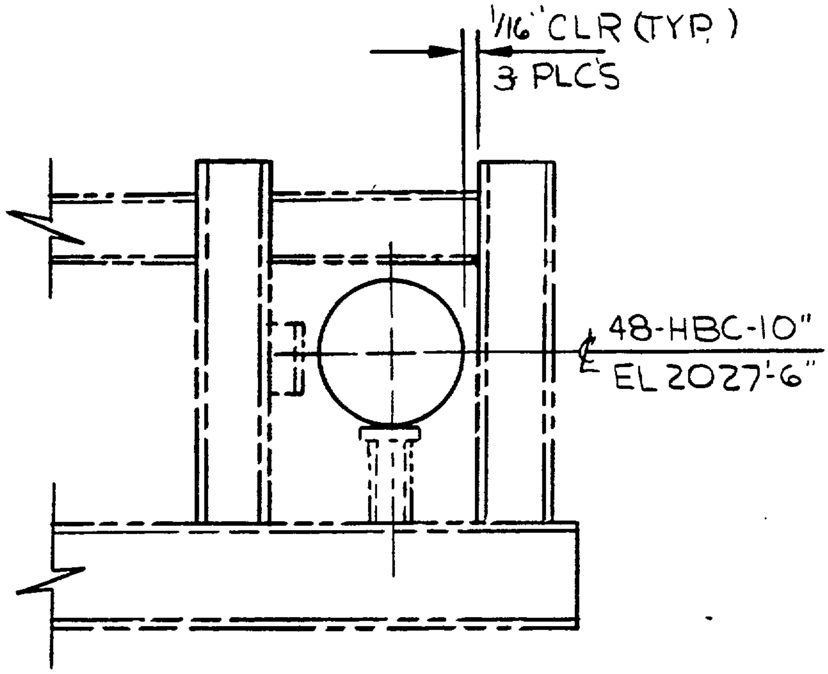
PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-C014/242(Q) SHT 1 OF 2	1

N40821

DRAWING APPLICABLE TO UNITS 1 2 3 4 5 6 7 8

NOTE: WORK W/DWG
O-GNO2-CO13/242



ELEVATION A-A

Supply B

Altran Report
96227-TR-03 Rev. ~~0~~ 1
Att./Appx. B Sh B340

JB
12/13/00

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
△								
△1	11/23/81	REV. REF. DWGS.	MT / RDB	HA	KLB / DL	BM	RL	
△0	5/3/78	ISSUED FOR CONSTRUCTION	CEW		BB	DB		

SNUPPS	BECHTEL GAITHERSBURG	REF. DWGS.	ISO M-03GN02 REV 6
DRAWING NO. M-06GN02			PIPE
			STEEL C-0S2421 REV 8
PIPE SUPPORTS	JOB. NO.	HANGER NO.	REV.
CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"	10466	O-GNO2-CO14/242 (Q) SHT 2 OF 2	1

N49846

DRAWING APPLICABLE TO UNITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

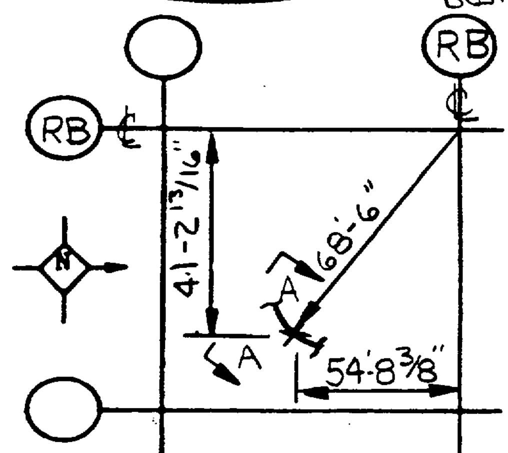
ITEM NO	NO REQ'D	PART NO.	SIZE	DESCRIPTION	MATERIAL

Supply B

Altran Report 96227-TR-03 Rev. ~~0~~ 1
Att./Appx. B Sh B341

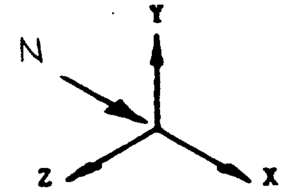
FORCES #	LATERAL	FY	FZ
POS.	3600	2250	—
NEG.	4500	5150	—

MVMTS. "	X	Y	Z
THERMAL	0.019	—	0.025
SEISMIC	0.051	—	0.049



PROBLEM NO. 200 STRESS NO. ____
ISSUE 1
DATA PT. 140 NUCLEAR CLASS 3

LOCATION PLAN
AREA 2



NOTE: All welds for nuclear supports to be visually inspected unless noted otherwise.

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENGR	APPR
2								
1	11/23/81	REV. REF. DWGS., LOADS, MVMTS, & ISSUE NO.	MT KA	KB	DL	BJ	RJ	
0	6/3/80	ISSUED FOR CONSTRUCTION	RPB CEW					

SNUPPS

DRAWING NO. M-06GN02

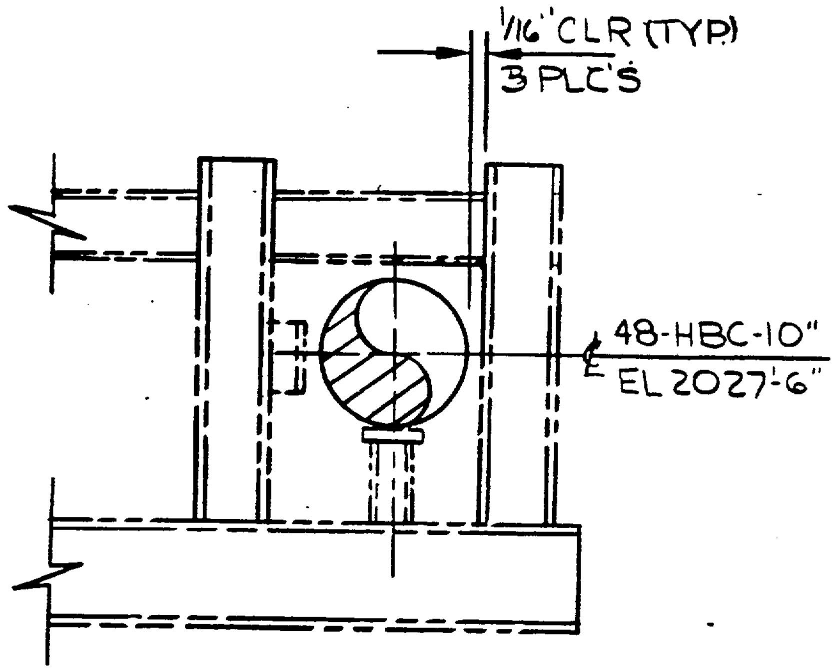
BECHTEL GAITHERSBURG

REF. DWGS. ISO M-03GN02 REV 6
PIPE ____
STEEL C-0S2421 REV 8

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-C012/242(Q) SHT 1 OF 2	1

NOTE: WORK W/DWG
O-GN02-C011/242



ELEVATION A-A

Supply B

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B342

JB

DB
12/13/00

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENG'R	APPR
1	11/23/81	REV. REF. DWGS.	MT	KR	DL	BF	RL	
0	8/3/78	ISSUED FOR CONSTRUCTION	RDB		BH	DB		B

SNUPPS	BECHTEL GAITHERSBURG	REF. DWGS. ISO M-03GN02 REV 6
DRAWING NO. M-06GN02		PIPE
		STEEL C-0S2421 REV 8
PIPE SUPPORTS	JOB. NO.	HANGER NO. / REV.
CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"	10466	O-GN02-C012/242 (Q) SHT 2 OF 2 / 1

DRAWING APPLICABLE TO UNITS 1 2 3 4 5 6 7 8

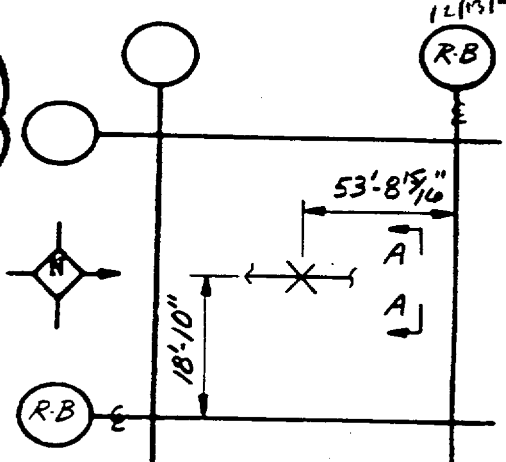
ITEM NO	NO REQ'D	PART NO	SIZE	DESCRIPTION	MATERIAL
1	1	2000	R/1-10	SWAY STRUT, P-P= 16", (BY M-218 A SUPPLIER)	
2	1	2600-10	R/1-10"	PIPE CLAMP	

Supply B

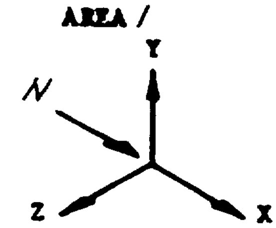
Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B343

FORCES #	FX	FY	FZ
POS.	–	–	5700
NEG.	–	–	5550 (2)

MVMTS. "	X	Y	Z
THERMAL	-0.011	-0.005	–
SEISMIC	0.052	0.050	–



LOCATION PLAN
AREA 1



PROBLEM NO. 200 STRESS NO. -

ISSUE 1 (2)

DATA PT. 65 NUCLEAR CLASS 3

NOTE: All welds for nuclear supports to be visually inspected unless noted otherwise

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ ENG'R	APPR
3								
2	11/23/81	REV. REF. DWGS, LOADS, MVMTS, & ISSUE NO	MT					
1	9/3/80	ISSUED FOR CONSTRUCTION	DQ					

SNUPPS

DRAWING NO. M-06GN02

PIPE SUPPORTS

CONTAINMENT COOLING SYSTEM
REACTOR BUILDING - TRAIN "B"

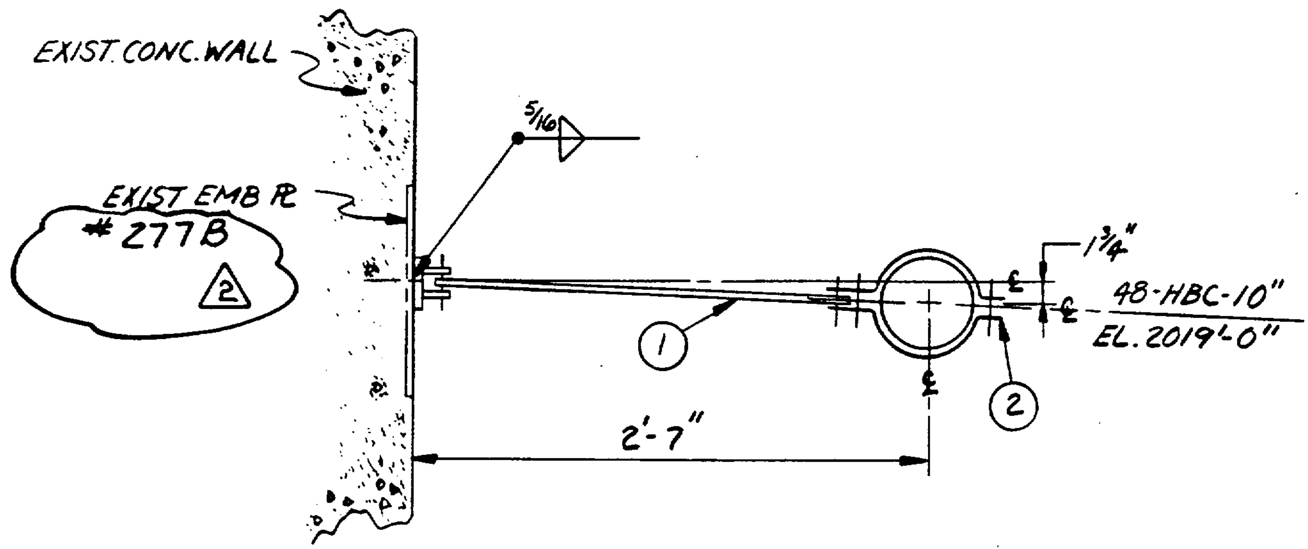
BECHTEL
GAITHERSBURG

REF. DWGS.
ISO M-03GN02 REV. 6
PIPE (2)
CONC. STEEL C-0C2913 REV. 15

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-R002/231(Q) SHT. 1 OF 2	2

N40821

DRAWING APPLICABLE TO UNITS



ELEVATION A-A

Supply B

Altran Report 96227-TR-03 Rev. 01
Att./Appx. B Sh. B344

JB
DB
12/15

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
3								
2	11/23/88	REV. REF. DWGS. & ADD EXIST. EMB. PL. NO.	MT KA	KKR DL	RH	RJ		
1	8/3/84	ISSUED FOR CONSTRUCTION	DO MS	VK SW	DB			B

SNUPPS

DRAWING NO. M-06GN02

BECHTEL GAITHERSBURG

REF. DWGS.
ISO M-03GN02 REV 6
PIPE
CONC STEEL C-0C2913 REV 15

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-R002/231(Q) SHT. 2 OF 2	2

N47049

DRAWING APPLICABLE TO UNITS 1 2 3 4 5 6 7 8

ITEM NO	NO REQ'D	PART NO	SIZE	DESCRIPTION	MATERIAL
1	1	211	1	SWAY STRUT PIPE O.D. = 10¾" W=3'-10¼" CLAMP MAT'L.=C.S. (BY M218 B SUPPLIER)	
2	1	211	1	SWAY STRUT PIPE O.D= 10¾" W= 2'-5 11/16", CLAMP MAT'L = C.S. (BY M-218 B SUPPLIER)	
3	1			T.S. 5"×5"×3/8", 14" LG (BY M-216 SUPPLIER)	SA 500 GR.B
4	1			PL ½"×3 1/16 × 11 3/16	SA 36
5	1			PL ½"×5×6" LG.	SA 36

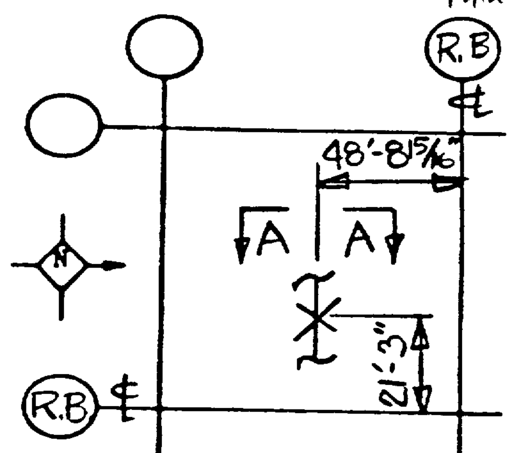
Supply B

Altran Report
96229-TR-03 Rev. 01
Att./Appx. B Sh B345

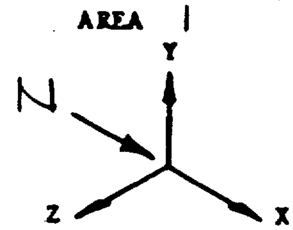
JB
DB 12/13/...

FORCES #	FX	FY	FZ
POS.	3000	1000	—
NEG.	3050	3700	—

MVMTS. "	X	Y	Z
THERMAL	—	—	0.012
SEISMIC	—	—	0.163



LOCATION PLAN
AREA 1



PROBLEM NO. 200 STRESS NO. —

ISSUE 1

DATA PT. 57 NUCLEAR CLASS 3

NOTE: 1. All welds for nuclear supports to be visually inspected unless noted otherwise
2. THIS DRAWING REPLACES 0-GN02-C004/231(Q) REV. 1
3. FOR DOCUMENT CLARITY-REVISIONS 0 & 1 OMITTED.
4. USE ITEMS 1 & 2 FROM HGR. 0-GN02-C004/231(Q) REV. 1

REV.	DATE	REVISIONS	BY	CH'K	DESGN SUPVR	ENG'R	PROJ. ENG'R	APPR
4	11/16/...	INC. FCR #1-5437-P & REV'D REF DWGS.			NK	RZ		
3	...	INC. FCR #1-4668-P	SA		KKR	RZ		
2	...	ISSUED FOR CONSTR., SEE NOTES 2-4, INC. FCR 1-2524 P	AS	PH				

SNUPPS

DRAWING NO.
M-16GN02

BECHTEL
GAITHERSBURG

REF. DWGS.
ISO M-13GNC2 REV 0
PIPE 4
STEEL C-052411 REV. 13

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

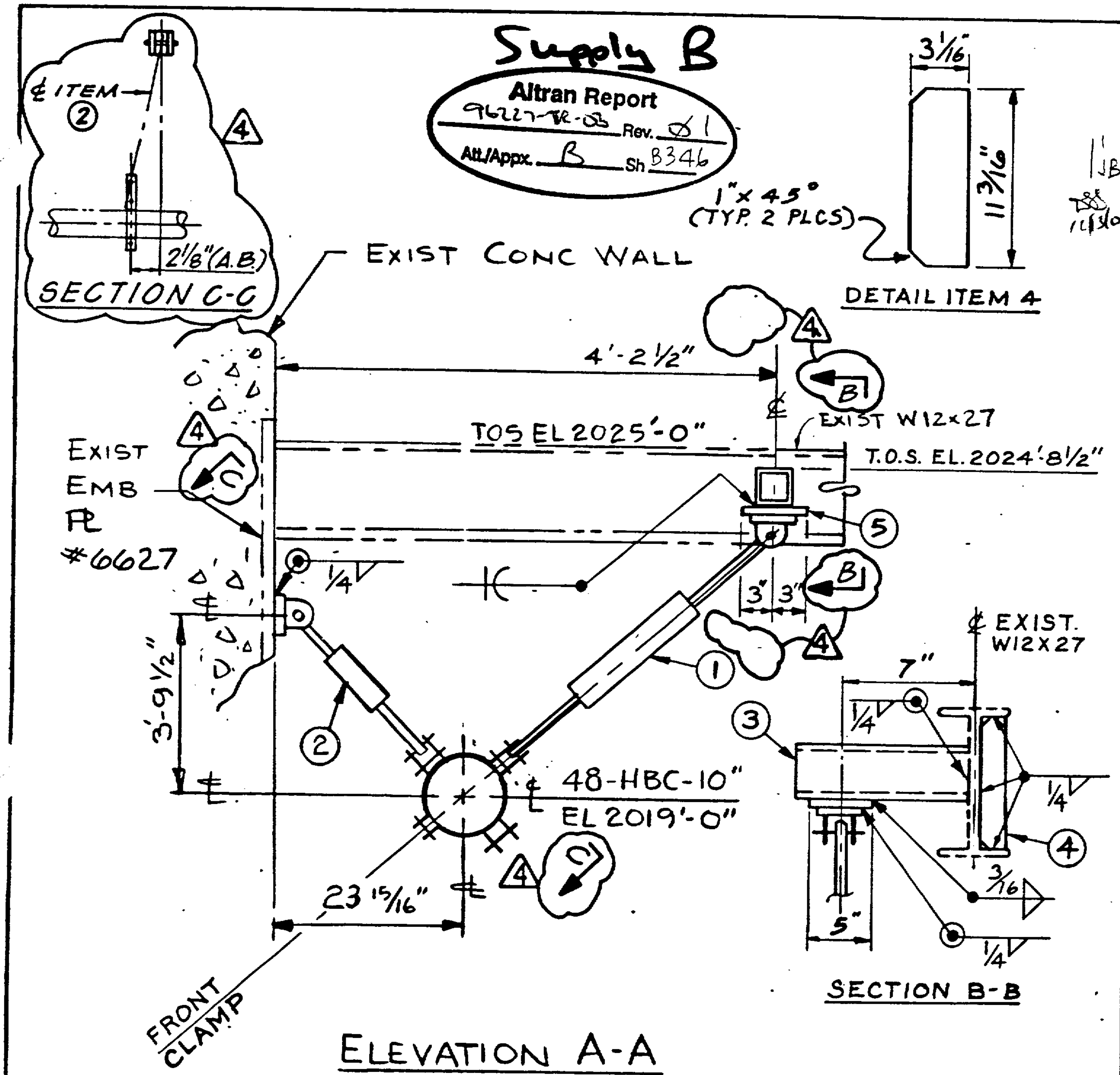
JOB. NO.	HANGER NO.	REV.
10466	1-GN02-C004/231(Q) SHT 1 OF 2	4

DRAWING APPLICABLE TO UNITS 1

N406

Supply B

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B346



ELEVATION A-A

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENG'R	APPR
4	11/16/..	INC. FCR 1-5437-P, REV'D. REF. DWG. & REV'D. AS NOTED.				NK		
3		INC. FCR #1-4668-P	3A		BCP	KKR		
2		ISSUED FOR CONSTR., SEE NOTES 2-4, INC. FCR 1-2524P	AS	RHB	PH			

SNUPPS DRAWING NO. M-16GN02 PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BLDG. TRAIN "B"	BECHTEL GAITHERSBURG	REF. DWGS.	ISO M-13GN02 REV. 0 PIPE STEEL C-0S2411 REV. 13	
	JOB NO. 10466		HANGER NO. 1-GN02-C004/231(Q) SHT 2 OF 2	REV. 4

N47049

DRAWING APPLICABLE TO UNITS 1

ITEM NO.	NO REQ'D	PART NO.	SIZE	DESCRIPTION	MATERIAL
1	1		W8x40	4'4" LG (BYM 216 SUPPLIER)	
2	2		W8x40	17" LG.	
3	1		W4x13	10 13/16" LG.	
4	1		W8x40	22 9/16" LG.	
5	1		W8x40	4'-3 3/8" LG.	
6	4		1/2" x 3 5/8" x 7 1/16" PLATE		SA-515 GR 65
7	4	△2	1 1/4" x 2 1/2" x 3 3/4"	LUG	SA-515 GR 65
8	2		1/2" x 6 1/2" x 22 3/8"	GUSSET PLATE	SA-515 GR. 65
9	1		1/2" x 6 1/2" x 22 3/8"	GUSSET PLATE	SA-515 GR. 65

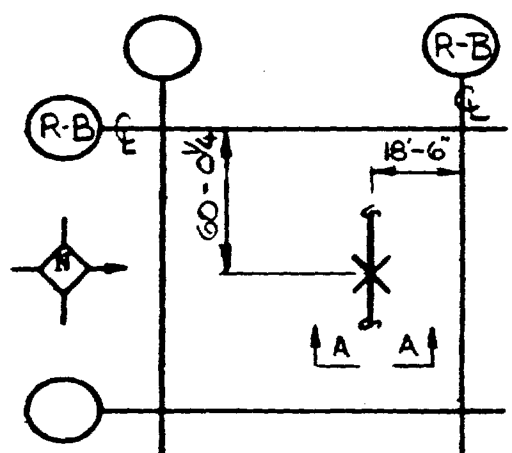
Supply B

Altran Report 96227-TR-03 Rev. Ø 1
Att./Appx. B Sh B347

11 JB
DB 12/15/00

FORCES #	FX	FY	FZ
POS.	4000	4050	3650
NEG.	3750	15800	2550

MVMTS. "	X	Y	Z
THERMAL	—	—	—
SEISMIC	—	—	—

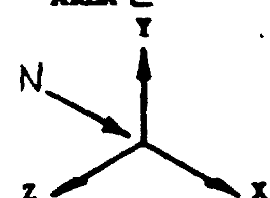


PROBLEM NO. 200 STRESS NO. ______

ISSUE 1

DATA PT. 215 NUCLEAR CLASS 3

LOCATION PLAN
AREA 2



NOTE: 1. All welds for nuclear supports to be visually inspected unless noted otherwise

△2 2. THIS DWG. REPLACES 0-GN02-C016/252 (Q) REV. 1
3. FOR DOCUMENT CLARITY REV. 0 & 1 OMITTED
4. USE ITEMS 1 THRU 6, 8, & 9 FROM 0-GN02-C016/252 (Q) REV. 1

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
△								
△								
△2	5/19/93	ISSUED FOR CONSTRUCTION (SEE NOTES 2 & 3) INC. FCR-1-2633-P						

SNUPPS

DRAWING NO. M-16GN02

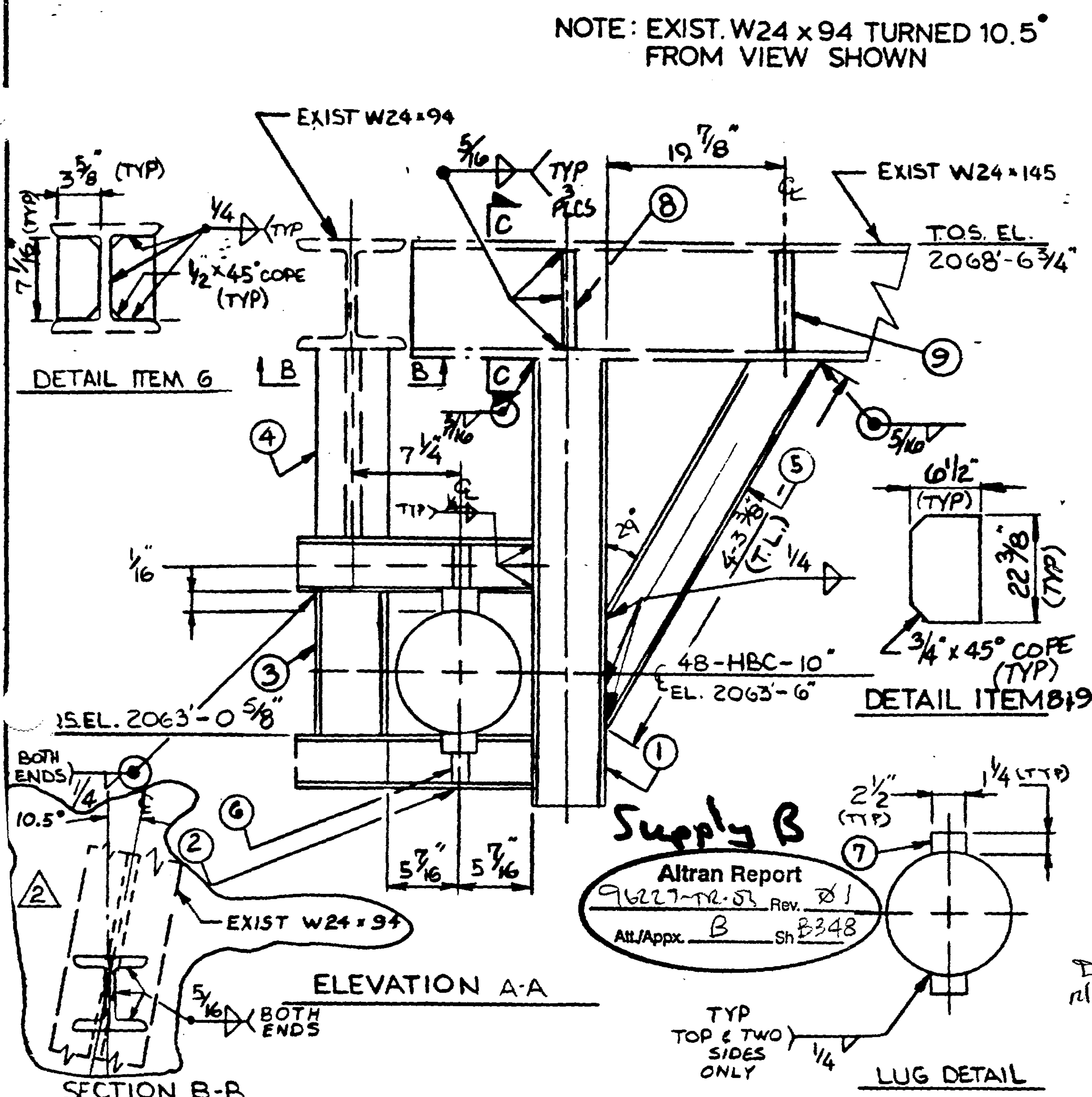
BECHTEL GAITHERSBURG

REF. DWGS. ISO M-03GN02 REV 7
PIPE ______
STEEL C-052621 REV 13

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	1-GN02-C016/252 (Q) SHT 1 OF 2	2

N40821



	8/9/82	ISSUED FOR CONSTRUCTION (SEE NOTES 2 & 3) INC. FCR 1-2633-P				R J		
V.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR

SNUPPS	BECHTEL GAITHERSBURG	REF. DWGS.	ISO M-03GN02 REV 7 PIPE STEEL C-0S2621 REV 13
DRAWING NO. M-16GN02			
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"	JOB. NO. 10466	HANGER NO. 1-GN02-C016/252 (Q) SHT 2 OF 7	REV. 2

ITEM NO	NO REQ'D	PART NO	SIZE / DESCRIPTION	MATERIAL
1	3		W8 x 40 2'-2" LG. (BYM-216 SUPPLIER)	
2	2		W6x20 11 5/16" LG.	
3	1		5" Ø PIPE STANCHION SCH.40 5 5/16" LG.	SA 106 GR B
4	1		5/8 x 7" x 7 1/8" PLATE (BYM-216 SUPPLIER)	SA 515 GR 65
5	2		7/16" x 2 7/8" x 8" PLATE	SA 515 GR 65
6	4		1 1/4 x 2 1/2 x 3 3/4" LUGS (BYM-216 SUPPLIER)	SA-515 GR 65
7	6		3/8 x 3 5/8 x 7 1/16" PLATE	SA 515, GR 65

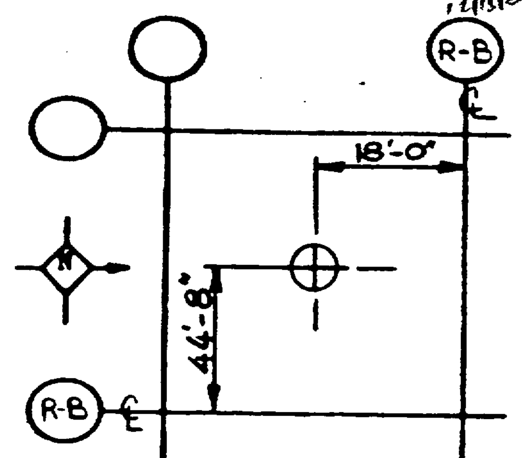
Supply B

Altran Report 96227-TR-03 Rev. Ø 1
Att./Appx. B Sh B349

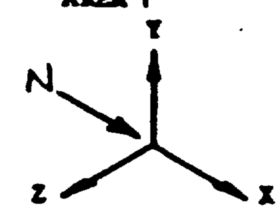
JB

FORCES #	FX	FY	FZ
POS.	3450	2950	2600
NEG.	3400	10100	2450

MVMTS. "	X	Y	Z
THERMAL	—	—	—
SEISMIC	—	—	—



LOCATION PLAN
AREA 1



PROBLEM NO. 200 STRESS NO. ______

ISSUE 1

DATA PT. 347 NUCLEAR CLASS 3

NOTE: 1. All welds for nuclear supports to be visually inspected unless noted otherwise
2. THIS DWG. REPLACES 0-GN02-C024/241(Q) REV. 2
3. FOR DOCUMENT CLARITY, REV. 0 THRU 2 OMITTED
4. USE ITEMS 1, 2, 3, 6, & 7 FROM 0-GN02-C024/241 (Q) REV. 2

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APP'R
5								
4	9/8/84	INC. FCR 1-5530-P, & REV. REF. DWG.				KKR		
3	8/9/83	ISSUED FOR CONSTRUCTION- SEE NOTES 2 & 3. - INC. NCR ISN 8157-P						

SNUPPS

DRAWING NO. M-16GN02

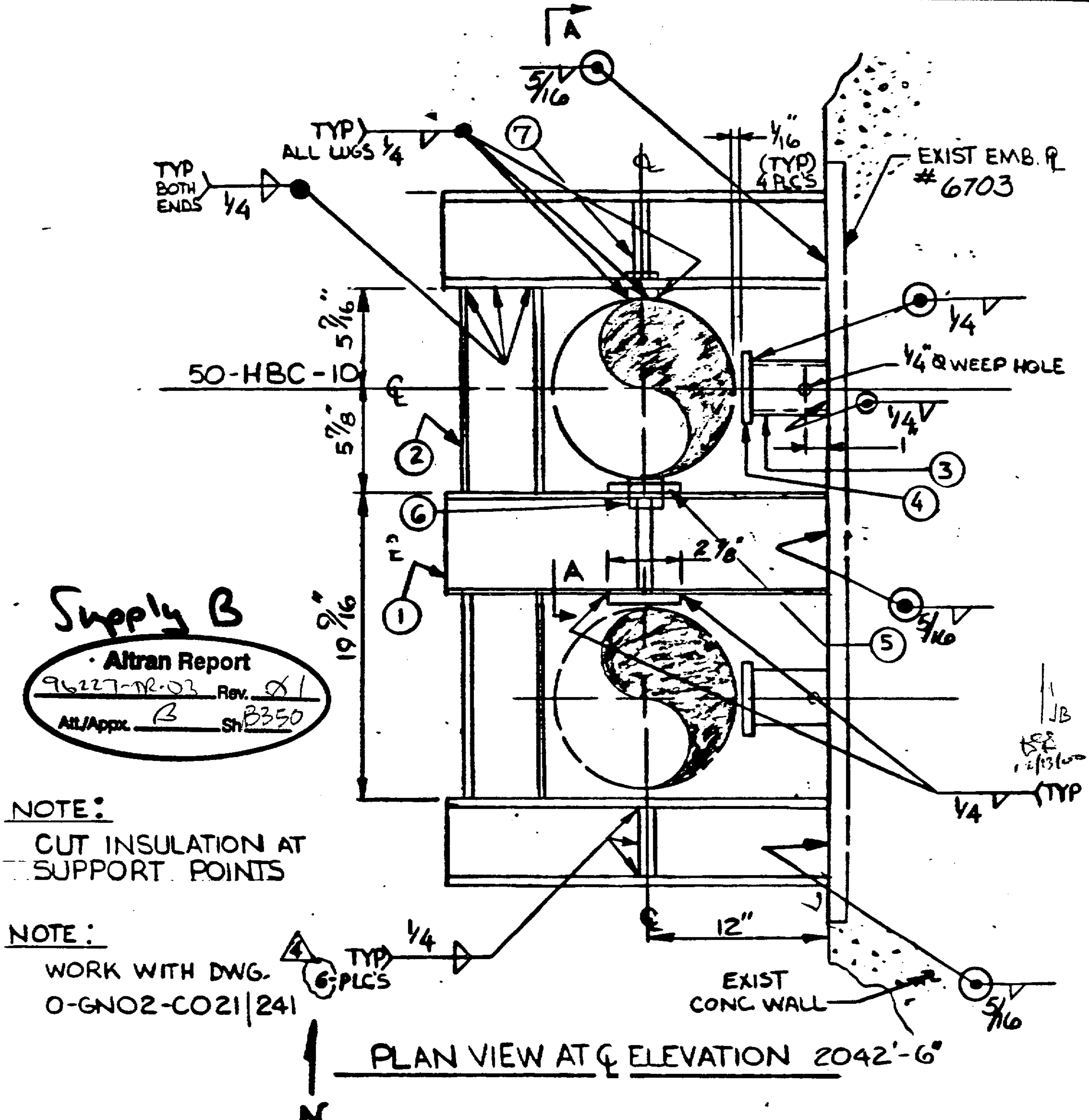
BECHTEL GAITHERSBURG

REF. DWGS. ISO M-03GN02 REV 7
PIPE ______ 4
CONC. C-0C2511 REV 9

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	1-GN02-C024/241 (Q) SHT. 1 OF 3	4

N40821



Supply B

Altran Report 96227-TR-03 Rev. 01
Att./Appx. B Sh. B350

NOTE:
CUT INSULATION AT SUPPORT POINTS

NOTE:
WORK WITH DWG. 0-GN02-C021|241

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
4	9/6/84	INC. FCR 1-5530-P, & REV. REF. DWG.	MEY BA	HDV	KKR	RL		
3	5/4/83	ISSUED FOR CONSTRUCTION - SEE NOTES 1 & 3. - INC. NCR 1SN 8157-P	RA JED	KKR TAS		RL		

SNUPPS

DRAWING NO.
M-16GN02

BECHTEL GAITHERSBURG

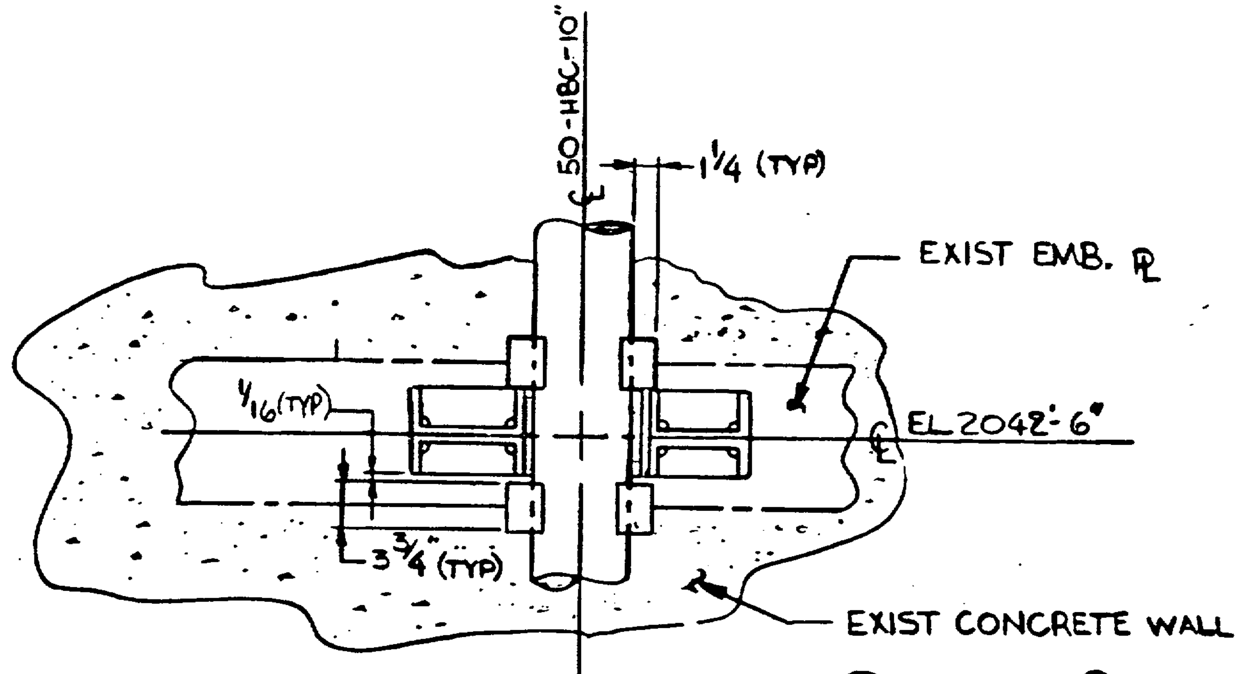
REF. DWGS.
ISO M-03GN02 REV. 7 (4)
PIPE
CONC C-0C2511 REV. 9

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

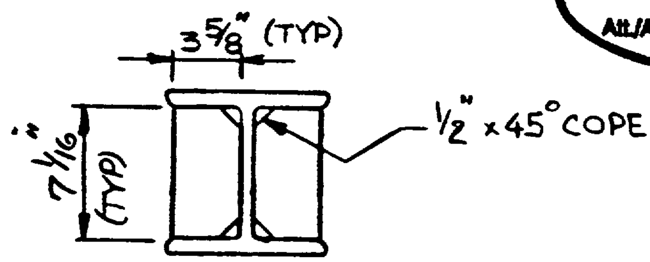
JOB. NO.	HANGER NO.	REV.
10466	1-GN02-C024/241(Q) SHT 2 OF 3	4

N47049

DRAWING APPLICABLE TO UNITS 1



SECTION A-A



DETAIL ITEM 7

Supply B

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh. B351

JB

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
2								
1	10/6/84	INC. FCR 1-5530-P, & REV. REF. DWG.			KKR	RZ		
0	8/9/83	ISSUED FOR CONSTRUCTION - SEE NOTES 2 & 3. - INC. NCR ISN 8157-P				RZ		

SNUPPS

DRAWING NO.
M-16GN02

BECHTEL
GAITHERSBURG

REF. DWGS.
ISO M-036N02, REV. 7
PIPE
CONC. C-OC2511, REV 9

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	1-GN02-C024|241 (Q) SHT. 3 OF 3	4

N47049

DRAWING APPLICABLE TO UNITS 1

ITEM NO	NO REQ'D	PART NO.	SIZE	DESCRIPTION	MATERIAL
1	1	211	C	SWAY STRUT, CLAMP MAT'L: CS, OD: 10¾, W: 7'-6⅛" (BY M-21B B SUPPLIER)	

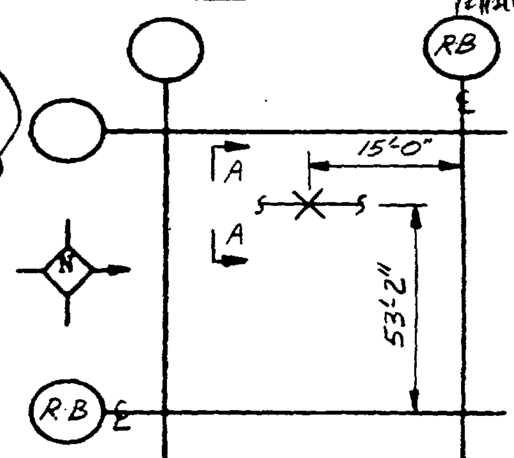
Supply B

Altran Report 96227-TR-03 Rev. Ø1
Att/Appx. B Sh B352

JB

FORCES #	FX	FY	FZ
POS.	–	–	3000
NEG.	–	–	3150

MVMTS. "	X	Y	Z
THERMAL	0.005	-0.012	–
SEISMIC	0.043	0.021	–



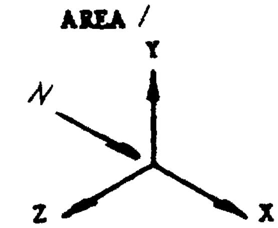
PROBLEM NO. 200 STRESS NO. ______

ISSUE 1

DATA PT. 399 NUCLEAR CLASS 3

NOTE: All welds for nuclear supports to be visually inspected unless noted otherwise

LOCATION PLAN
AREA 1



REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENG'R	APPR
△								
1	11/23/8	REV. REF. DWGS., LOADS, MVMTS & ISSUE NO.	MT / HA	KKR / VBZ / DU	BJ	RJ		
0	8/3/	ISSUED FOR CONSTRUCTION	RG / mon	VBZ / SW				

SNUPPS

DRAWING NO. M-06GN02

BECHTEL GAITHERSBURG

REF. DWGS.
ISO M-03GN02 REV 6
PIPE ______
CONC. STEEL C-0C2511 REV 9

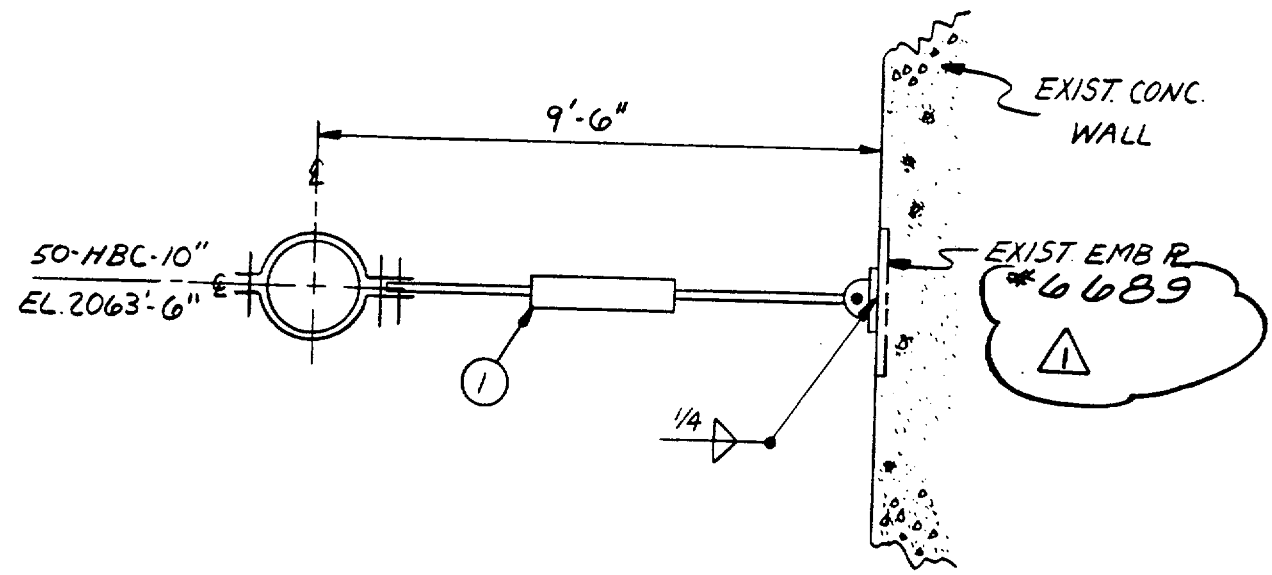
PIPE SUPPORTS

CONTAINMENT COOLING SYSTEM
REACTOR BUILDING - TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-R014/251(Q) SHT 1 OF 2	1

N40821

DRAWING APPLICABLE TO UNITS 1 2 3 4 5 6 7 8



ELEVATION A-A

Supply B

Altran Report
96227-TR-03 Rev. Ø 1
Att./Appx. B Sh B353

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENG'R	APPR
2								
1	11/23/81	REV. REF. DWGS. & ADD EXIST. EMB. PL. NO.					RJ	
0	8/3/78	ISSUED FOR CONSTRUCTION						

SNUPPS

DRAWING NO.

M-06GN02

PIPE SUPPORTS

CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN-"B"

BECHTEL
GAITHERSBURG

REF. DWGS.
ISO M-03GN02 REV. 6
PIPE
CONC. C-0C2511 REV. 9

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-R014/251(Q) SHT 2 OF 2	1

N47049

DRAWING APPLICABLE TO UNITS 1 2 3 4 5 6 7 8

ITEM NO	NO REQ'D	PART NO.	SIZE / DESCRIPTION	MATERIAL
1	2		W4X13 20" LONG (BY M-216 SUPPLIER)	

Supply B

Altran Report
96227-TR-03 Rev. Ø1
Att./Appx. B Sh B354

FORCES #	FX	FY	FZ
POS.	1350	———	———
NEG.	1350	———	———

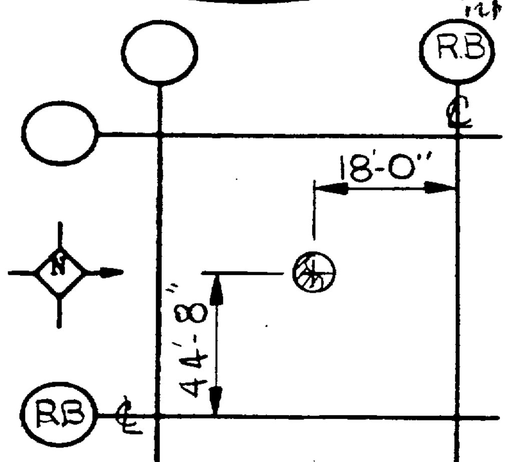
MVMTS."	X	Y	Z
THERMAL	———	0.031	0.018
SEISMIC	———	0.025	0.082

PROBLEM NO. 200 STRESS NO. ______

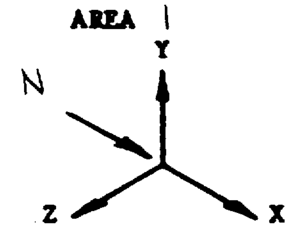
ISSUE 1

DATA PT. 383 NUCLEAR CLASS 3

NOTE: All welds for nuclear supports to be visually inspected unless noted otherwise



LOCATION PLAN
AREA 1



REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENG'R	APPR
2								
1	11/23/81	REV. REF. DWGS, LOADS, MVMTS, & ISSUE NO						
0	8/3/85	ISSUED FOR CONSTRUCTION						

SNUPPS

DRAWING NO.
M-06GN02

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

BECHTEL
GAITHERSBURG

REF. DWGS.
ISO M-03GN02 REV 6
PIPE
STEEL C-0C2916 REV 15

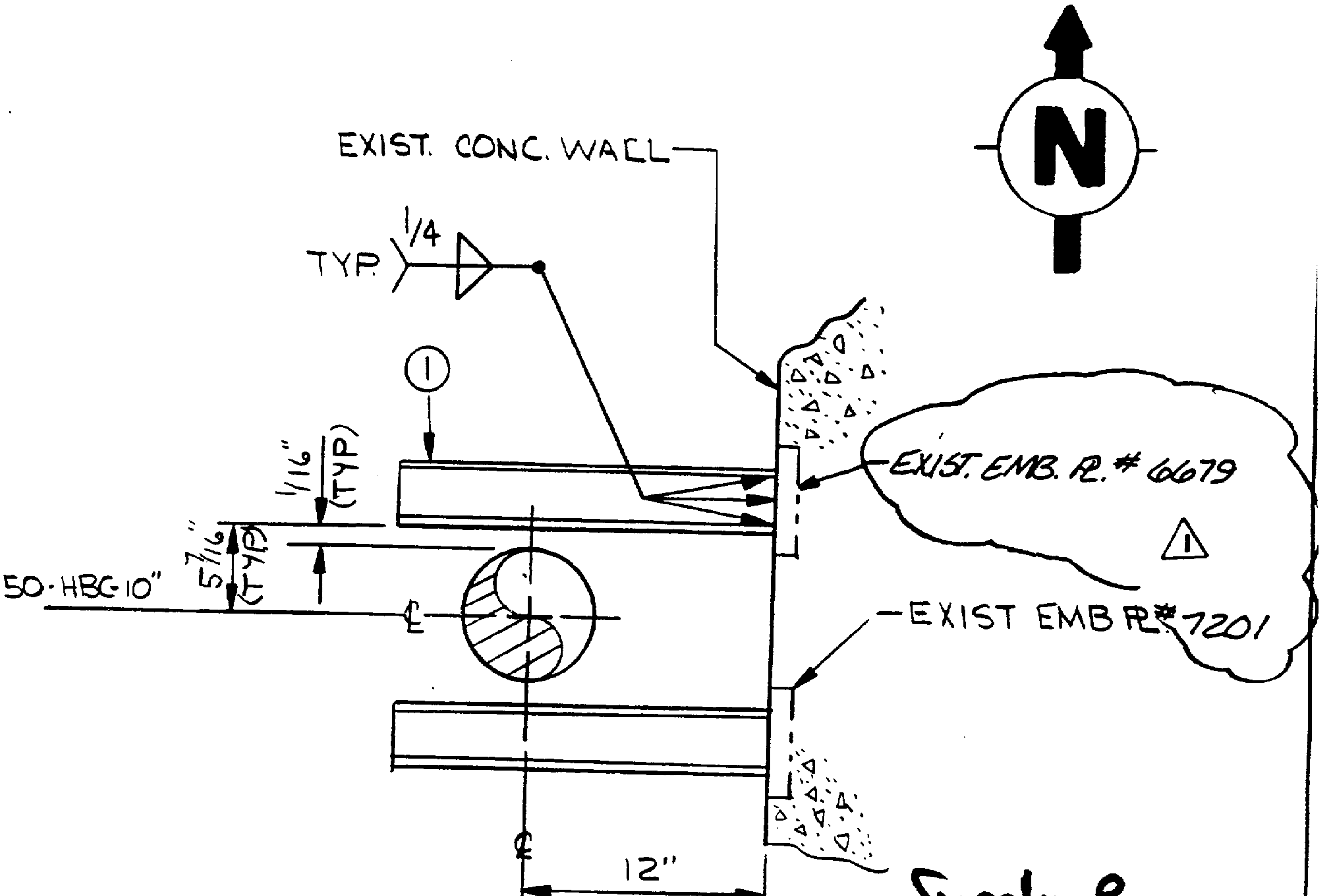
JOB. NO. 10466

HANGER NO. 0-GN02-R012/251(Q)
SHT. 1 OF 2

REV. 1

N40821

DRAWING APPLICABLE TO UNITS 1 2 3 4 5 6 7 8



Supply B

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B355

JB

PLAN VIEW
AT ℄ EL 2059'-6"

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENG'R	APPR
△								
△1	11/23/81	REV. REF. DWGS., & ADD EXIST. EMB. PL. NOS.						
△0	8/3/78	ISSUED FOR CONSTRUCTION						

SNUPPS

DRAWING NO. M-06GN02

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

BECHTEL
GAITHERSBURG

REF. DWGS.
ISO M-03GN02 REV 6 △1
PIPE
STEEL C-0C2916 REV 15

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-R012/251(Q) SHT 2 OF 2	1

N49846

DRAWING APPLICABLE TO UNITS	1	2	3	4	5	6	7	8

ITEM NO	NO REQ'D	PART NO.	SIZE DESCRIPTION	MATERIAL
1	1		W4X13 2'-0" LONG (BY M-216 SUPPLIER)	
2	2		W4X13 15" LONG	

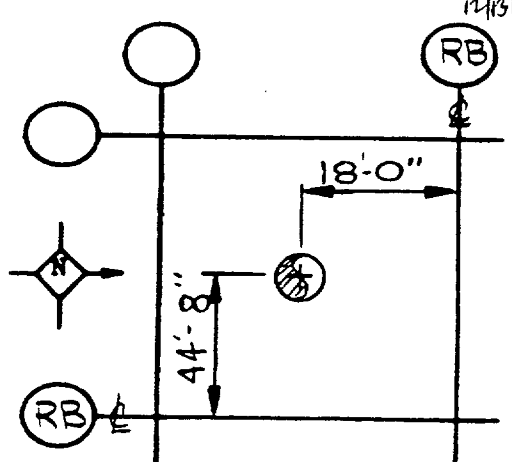
Supply B

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B356

JB
DBS 12/13/

FORCES #	FX	FY	FZ
POS.	——	——	1950
NEG.	——	——	1950

MVMTS. "	X	Y	Z
THERMAL	0.034	0.028	——
SEISMIC	0.149	0.025	——

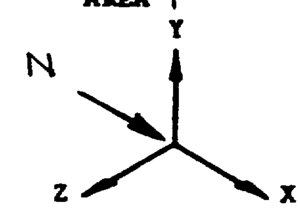


PROBLEM NO. 200 STRESS NO. ______

ISSUE 1

DATA PT. 335 NUCLEAR CLASS 3

LOCATION PLAN AREA



NOTE: All welds for nuclear supports to be visually inspected unless noted otherwise

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
2								
1	11/23/81	REV. REF. DWGS, LOADS, MVMTS, & ISSUE NO.						
0	5/3/78	ISSUED FOR CONSTRUCTION						

SNUPPS

DRAWING NO. M-06GN02

BECHTEL GAITHERSBURG

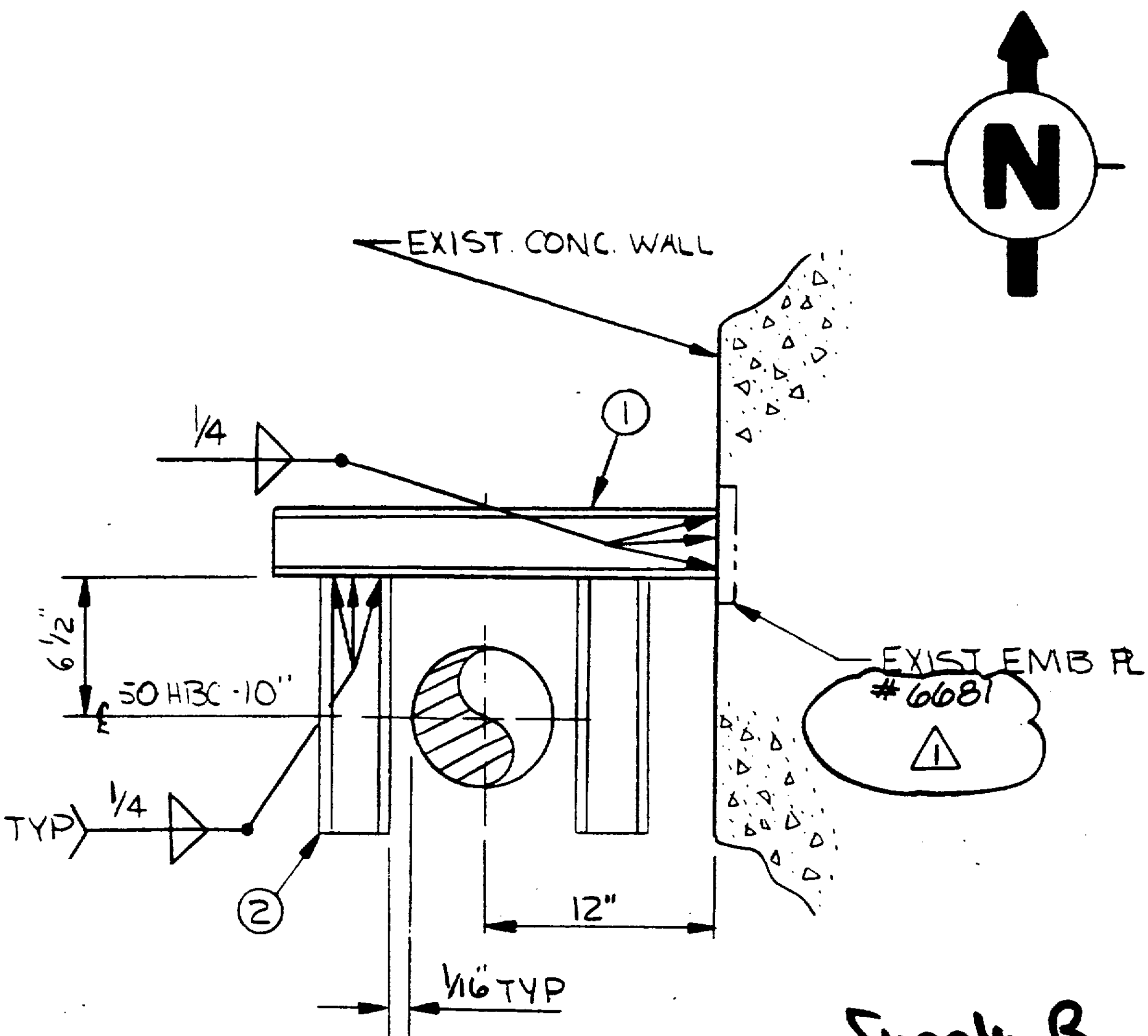
REF. DWGS. ISO M-03GN02 REV 6 PIPE ______ STEEL C-0C2916 REV 15

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-R010/241 (Q) SHT 1 OF 2	1

N40821

DRAWING APPLICABLE TO UNITS



PLAN VIEW
AT ℄ EL 2027'-3"

Supply B

Altran Report
96227-AR-03 Rev. 01
Att./Appx. B Sh B357

JB
12/23/...

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENG'R	APPR
△								
△1	11/23/81	REV. REF. DWGS. & ADD EXIST. EMB. PL.	MT/VA	NB	BL/BA	RL		
△0	8/3/78	ISSUED FOR CONSTRUCTION	RBG/CEW	B/SW	DR	JB		

SNUPPS

DRAWING NO.

M-06GN02

BECHTEL
GAITHERSBURG

REF. DWGS.
ISO M-03GN02 REV 6 △1
PIPE
STEEL C-0C2916 REV 15

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-R010/241(Q) SHT 2 OF 2	1

DRAWING APPLICABLE TO UNITS 1 2 3 4 5 6 7 8

N49846

ITEM NO	NO REQ'D	PART NO	SIZE	DESCRIPTION	MATERIAL
1	1	211	C	SWAY STRUT PIPE O.D. = 6 5/8"	
				W = 2'-0 1/4" CLAMP MAT'L = C.S.	
				(BY M-218 B SUPPLIER)	
2	1	211	C	SWAY STRUT PIPE O.D. = 6 5/8"	
				W = 16 5/8" CLAMP MAT'L = C.S.	
				(BY M 218 B SUPPLIER)	

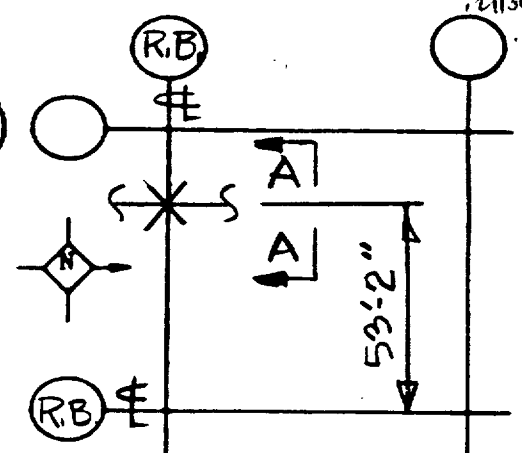
Supply B

Altran Report 96227-TR-03 Rev. 01
Att./Appx. B Sh 3358

JB

FORCES #	FX	FY	FZ
POS.	—	600	900
NEG.	—	1800	950

MVMTS. "	X	Y	Z
THERMAL	0.033	—	—
SEISMIC	0.044	—	—



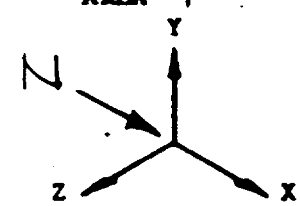
PROBLEM NO. 200 STRESS NO. —

ISSUE 1

DATA PT. 407 NUCLEAR CLASS 3

NOTE: All welds for nuclear supports to be visually inspected unless noted otherwise

LOCATION PLAN
AREA 1



REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
1	11/23/81	REV. REF. DWGS, LOADS, MVMTS, & ISSUE NO.	MT / HA	KR / PL	BH	RJ		
0	9/3/80	ISSUED FOR CONSTRUCTION	DEN / RMM	VR / SW				B

SNUPPS

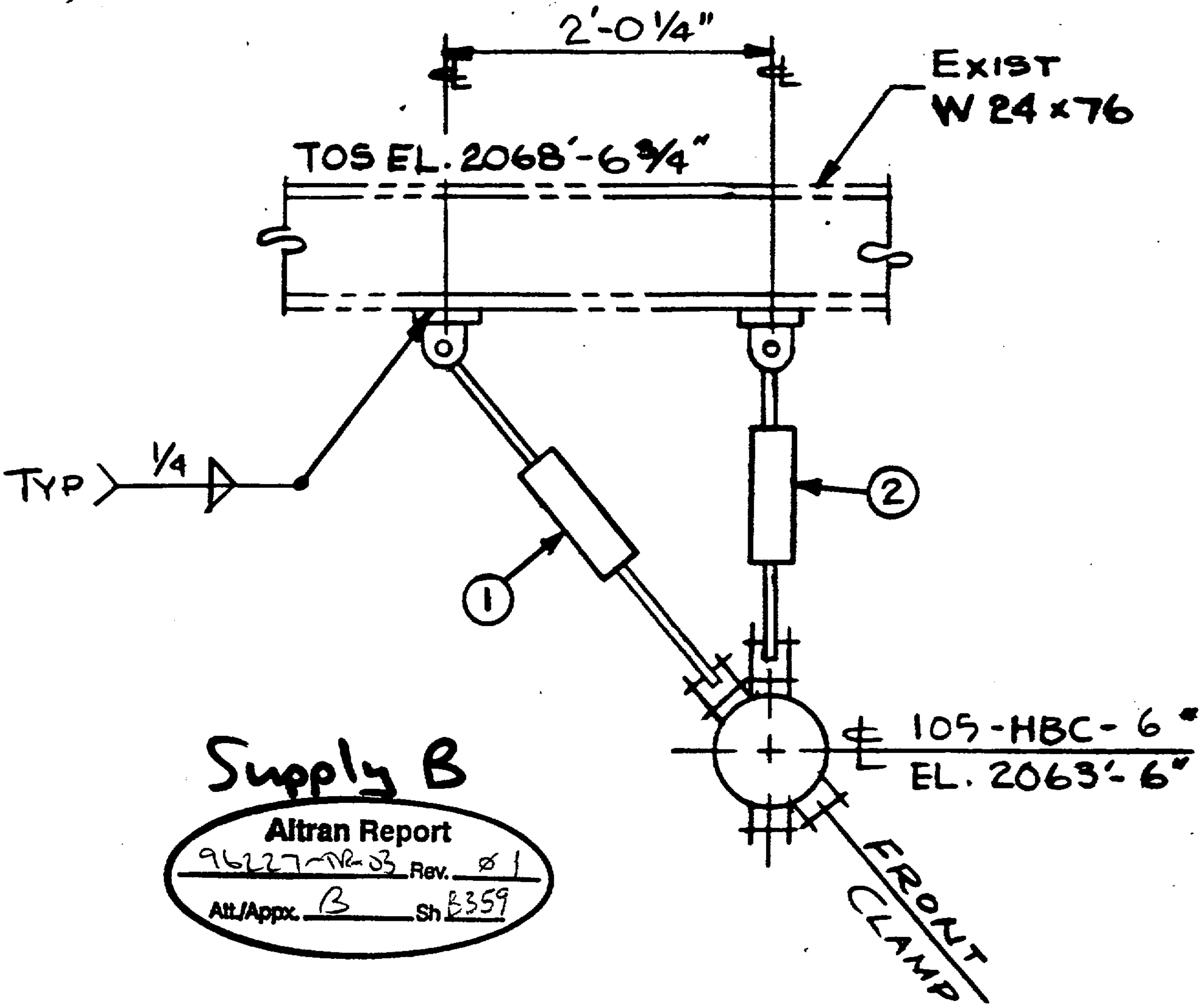
DRAWING NO. M-06GN02

BECHTEL GAITHERSBURG

REF. DWGS. ISO M-03GN02 REV. 6
PIPE
STEEL C-0S2611 REV. 9

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-C027/251 (Q) SHT 1 OF 2	1



Supply B

Altran Report 96227-TR-03 Rev. 01
Att./Appx. B Sh B359

JB
12/13/00

ELEVATION A-A

REV.	DATE	REVISIONS	BY	CHK	DESIGN SUPVR	ENG'R	PROJ. ENGR	APP
1	4/28/..	REV. REF. DWGS.						
0	5/3/..	ISSUED FOR CONSTRUCTION						

SNUPPS

DRAWING NO. M-06GN02

BECHTEL GAITHERSBURG

REF. DWGS.
ISO M-09GN02 Rev 6
PIPE
STEEL C-092611 Rev 9

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BLDG. TRAIN "B"

JOB NO.	HANGER NO.	REV.
10466	0-GN02-C027/251 (Q) SHT 2 OF 2	1

M47049

DRAWING APPLICABLE TO UNITS 1 2 3 4 5 6 7 8

ITEM NO	NO REQ'D	PART NO	SIZE	DESCRIPTION	MATERIAL
1	1	211	C	SWAY STRUT ASSY W= 40.39"	
			PIPE O.D. = 10 3/4"	CLAMP MATL: C.S (BY-M218B SUPPLIER)	
2	1	211	C	SWAY STRUT ASSY - (W=21.67")	
			PIPE OD. = 10 3/4"	CLAMP MATL. CS (BY-M218B SUPPLIER)	

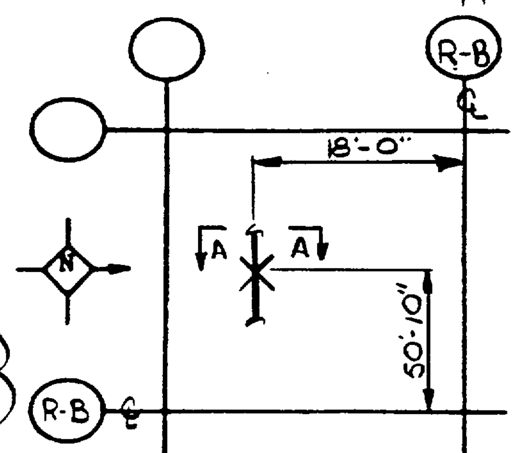
Supply B

Altran Report
96227-TR-03 Rev. 01
Att./Appx. B Sh B360

JB
12/10/00

FORCES #	FX	FY	FZ
POS.	3100	1000	—
NEG.	3150	2050	—

MVMTS. "	X	Y	Z
THERMAL	—	—	0.002
SEISMIC	—	—	0.047



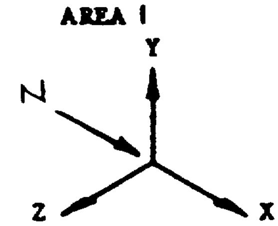
PROBLEM NO. 200 STRESS NO. ______

ISSUE 1

DATA PT. 390 NUCLEAR CLASS 3

NOTE: All welds for nuclear supports to be visually inspected unless noted otherwise

LOCATION PLAN
AREA 1



REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENG'R	APPR
1	11/23/81	REV. REF. DWGS, MVMTS, LOADS, & ISSUE NO	MT DRAWA	KKB	DL	BH	RJ	
0	1/3/78	ISSUED FOR CONSTRUCTION	MT		BH			

SNUPPS

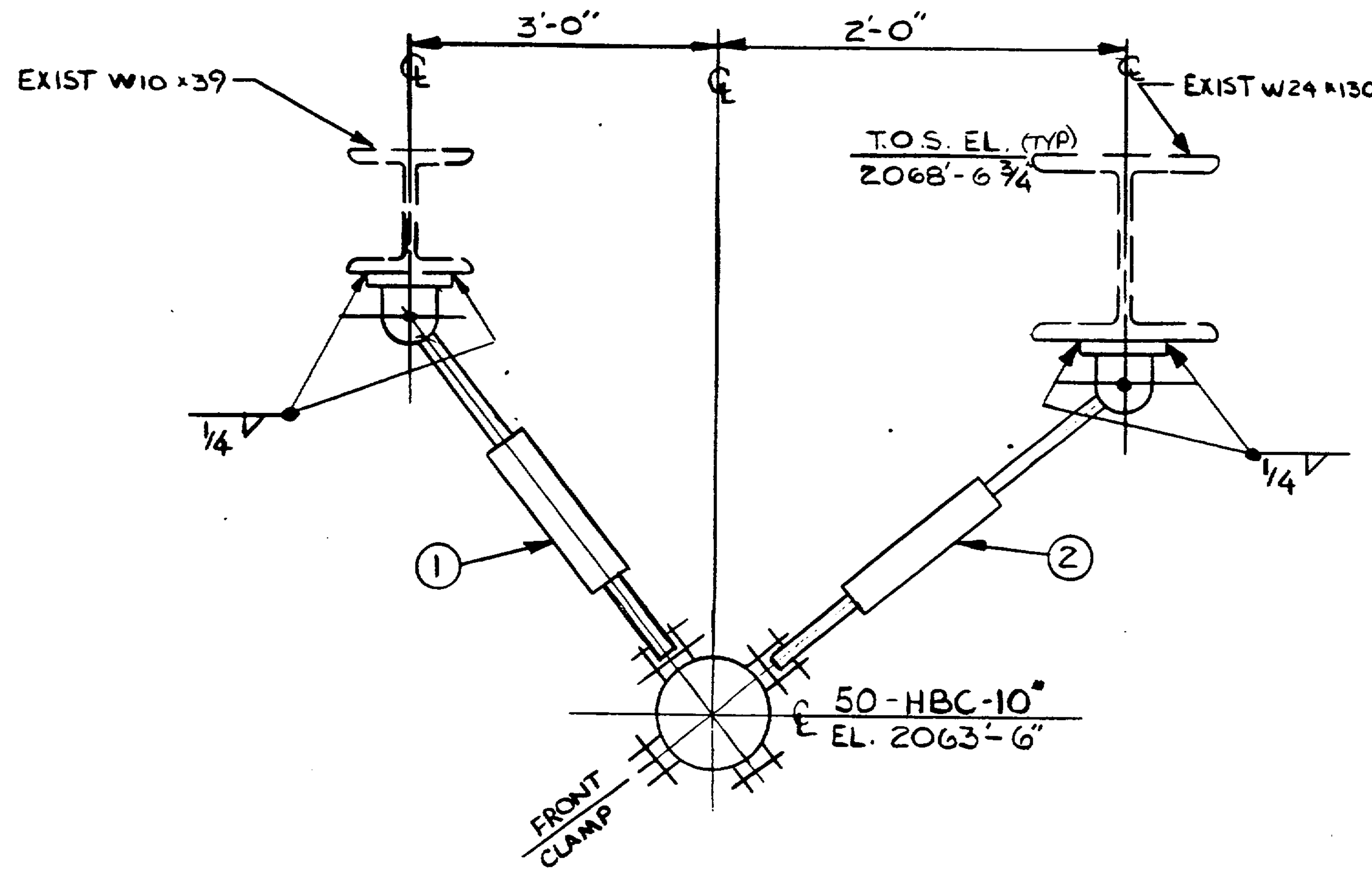
DRAWING NO.
M-06GN02

BECHTEL
GAITHERSBURG

REF. DWGS.
ISO M-03GN02 REV 6
PIPE ______
STEEL C-0S2611 REV 9

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN 'B'

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-C026/251 (Q) SHT. 1 OF 2	1



ELEVATION A-A

Supply B

Altran Report
96227-TR-03 Rev. Ø1
Att./Appx. B Sh B361

DSS 12/13/00

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
2								
1	11/23/81	REV. REF. DWGS						
0	5/3/	ISSUED FOR CONSTRUCTION						

SNUPPS

DRAWING NO.

M-066N02

BECHTEL GAITHERSBURG

REF. DWGS.

ISO M-03GN02 REV 6
PIPE
STEEL C-052611 (Q) REV 9

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN 'B'

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-C026/251(Q) SHT. 2 OF 2	1

N47049

DRAWING APPLICABLE TO UNITS 1 2 3 4 5 6 7 8

ITEM NO	NO REQ'D	PART NO.	SIZE DESCRIPTION	MATERIAL
1	1		5/8"X7"x7" PLATE (BY M-216 SUPPLIER)	SA 515 GR65
2	1		5"Ø SCH 40 PIPE, 5 15/16" LONG (BY M-216 SUPPLIER)	SA-106 GR B

Supply B

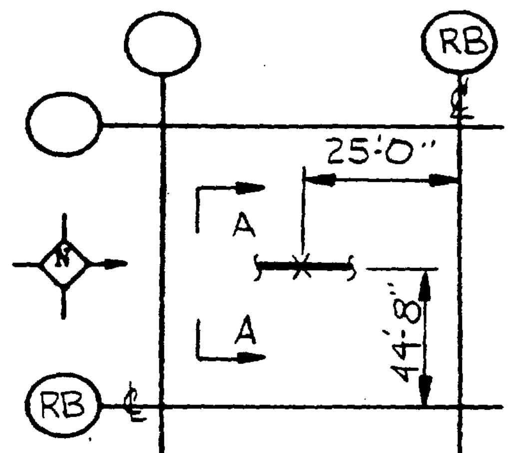
Altran Report
96227-TR-03 Rev. Ø1
Att./Appx. B Sh B362

JB

DSB
12/13/00

FORCES #	FX	FY	FZ
POS.	———	1600	1950
NEG.	———	5500	2000

MVMTS. "	X	Y	Z
THERMAL	0.021	———	———
SEISMIC	0.061	———	———



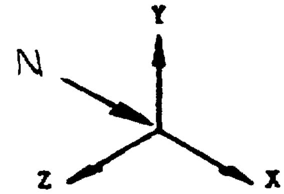
PROBLEM NO. 200 STRESS NO. ———

ISSUE 1

DATA PT. 320 NUCLEAR CLASS 3

NOTE: All welds for nuclear supports to be visually inspected unless noted otherwise

LOCATION PLAN
AREA 1



REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPVR	ENG'R	PROJ. ENGINR	APPR
2								
1	11/22/81	REV. REF. DWGS., LOADS, MVMTS, & ISSUE NO.	MT / HA	KKB / RL	BH	RL		
0	5/3/80	ISSUED FOR CONSTRUCTION	DEW / CEW	VE / BU	DS / GS	BS		B

SNUPPS

DRAWING NO.

M-06GN02

BECHTEL
GAITHERSBURG

REF. DWGS.
ISO M-03GN02 REV 6
PIPE
STEEL C-0C2916 REV 15

PIPE SUPPORTS
CONTAINMENT COOLING SYSTEM
REACTOR BUILDING TRAIN "B"

JOB. NO.	HANGER NO.	REV.
10466	0-GN02-C022/231(Q) SHT 1 OF 2	1

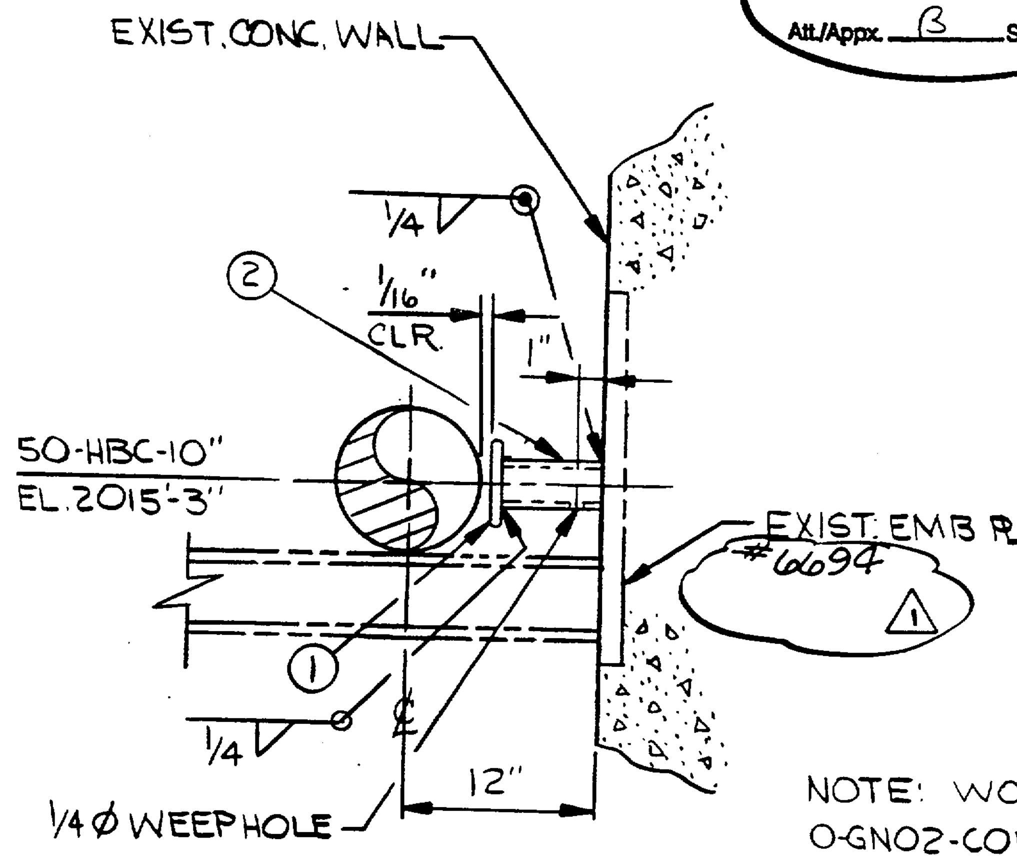
N40821

DRAWING APPLICABLE TO UNIT

Supply B

Altran Report 96227-TR-03 Rev. Ø1
Att./Appx. B Sh B363

JB
DGG 12/13/00



ELEVATION

NOTE: WORK W/DWG O-GN02-C019/231

REV.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ. ENG'R	APPR
1	11/23/81	REV. REF. DWGS. & ADD EXIST EMB PL NO.	MT	AKR	BY	RJ		
0	5/3/	ISSUED FOR CONSTRUCTION	DRW	CEW	DB			

SNUPPS	BECHTEL GAITHERSBURG	REF. DWGS.	ISO M-03GN02 REV 6
DRAWING NO. M-06GN02			PIPE
			STEEL C-0C2916 REV 15
PIPE SUPPORTS CONTAINMENT COOLING SYSTEM REACTOR BUILDING TRAIN "B"	JOB. NO. 10466	HANGER NO. O-GN02-C022/231(Q) SHT 2 OF 2	REV. 1

N49846

DRAWING APPLICABLE TO UNITS 1 2 3 4 5 6 7 8