BALANCE OF PLANT

MECHANICAL EQUIPMENT AND PIPING

SEISMIC REEVALUATION PROGRAM

SAN ONOFRE

NUCLEAR GENERATING STATION

UNIT 1

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1.0 INTRODUCTION

1.1 BACKGROUND

Structures, equipment, and piping at San Onofre Unit 1 originally designated as seismic category A were designed to withstand a 0.5g Housner Design Basis Earthquake. The design work was completed in early 1965. The methods of analysis and acceptance criteria were in accordance with accepted practice at that time. The technology of seismic analysis has advanced rapidly in the years since the original design of San Onofre Unit 1 was completed. This advance has been largely in the field of finite-element analysis and numerical methods. During this same period, codes and regulatory practices pertaining to the design of nuclear power plants have also changed. This evolution, while not resulting in a change in the basic concepts of design, has yielded more detailed information concerning the behavior of structures during an earthquake.

San Onofre Nuclear Generating Station Unit 1 (San Onofre Unit 1) was designed before the current technology and codes had fully evolved. In order to obtain an updated understanding of the plant dynamic characteristics and to reflect an increase of the maximum ground acceleration from 0.5g to 0.67g (the design basis for Units 2 and 3), a seismic reevaluation program was initiated to evaluate safety related structures and equipment at San Onofre Unit 1. This program was based upon the use of current analysis methods and acceptance criteria.

The first phase of the seismic reevaluation program began in 1974 with the reevaluation of the NSSS, the concrete reactor building and the steel containment sphere. As a result of this reevaluation, modifications to the NSSS supports were installed in 1976. During this same time two new structures were constructed. These were the sphere enclosure building and the diesel generator building; the former to provide additional biological shielding about the containment structure and the latter to house two new emergency power diesel generators. Both of these structures and associated seismic category A mechanical equipment and piping were designed to the same seismic input levels utilized for Units 2 and 3 (0.67g) and the acceptance criteria were based upon current standards.

After the completion of the initial phase of the seismic reevaluation program a "balance of plant" program was begun to reevaluate the remaining safety related structures, equipment, and piping. This program was suspended in 1978 to allow time for studies of expected site specific ground accelerations and because the NRC staff requested that the seismic reevaluation of San Onofre Unit 1 be performed as part of the Systematic Evaluation Program (SEP).

In mid 1981, work was restarted on the seismic reevaluation of safety related mechanical equipment and piping not previously reevaluated or otherwise qualified. The BOPMEP Seismic Reevaluation Program includes the remainder of the reactor coolant pressure boundary (RCPB) not previously reevaluated and those systems essential to safe shutdown of the plant.

1.2 ORGANIZATION OF THE REPORT

This report has been divided into five sections. Section 1 describes the background associated with the BOPMEP Program. Section 2 describes the program scope. Section 3 describes the program approach and the criteria used for the reevaluation. Section 4 discusses in detail the various methods used for the reevaluation of the piping and the mechanical equipment. Section 5 contains the results of the reevaluation reported separately for each system. Computed stresses are compared to the reevaluation criteria and tabulations of these comparisons are provided. In these tabulations modifications are identified for cases where piping or mechanical equipment do not satisfy the criteria described in Section 3.

2.0 PROGRAM SCOPE

2.1 GENERAL

This document describes the Seismic Reevaluation Program for the San Onofre Nuclear Generating Station, Unit 1, Balance of Plant Mechanical Equipment and Piping (BOPMEP) which is being conducted as part of the Systematic Evaluation Program (SEP).

The scope of the BOPMEP Seismic Reevaluation Program consisted of:

(a) The remainder of the Reactor Coolant Pressure Boundary (RCPB) not previously reevaluated;

(b) The piping, equipment and field erected tanks necessary to bring the plant to a safe cold shutdown condition (less than 200°F). This includes boration of the Reactor Coolant System (RCS), heat removal, depressurization of the RCS and miscellaneous supporting functions.

2.2 SYSTEMS

The plant systems reevaluated in the BOPMEP Seismic Reevaluation Program are discussed in the following subsections. These subsections include discussions of system boundaries.

2.2.1 REACTOR COOLANT PRESSURE BOUNDARY

The RCPB includes piping and valves which are connected to the RCS, up to and including the following:

(a) The outermost containment isolation valves in piping which penetrates the containment sphere.

(b) The RCS safety and relief valves.

(c) Piping, fittings and valves leading to connecting systems up to and including the first normally closed valve (from the high pressure side) or the first normally open valve capable of automatic or remote manual closure.

2.2.2 SAFE SHUTDOWN SYSTEMS

Systems listed below which are required to bring the plant to a safe cold shutdown were reevaluated.

System boundaries included all connected piping up to and including the first valve that is normally closed or capable of automatic or remote manual closure when the safe shutdown is required.

A. BORATION AND DEPRESSURIZATION FUNCTION

(a) Portions of the Chemical and Volume Control System (CVCS) that supply borated water from the Refueling Water Storage Tank (RWST) to the RCS via the normal charging lines and the auxiliary spray line to the pressurizer.

(b) Portions of the Miscellaneous Water System which are required to ensure pressure boundary integrity of the RWST and piping to the CVCS.

B. HEAT REMOVAL FUNCTION

(a) Portions of the Main Steam System required to remove decay heat from the RCS by venting steam to the atmospheric steam dump valves in the main steam relief header.

(b) Portions of the Condensate and Feedwater System and Auxiliary Feedwater System required to provide makeup to the steam generators.

(c) Portions of the Auxiliary Coolant System required to remove decay heat in going from hot shutdown to cold shutdown including Residual Heat Removal System piping and equipment.

In addition, all portions of the Auxiliary Coolant System required to support equipment cooling requirements and maintain its pressure boundary were reevaluated. Piping and equipment connected to the spent fuel pool were reevaluated to ensure integrity of the fuel pool.

(d) The Salt Water Cooling System from the intake structure to the component cooling water heat exchangers.

C. MISCELLANEOUS SUPPORT SYSTEMS

To support the primary functions noted above, instrument air and service water were reevaluated insofar as they support the capability to effect a safe cold shutdown.

3.0 BOPMEP APPROACH AND REEVALUATION CRITERIA

3.1 BOPMEP APPROACH

This reevaluation considered the occurrence of a Design Basis Earthquake (DBE) in combination with normal plant operating loads. Mechanical equipment, piping and tanks were reevaluated with respect to their ability to withstand the effects of a DBE without loss of the capability to perform their safety functions.

The BOPMEP Seismic Reevaluation Program utilized the DBE described in subsection 3.7.1 and Figure 3.7-1 of the document entitled "Balance of Plant Structures (BOPS) Seismic Reevaluation Criteria" which was transmitted to the NRC by Reference 1. The design response spectra for horizontal ground motion correspond to the Housner spectra, as described in Section 9.2 of the San Onofre Unit 1 FSA, normalized to 0.67 g. The design response spectra for vertical ground motion are normalized to 2/3 of the horizontal spectra.

The floor response spectra employed in this program are based on the above ground motion and were developed, where required, in accordance with the provisions of Section 3.7.2.5 of BOPS Seismic Reevaluation Criteria document.

3.2 REEVALUATION CRITERIA

3.2.1 PIPING AND MECHANICAL EQUIPMENT CRITERIA

The analysis and reevaluation of piping considered the faulted condition as defined in the ASME Section III Code. Reference to the ASME Section III Code herein refers to the ASME Boiler and Pressure Vessel Code, Section III, 1974 edition, summer addenda, (Reference 2). The 1974 edition of the code is referenced because the quality assurance review of the ADLPIPE computer code was to that edition. However, the code equations for resultant stresses which are utilized in this computer program have not changed in subsequent editions of the code.

The original design code for most of the piping is Power Piping Code ASA B31.1, 1955. The basic material allowable stresses are comparable between ASA B31.1 and ASME Section III Code. The design, fabrication, and installation practices employed during the original design and construction of the plant are essentially the same as those used today for safety related systems. These equivalent methods pertain to welding procedures, non-destructive examination, methods of fabrication, material mechanical properties, pipe wall thickness and other basic engineering and construction techniques. For these reasons the rules of ASME Section III Code (Class 2 and 3) have been selected as the guideline acceptance criteria for the RCPB and safe shutdown systems.

Some portions of the piping reevaluated would be considered ASME Section III, Class 1 piping in newer plants. From ASME Section III

subsections NB-3650 and NC-3650, the allowable stress limits for ASME Code Class 1 piping are higher than the allowable for ASME Code Class 2 and 3 piping. However more stringent design and fabrication methods are required to use the Class 1 allowables. Therefore to minimize reevaluation analysis requirements, the more conservative Code Class 2 and 3 allowables were used for all piping. This is consistent with references 3, 4 and 5.

For the BOPMEP program the stress limits presented in Table 3-1 were used for piping stress evaluation. Table 3-1 is a restatement of the stress limits given in the ASME Section III Code. Similarly, the reevaluation of mechanical equipment (i.e. pressure vessels, heat exchangers, pumps and valves) was based on the consideration of primary stresses in accordance with the limits for emergency conditions for active components and faulted service for inactive components, as contained in the ASME Section III Code. Table 3-2 provides the load combinations and stress limits used for mechanical equipment.

The load combination and stress limits used for the reevaluation of supports for piping and mechanical equipment are provided in Table 3-3. As described in footnote 4 of Table 3-3, the AISC "Specification for the Design, Fabrication and Erection of Structure Steel For Buildings" (Reference 6) was used as the basis for allowable stresses for linear supports of mechanical equipment and piping. Otherwise, manufacturer's load rating limit information or ASME Section III Code provisions provide the basis for reevaluation

acceptance criteria for piping, mechanical component supports and plate and shell type supports.

3.2.2 FIELD ERECTED TANKS CRITERIA

The load combination and stress limits for the reevaluation of field erected tanks are provided in Table 3-4. The shell stress limits and anchorage criteria specified are consistent with the AWWA standard (Reference 7) and the AISC Manual of Steel Construction, Eighth Edition respectively. These working stress allowables are increased by a factor of 1.25 for shell stress and 1.33 for anchorage criteria in accordance with the provisions of the codes. The criteria for bearing pressure and safety factors against overturning and sliding are consistent with the BOPS Seismic Reevaluation Criteria Section 3.8.5.5 which was transmitted to the NRC by Reference 1.

3.3 STRUCTURAL INTEGRITY CRITERIA

The reevaluation criteria discussed in Section 3.2 is not indicative of probable structural failure. In fact there is substantial compounded margin in present day seismic qualification criteria.

A synopsis of a series of analytical studies of seismic margin done at Lawrence Livermore Lab is presented in Reference 8. These analytical studies for the most part were based on using coupled soil-building models, and coupled building equipment models, then performing dynamic time history analyses parametrically using a large number of scaled actual earthquake acceleration time histories.

Very briefly these studies identified the "Factors of Conservatism" (or margin) associated with various practices. These factors are listed in Table 3-5. This work is especially useful because it is a direct rational approach to the study of the conservatism in each part of the long seismic design chain.

In order to make an accurate assessment of the structural capability of the piping and equipment, a different criteria, less conservative than the reevaluation criteria, was developed. This criteria was used to assess the structural integrity of piping and mechanical equipment when the reevaluation criteria was not met. The intent of this criteria was to establish maximum stress levels below which structural failure would not be expected. The "integrity criteria" stress levels were developed for comparison to elastically calculated stresses and are based on the results of Reference 8. The factors used for the various components are listed in Table 3-6.

All of the factors in Table 3-5 are applicable to the piping and equipment. The range of cumulative multiple factors of conservatism from Table 3-5 is 5.2 to 7.7.

The lower bound value of 5.2 was used to establish the Integrity Criteria for large piping. Specifically the Integrity Criteria allowable was the product of the code allowable from Table 3-3 and the cummulative factor of conservatism (5.2).

Mechanical equipment was based on similar factors to the large piping. However mechanical equipment supports tend to be more compact and rigid. Therefore, the reserve plastic capacity was not included in the respective factor. The resulting Integrity Criteria for mechanical equipment was the product of the cummulative conservatism factor (2.36) and the code allowable from Table 3-3.

The factor developed for pipe support structures was similar to that for the equipment since supports, primarily bolts and welds are rigid and brittle in relation to piping. However, the effects of damping on piping support loads are significant. Therefore the maximum damping factor was included in the support structures conservatism factor. The resulting integrity criteria allowable the product of the factor of conservatism (3.0) and the support component ultimate stress or strength. The conservatism factor for piping component standard supports (e.g., U-bolts) is based on similar factors to the piping. The factor is the product of 5.2 and the component design load rating.

The conservatism of evaluation of the field erected tanks is considered small. Therefore the integrity criteria allowable for the tanks is the ultimate strength values of the tank components.

The survey presented in Reference 9 suggests that power plant piping will not fail in a severe earthquake. This is especially true for small piping because of its inherent flexibility. Therefore it is concluded that structural integrity is not applicable for small piping.

TABLE 3-1

LOADING COMBINATIONS AND STRESS CRITERIA FOR

SEISMIC REEVALUATION OF PIPING[a]

Condition	Loading Combinations	Stress Limits
FAULTED	PO + DW + DBE + DF	$S_{OL} < 2.4\ S_h$

Legend:

PO - Operating Pressure

DW - Dead Weight

DBE - Design Basis Earthquake (inertia portion)

DF - Dynamic events associated with conduct of safe shutdown during or following which the piping system being evaluated must remain intact, e.g. main steam safety relief valve discharge.

S_{OL} - Defined by EQN. 9 - NC 3652, ASME Section III Code

S_h - Basic material allowable stress at operating temperature, PSI (Refer to Table I-73 of ASME Section III Code)

[a] Allowable criteria stated herein are guideline criteria. Deviations may be taken when justified.

TABLE 3-2

LOADING COMBINATIONS AND STRESS CRITERIA FOR MECHANICAL EQUIPMENT[a] (Sheet 1 of 2)

Component	Loading Combination[2]	Criteria[5]
Pressure vessels and heat-exchangers	Deadweight + Pressure + DBE + Nozzle Loads	$\sigma_m \leq 2.0S$ $(\sigma_m \text{ or } \sigma_\ell) + \sigma_b \leq 2.4S$
Active pumps[1]	Deadweight + Pressure + DBE + Nozzle Loads	$\sigma_m \leq 1.5S$ $(\sigma_m \text{ or } \sigma_\ell) + \sigma_b \leq 1.8S$
Inactive pumps	Deadweight + Pressure + DBE + Nozzle Loads	$\sigma_m \leq 2.0S$ $(\sigma_m \text{ or } \sigma_\ell) + \sigma_b \leq 2.4S$
Active valves[1]	Deadweight + Pressure + DBE + Nozzle Loads	Extended Structure: $\sigma_m \leq 1.5S$ $(\sigma_m \text{ or } \sigma_\ell) + \sigma_b \leq 1.8S$ Nozzle loads: [3] Pressure Boundary $1.2\ P$[6]
Inactive valves	Deadweight + Pressure + DBE + Nozzle Loads	$\sigma_m \leq 2.0S$ $(\sigma_m \text{ or } \sigma_\ell) + \sigma_b \leq 2.4S$ Nozzle loads: [4] Pressure Boundary $1.5\ P$[6]

[a] Allowable criteria stated here are guideline criteria. Deviations may be taken when justified.

TABLE 3-2

LOADING COMBINATIONS AND STRESS CRITERIA FOR MECHANICAL EQUIPMENT[a] (Sheet 2 of 2)

NOTES

1. Active pumps and valves are defined as those that must perform a mechanical motion during the course of accomplishing a system safety function.

2. Nozzle loads shall include piping loads transmitted to the component during the DBE. Operating pressure is the pressure at the normal full power condition.

3. Piping loads at piping/active-valve interfaces shall be limited to below yield stress of the attached piping.

4. Valves, being stronger than the attached piping, and not having a history of gross failures of pressure boundaries, can safely accept piping loads without compromising the valve pressure retaining integrity. Therefore a nozzle loads check is not necessary.

5. σ_m = general membrane stress. This stress is equal to the average stress across the solid section under consideration, excludes discontinuities and concentrations, and is produced only by mechanical loads.

   σ_ℓ = local membrane stress. This stress is the same as σ_m except that it includes the effect of discontinuities.

   σ_b = bending stress. This stress is equal to the linear varying portion of the stress across the solid section under consideration, excludes discontinuities and concentrations, and is produced only by mechanical loads.

   S = Code allowable stress value. The allowable stress shall correspond to the metal temperature at the section under consideration.

6. P = Pressure rating specified in ASME Section III Code, Table NC-3512(b) at service temp.

[a] Allowable criteria stated here are guideline criteria. Deviations may be taken when justified.

TABLE 3-3

LOADING COMBINATIONS AND STRESS CRITERIA FOR MECHANICAL EQUIPMENT SUPPORTS AND BOP PIPING SUPPORTS[a] (Sheet 1 of 2)

Support	Loading Combination[3]	Criteria[4]
Linear supports[1] for Mechanical equipment and piping	Deadweight + DBE + Thermal + Nozzle Loads	$1.65 \geq$ Deadweight + DBE + Thermal Loads + Nozzle Loads
Plate and shell[2] supports for Mechanical equipment (Active)	Deadweight + DBE + Nozzle Loads + Thermal	$\sigma_1 \leq 1.2Sa$ $\sigma_1 + \sigma_2 \leq 1.8Sa$ $\sigma_3 \leq 0.5Sa$
Plate and shell supports for Mechanical equipment (Inactive) and piping	Deadweight + DBE + Nozzle Loads + Thermal	$\sigma_1 \leq$ Lesser of $1.5Sa$ or $0.4\ S_u$ $\sigma_1 + \sigma_2 \leq$ Lesser of $2.25Sa$ or $0.6\ S_u$ $\sigma_3 \leq 0.5Sa$
Piping Mechanical Component supports	Deadweight + DBE + Nozzle Loads + Thermal	Manufacturer's Load Limit Information

[a] Allowable criteria stated here are guideline criteria. Deviations may be taken when justified.

TABLE 3-3

LOADING COMBINATIONS AND STRESS CRITERIA FOR MECHANICAL EQUIPMENT

SUPPORTS AND BOP PIPING SUPPORTS[a] (Sheet 2 of 2)

NOTES
1. Linear type support: A linear type component support is defined as acting under essentially a single component of direct stress. Such elements may also be subjected to shear stresses. Examples of such structural elements are: tension and compression struts, beams and columns subjected to bending, trusses, frames, rings, arches and cables.
2. Plate and shell type supports: Plate and shell type supports are supports such as vessel skirts and saddles that are fabricated from plate and shell elements and are normally subjected to a biaxial stress field.
3. Nozzle loads shall be those nozzle loads acting on the supported equipment during the DBE. Operating pressure is the pressure at the normal full power condition.
4. σ_1 = membrane stress, which is the average stress across the solid section under consideration. It includes the effects of discontinuities but not local stress concentrations.
σ_2 = bending stress, which is the linear varying portion of the stress across the solid section under consideration. It excludes the effects of discontinuities and concentrations.
σ_3 = maximum tensile stress at the contact surface of a weld producing tensile load in a direction through the thickness of plate and rolled shape elements.
Sa = allowable stress value from the applicable Table of Appendix I of ASME Code.
S_u = ultimate strength of material at a given temperature.
S = for structural steel, S is the required section strength based on elastic design methods and the allowable stresses defined in Part 1 of the AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings" November 1, 1978.

[a] Allowable criteria stated here are guideline criteria. Deviations may be taken when justified.

TABLE 3-4

LOADING COMBINATIONS AND ACCEPTANCE

CRITERIA FOR FIELD ERECTED TANKS[a] (Sheet 1 of 2)

Item	Loading Combination[1]	Criteria[2]
Shell plate (A283 grade C)	$D + L + F + R_o + E'$	$fs \leq 15.0$ ksi $fc \leq 15.0$ ksi
Anchor Bolts (A307-A)	$D + L + F + R_o + E'$	$fv \leq 10$ ksi $ft \leq 26\text{-}1.8\ fv \leq 20$ ksi
Foundation	$D + L + F + R_o + E'$ $D + F + E'$	17 KSF bearing pressure SF = 1.1 overturning, sliding and flotation safety factor

[a]Allowable criteria stated herein are guideline criteria. Deviations may be taken when justified.

TABLE 3-4

LOADING COMBINATIONS AND ACCEPTANCE

CRITERIA FOR FIELD ERECTED TANKS (Sheet 2 of 2)

NOTES

1. Definitions and Nomenclature for Load Combination

D = Dead Loads or their related internal moments and forces.

L = Applicable live loads or their related internal moments and forces.

F = Lateral and vertical pressure of liquids, or their related internal moments and forces.

R_o = Maximum pipe and equipment reactions during normal operating conditions based on the steady-state condition, if not included in the above loads.

E´ = Loads generated by the Design Basis Earthquake (DBE).

2. Definitions and Nomenclature for Criteria

f_s = Maximum calculated tensile stress

f_c = Maximum calculated compressive stress

f_t = Maximum calculated bolt tensile stress

f_v = Maximum calculated bolt shear stress

TABLE 3-5

Practice	Margin
a) Broadening of Floor Response Spectra	1.17
b) Use of Elastic Spectra with Inelastic Response	1.2
c) Consideration of actual material properties	1.17
d) Consideration of coupling effects	1.44
e) Reserve plastic capacity	2.2 to 2.6
f) Increased Damping	1.0 to 1.25

TABLE 3-6

INTEGRITY CRITERIA ALLOWABLES

Components		Stress Criteria
Piping	Large (>2")	5.2 x Code Allowable[1]
	Small (≤2")	Not Applicable
Pipe Supports	Component Standard Support	5.2 x Component Design Load Rating
	Structural Steel Support	3 x S_u[2]
	Concrete Fasteners	3 x Ultimate Pullout
Mechanical Equipment	All components except concrete fasteners	2.36 x Code Allowable[1]
	Concrete fasteners	3 x Design Load Rating
Field Erected Tank		S_u

[1] From Tables 3-1, 3-2 and 3-3

[2] Ultimate Strength

4.0 METHODS OF EVALUATION

4.1 LARGE PIPING

Large piping (>2") systems were reevaluated using one of the following methods in conjunction with the reevaluation criteria of Section 3.2.

(a) Lumped mass dynamic models using the appropriate amplified floor response spectra as input to the dynamic analysis.

(b) A similarity approach where a piping system is reevaluated on the basis of its similarity to other qualified or reevaluated piping systems or components. For example for similar pipe runs, one line is chosen for detailed analysis and other similar lines are reevaluated by comparison to the line analyzed in detail.

(c) Declassification by the addition of isolation valves or safety analysis.

The selection of the appropriate method employed in any given instance depended on a number of factors such as the support configuration, the uniqueness of the line configuration, and the line size.

The majority of the piping systems were reevaluated using dynamic analysis with response spectra input. The following principal computer codes were

used in dynamic and static analyses to determine loads, stresses and deformations of systems and components. These programs are described and verified in References (10) through (12).

A. DIS/ADLPIPE - static and dynamic pipe design and stress analysis

B. ME101 - linear elastic analysis of piping systems

C. BSAP - structural analysis program for static and dynamic response of linear systems

DIS/ADLPIPE and ME101 were used to analyze piping system for dead weight and seismic loadings. BSAP was used to analyze complex piping support configurations.

The percentage of the critical damping value used in the analysis of piping and equipment is given in Table 4-1. These are identical with the damping values recommended in Regulatory Guide 1.61 (Reference 13).

The combination of modal responses are in accordance with Regulatory Guide 1.92 (Reference 14). The total seismic response for each analysis was obtained by combining the individual modal responses utilizing the square-root-of-the-sum-of-the-squares method.

For systems having modes with closely spaced frequencies, the above method was modified to include the possible effect of these modes. The

groups of closely spaced modes were chosen such that the difference between the frequencies of the first mode and the last mode in the group were obtained in accordance with Regulatory Guide 1.92.

The piping systems were considered as linear elastic. The following items were considered in preparation of the mathematical model for static and dynamic analysis.

A. Each model commenced and terminated at an anchor. If this was not possible, due to model size and/or complexity, one of two following options was used:

   (i) Overlapping of partial models were employed to ensure that the effects of boundary conditions were minimized.

   (ii) The model was terminated at the branch where the section modulus ratio of run pipe to branch pipe was equal to or greater than 10.

B. Field verified piping isometrics and IE Bulletin 79-14 reviewed reports were used in modeling piping geometry and restraint locations.

C. Equipment nozzles and penetrations were considered as an anchor point in the analysis. Penetrations which are grouted were assumed as bilateral restraints. (Axial restraint was only considered if a welded collar is embedded in the penetration).

D. Flanges were considered as additional lumped weight. Flange cross sectional properties were assumed to be the same as connecting pipe.

E. Valves were modeled as follows:

(i) Valve body thickness was assumed to be at least twice the connecting pipe wall thickness.

(ii) Operator's cross section properties were calculated on the basis of lowest frequency of 33 HZ.

(iii) If actual valve data was not available, the length of the valve, dimension of the operator, and total weight were obtained from catalogs.

(iv) For valves without operators, the total weight of the valve was lumped at the center of the valve.

(v) When the valve and operator center of gravity (C.G.) was known, the total weight was lumped at the C.G.

(vi) When the valve and operator C.G. was not known, and the center of gravity could not be calculated, 2/3 of the total weight was lumped at the center of the valve body. The remaining 1/3 of the total weight was lumped at tip of the operator.

G. In certain instances, Seismic Category A piping is connected to non-Seismic Category A piping at locations other than a piece of equipment. These transition points occur at isolation boundary valves. Since a dynamic analysis must be modeled from pipe anchor point to anchor point (or seismic restraint), it was necessary to analyze the system from the anchor point in the Seismic Category A system through the valve to the first anchor point or equivalent seismic restraint beyond the Seismic Category A system boundary.

Where small Non-Seismic Category A piping is attached to Seismic Category A piping, its effect on the Seismic Category A piping was accounted for by lumping a portion of its mass with Seismic Category A piping at the point of attachment or alternately, the non-seismic piping was included in the seismic piping model out to the first seismic restraint or anchor point.

4.2 SMALL PIPING

A summary of small pipe evaluated is listed in Table 4-2. The evaluation of the small piping ($\leq$2" nominal diameter) was performed by one of the following methods in conjunction with the reevaluation criteria of Section 3.2:

- the ADLPIPE computer program with lumped mass finite element models

- o screening rule technique by hand calculations

- o declassification by the addition of isolation valves or safety analysis.

Results of small piping evaluation were based on a large sample (70%) of the entire scope of small piping. Table 4-2 summarizes, by system, the total number of lines within this scope and the size of the sample that was evaluated in the current program. The small pipe having motor operated valves was considered to be particularly important and all of it was analyzed using ADLPIPE computer models. From the remainder of the piping a number of lines in each of the systems were selected for the sample, and evaluated by hand calculation techniques described below (with preference given to piping in active systems and larger diameter piping).

The screening rules techniques used to evaluate the small pipe comprise several tests of increasing complexity, but decreasing conservatism, which were applied to the pipe configurations. The first test consisted of comparing the spans between seismic supports with critical span lengths which are based on the pipe size, the response spectra, the effect of pipe fittings, and a conservative material stress allowable. If the spans failed to meet the criteria, a hand calculation of the combined stress (seismic, deadweight, and pressure) was performed and compared to the pipe allowable. The effect of concentrated weights within a span was accounted for. For lines that met the reevaluation criteria the most critical support was selected and stress analyzed. Screening rule techniques were verified by computer analysis.

Generally evaluation was performed using as-built isometrics. Whenever the isometrics were not available, field inspection and field sketches of the lines were employed to obtain the information necessary to apply the screening rules.

4.3 FIELD ERECTED TANKS

There are two field erected tanks in the scope of this reevaluation, the refueling water storage tank and condensate storage tank. They were designed in accordance with methods set forth in the Atomic Energy Commission's TID-7024 (Reference 15). The refueling water storage tank is a cylindrical welded steel structure with a domed top. This tank is constructed of five courses of steel plates with the mean diameter of 34 feet and a straight shell height of 37 feet, one inch. Plate thicknesses are: 0.25 inch for the roof, 0.25 inch for the top four courses, 0.329 inch for the bottom course, and 0.3125 inch for the tank bottom. The condensate storage tank is identical to the refueling water storage tank except all courses are 0.26 inch thick.

The refueling water storage tank foundation is a circular reinforced concrete slab. The slab is 35 feet, 6 inches in diameter and its thickness varies between 2 feet, 4-1/4 inches and 2 feet, 0-inch. There are 32 1-5/8-inch diameter anchor bolts embedded 1-foot, 8 inches into the slab for the support of the tank. The condensate storage tank rests on a six-inch thick layer of rock which extends two feet beyond the tank's shell. The tank is surrounded by asphalt paving at its base.

An equivalent static analysis method was used for the structural reevaluation of these tanks. In this analysis three vibrational modes were considered. Of these, two were horizontal modes (impulsive and convective sloshing) and one was vertical. The fundamental frequency of the element being analyzed was computed and its corresponding acceleration coefficient was obtained from the appropriate response spectrum curve described in Section 3.1. If the computed frequency was within the resonance region of the amplified response curve, the resulting acceleration coefficient was increased by 50% to conservatively account for any increased participation from other modes. The resulting acceleration coefficient was then used to compute the moments and forces associated with the seismic loading. The forces and moments associated with these three modes were computed by methods outlined in Reference 8. Damping values of 4 and 0.5 percent of critical, for impulsive and convective modes respectively, were used to determine the spectral acceleration coefficients. The effects of the three individual vibrational modes were combined via the SRSS method to obtain the net dynamic effect.

Using the forces, pressures and moments obtained in the equivalent static analysis the structural adequacy of the tanks was investigated in the following manner. The net hydrodynamic pressure was added to the hydrostatic pressure to obtain the net internal fluid pressure. From this pressure the circumferential (hoop) stresses in the tank shell were determined. The slosh height, above the top of the fluid, due to the DBE was computed and the pressures on the tank top resulting from this fluid sloshing were considered. The existing anchor bolts, tying the Refueling Water Storage Tank to the foundation, were evaluated for uplift tension resulting from the maximum overturning moment at the base of the tank. The base forces

obtained from the equivalent static analysis were utilized to assess the stresses on the soil due to the vertical response and overturning moment. Also, the tank foundation was evaluated for the seismic forces imposed by the base of the tank. These forces include the hydrodynamic fluid pressures at the base of the tank as well as the tank shell longitudinal compressive and tensile forces resulting from the maximum overturning moment at the base of the tank.

4.4 MECHANICAL EQUIPMENT

Mechanical components, such as pumps and tanks, included in the systems being reevaluated are listed in Table 4-3 and valves with extended operators are listed in Table 4-4. Those components indicated as non-active are not required to function in order to facilitate safe cold shutdown, but are required to maintain system pressure boundary.

The evaluation of the equipment was performed on the basis of an equipment sample, because of the similarity of various types of equipment (pumps, valves, etc.). A field audit of the equipment was performed prior to commencing any analysis work and a respresentative sample was selected. The sample of equipment chosen for analysis, together with the reasons for the choice of each item, is given in Table 4-5. The sample is based on the seismic fragility of the equipment as judged from the field inspection.

The stress analysis of the equipment and the supports was performed using linear elastic analysis methods. Hand calculation methods and lumped mass dynamic computer models were used as appropriate. In cases

where hand calculation methods were used the peak acceleration value from the response spectrum was employed if the natural frequency of the component was not computed. When the natural frequency was computed for a component the corresponding response spectrum acceleration value was employed. The seismic inertia loading was then applied as an equivalent static 'g' load. Some equipment was analyzed using lumped mass dynamic models and in these cases a response spectrum method was employed.

Actual nozzle seismic loads were applied in a conservative manner when these loads were available. When the nozzle loads were not available, an assumed load was applied to the equipment. The assumed load was that load which would cause the outside of the pipe to yield.

Manual valves have heavier bodies than the attached piping, and they need not operate during the earthquake. Therefore manual valves are considered acceptable in piping systems that satisfy reevaluation criteria.

The evaluation procedure for valves with extended operators differed from that used for other equipment. No data on allowable seismic loading was available for valves. As a result the approach used was to establish a limit on the seismic acceleration which each valve can experience as part of the piping system. This limit was then compared with results of the piping analyses in Section 5.0. The limits were obtained by:

- identification of the critical stress zones for a class of valves by equivalent static analysis and

- comparison of the structural properties of valves within the class, to determine the relative magnitude of seismic loading and the margins of stress variation within an individual valve structure; for example, whether a particular valve would be expected to fail in the yoke, the bonnet, the bolting or elsewhere.

TABLE 4-1

DBE DAMPING VALUES USED FOR BOPMEP SEISMIC REEVALUATION PROGRAM

Item	DBE Damping (Percent of Critical)
Mechanical Equipment and piping greater than or equal to 12 inches	3
Piping Less than 12 inches	2
Welded steel structures	4
Bolted and/or riveted steel structures	7

TABLE 4-2

DETAILS OF PIPING SAMPLE EVALUATED

System	Total Lines in Scope	Lines Evaluated	% Scope Evaluated
Auxiliary Coolant	26	18	70
Chemical Feed	8	8	100
Circulating Water	8	8	100
Compressed Air	45	24	50
Chemical & Volume Control	57	51	90
Feedwater & Condensate	3	3	100
Miscellaneous Water	9	9	100
Safety Injection	9	9	100
Reactor Cycle Sampling	6	5	80
Reactor Coolant	29	9	30
Steam	11	2	20
TOTAL	211	146	70

TABLE 4-3

EQUIPMENT INCLUDED IN BOPMEP PROGRAM (Sheet 1 of 3)

Equipment Type	Description	Equipment Number	Selected to Sample
Heat Exchanger	Regenerative	E-13	√
	Excess Letdown	E-33	
	Seal Water	E-34	√
	Residual Heat Removal	E-21A/B	
	Component Cooling	E-20A/B	√
	Recirculation	E-11	√
	Spent Fuel Pit	E-12	√
	Pressurizer Sample	E-27	
	Reactor Coolant Sample	E-28	
	Charging Pump Discharge Sample	--	
Tank	Volume Control	C-15	
	Component Cooling Surge	C-17	√
	Air Receiver	C-4A/B/C	√
Pump	Charging	G-8A/B	
	Test (Inactive)	G-42	
	Component Cooling	G-15A/B/C	
	Thermal Barrier Emerg. Cooling	--	

TABLE 4-3

EQUIPMENT INCLUDED IN BOPMEP PROGRAM (Sheet 2 of 3)

Equipment Type	Description	Equipment Number	Selected to Sample
Pump (Continued)	Residual Heat Removal	G-14/A/B	
	Safety Injection (Inactive)	G-50A/B	√
	Salt Water Cooling	G-13A/B	√
	Service Water (Inactive)	G-17A/B	
	Refueling Water (Inactive)	G-27N/S	
	Aux. Feedwater - Turbine Driven	G-10	
	Aux. Feedwater - Motor Driven	G-10S	
Filter	Seal Water Return	C-40	√
	Seal Water Injection	C-42 N/S	
	Seal Water Supply	RCP A/B/C	
	Instrument Air	X-49 A/B	
Miscellaneous	Chemical Pot Feeder	X-19	
	Charging Pump Oil Cooler	--	
	Presr. Liquid Sample Vessel	C-13	
	Reactor Coolant Sample Vessel		

TABLE 4-3

EQUIPMENT INCLUDED IN BOPMEP PROGRAM (Sheet 3 of 3)

Equipment Type	Description	Equipment Number	Selected to Sample
Miscellaneous (Continued)	After Coolers	E-26A/B/C	√
	Aircompressors	K-1A/B/C	√
	Instrument Air Dryer	X-47	

TABLE 4-4

VALVES WITH EXTENDED OPERATORS INCLUDED IN BOPMEP PROGRAM (Sheet 1 of 5)

Valve Operator Type	Tag Number	Line Number	Manufacturer	
			Body	Operator
Motor	MOV 14	17-6"-EG	Pacific	Limitorque
	MOV 15	19-6"-EG	Pacific	Limitorque
	MOV 16	18-6"-EG	Pacific	Limitorque
	MOV 17	20-6"-EG	Pacific	Limitorque
	MOV 18	2000-5"-2502	Velan	Limitorque
	MOV 19	2106-4"-2502	Velan	Limitorque
	MOV 356	2090-2"-2502	Edwards	Limitorque
	MOV 357	2091-2"-2502	Edwards	Limitorque
	MOV 358	2092-2"-2502	Edwards	Limitorque
	MOV 720B	3057-10"-152	Crane	Limitorque
	MOV 813	5002-8"-2501	Crane	Limitorque
	MOV 814	5002-8"-2501	Crane	Limitorque
	MOV 822A	3015-6"-601	Crane	Limitorque
	MOV 822B	3019-6"-601	Crane	Limitorque
	MOV 833	3001-6"-2501	Crane	Limitorque
	MOV 834	3001-6"-2501	Crane	Limitorque
	MOV 883	723-8"-HP	Darling	Limitorque
	MOV/LCV 1100B	6015-4"-151	Darling	Limitorque
	MOV/LCV 1100C	2000-4"-151	Darling	Limitorque

TABLE 4-4

VALVES WITH EXTENDED OPERATORS INCLUDED IN BOPMEP PROGRAM (Sheet 2 of 5)

Valve Operator Type	Tag Number	Line Number	Manufacturer	
			Body	Operator
Motor	MOV/LCV 1100D	6015-4"-151	Darling	Limitorque
Air	CV-3	15-4"-EG	BS & B	BS & B
	CV-4	15-4"-EG	BS & B	BS & B
	CV-19	721-10"-HP	BS & B	BS & B
	CV-20	721-10"-HP	BS & B	BS & B
	CV-21	344-3"-HP	BS & B	BS & B
	CV-76	65-10"-HH	BS & B	BS & B
	CV-77	64-10"-HH	BS & B	BS & B
	CV-78	63-20"-HH	BS & B	BS & B
	CV-79	62-10"-HH	BS & B	BS & B
	CV-82	734-6"-HM2	Fisher	Fisher
	CV-92	765-4"-HM2	Fisher	Fisher
	CV-114	8020-6"-HM2	Fisher	Fisher
	CV-124	18-6"-EG	BS & B	BS & B
	CV-125	20-6"-EG	BS & B	BS & B
	CV-126	17-6"-EG	BS & B	BS & B
	CV-127	19-6"-EG	BS & B	BS & B
	CV-145	10-1-1/2"-EG	Fisher	Fisher
	CV-202	2067-2"-2501	BS & B	BS & B
	CV-203	2071-2"-2501	BS & B	BS & B
	CV-204	2068-2"-2501	BS & B	BS & B

TABLE 4-4

VALVES WITH EXTENDED OPERATORS INCLUDED IN BOPMEP PROGRAM (Sheet 3 of 5)

Valve Operator Type	Tag Number	Line Number	Manufacturer	
			Body	Operator
Air	CV-276	2007-3/4"-2501	BS & B	BS & B
	CV-287	5014-3/4"-2501	BS & B	BS & B
	CV-291	2104-2"-151	BS & B	BS & B
	CV-304	2081-2"-2501	BS & B	BS & B
	CV-305	2080-2"-2501	BS & B	BS & B
	CV-412	2102-1"-601	BS & B	BS & B
	CV-413	2073-1"-601	BS & B	BS & B
	PCV-430C	5025-3"-2501	BS & B	BS & B
	PCV-430H	5011-3"-2501	BS & B	BS & B
	CV-530	5034-2"-2501	Darling	BS & B
	CV-531	5035-2"-2501	Darling	BS & B
	CV-544	5018-3/8"-2505	Masoneilan	Masonelilan
	CV-545	5034-2"-2501R	BS & B	BS & B
	CV-546	5035-2"-2501R	BS & B	BS & B
	TCV-601A	3033-8"-152	BS & B	BS & B
	TCV-601B	3029-8"-152	BS & B	BS & B
	HCV-602	3001-6"-2501	Fisher	BS & B
	RCV 605	3097-1"-152	BS & B	BS & B
	CV 722A	3079-1-1/2"-152	BS & B	BS & B
	CV 722B	3076-1-1/2"-152	BS & B	BS & B
	CV 722C	3082-1-1/2"-152	BS & B	BS & B

TABLE 4-4

VALVES WITH EXTENDED OPERATORS INCLUDED IN BOPMEP PROGRAM (Sheet 4 of 5)

Valve Operator Type	Tag Number	Line Number	Manufacturer	
			Body	Operator
Air	CV-951	5029-3/8"-2505	Masoneilon	Masoneilon
	CV-953	5032-3/8"-2505	Masoneilon	Masoneilon
	CV-955	5026-3/8"-2505	Masoneilon	Masoneilon
	CV-956	5004-3/8"-2505	Masoneilon	Masoneilon
	CV-957	5004-3/8"-2505	Masoneilon	Masoneilon
	CV-962	3008-3/8"-2505	Masoneilon	Masoneilon
	CV-992	5029-3/8"-2505	Masoneilon	Masoneilon
	FCV-1112	2002-2"-2502	BS & B	BS & B
	LCV-1112	5008-2"-2501	BS & B	BS & B
	FCV-1115A	2005-2"-2502	BS & B	BS & B
	FCV-1115B	2008-2"-2502	BS & B	BS & B
	FCV-1115C	2011-2"-2502	BS & B	BS & B
	FCV-1115D	2006-2"-2502	BS & B	BS & B
	FCV-1115E	2009-2'-2502	BS & B	BS & B
	FCV-1115F	2012-2"-2502	BS & B	BS & B
	PCV-1115A	2014-2"-151	BS & B	BS & B
	PCV-1115B	2018-2"-151	BS & B	BS & B
	PCV-1115C	2020-2"-151	BS & B	BS & B
Solenoid	SV65	Various 1/2" & 3/4" lines in Circulating Water System	ASCO	ASCO
	SV66		ASCO	ASCO
	SV79		ASCO	ASCO

TABLE 4-4

VALVES WITH EXTENDED OPERATORS INCLUDED IN BOPMEP PROGRAM (Sheet 5 of 5)

Valve Operator Type	Tag Number	Line Number	Manufacturer	
			Body	Operator
Solenoid	SV80	"	ASCO	ASCO
	SV81	"	ASCO	ASCO
	SV82	"	ASCO	ASCO
	SV100	"	ASCO	ASCO
	SV102	"	ASCO	ASCO
	SV103	"	ASCO	ASCO
	SV104	"	ASCO	ASCO
	SV600	1152-3/4-HP3	Target Rock	Target Rock
	SV601	1151-3/4-HP3	Target Rock	Target Rock
Air Motor	CV410	2103-2"-151	Grinnell	Grinnell
	CV411	2103-2"-151	Grinnell	Grinnell
Ball Valve w/Electro-Hydraulic Actuator	CV517	734-6"-GM	EBV	EBV
	CV518	734-6"-GM	EBV	EBV
	CV525	3006-2"-601	EBV	EBV
	CV526	3006-2"-601	EBV	EBV
	CV527	2014-3"-151	EBV	EBV
	CV528	2014-3"-151	EBV	EBV
Butterfly with Piston Actuator	POV 5	415-12"-KP1	Pratt	Pratt
	POV 6	416-12"-KP1	Pratt	Pratt
	POV 11	-12"-KP1	Pratt	Pratt

TABLE 4-5

MECHANICAL EQUIPMENT REEVALUATION SAMPLES FOR STRUCTURAL ANALYSIS
(Sheet 1 of 2)

Sample No.	Equipment Description	Sampling Rationale
1	Saltwater Cooling Pumps	Represent the only vertical type pumps.
2	Safety Injection Pumps	These pumps are supported differently from most horizontal type pumps. Large attached piping suggested significant nozzle loads are to be reacted by the support structure.
3	Residual Heat Removal Pumps	Representative of horizontal pumps.
4	BS & B Air-operated Valves	Represent one of the three major types of valves.
5	Henry Pratt Butterfly Valves	Represent another group of air operated valves. Air operators are offset with respect to valve body.
6	Limitorque Motor-Operated Valves	These motor-operated valves with heavy operators represent the third major type of valve. Valve yoke and stem are structurally different than the other types.
7	Spent Fuel Pit Heat Exchanger	Identified as flexible during field inspection. Long slender shell supported by two saddles anchored by two bolts each on top of 2.5 feet-high concrete pedestals.
8	Regenerative Heat Exchanger	This item is a triple stacking design with each shell saddle mounted one above the other. This results in high vertical center of gravity with respect to foundation anchor.

TABLE 4-5

MECHANICAL EQUIPMENT REEVALUATION SAMPLES FOR STRUCTURAL ANALYSIS
(Sheet 2 of 2)

Sample No.	Equipment Description	Sampling Rationale
9	Seal Water Heat Exchanger	This item is horizontally mounted on steel structural members which are anchored to the floor and wall in charging Pump Room. Two saddles support the shell; each is attached to the steel structure by only two bolts.
10	Recirculation Heat Exchanger	Horizontally mounted on two saddles which are anchored by four bolts onto slender concrete pedestal. Heat exchanger passes high c.g.
11	Component Cooling Water Heat Exchanger	Two stacking shells mounted horizontally on two sets of double saddles. The upper shell is flexible in all directions.
12	Seal Water Return Filter	This item is chosen as a representative sample for all filters. This item is a vertical component supported by three pipe legs which are anchored to three concrete pads. There are no lateral supports. Filter has a heavy lead jacket that will contribute to overturning moment.
13	Air Compressors	Representative of three identical air compressors.
14	Aftercoolers	Unique item that is coupled with piping response.
15	Air Receiver Tanks	Represent the only vertical tank.
16	Component Cooling Surge Tank	Represent the horizontally mounted tanks.

5.0 SYSTEM EVALUATION

This section provides results of the seismic reevaluation and balance of plant plant mechanical equipment and piping with respect to the reevaluation criteria in Section 3.2 and the integrity criteria in Section 3.3 (except for small piping as discussed in Section 3.3). These results are presented separately for each system in the following subsections. The results also identify modifications which would be necessary to meet the reevaluation criteria and/or the integrity criteria. However, alternatives to the various modifications identified include declassification of a portion of the system or reassessment of the analysis results based on further refinement and/or extension of the existing analyses. For example, the evaluations may be refined by (1) using actual nozzle loads for mechanical equipment in lieu of conservatively assumed nozzle loads, and by (2) performing specific analyses in cases where evaluations were based on similarity.

5.1 AUXILIARY COOLANT SYSTEM

5.1.1 SYSTEM DESCRIPTION

To facilitate and maintain safe cold shutdown, the Auxiliary Coolant System removes residual and sensible heat from the Reactor Coolant System, cools the spent fuel pit water and provides cooling to dissipate heat from the charging pumps.

The Auxiliary Coolant System consists of the component cooling system, the residual heat removal system, and the spent fuel pit cooling system. In order to perform its safe shutdown function the component cooling pumps and component cooling heat exchangers must be operable in the component cooling system, the residual heat removal pumps and residual heat exchangers must be operable in the residual heat removal system, and the spent fuel pit pump, heat exchanger and filter must be operable in the spent fuel pit cooling system. The remaining piping and valves, the component cooling surge tank, the thermal barrier emergency pump and the recirculation heat exchanger must maintain component cooling system pressure boundary.

5.1.2 SUMMARY OF RESULTS

A. Large Piping

The large piping from the Auxiliary Coolant System contains seventy nine (79) lines in the system that are within the scope of the seismic reevaluation. There are 251 existing supports in the system. The results recorded in Table 5.1-1 show that sixteen (16) of the seventy-nine (79) lines meet the reevaluation criteria and all of the lines meet the integrity criteria.

Table 5.1-2 summarizes the results of the analysis of the existing supports for all lines in the system. Of the 251 existing supports, 192 meet the reevaluation criteria and 241 meet the integrity criteria.

Tables 5.1-1 and 5.1-2 identify 33 new supports and modification of 147 existing supports. Ten of these modifications are required to meet the integrity criteria.

B. Small Piping

The sample of small piping from the Auxiliary Coolant System contains eighteen (18) of the twenty-six (26) lines in the system that are within the scope of the evaluation. The results of the evaluation are recorded in Table 5.1-3. Of the 18 lines evaluated, 5 are within the reevaluation criteria. Based on the results in this task an estimated 23 supports to be modified and/or added have been identified.

C. Mechanical Equipment

Most of the equipment in the Auxiliary Coolant System were included in the evaluation samples. These include the Component Cooling Heat Exchangers, the Recirculation Heat Exchanger, the Spent Fuel Pit Heat Exchanger, the Component Cooling Surge Tank, and the Residual Heat Removal Pumps. The results of these equipment are summarized in Tables 5.1-4 through 5.1-8. The remaining equipment were evaluated based on similarity of the selected samples or by field inspection.

The Component Cooling Heat Exchangers and their support structure were found to be flexible in both N-S and E-W directions. The

stress summary in Table 5.1-4 shows the heat exchanger shell is structurally adequate. The support saddles, steel framing, anchor bolts, and saddle bolts were found to exceed the reevaluation criteria. In the case of anchor bolts and saddle bolts, the integrity criteria were not met. It was determined that additional lateral supports and local stiffening of support frame are required to meet the reevaluation criteria for these components.

The Recirculation Heat Exchanger was analyzed as an equivalent single degree-of-freedom system in the three principal seismic directions. Results of the analysis, given in Table 5.1-5, indicate the heat exchanger shell and the support saddles met the reevaluation criteria. The anchor bolts holding the saddles to the concrete pedestals are overstressed due to bolt bending. The resultant bolt stress exceeded both the reevaluation criteria and the integrity criteria. Additional anchors would be required to meet the reevaluation criteria.

A stress summary for the Spent Fuel Pit Heat Exchanger is given in Table 5.1-6. The heat exchanger was analyzed as an elastic beam supported by two cantilever supports which simulated the structural characteristics of the saddles, the concrete pedestals, and the anchor bolts. Results of dynamic simulation found the heat exchanger as structurally adequate. The stresses in the saddles and the anchor bolts were exceeded the reevaluation criteria but were within the integrity criteria.

The Residual Heat Removal Heat Exchangers were not analyzed as selected samples. They are similar to the Spent Fuel Pit Heat Exchanger. Therefore, by comparison, the Residual Heat Removal Heat Exchangers meet the integrity criteria but may require modification to saddle and anchor bolts to meet the reevaluation criteria.

The Component Cooling Surge Tank represented the horizontal type tanks. It was analyzed as a single degree of freedom (DOF) system in three seismic directions. The fluid sloshing effect was found negligible. The tank shell and support saddle stresses were determined to meet the reevaluation criteria as shown in Table 5.1-7. The anchor bolts exceeded the reevaluation criteria, but met the integrity criteria.

The stress results for the Residual Heat Removal Pumps are summarized in Table 5.1-8. The pumps were analyzed using equivalent static 'g' loads corresponding to the peak accelerations of the appropriate response spectra. The pump and motor components were considered as rigid masses. As shown in Table 5.1-8, results of the analysis indicated stresses at the supporting plates met the reevaluation criteria. Both the motor mounting bolts and the pump bolting exceeded the reevaluation criteria. The 1/2 in. diameter holddown bolts at the base plate exceeded the reevaluation criteria as well as the integrity criteria.

The Component Cooling Water Pumps were evaluated by similarity to the other horizontal type pumps. In particular, the results of the Safety Injection Pumps in Section 5.8.2 are applicable. From those results, it is projected that the pump hold down bolts may not meet the integrity criteria.

The Thermal Barrier Emergency Cooling Pump is another horizontal type pump in the Auxiliary Coolant System. Field inspection confirmed this pump having relatively small mass and low center of gravity compared to other similar pumps. The pump skid was well anchored to the containment floor. Therefore the pump was judged structurally adequate and meets the reevaluation criteria.

Nine pneumatic diaphragm type control valves were reevaluated in the Auxiliary Coolant System. Three of the nine valves were analyzed as samples within the generic group known as BS & B Type. The remainder were evaluated based on similarity. Seismic capabilities in term of equivalent g values were determined as given in Table 5.12-1.

There are also seven motor operated control valves in the Auxiliary Coolant System. These were evaluated by similarity within the generic group known as Limitorque Type. Seismic capabilities of these are summarized in Table 5.12-1.

5.2 CHEMICAL FEED SYSTEM

5.2.1 SYSTEM DESCRIPTION

In relation to safe shutdown, the chemical feed system is required to maintain system pressure boundary of the component cooling system, the steam generators and the refueling water storage tank. The portions of the systems evaluated consist of the component cooling system chemical pot feeder and associated piping and valves from the chemical feed system to the steam generators and the refueling water storage tank.

5.2.2 SUMMARY OF RESULTS

A. Small Piping

The sample of small piping from the Chemical Feed System contains all of the eight (8) lines that are included in the scope of the evaluation. The results of the evaluation are recorded in Table 5.2-1. Of the eight lines, two lines are within reevaluation criteria. Based on the results in this table, an estimated 2 supports to be modified and/or added have been identified.

B. Equipment

The Chemical Pot Feeder is the only mechanical equipment item within scope in the Chemical Feed System. The feeder was not analyzed as one of the selected sample. It was

determined from field inspection that the feeder has relatively small mass and is adequately supported. It is concluded that it meets the reevaluation Criteria.

5.3 CIRCULATING WATER SYSTEM

5.3.1 SYSTEM DESCRIPTION

The portion of the circulating water system required for safe shutdown is the salt water cooling system which removes heat from the component cooling heat exchangers of the Auxiliary Coolant System. The salt water cooling pumps are required to supply cooling water to the component cooling heat exchangers. Other piping and valves are required to maintain system pressure boundary.

5.3.2 SUMMARY OF RESULTS

A. Large Piping

The large piping from the circulating water system contains eleven (11) lines in the system that are within the scope of the seismic reevaluation. There are a total of 28 existing supports in the system. The results recorded in Table 5.3-1 show that five of the 11 lines meets the reevaluation criteria and all of the lines meet the integrity criteria.

Table 5.3-2 summarizes the results of the analysis of the existing supports for the lines in the system. Of the 28 existing supports, 20 meet the reevaluation criteria and 27 meet the integrity criteria.

Tables 5.3-1 and 5.3-2 identify 1 new support and modification of 17 existing supports.

B. Small Piping

The sample of small piping from the Circulating Water System contains all of the eight (8) lines in the system that are within the scope of the evaluation. The results of the evaluation are recorded in Table 5.3-3. Of the 8 lines evaluated, five (5) are within the reevaluation criteria. Based on the results in this table, an estimated 17 supports to be modified and/or added have been identified.

C. Mechanical Equipment

The mechanical equipment in the subsystem are two Salt Water Cooling Pumps. These pumps are the only vertical pumps in the present scope. Analysis of the pumps showed major components meet the reevaluation criteria. The bolt stresses were found to exceed the reevaluation criteria allowable, but were still within the integrity criteria as summarized in Table 5.3-4.

There are three butterfly type control valves with extended piston actuators. The piston cylinders are joined to the control linkage by a pin joint for which the load limit was not known; it was determined by inspection that the cylinders appear to require support.

5.4 COMPRESSED AIR SYSTEM

5.4.1 SYSTEM DESCRIPTION

The compressed air system provides a continuous supply of pressurized air for instruments and controls for safe shutdown.

The instrument air compressors, aftercoolers, air receivers, air dryers and air filters are required to supply instrument air to pneumatic valves required to function in order to facilitate safe shutdown.

5.4.2 SUMMARY OF RESULTS

A. Piping

The sample of the Instrument Air System includes twenty-four (24) of the forty-five (45) lines in the system that are within the scope of the evaluation. The results of the evaluation are recorded in Table 5.4-1. Of the twenty-four (24) lines evaluated, twelve (12) lines meets the reevaluation criteria and all of the lines meet the integrity criteria.

Table 5.4-2 summarizes the results of the analysis of existing supports for all lines in the system. All supports are within the integrity criteria.

Based on Tables 5.4-1 and 5.4-2 an estimated 110 supports modified and/or added have been identified.

B. Mechanical Equipment

Equipment included in the Compressed Air System are an Instrument Air Dryer, Air Receivers, Aftercoolers, Air Compressors, and Instrument Air Filters. The Instrument Air Dryer and Filters were found satisfactory during field inspection and therefore were not included in the evaluation sampling.

The Air Receivers were chosen as the group sample for vertically mounted tanks. Results of analysis indicated the stresses at the air receiver shell and supporting angles are well within the reevaluation criteria as summarized in Table 5.4-3. The critical components were the base plates and concrete anchor bolts which were subjected to plate bending resulting from overturning of the air receivers. Both base plates and anchor bolts were found to exceed the reevaluation criteria; but both met the integrity criteria.

Dynamic responses of the Aftercoolers were determined by simulating them as lumped mass models in the piping analysis. The calculated stresses for the Aftercooler shell and the Moisture Separator are given in Table 5.4-4. As shown, the stresses are within the reevaluation criteria.

A stress summary for the Air Compressors is given in Table 5.4-5. As shown, the calculated stresses were small. The tandem boltings joining the cantilevered filter unit to the compressor are subjected to significant loadings; but the resultant stresses were found to meet reevaluation criteria. The foundation anchors were determined to exceed the reevaluation criteria based on the conservative assumption that only two of the six anchor bolts are effective; however, the anchors met the integrity criteria.

5.5 CHEMICAL AND VOLUME CONTROL SYSTEM

5.5.1 SYSTEM DESCRIPTION

In the function of facilitating safe shutdown, the chemical and volume control system is used to maintain the proper water inventory in the Reactor Coolant System and adjust the concentration of boron. The system also provides the seal water for the reactor coolant pumps in order to maintain reactor coolant pressure boundary.

5.5.2 SUMMARY OF RESULTS

A. Piping

The sample of piping from the Chemical and Volume Control System contains fifty-one (51) of the fifty-seven (57) system lines that are within the scope of the evaluation. The results of the evaluation are recorded in Table 5.5-1. Of the fifty-one (51) lines evaluated, forty-three (43) lines are within the reevaluation criteria. Based on the results in this table, an estimated 106 supports modified and/or added have been identified.

B. Mechanical Equipment

A dynamic analysis of the Regenerative Heat Exchanger was performed using a lumped mass model which included the flexibilities of the heat exchanger shells, support saddles, and anchors. Results of the analysis are summarized in Table 5.5-2. The heat exchanger shells and support saddles were determined to meet the reevaluation criteria. The stresses at the pipes connecting the shells and at the anchor bolts were found to exceed the reevaluation criteria. The anchor bolt stresses were found to exceed both the reevaluation criteria and the integrity criteria.

The Seal Water Heat Exchanger was analyzed using a detailed model of the heat exchanger shell and its support structures. The analysis results are summarized in Table 5.5-3. The stresses calculated at the shell, saddles, and saddle bolt met the reevaluation criteria. However, the supporting steel frames exceeded the reevaluation criteria and the integrity criteria. In addition, the concrete anchor bolts joining the steel frames to the wall and floor exceeded both the reevaluation and integrity criteria.

The Excess Letdown Heat Exchanger was not included in the equipment samples selected for analysis. Field inspection found it similar in support configuration to the Spent Fuel Pit Heat Exchanger. It was noted to be smaller in diameter and length; but large coupling with attached piping were expected. Therefore the anchor bolts and support structure were projected to exceed the reevaluation criteria.

The Test Pump was evaluated by similarity to the Residual Heat Removal Pumps. By field inspection the Test Pump were confirmed to be smaller in size and therefore well anchored.

The Charging Pumps were also evaluated by similarity to the Residual Heat Removal Pumps. However the charging pumps are larger in size and were expected to induce larger support reactions. Therefore the hold down bolts were considered to exceed the reevaluation criteria. The oil coolers for the Charging Pumps are mounted to vertical steel channels which are anchored to floor embed-

ments. The floor anchors were determined to be adequate during field inspection.

The Volume Control Tank is similar to the Component Cooling Surge Tank analyzed in the Auxiliary Coolant System. By comparison, the Volume Control Tank is also concluded to exceed the reevaluation criteria but to meet the integrity criteria.

The Seal Water Return Filter was analyzed as a representative sample for the filters. Results of analysis are summarized in Table 5.5-4. It was found that the stresses at the filter shell meet the reevaluation criteria. However, the resulting stresses at the supporting structure including the support pipes, the anchor bolts, and base plate weldment were found to exceed the reevaluation criteria and the integrity criteria. Similar results are expected for the Seal Water Injection Filters which are supported in an identical manner as the Return Filter. The Supply Filters however were found to meet the reevaluation criteria. Field inspection revealed that these filters have smaller effective masses and are supported at the base by larger angle beams.

There are twenty-one pneumatic diaphragm type control valves in the CVCS. Three of the twenty-one were analyzed as samples in the BS and B group. The remainder were evaluated based on similarity. The seismic capabilities of these valves are summarized in Table 5.12-1.

Four motor operated control valves were also evaluated in the CVCS. Seismic capabilities are given in Table 5.12-1.

5.6 FEEDWATER AND CONDENSATE SYSTEM

5.6.1 SYSTEM DESCRIPTION

For safe shutdown the feedwater and condensate system provides cooling water to the steam generators by the auxiliary feedwater system and maintains steam generator pressure boundary. The auxiliary feedwater pumps pump water from the condensate storage tank through the main feedwater line to the steam generators.

5.6.2 SUMMARY OF RESULTS

A. Large Piping

The large piping from the Feedwater and Condensate System contains fifteen (15) lines in the system that are within the scope of the seismic reevaluation. There are 78 existing supports in the system. The results recorded in Table 5.6-1 show that four (4) of the fifteen (15) lines meet the reevaluation criteria.

Table 5.6-2 summarizes the results of the analysis of the existing supports for all lines in the system. Of the 78 existing supports, 59 meet the reevaluation criteria and 76 meet the integrity criteria.

Tables 5.6-1 and 5.6-2 identify three new supports and modification of 50 existing supports. Two (2) of these modifications are required to meet the integrity criteria.

B. Small Piping

The sample of small piping from the Feedwater and Condensate System contains all three (3) lines in the system that are within the scope of the evaluation. The results of evaluation are recorded in Table 5.6-3. Based on the results in this table, an estimated 30 supports modified and/or added have been identified.

C. Mechanical Equipment

The mechanical equipment in this subsystem are the two Auxiliary Feedwater Pumps. One pump is turbine driven and the other is motor driven. These pumps were inspected during a field walkdown and found to be well anchored. The comparison of these pumps with other horizontal type pump samples suggested that they meet the reevaluation criteria.

Three control valves with pneumatic diaphragm type operators are in the Feedwater and Condensate System. These valves were evaluated within the BS and B Type valve analysis. Seismic capabilities of these valves are given in Table 5.12-1.

D. Condensate Storage Tank

Table 5.6-4 lists the results of the evaluation of the Condensate Storage Tank. The tank has no anchorage, so consequently the tank was checked for uplift. Following the methods outlined in Appendix A of Reference 7 yielded an uplift factor of 6.02, which exceeds 1.54; the point at which uplift is certain. Structural modifications are required to prevent uplift.

The possibility of both soil failure and the tank overturning was examined. The above paragraph indicated that the existing tank is vulnerable to uplift (i.e., overturning), therefore it has already been shown that anchorage will have to be provided.

The soil was evaluated for the most severe loading case of a vertically downward earthquake in combination with overturning moment. In this case the soil was capable of resisting an overturning moment of 27500 k-ft based on a soil bearing capacity of 17 ksf (Ref. 16). This exceeded the computed overturning moment of 20078 k-ft by 37%.

The analysis indicated that the existing structure has only 31% of the resistance to sliding needed to prevent movement during the DBE.

The configuration of the superstructures of the Refueling Water and Condensate Storage Tanks are identical. The stresses in the tank dome

and walls are dependent on the amount of water and the tank configuration only. Since these are identical in the two tanks the computed stress will be identical. Consequently the findings reported in Section 5.7.2.0 apply to the Condensate Storage Tank as well.

5.7 MISCELLANEOUS WATER SYSTEMS

5.7.1 SYSTEM DESCRIPTION

The miscellaneous water systems function in safe shutdown is to provide a source of makeup to the reactor coolant system (from the refueling water storage tank) and to maintain the RWST pressure boundary.

5.7.2 SUMMARY OF RESULTS

A. Large Piping

There are a total of twelve (12) lines in the Miscellaneous Water System that are within the scope of the seismic reevaluation. There are 92 existing supports in the system. The results recorded in table 5.7-1 show that two (2) of the twelve (12) lines meet the reevaluation criteria and all of the lines meet the integrity criteria.

Table 5.7-2 summarizes the results of the analysis of the existing supports for all lines in the system. Of the 92 existing supports, 70 meet the revaluation criteria.

Tables 5.7-1 and 5.7-2 identify 10 new supports and modification of 48 existing supports. Three (3) of these modifications are required to meet the integrity criteria.

B. Small Piping

The sample of small piping from the Miscellaneous Water Systems contains nine (9) line in the system that are within the scope of the evaluation. The results of the evaluation are recorded in Table 5.7-3. Of the 9 lines evaluated, three (3) are within the reevaluation criteria. Based on the results in this table, an estimated 6 supports modified and/or added have been identified.

C. Mechanical Equipment

The Service Water Pumps and the Refueling Water Pumps were evaluated based on field inspection and by similarity to the Residual Heat Removal Pumps. These pumps all have massive motor and pump units as well as large attached piping. Hence by comparison with the RHR pump, the loads on base plate hold down bolts, motor mounting bolts and pump bolts will exceed the reevaluation criteria.

Three pneumatic diaphragm control valves were evaluated by similarity to the BS and B Type samples. Their seismic capabilities are given in Table 5.12-1. The motor operated control valve was evaluated by similarity within the Limitorque generic group. Its seismic capability is given in Table 5.12-1.

D. Refueling Water Storage Tank

Table 5.7-4 lists the results of the evaluation of the Refueling Water Storage Tank. The tank is anchored to the concrete mat by 34 1-5/8" ϕ A307 anchor bolts. These are evenly spaced around the perimeter of the tank. The occurrence of a DBE will induce both shear and tensile forces in these bolts. The connection stresses were compared against the working stress allowables of AISC. These values were increased by a factor of 1.33 in accordance with provisions of Section 1.5.6 of the Code. During the DBE the most severely loaded bolt will experience a shear stress of 18.93 ksi and a tensile stress of 32.85 ksi. These significantly exceed the reevaluation criteria of 13.33 ksi and 26.66 ksi. Therefore additional anchorage is required.

When considering overturning two aspects were considered. The soil underneath the tank was checked against failure due to the DBE loadings in combination with normal operating loads. The possibility of the tank overturning was also checked.

Both soil failure and tank overturning were compared against a minimum factor of safety of 1.1. A vertically downward earthquake with the accompanying overturning moment would be the most severe loading case on the soil. When this occurs the soil beneath the tank is able to resist an overturning moment of 36245 k-ft, based on a bearing capacity of 17 ksf (Reference 16). This exceeds the

computed overturning moment of 23492 k-ft by 54%, corresponding to a factor of safety of 1.54; therefore the soil capacity is adequate.

A vertically upward earthquake coupled with the overturning moment constitutes the most severe loading condition when considering the tank overturning about its base. These loads induce an overturning moment of 23492 k-ft while the weight of the tank, water and foundation provide a resisting moment of 36027 k-ft. The computed factor of safety is 1.53, as compared to the allowable of 1.1, which indicates that the tank will not overturn.

The Refueling Water Storage Tank foundation is embedded in soil. During a seismic event a dynamically induced force would be developed in a thin layer of soil just below the foundation. The horizontal force in the foundation slab and the supporting soil was computed to be 1614 kips. The worst case of a vertically upward earthquake was considered when computing the normal force of the tank. The coefficient of friction between the soil media and the foundation was chosen in accordance with Reference 17. The resistance to horizontal motion computed, 2035 kips, exceeded the dynamically induced force of 1614 kips. The corresponding factor of safety, 1.26, exceeded the required safety factor of 1.1.

When considering the integrity of the tank shell three independent stresses were evaluated. The analysis resulted in dome stress

of 2.33 ksi which is significantly less than the AWWA allowable of 18.75 ksi; therefore the dome meets the reevaluation criteria.

At the interface between the tank shell and base plate, the most critical location, the stress due to axial loading was 7.06 ksi and the stress due to bending was 6.91 ksi. Both are significantly less than the allowable of 18.75 ksi from the AWWA standards. The allowable stresses included a seismic overstress factor of 1.25 in accordance with Section 3.3.4 of the Standard. Linearly combining the effects of bending and axial loading indicates that the walls were stressed to a maximum of 75% of their capacity in the vertical direction.

The internal pressures resulting from the three dynamic modes were combined by the SRSS method and added to the hydrostatic pressure to obtain the total internal pressure. The hoop stress was then computed from this pressure. At the base of tank the stress was found to be 18.46 ksi which is less than the allowable of 18.75 ksi in accordance with the AWWA standard. Therefore, the first steel ring is adequate. The stress in the second ring from the bottom had stresses as high as 21.37 ksi, exceeding the AWWA allowable of 18.75 ksi. The maximum stress in the third ring was 16.60 ksi. Therefore, hoop stresses exceeded the reevaluation criteria.

In summary, bolt stresses and hoop stresses exceeded the reevaluation criteria; however, the tank met the integrity criteria.

5.8 SAFETY INJECTION

5.8.1 SYSTEM DESCRIPTION

Portions of the Safety Injection System are required to maintain RWST pressure boundary to accomodate safe shutdown. Additionally portions are required to maintain the reactor coolant pressure boundary.

5.8.2 SUMMARY OF RESULTS

A. Large Piping

There are total of eight (8) lines in the Safety Injection System that are within the scope of the seismic reevaluation. There are 100 existing supports in the system. The results recorded in Table 5.8-1 show that one of the eight (8) lines meet the reevaluation criteria and all of the lines meet the integrity criteria.

Table 5.8-2 summarizes the results of the analysis of the existing supports for all lines in the system. Of the 100 existing supports, 72 meet the reevaluation criteria.

Tables 5.8-1 and 5.8-2 identify 4 new supports and modification of 47 existing supports. Three (3) of these modifications are required to meet the integrity criteria.

B. Small Piping

The sample of small piping from the Safety Injection System contains nine (9) lines in the system that are within the scope of the evaluation. The results of the evaluation are recorded in Table 5.8-3. Of the nine (9) lines evaluated, 3 are within the reevaluation criteria. Based on the results in this table, an estimated 8 supports modified and/or added have been identified.

C. Mechanical Equipment

The Safety Injection Pumps were analyzed as the generic representative of the horizontally mounted pumps. Seismic loads were conservatively assumed to be the peak accelerations of the appropriate response spectra. Results of analysis indicated the pump support frame met the reevaluation criteria as summarized in Table 5.8-4. The pump hold down bolts were found to be over stressed in bending in excess of both the reevaluation and integrity criteria. Motor hold down bolts and foundation anchor bolts met the reevaluation criteria.

There are five control valves with motor operators considered in the Safety Injection System. These valves were evaluated by similarity to the Limitorque Type valve samples. Seismic capabilities of these valves were determined and given in Table 5.12-1.

5.9 REACTOR CYCLE SAMPLING SYSTEM

5.9.1 SYSTEM DESCRIPTION

Portions of the reactor cycle sampling system are required to maintain reactor coolant pressure boundary.

5.9.2 SUMMARY OF RESULTS

A. Piping

The sample of small piping from the Reactor Cycle Sampling System contains five (5) of the six (6) lines in the system that are within the scope of the evaluation. The results of the evaluation are recorded in Table 5.9-1. Based on the results in this table, an estimated 9 supports modified and/or added have been identified.

B. Mechanical Equipment

The mechanical equipment considered in the Reactor Vessel Cycle Sampling System were three heat exchangers and two sample vessels. These items were evaluated during field inspection and were concluded to meet the reevaluation criteria.

There are seven pneumatic diaphragm type control valves in this subsystem. These valves, while subject to the same seismic limitations as the BS and B group, are mounted in 3/8" sampling lines which are not capable of transmitting significant seismic motions.

5.10 REACTOR COOLANT SYSTEM

5.10.1 SYSTEM DESCRIPTION

The reactor coolant system is primarily required to maintain reactor coolant pressure boundary. Additionally the pressurizer PORVs are required to facilitate safe shutdown.

5.10.2 SUMMARY OF RESULTS

A. Large Piping

The large piping from the Reactor Coolant System contains thirteen (13) lines in the system that are within the scope of the seismic reevaluation. There are 48 existing supports in the system. The results recorded in Table 5.10-1 show that one (1) of the thirteen (13) lines meets the evaluation criteria and all of the lines meet the integrity criteria.

Table 5.10-2 summarizes the results of the analysis of the existing supports for the lines in the system. Of the 48 existing supports, 29 meet the reevaluation criteria.

Tables 5.10-1 and 5.10-2 identify 20 new supports and modification of 24 existing supports. Two (2) of these modifications are required to meet the integrity criteria.

B. Small Piping

The sample of small piping from the Reactor Coolant System contains seven (7) lines in the system that are within the scope of the evaluation. The results of the evaluation are recorded in Table 5.10-3. Based on the results in this table, an estimated 19 supports modified and/or added have been identified.

C. Mechanical Equipment

Seven pneumatic diaphragm type control valves were considered in the Reactor Coolant System. These valves were evaluated by similarity to the BS and B Type sample analysis. Seismic capabilities of these valves were determined as shown in Table 5.12-1.

There are also three solenoid type control valves in this subsystem. Field inspection of these valves found that they were not critical because of their negligible masses.

5.11 STEAM SYSTEM

5.11.1 SYSTEM DESCRIPTION

The steam system provides a means to cool down the reactor by relieving steam to the atmosphere. The main steam relief valves are required to relieve steam. The system piping and valves are also required to maintain steam generator pressure boundary.

5.11.2 SUMMARY OF RESULTS

A. Large Piping

The large piping from the Main Steam System contains eighteen (18) lines that are within the scope of the seismic reevaluation. There are 93 existing supports in the system. The results recorded in Table 5.11-1 show that ten (10) of the 18 lines meet the reevaluation criteria and all of the lines meet the integrity criteria.

Table 5.11-2 summarizes the results of the analysis of the existing supports for the lines in the system. Of the 93 existing supports, 59 meet the reevaluation criteria.

Tables 5.11-1 and 5.11-2 identify 3 new supports and modification of 47 existing supports. One (1) of these modifications is required to meet the integrity criteria.

B. Small Piping

The sample of the small piping in the Steam System contains two (2) of the four (4) lines in the system that are within the scope of the evaluation. The results of the evaluation are recorded in Table 5.11-3. Based on the results in this table, an estimated 32 supports modified and/or added have been identified.

C. Mechanical Equipment

There are eleven pneumatic diaphragm type control valves considered. Five of the eleven were analyzed as samples within the BS and B generic group. The remainder were evaluated based on similarity. Seismic capabilities in terms of equivalent g values were determined as given in Table 5.12-1.

There are four motor operated valves which were evaluated by similarity within the Limitorque group. Seismic capabilities of these valves are given in Table 5.12-1.

5.12 VALVES

A summary of the evaluation of extended operator valves is provided in Table 5.12-1.

6.0 REFERENCES

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16 - SONGS 2 & 3 FSAR, Appendix C-3.76.

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TABLE 5.1-1. LARGE PIPING RESULTS FOR AUXILIARY COOLANT

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
3093-4-152N	334592-1 (AC-01)	46.9	36.	0.77	187.	4.0		X	X		(i) Change the fitting from stub-in into reinforce fabricated tee at intersection of lines 3037-14-152N & 3093-4-152N (data point 514) (ii) Change existing rod hanger at node point 23 into strut
3038-4-152N	334569-1 (AC-02)	61.	36.	0.59	187.	3.1		X	X		(i) Change the fittings from stub-in into reinforce fabrication at the intersection of lines: 3056-14-152N & 3038-4-152N (data point 5) (ii) Change the rod hanger to rigid Y support at data point 65 & 100
3039-4-152N 717-3-HP	334593-2 (AC-03)	95.6	36.	0.3	187.	2.0		X	X		(i) Change existing rod hanger at 8-PS-20 into guide (rigid Y and E-W restraints) (ii) Add restraint in N-S direction at support location 8-PS-8 (data point 110)
3048-14-152N 3048-10-152N 3053-10-152N 3048-8-152N 3049-8-152N 3050-8-152N	334568-1 334567-1 (AC-04)	16.1	36.	2.24	187.	11.6	X		X		(i) Change existing under support 8-PS-7 (data point 120) into rigid Y support
3037-8-152N 3040-8-152N 3041-8-152N 3037-14-152N 3040-14-152N 3046-6-152N 3104-6-152N 3046-8-152N 3033-8-152N 3029-8-152N 3073-3-152N 3078-3-152N 3083-3-152N	334591-1 334594-1 714450-1 714452-1 714454-1 714456-2 714458-3 714460-2 714462-2 (AC-05)	149.9	36.	0.24	187.	1.2		X	X		(i) Change existing anchor to rigid ± Y at 8-PS-19 (D.P. 26), 8-PS-17A (D.P. 66), 8-R-PS-15 (D.P. 312 & 321) and 8-R-PS-13 (D.P.399) (ii) Add holddown at T1-PS-14 (D.P. 728 & 811), data point 621 & 629 (iii) Add the restraint in E-W & N-S the existing support data point 123 & 145

TABLE 5.1-1. LARGE PIPING RESULTS FOR AUXILIARY COOLANT

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
3085-3-152N 3095-2-1/2-HH 3055-2-152N 3031-2-152N	(AC-05 Contd)										(iv) Add restraint in E-W direction & ty direction at existing support T1-PS-15C (D.P. 167) (vi) Change the fitting from stub-in into into reinforced fabricated tee at data points 40, 70, 190 & 195 (vii) Install new supports at following data points: Data Points — Type of Supports 482 — E-W & N-S 582 — E-W & N-S 676 — E-W, N-S, & Vertical 687 — E-W & Vertical 721 — N-S 765 — N-S 804 — N-S
3056-14-152N 3056-10-152N 3057-10-152N 3045-8-152N 3045-6-152N 3103-6-152N 3090-8-152N 3064-8-152N 3904-2-1/2 HH 3066-3-152N 3067-3-152N 3068-3-152N 3069-3-152N	714449-1 3348651 334599-1 334546-1 714451-1 714457-2 714661-3 714459-2 714453-1 714455-1 (AC-06)	141.7	36.	0.254	187.	1.3		X	X		(i) Add holddown at following existing support ocations 8-PS-7 (D.P. 215); T1-PS-14 (D.P. 480, 530 & 580); and data points 160, 653, 663, 750, 765 & 150 (ii) Add restraint in E-W direction at following existing support location; T1-PS-14 (D.P. 40); 8-PS-5 (D.P. 340); & data points 110, 130 & 160 (iii) Add restraint in E-W & N-S direction at data point 65 & 140 (iv) Install new supports in N-S & E-W direction at node points 505, 555, 605 & 705
3084-6-151R	(AC-07)	10.1	44.4	4.4			X		X		

TABLE 5.1-1. LARGE PIPING RESULTS FOR AUXILIARY COOLANT

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
3086-6-151R	(AC-08)	28.9	44.6	1.547	232.	8.0	X		X		(i) Add holddown to following existing support locations: 14-PS-15 (D.P. 73); 14-PS-14 (D.P. 85); 14-PS-12 (D.P. 87)
3090-8-152N	334570-1 714449-1 (AC-11)	10.0	36.	3.59	187.	18.		X	X		(i) Change existing under support 1-PS-60 into rigid (± y support) (ii) Reduce the clearance between the pipe & support to 1/16 inch for the following existing support: 1-SC-152-5 in E-W, N-S and +y direction
3029-8-152N	334566-1 714450-1 (AC-12)	6.0	36.	6.02	187.	31.3		X	X		(i) Change existing rod hanger 1-R-152-2 into strut (±y support) (ii) Add holddown to existing under support 1-PS-60 (iii) Reduce the clearance between the pipe & support to 1/16 inch for the following support: 1-SC-152-5 (x and z direction) 1-SC-152-6 (x direction)
3064-8-152N	334571-1 714451-1 (AC-13)	6.5	36.	5.54	187.	28.8		X	X		(i) Add holddown to the existing support 1-PS-60 (D.P. 15) (ii) Reduce the clearance between the pipe & support to 1/16 inch for the following support: 1-SC-152-6 (x direction) 1-SC-152-5 (x & z direction)
3033-8-152N	334565-2 714452-1 (AC-14)	5.9	36.	6.14	187.	31.9		X	X		(i) Add holddown to the existing support 1-PS-60 (D.P. 67)

TABLE 5.1-1. LARGE PIPING RESULTS FOR AUXILIARY COOLANT

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
	(AC-14 Contd)										(ii) Reduce the clearance between the pipe & support to 1/16 inch for the following supports: 1-SC-152-5 (X, Z and +Y direction) 1-SC-152-6 (X direction)
3068-3"-152N 3109-3"-152N 3113-3"-152N 3114-3"-152N 3067-3"-152N 3069-3"-152N	334572-1 714459-2 334573-2 714457-2 334574-2 714461-3 334666-0 (AC-15)	63.1	36.0	0.57	187.	2.8		X	X		(i) Install new supports in N.S. & E.W. direction @ node points 66,106 and 935 (ii) Add holddown & restraint in N-S direction at existing support at node point 120 & 950 (iii) Install new support in E.W. direction at node point 137 & 462 (iv) Install new support in N-S direction at node point 457 & 745 (v) Add restraint in E-W direction at existing support 1-R-152-8 (data point 791 and 1-R-152-10 (data point 805) (vi) Install new support in ±Y, ±Z direction at node point 727 (vii) Add support $\underline{1}^{AR}$ to pipe & holddown at existing support 1-PS-54 (data point 820) (viii) Reduce clearance between pipe & support to 1/16" at following existing supports: a) 1-SC-152-12 (D.P. 82) b) 1-SC-152-13 (D.P. 438) c) 1-SC-152-8 (D.P. 775) d) 1-SC-152-9 (D.P. 795) e) 1-SC-152-10 (D.P. 840)

TABLE 5.1-1. LARGE PIPING RESULTS FOR AUXILIARY COOLANT

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
	(AC-15 contd)										(ix) Add holddown to existing supports at node points 130 & 160 (x) Change existing spring hanger 1-5-152-14 (D.P. 90) to strut
3073-3"-152N 3079-1-1/2"-152N 3079-1-1/2"-2503N 3071-1"-152N	334587-2 334490-1 334496-2 714458-3 (AC-16)	115.5	36.00	0.31	187.	1.6		X	X		(i) Add restraint in N-S direction at existing support 1-S-152-20 (ii) Install new support in E-W direction at node point 107 (iii) Reduce the clearance between the pipe & support from 1/4" to 1/16" at existing support #1-SC-152-13 (data point 70)
3078-3"-152N	334588-2 714460-2 (AC-17)	23.9	36.00	1.5	187.	7.8		X	X		(i) Install new support in N-S & E-W dir. at node point 57 & 102 (ii) Add holddown and restraint in N-S direction at the existing support 1-PS-52 data point 120) (iii) Add holddown and reduce the clearance in N-S direction from 5/16" to 1/16" at existing support 1-SC-152-10 (data point 30) (iv) Reduce the clearance in E-W & N-S direction to 1/16" at existing pipe support 1-SC-152-12 (data point 70)
3083-3"-152N 3082-1-1/2"-152N 3082-1-1/2"-2503N 3081-1"-152N	334589-2 714462-2 334498-2 334499-1 (AC-18)	47.3	36.0	0.76	187.	4.0		X	X		(i) Install new support in N-S direction at node point 56 (ii) Reduce the clearance to 1/16 at existing supports a) 1-SC-152-8 b) 1-SC-152-9

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
	(AC-18 Contd)										(iii) Change existing rod hanger 1-R-152-9 and 1-R-152-10 to strut (iv) Add hold down & restraint in N-S direction to the existing supports a) 1-PS-52 b) 1-PS-50 (v) Add holddown to the existing support 1-PS-42 (vi) Add holddown & support ^{av} to pipe to the existing support 1-PS-54
3094-2-1/2"-HH	334500-1 714453-1 (AC-19)	48.3	36.	0.745	187.	3.9		X	X		(i) Add restraint in N-S direction at the following existing supports: 1-PS-42 (D.P. 75) 1-PS-50 (D.P. 85) 1-PS-51 (D.P. 95) (ii) Add horizontal restraint at the existing support 1-PS-53 (D.P. 105) (iii) Installation (new support) restraint in E-W direction at data point 37 (iv) Install (new support) restraints in E-W & N-S direction at data point 62
3095-2-1/2-HH 3043-2-A 3009-2-A	334501-1 334650-0 334649-0 714454-1 (AC-20)	29.5	36.	1.22	187.	6.3	X		X		(i) Add holddown to the following existing supports: 1-PS-38 (D.P. 80) 1-PS-54 (D.P. 135) (ii) Add restraint in N-S direction at following existing supports: 1-PS-50 (D.P. 95) 1-PS-52 (D.P. 115)

TABLE 5.1-1. LARGE PIPING RESULTS FOR AUXILIARY COOLANT

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
	(AC-20 Contd)										(iii) Add horizontal restraint at the existing support 1-PS-53 (D.P. 125) (iv) Install (new support) restraint in N-S & E-W direction at data point 57 & 250
3066-3-152N	714455-1 (AC-21)	49.4	36.	0.73	187.	3.8		X	X		(i) Add holddown at following existing pipe supports: 1-PS-38 (D.P. 55) 1-PS-51 (D.P. 65) (ii) Add restraint in N-S direction at following existing supports 1-PS-42 (D.P. 51) 1-PS-50 (D.P. 59) 1-PS-52 (D.P. 69) (iii) Install (new supports) in N-S & E-W direction at data point 41 & 74
3085-3-152N	714456-2 (AC-22)	28.2	36.	1.28	187.	6.6	X		X		(i) Add holddown at following existing supports 1-PS-38 (D.P. 47) 1-PS-59 (D.P. 59) (ii) Add the restraint in N-S direction at following existing support 1-PS-42 (D.P. 41) 1-PS-50 (D.P. 53) 1-PS-52 (D.P. 65) (iii) Install (new support) restraint in N-S & E-W direction at node point 30
3015-6-601R 3016-6-601R 3019-6-601R 3004-4-601R	334578-1 (AC-23)	80.1	39.4	0.49	205.	2.6		X	X		(i) Add holddown to following supports 1-R-601R-9 1-R-601R-10

TABLE 5.1-1. LARGE PIPING RESULTS FOR AUXILIARY COOLANT

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
	(AC-23 Contd)										(ii) Change existing rod hanger 1-R-601R-7 to strut (iii) Add restraint in N-S, E-W & +Y direction to the following under support at data point 340
5002-6-601R 5002-8-601R 5038-6-601R 5038-8-601R 5002-8-2501R	334579-3 (AC-24)	55.0	41.5	0.755	216.	3.9		X	X		(i) Change existing rod hanger 1-R-601R-2 into guide (Y & Z supports) (ii) Install (new support) snubber in N-S direction at or near by existing rod hanger 1-R-601R-2
3000-6-601R 3001-6-601R 3001-6-2501R 3003-4-601R	334580-3 (AC-24-1)	18.0	44.2	2.45	230.	12.8	X		X		(i) Change existing rod hanger 1-R-601R-12 into strut (ii) Reduce the clearance between the pipe & support to 1/16 inch in N-S & E-W direction of support number 1-SC-601R-4

TABLE 5.[illegible] SUPPORT RESULTS FOR AUXILIARY COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
3093-4-152N	334592-1	8-SC-152-N	C	Concrete fastener	2.71	2.3	0.8	27.6	10.2		X	X		Provide additional concrete fastener
3093-4-152N	334592-1	23	C	C 3x4.1	F_b=4.51	32.4	7.18			X		X		
3093-4-152N	334592-1	25	J							X		X		U-bolt, as per catalog
3093-4-152N	334592-1	30	C	C 3x4.1	F_b=4.51	32.4	7.18			X		X		
3093-4-152N	334592-1	50	C	C 3x4.1	F_b=11.1	32.4	2.92			X		X		
3093-4-152N	334592-1	60	C	Concrete fastener	T=2	T=1.5	0.75	18	9		X	X		Install brace in Z-direction
3093-4-152N	334592-1 (AC-01)	109	C	Concrete fastener	T=0.93 S=0.06	T=1.5 S=2.3	1.61 38.3			X		X		
3038-4-152N	334569-1	35	C	C 3x4.1	F_b=4.4	32.4	7.36			X		X		
3038-4-152N	334569-1	45	J							X		X		Small load - as per catalog
3038-4-152N	334569-1	60	J							X		X		Small load - as per catalog
3038-4-152N	334569-1	65	C	L 3x3x 1/4	F_b=12.2	32.4	2.6			X		X		
3038-4-152N	334569-1	100	C	L 3x3x 1/4	F_b=21.3	32.4	1.52			X		X		
3038-4-152N	334569-1	110	C	Concrete fastener	T=2	T=1.5	0.75	18	9		X	X		Install brace in X-direction
3038-4-152N	334569-1 (AC-02)	150	C	Concrete fastener	T=2	T=1.5	0.75	18	9		X	X		Install brace in X-direction
3039-4-152N	334593-2	35	C	W6x15.5	F_b=0.35	32.4	92.57			X		X		
717-3-HP	(AC-03)	8-PS-20	C	W6x15.5	F_b=2.51	32.4	12.9			X		X		

(1) ADLPIPE Node No.

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
	334593-2 (AC-03)	8-PS-8	C	W4x13	F_b=0.22	32.4	147			X		X		
3048-14"-152N	334567-1	8-PS-7	C	W6x15.5	2.43KSI	32.4KSI	13.3			X		X		
3048-14"-152N	334567-1	B-PS-8	C	W6x15.5	105KSI	32.4KSI	0.31	174KSI	1.66		X	X		Add brace in X-direction
3048-14"-152N	334567-1	8-PS-9	C	Concrete fastener	26.2KIP	3.7KIP	0.14	44.4KIP	1.69		X	X		Add brace in X-direction
3048-14"-152N	334567-1	8-PS-18	C	Concrete fastener	104KIP	3.7KIP	0.04	44.4KIP	0.43		X		X	Add brace in Z-direction
3048-14"-152N	334567-1 (AC-04)	8-PS-17	C	Concrete fastener	27.3KIP	3.7KIP	0.17	44.4KIP	1.99		X	X		Add brace in Z-direction
3048-8"-152N	334591	8-PS-19	C	Concrete fastener	15.2KIP	1KIP	0.07	12KIP	0.79		X		X	Add brace
3040-14"-152N	334591	8-PS-17A	C	Concrete fastener	30.1KIP	2.2KIP	0.07	26.4KIP	0.87		X		X	Add brace
3040-14"-152N	334591	120 (1)	J	Concrete fastener						X		X		Load small for existing support
3040-14"-152N	334591	123 (1)	J	Concrete fastener						X		X		do
3040-14"-152N	334591	125 (1)	J	Concrete fastener						X		X		do
3040-14"-152N	334591	145 (1)	J	Concrete fastener						X		X		do
3037-14"-152N	33459	T1-PS-I5C	C	Weld	3.4KSI	19.2KSI				X		X		
3037-14"-152N	33459 (AC-05)	T1-PS-15D	C	Weld	5.7KSI	19.2KSI				X		X		

(1) ADLPIPE Node No.

TABLE 5.1-2. SUPPORT RESULTS FOR AUXILIARY COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
3046-8"-152N	334595	8-PS-1	C	Concrete fastener	3.4KIP	1KIP	0.3	12KIP	3.53		X	X		Add brace in X-direction
3046-8"-152N	334594	8-PS-2	C	Concrete fastener	8KIP	2.7KIP	0.34	32.4KIP	4.05		X	X		Add brace in X-direction
3004-6"-152N	334594	8-PS-5	C	Concrete fastener	28.5KIP	3.6KIP	0.13	43KIP	1.51		X	X		Add brace
3046-6"-152N	334594	8-R-PS-15	C	Concrete fastener	3.9KIP	1KIP	0.26	12KIP	3.08		X	X		Add brace
3046-6"-152N	334594	8-R-PS-15	J	Concrete fastener							X	X		By comparison to 8-R-PS-13
3104-6"-152N	334594	8-PS-5	C	Concrete fastener	28.5KIP	3.6KIP	0.13	43KIP	1.51		X	X		Add brace in X & Z-direction
3104-6"-152N	334594	8-R-PS-13	C	Concrete fastener	2KIP	1KIP	0.51	12KIP	6.0		X	X		Add brace in X & Z-direction
3104-6"-152N	334595	8-3104-UG-001	J	Concrete fastener						X		X		Small load - as per catalog
3085-3"-152N	714456	605 (1)	J	Concrete fastener						X		X		As per catalog
3085-3"-152N	714456	621 (1)	C	C 4x3.1	27.7KSI	32.4KSI				X		X		
3085-3"-152N	714456	629 (1)	C	C 4x3.1	27.7KSI	32.4KSI				X		X		
3073-3"-152N	714458	TI-PS-14	C	Concrete fastener	0.66KIP	1KIP				X		X		
3078-3"-152N	714460 (AC-05) CONT)	TI-PS-14	C	Concrete fastener	0.66KIP	1KIP				X		X		

(1) ADLPIPE Node No.

TABLE 5.1-2. SUPPORT RESULTS FOR AUXILIARY COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
3056-14"-152N	334865	T1-PS-15D	C	W4x13	F_b=3.4	32.4	9.5			X		X		
3056-14"-152N	334865	T1-PS-15L	C	W4x13	F_b=2.24	32.4	14.46			X		X		
3056-14"-152N	334865	90	J							X		X		Defer to AC-05, D.P. #120
3056-14"-152N	334865	110	J							X		X		do
3056-14"-152N	334865	130	J							X		X		do
3056-14"-152N	334865	140	J							X		X		do
3056-14"-152N	334865	150	J							X		X		do
3056-14"-152N	334865	160	J							X		X		do
3056-14"-152N	334599	8-PS-9	C	Concrete fastener	T=26.24	T=3.7	0.14	44.4	1.69		X	X		Add brace in X-direction
3056-14"-152N	334599	8-PS-8	C	W6x15.5	F_b=104.8	32.4	0.31	174	1.65		X	X		Add brace in Z-direction
3056-14"-152N	334599	8-PS-7	C	W6x15.5	F_b=8.6	32.4	3.7			X		X		
3045-8"-152N	334546	8-PS-22	C	Concrete fastener	T=26.5	3.7	0.14	44.4	1.69		X	X		Add brace in X-direction
3045-6"-152N	334546	8-PS-20	J							X		X		Small load - as per catalog
3045-6"-152N	334546 (AC-06)	8-PS-6	J							X		X		Small load - as per catalog

(1) ADLPIPE Node No.

TABLE 5.1 SUPPORT RESULTS FOR AUXILIARY COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judgement	Critical Section	Section Stress (KSI) (a)	Reevaluation Criteria (KSI) (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevaluation Criteria		Meets Reevaluation Criteria		Remarks
										Yes	No	Yes	No	
3069-3"-152N	714457	T1-PS-14	C	W4x13	F_b=32.58	32.4	1.0			X		X		
3067-3"-152N	714461	T1-PS-14	C	W4x13	F_b=32.58	32.4	1.0			X		X		
3068-3"-152N	714459	T1-PS-14	C	W4x13	F_b=32.58	32.4	1.0			X		X		
3094-2-1/2"-HH	714453-1	653	C	C4x3.1	F_b=61.5 KSI	32.4KSI	0.53	174	2.8		X	X		Provide brace and additional vertical member w/base P
3094-2-1/2"-HH	714453	663	C	C4x3.1	F_b=61.5 KSI	32.4KSI	0.53	174	2.8		X	X		do
3066-3"-152N	714455	750	C	C3x4.1	F_b=21.16	32.4	1.53			X		X		
3066-3"-152N	714455	765	C	C3x4.1	F_b21.16	32.4	1.53			X		X		
3056-10"-152N	334599	8-R-PS-14	C	Weld	36.13	19.2	0.53	87	2.4		X	X		Change anchor to Y-rigid test
3057-10"-152N	334599	8-R-PS-14	C	Weld	39.33	19.2	0.49	87	2.2		X	X		do
3057-10"-152N	334599 (AC-06)	8-R-PS-14	C	Weld	20.57	19.2	0.90	87	4.2		X	X		do
3084-6"-151R	AC-07	21	J							X		X		Small load - as per catalog
3084-6"-151R	AC-07	29	C	Concrete fastener	7.1KIP	2.2KIP	0.31	26.4KIP	3.7		X	X		Add brace in X-direction
3084-6"-151R	AC-07	33	C	Concrete fastener	3.7KIP	2.2KIP	0.6	26.4KIP	7.2		X	X		do

(1) ADLPIPE Node No.

TABLE 5.1 SUPPORT RESULTS FOR AUXILIARY COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
3084-6"-151R	AC-07	51	C	Concrete	21.6KIP	1.5KIP	0.07	18KIP	0.83		X		X	Add brace
3084-6"-151R	AC-07	55	C	W6x15.5	33.4KSI	32.4KSI	0.97	172.8KSI	5.34		X	X		Add brace in Z-direction
3084-6"-151R	AC-07	61	C	Concrete fastener	26.8KIP	1.5KIP	0.06	18KIP	0.67		X		X	Add brace
3086-6-151R	~~Not assigned~~	8-PS-10	C	Concrete fastener	T=26.8 S=0.18	T=1.5 S=2.3	0.06 12.7	T=18 S=6.9	0.67 38.3		X		X	Add brace
3086-6-151R	(AC-08)	8-PS-7	C	Base Plate	43.2	32.4	0.75	172.8	4		X	X		Refer to AC-07, D.P. #55
3086-6-151R		8-PS-12	C	Concrete fastener	T=21.6 S=0.35	T=1.5 S=2.3	0.07 6.57	T=18 S=6.9	0.83 19.7		X		X	Refer to AC-07, D.P. #51
3086-6-151R		14-PS-17	C	Concrete fastener	T=7.12 S=0.03	T=2.2 S=3.7	0.31 123	T=26.3 S=11.1	13.7 370		X	X		Refer to AC-07, D.P. #29
3086-6-151R 151R		14-PS-22	C	Concrete fastener	T=3.69 S=1.87	T=2.2 S=3.7	0.6 1.08	T=26.4 S=11.1	7.15 5.94		X	X		Refer to AC-07, D.P. #33
3086-6-151R		14-R-PS-40	C	C6x8.2	F_b=9.63	32.4	3.36			X		X		
3086-6-151R		14-PS-16	J							X		X		Small loads - as per catalog
3086-6-151R		14-PS-15	J							X		X		Small loads - as per catalog
3086-6-151R		75	J							X		X		Loads ok for existing structure
3086-6-151R		14-PS-14	C	W8x31	F_b=3.39	32.4	9.56			X		X		
3086-6-151R		14-PS-12	C	W6x8.5	F_b=18	32.4	1.8			X		X		

(1) ADLPIPE Node No.

TABLE 5.1-2. SUPPORT RESULTS FOR AUXILIARY COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
3090-8-152N	714449-1	1-PS-60	C	W8x40	F_b=0.37	32.4	37.8			X		X		
3090-8-152N	714449-1	1-SC-152-6	C	W6x20	F_b=4.6	32.4	7.04			X		X		
3090-8-152N	334570-1 (AC-11)	1-SC-152-5	C	W4x13	F_b=15.15	32.4	2.14			X		X		
3029-8-152N	334566-1	1-R-152-2	J							X		X		As per catalog
3029-8-152N	334566-1	1-SC-152-5	C	W4x13	F_b=15.15	32.4	2.14			X		X		
3029-8-152N	714450-1	1-SC-152-6	C							X		X		As per AC-11, D.P. #35
3029-8-152N	714450-1 (AC-12)	1-PS-60	C	W8x40	F_b=0.37	32.4	37.8			X		X		
3064-8-152N	714451-1	1-PS-60	C	W8x40	F_b=0.37	32.4	87.8			X		X		
3064-8-152N	714451-1	1-SC-152-6	C							X		X		As per AC-11, D.P. #35
3064-8-152N	334571-2	1-SC-152-5	C	W4x13	F_b=15.15	32.4	2.14			X		X		
3064-8-152N	334571-2 (AC-13)	1-S-152-3	J							X		X		As per catalog
3033-8-152N	334565-2	1-R-152-1	J							X		X		As per catalog
3033-8-152N	334565-2	1-SC-152-5	C	W4x13	F_b=15.15	32.4	2.14			X		X		
3033-8-152N	714452-0	1-SC-152-6	C							X		X		As per AC-11, D.P. #35
3033-8-152N	714452-0 (AC-14)	1-PS-60	C	W8x40	F_b=0.37	32.4	87.8			X		X		

(1) ADLPIPE Node No.

TABLE 5.1 2. SUPPORT RESULTS FOR AUXILIARY COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
3068-3"-152N	334572-1	1-S-152-16	J							X		X		As per catalog
3068-3"-152N	334572-1	1-SC-152-12	J							X		X		Small load
3068-3"-152N	334572-1	1-S-152-14	J							X		X		Small load
3068-3"-152N	334572-1	1-S-152-12	J							X		X		As per catalog
3068-3"-152N	334572-1	120	C	2-1/2x 2-1/2x1/4 L	F_b=10.56	32.4	3.1			X		X		
3068-3"-152N	334572-1	130	J							X		X		Small load
3068-3"-152N	334572-1	155	J							X		X		Small load
3068-3"-152N	334572-1	1-R-PS-50	J							X		X		Small load
3068-3"-152N	334572-1	1-PS-38	J							X		X		Small load
3068-3"-152N	334572-1	1-SC-152-11	J							X		X		Steel adeq
3068-3"-152N	334572-1	1-PS-42	J							X		X		Small load
3068-3"-152N	334572-1	225	J							X		X		As per catalog
3068-3"-152N	334572-1	1-SC-152-6	J							X		X		As per AC-11, D.P. #35
3068-3"-152N	334572-1 (AC-15)	1-PS-60	J							X		X		Small load

(1) ADLPIPE Node No.

TABLE 5.1-2. SUPPORT RESULTS FOR AUXILIARY COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
3108-3"-152N	334666-0	945	J							X		X		Small load
3108-3"-152N	334666-0	950	J							X		X		Small load
3069-3"-152N	334573-2	1-S-152-18	J							X		X		As per catalog (SP)
3069-3"-152N	334573-2	1-SC-152-13	C	2x2x1/4L	F_b=12.69	32.4	2.55			X		X		
3069-3"-152N	334573-2	1-S-152-19	J							X		X		As per catalog (CP)
3069-3"-152N	334573-2	1-SC-152-14	C	2x2x3/8L	F_b=6.98	32.4	4.64			X		X		
3069-3"-152N	334573-2	1-R-152-22	C	2x2x3/8L	F_b=3.74	32.4	8.66			X		X		
3069-3"-152N	334573-2	512	J							X		X		As per catalog (U)
3069-3"-152N	714459-2	1-SC-152-6	J							X		X		As per AC-11, D.P. #35
3069-3"-152N	714459-2	1-PS-60	J							X		X		Small load, as per catalog (U)
3067-3"-152N	334574-2	1-3067-SH-001	J							X		X		Small load, as per catalog (SP)
3067-3"-152N	334574-2	1-SC-152-7	J								X		X	Replace existing support to a Z-rigid restraint
3067-3"-152N	334574-2	1-S-152-7	J							X		X		As per catalog (CP)
	(AC-15 CONT)													

(1) ADLPIPE Node No.

TABLE 5.1-2. SUPPORT RESULTS FOR AUXILIARY COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
3067-3"-152N	334574-2	1-SC-152-8	C	2x2x1/4L	F_b=22.66	32.4	1.43			X		X		
3067-3"-152N	334574-2	1-R-152-8	C	2x2x1/4L	F_b=8.1	32.4	4			X		X		
3067-3"-152N	334574-2	1-R-152-9	C	2x2x1/4L	F_b=25.91	32.4	1.25			X		X		
3067-3"-152N	334574-2	1-SC-152-9	C	2x2x1/4L	F_b=18.93	32.4	1.6			X		X		
3067-3"-152N	334574-2	1-R-152-23	C	2x2x1/4L	F_b=25.91	32.4	1.25			X		X		
3067-3"-152N	334574-2	1-R-152-10	C	2x2x1/4L	F_b=8.1	32.4	4			X		X		
3067-3"-152N	334574-2	1-PS-54	J							X		X		Small load
3067-3"-152N	334574-2	1-PS-53	J							X		X		Small load
3067-3"-152N	334574-2	1-PS-52	J							X		X		Small load
3067-3"-152N	334574-2	1-PS-51 1-SC-152-10	J							X		X		Small load
3067-3"-152N	334574-2	1-R-PS-50	J							X		X		Small load
3067-3"-152N	334574-2	1-PS-38	J							X		X		Small load
3067-3"-152N	334574-2	1-SC-152-11	J							X		X		Refer to AC-19, D.P. #80
3067-3"-152N	334574-2 (AC-15 CONT)	1-PS-42	J							X		X		Defer to AC-19, D.P. #75

(1) ADLPIPE Node No.

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
3067-3"-152N	714461-2	1-SC-152-6	J							X		X		As per AC-11, D.P. #35
3067-3"-152N	714461-2 (AC-15 CONT)	1-PS-60	J							X		X		As per catalog
3073-3-152N	334587-2	1-SC-152-13	C	2x2x1/4L	F_b=12.69	32.4	2.55			X		X		
3073-3-152N	334587-2	1-5-152-17	J							X		X		As per catalog (SP)
3073-3-152N	334587-2	1-S-152-20	J							X		X		As per catalog (SP)
3073-3-152N	334587-2	1-R-152-21 1-SC-152-14	C	2x2x3/8L	F_b=5.43	32.4	5.97			X		X		
3073-3-152N	334587-2	1-R-152-22	J	2x2x3/8L	F_b=19.29	32.4	1.68			X		X		
3073-3-152N	334587-2	1-SC-152-6	J							X		X		Refer to AC-11, D.P. #35
3073-3-152N	334587-2 (AC-16)	1-PS-60	J							X		X		Refer to AC-13, D.P. #15
3078-3-152N	334588-2	1-S-152-15	J							X		X		As per catalog (SP)
3078-3-152N	334588-2	1-SC-152-12	C	2x2x1/4L	F_b=8.9	32.4	3.64			X		X		
3078-3-152N	334588-2	1-S-152-13	J							X		X		As per catalog (SP)
3078-3-152N	334588-2	1-S-152-11	J							X		X		As per catalog (SP)
3078-3-152N	334588-2	1-PS-52	J							X		X		Refer to AC-19, D.P. #95
3078-3-152N	334588-2	1-PS-51 1-SC-152-10	J							X		X		Refer to AC-19, D.P. #90
3078-3-152N	334588-2 (AC-17)	1-R-PS-50	J							X		X		Refer to AC-19, D.P. #85

(1) ADLPIPE Node No.

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
3078-3-152N	334588-2	1-PS-38	J							X		X		Refer to AC-19, D.P. #80
3078-3-152N	334588-2	1-SC-152-11	J							X		X		As per catalog (U)
3078-3-152N	334588-2	1-PS-42	J							X		X		Refer to AC-19, D.P. #75
3078-3-152N	334588-2	197	J							X		X		As per catalog
3078-3-152N	334588-2	1-SC-152-6	J							X		X		Refer to AC-11, D.P. #35
3078-3-152N	334588-2 (AC-17 CONT)	1-PS-60	J							X		X		Refer to AC-13, D.P. #15
3083-3-152N	334589	1-3083-SH-001	J							X		X		As per catalog (SP)
3083-3-152N	334589	1-SC-152-7	J								X		X	Change existing support to a Z-rigid restraint
3083-3-152N	334589	85	J								X		X	Existing snubber support 2 pipe, replace to one snubber to one pipe
3083-3-152N	334589	1-S-152-6	J							X		X		As per catalog (SP)
3083-3-152N	334589	1-SC-152-8	C	Weld	5.89	19.2	3.26			X		X		
3083-3-152N	334589	1-R-152-8	C	2x2x1/4L	F_b=8.9	32.4	3.6			X		X		
3083-3-152N	334589	1-R-152-9	C	2x2x1/4L	F_b27.53	32.4	1.18			X		X		
3083-3-152N	334589	1-R-152-23	C	2x2x1/4	F_b=25.91	32.4	1.25			X		X		
3083-3-152N	334589	1-R-152-10	C	2x2x1/4	F_b=4.86	32.4	6.67			X		X		
3083-3-152N	334589 (AC-18)	1-PS-54	C	L3x3x1/2	F_b=29.9	32.4	1.08			X		X		

(1) ADLPIPE Node No.

TABLE 5.1-2. SUPPORT RESULTS FOR AUXILIARY COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
3083-3-152N	334589	1-PS-53	C	L3x3x1/2	F_b=29.9	32.4	1.08			X		X		
3083-3-152N	334589	1-PS-52	C	L3x3x1/2	F_b=29.9	32.4	1.08			X		X		
3083-3-152N	334589	1-PS-51 1-SC-152-10	C	L3x3x1/2	F_b=29.9	32.4	1.08			X		X		
3083-3-152N	334589	1-PS-50	C	L3x3x1/2	F_b=29.9	32.4	1.08			X		X		
3083-3-152N	334589	1-PS-38	C	L3x3x1/2	F_b=29.9	32.4	1.08			X		X		
3083-3-152N	334589	1-SC-152-11	J							X		X		Refer to AC-19, D.P. #80
3083-3-152N	334589	1-PS-42	C	W6x15.5	F_b14.4	32.4	2.25			X		X		
3083-3-152N	714462	1-SC-152-6	C	W6x15.5	F_b=19.1	32.4	1.7			X		X		
3083-3-152N	714462	1-PS-60	C	W8x40	F_b=5.1	32.4	6.35			X		X		
3083-3-152N	334589 (AC-18 CONT)	1-SC-1529	J							X		X		Small load
3094-2-1/2-HH	714453	1-PS-60	C	W8x40	F_b=0.37	32.4	88			X		X		Refer to AC-13, D.P. #15
3094-2-1/2-HH	714453	1-SC-152-6	J							X		X		Refer to AC-11, D.P. #35
3094-2-1/2-HH	714453	55	J							X		X		As per catalog (U)
3094-2-1/2-HH	334500	1-PS-42	C	L2x2x1/4	F_b=89	32.4	0.36	172.8	1.94		X	X		Add additional Y-restraint
3094-2-1/2-HH	334500	1-PS-38	C	L2x2x3/8	F_b=56.5	32.4	0.57	172.8	3.06		X	X		Add additional Y-restraint
3094-2-1/2-HH	334500 (AC-19)	1-PS-50	C	L2x2x3/8	F_b=56.5	32.4	0.57	172.8	3.06		X	X		Add additional Y-restraint

(1) ADLPIPE Node No.

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
3094-2-1/2-HH	334500	1-PS-51	C	L2x2x3/8	F_b=56.5	32.4	0.57	172.8	3.06		X	X		Add additional Y-restraint
3094-2-1/2-HH	334500	1-PS-52	C	L2x2x3/8	F_b=56.5	32.4	0.57	172.8	3.06		X	X		Add additional Y-restraint
3094-2-1/2-HH	334500	1-PS-53	C	L2x2x3/8	F_b=56.5	32.4	0.57	172.8	3.06		X	X		Add additional Y-restraint
3094-2-1/2-HH	334500	1-PS-54	C	L2x2x3/8	F_b=56.5	32.4	0.57	172.8	3.06		X	X		Add additional Y-restraint
3094-2-1/2-HH	334500 (AC-19 CONT)	1-PS-55	C	Weld	65.92	19.2	0.29	86.4	1.31		X	X		Install brace in Y-direction
3095-2-1/2-HH	714454	1-PS-60	J							X		X		Refer to AC-13, D.P. #15
3095-2-1/2-HH	714454	1-SC-152-6	J							X		X		Refer to AC-11, D.P. #35
3095-2-1/2-HH	334501	50	J							X		X		As per catalog (U)
3095-2-1/2-HH	334501	1-PS-42	C	L2-1/2x 2-1/2x 1/4	F_b=89	32.4	0.36	172.8	1.94		X	X		Refer to AC-19, D.P. #75
3095-2-1/2-HH	334501	1-PS-38	C	L2-1/2x 2-1/2x 1/4	F_b=56.4	32.4	0.57	172.8	3.06		X	X		Refer to AC-19, D.P. #80
3095-2-1/2-HH	334501	1-PS-50	C	L2-1/2x 2-1/2x 1/4	F_b=79.5	32.4	0.4	172.8	2.17		X	X		Refer to AC-19, D.P. #85
3095-2-1/2-HH	334501 (AC-20)	1-PS-51	C	L2-1/2x 2-1/2x 1/4	F_b=56.4	32.4	0.51	172.8	3.06		X	X		Refer to AC-19, D.P. #90

(1) ADLPIPE Node No.

TABLE 5.[illegible]2. SUPPORT RESULTS FOR AUXILIARY COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
3095-2-1/2-HH	334501	1-PS-52	C	L2-1/2x 2-1/2x 1/4	F_b=75.7	32.4	0.43	172.8	2.28		X	X		Refer to AC-19, D.P. #95
3095-2-1/2-HH	334501	1-PS-53	C	L2-1/2x 2-1/2x 1/4	F_b=77.3	32.4	0.42	172.8	2.24		X	X		Refer to AC-19, D.P. #105
3095-2-1/2-HH	334501	1-PS-54	C	L2-1/2x 2-1/2x 3/8	F_b=76.4	32.4	0.42	172.8	2.26		X	X		Refer to AC-19, D.P. #110
3095-2-1/2-A	334501	1-PS-55	C	Weld	69	19.2	0.28	86.4	1.25		X	X		Add brace
3043-2-A	334650	305	J							X		X		As per catalog (U)
3043-2-A	334650	330	J							X		X		As per catalog (U)
3043-2-A	334650	335	J							X		X		Small load, as per catalog
3043-2-A	334650	340	J							X		X		Small load, as per catalog (U)
3043-2-A	334650	360	J							X		X		As per catalog (U)
3043-2-A	334650	365	J							X		X		As per catalog (U)
3043-2-A	334650	375	J							X		X		As per catalog (U)
3009-2-A	334649	505	J							X		X		As per catalog (U)
3009-2-A	334649	530	J							X		X		As per catalog (U), small load
3009-2-A	334649	535	J							X		X		As per catalog (U), small load
3009-2-A	334649	540	J							X		X		As per catalog (U)
3009-2-A	334649 (AC-20 CONT)	565	J							X		X		As per catalog (U)

(1) ADLPIPE Node No.

TABLE 5.1-2. SUPPORT RESULTS FOR AUXILIARY COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
3009-2-A	334649	570	J							X		X		As per catalog (U) small load
3009-2-A	334649	580	J							X		X		As per catalog (U) small load
3009-2-A	334649 (AC-20 CONT)	590	J							X		X		As per catalog (U)
3066-3"-152N	714455	1-PS-60	J							X		X		Refer to AC-13, D.P. #15
3066-3"-152N	714455	1-SC-152-6	J							X		X		Refer to AC-11, D.P. #35
3066-3"-152N	714455	1-PS-42	J							X		X		Refer to AC-19. D.P. #75
3066-3"-152N	714455	1-PS-38	J							X		X		Refer to AC-19, D.P. #80
3066-3"-152N	714455	1-PS-50	J							X		X		Refer to AC-19, D.P. #85
3066-3"-152N	714455	1-PS-51	J							X		X		Refer to AC-19, D.P. #90
3066-3"-152N	714455 (AC-21)	1-PS-52	J							X		X		Refer to AC-19. D.P. #95
3085-3-152N	714456-2	1-PS-60	J							X		X		Refer to AC-13, D.P. #15
3085-3-152N	714456-2	1-SC-152-6	J							X		X		Refer to AC-11, D.P. #35
3085-3-152N	714456-2 (AC-22)	1-PS-42	J							X		X		Refer to AC-19, D.P. #75

(1) ADLPIPE Node No.

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
3085-3-152N	714456-2	1-PS-38	J							X		X		Refer to AC-19, D.P. #80
3085-3-152N	714456-2	1-PS-50	J							X		X		Refer to AC-19, D.P. #85
3085-3-152N	714456-2	1-PS-51	J							X		X		Refer to AC-19, D.P. #90
3085-3-152N	714456-2 (AC-22 CONT)	1-PS-52	J							X		X		Refer to AC-19, D.P. #95
3015-6-601R	334578-1	1-S-601R-5	J							X		X		As per catalog (SP)
3015-6-601R	334578-1	1-S-601R-6	J							X		X		As per catalog (SP)
3015-6-601R	334578-1	1-R-601R-7	C	2-1/2x 2-1/2x 3/8L	F_b=6.36	32.4	5.1			X		X		
3015-6-601R	334578-1	1-SC-601R-3	C	C3x4.1	F_b=8.42	32.4	3.84			X		X		
3015-6-601R	334578-1	1-S-601R-8	J							X		X		As per catalog (SP)
3004-4-601R	334578-1	340	J							X		X		Small load
3019-6-601R	334578-1	1-R-601R-10	J							X		X		As per catalog
3015-6-601R	334578-1 (AC-23)	1-R-601R-9	J							X		X		As per catalog
3001-6-601R	334580-3	1-R-601R-12	C	W4x13	F_b=39.8	32.4	0.81	172.8	4.34		X	X		Add brace in Y-direction
3001-6-601R	334580-3	1-SC-601R-4	C	W4x13	F_b=60.2	32.4	0.538	172.8	2.87		X	X		Refer to D.P.#54
3001-6-2501R	334580-3 (AC-24)	1-S-601R-13	J							X		X		As per catalog (SP)

(1) ADLPIPE Node No.

TABLE 5.[illegible]2. SUPPORT RESULTS FOR AUXILIARY COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
3001-6-2501R	334580-3	1-S-601R-11	J							X		X		As per catalog (SP)
5002-8"-601R	334574-3	1-SC-2501R-A	C	Conc. fastener	T=24.8 S=1.5	T=2.2 S=3.7	0.1 2.47	26.4 3.7	1.06 2.47		X	X		Add brace in Y-direction
5002-8"-601R	334574-3	1-S-2501R-15	J							X		X		As per catalog (SP)
5002-8"-601R	334574-3	1-S-601R-1	J							X		X		As per catalog (SP)
5002-8"-601R	334574-3	1-SC-601R-2	C	C3x4.1	F_b=144	32.4	0.22	172.8	1.2		X	X		Add brace in X-direction
5002-8"-601R	334574-3	1-R-601R-2	J							X		X		As per catalog (R)
5002-8"-601R	334574-3	1-S-601R-3	J							X		X		As per catalog (SP)
5038-6"-601R	334574-3	1-SC-601R-2	C	C3x4.1	F_b=144	32.4	0.22	172.8	1.2		X	X		Refer to D.P. #342
5038-6"-601R	334574-3 (AC-24-1)	1-S-601R-4	J							X		X		As per catalog (SP)

(1) ADLPIPE Node No.

TABLE 5.1-3. SMALL PIPING RESULTS FOR AUXILIARY COOLANT SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
3006-2-601 3006-2-EP	334925-1 714447-6	44.5	37.7	<0.85	196.	4.4		X	-	-	(2) Add E-W seismic restraint between supports 1-3006-UG-005 and -004 at approx. 20' elevation. Modify supports IT-3006-UG-007 and -008 to provide vertical seismic restraint
3007-2-A 3011-2-A	334647-0	39.0	36.0	0.92	187.	4.8		X	-	-	
3013-1-152 3013-1-1/2-152 3014-1-152	334652-0 334655-0	36.5	28.8	0.79	150.	4.1		X	-	-	(2) Add E-W restraint on line 3011 between valve 2"-628 and line 3007
3017-1-152 3017-1-1/2-152 3018-1-152	334654-0 334656-0	29.4	28.8	0.98	150.	5.1		X	-	-	(2) Provide E-W and N-S restraint for long N-S run at Fl. 12'2" (2) Provide E-W restraint at or near one of existing spaces
3036-1-152 3036-2-152	334672-0	22.5	36.0	1.6	187.	8.3	X		-	-	
3044-2-A	334651-0	69.3	36.0	0.52	187.	2.7		X	-	-	(2) O.K. No existing seismic supports
3052-1-152 3052-1-1/2-152	334487-1	29.9	28.8	0.96	150.	5.0	X		-	-	(2) O.K.
3058-1-152	334487-1	22.4	28.8	1.3	150.	6.7	X		-	-	(2) O.K. because within 4% of allowable
3059-1-152	334487-1	18.9	28.8	1.5	150.	7.9	X		-	-	
3060-1-152	334502-1	100.0	28.8	0.29	150.	1.5		X	-	-	(2) O.K. No existing seismic supports
3061-1-152	334502-1	99.6	28.8	0.29	150.	1.5		X	-	-	
3097-1-152	334502-1	32.9	28.8	0.88	150.	4.6		X	-	-	(2) O.K. No existing seismic supports
3110-1-1/2-2503	334503-1	-	-	-	-	-		X	-	-	(2) Add vertical restraint on chemical pot feeder
3110-1-1/2-152 3110-2-152	334504-1										(2) O.K. if line 3060 is supported as recommended
3111-1-1/2-2503 3111-1-1/2-152 3111-2-152	334505-1	141.0	28.8	0.20	150.	1.1		X	-	-	(2) Add vertical restraint to RCV605. Conclusions and recommendations based on stress calculations for line 3111. Replace existing deadweight supports with bilateral seismic restraints (2) Provide vert. seismic restraint on 1' 10-1/2" E-W run at El. 12' 6". Provide E-W & N-S restraint near valve 741B-2"-T36. Modify DW restraints without U-bolts to E-W & vert. seismic restraints. Provide N-S restraint for 16'4" N-S run at E. 0' 5"

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.1-3. SMALL PIPING RESULTS FOR AUXILIARY COOLANT SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
3112-1-1/2-2503 3112-1-1/2-152	334506-2	-	-	-	-	-		X	-	-	O.K. if line 3110 is supported as recommended.

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.1-4

MECHANICAL EQUIPTMENT ANALYSIS SUMMARY

EQUIPMENT: Component Cooling Heat Exchanger (E-20A, B)

COMPONENT DESCRIPTION	REEVALUATION CRITERIA L	CALCULATED VALUE C	$\frac{L}{C}$	INTEGRITY CRITERIA I	$\frac{I}{C}$	MEETS REEVALUATION CRITERIA		MEETS INTEGRITY CRITERIA		REMARKS
						YES	NO	YES	NO	
Heat Exchanger Shell (KSI)	32.9	16.1	2.04	77.55	4.82	X		X		
Support Saddle	28.4	36.1	0.79	71.34	1.98		X	X		Require Additional Lateral Support plus Local Stiffening of Support Frames
Saddle Bolts (KSI)	40.0	234.0	0.17	141.6	0.61		X		X	
Support Frame (KSI)	28.4	61.7	0.46	71.34	1.16		X	X		
Support Frame Anchor Bolts	40.0	298.6	0.13	130.0	0.44		X		X	

TABLE 5.1

MECHANICAL EQUIPTMENT ANALYSIS SUMMARY

EQUIPMENT: Recirculation Heat Exchanger (E-11)

COMPONENT DESCRIPTION	REEVALUATION CRITERIA L	CALCULATED VALUE C	$\frac{L}{C}$	INTEGRITY CRITERIA I	$\frac{I}{C}$	MEETS REEVALUATION CRITERIA		MEETS INTEGRITY CRITERIA		REMARKS
						YES	NO	YES	NO	
Recirculation Heat Exchanger Shell (KSI)	26.9	8.3	3.24	63.99	7.64	X		X		
Support Saddle (KSI)	28.4	10.5	2.70	71.34	6.79	X		X		
Anchor Bolts (KSI)	40.0	152.9	0.26	130.0	0.85		X		X	Bolt Bending Requires Additional Anchoring

TABLE 5.1-

MECHANICAL EQUIPTMENT ANALYSIS SUMMARY

EQUIPMENT: Spent Fuel Pit Heat Exchanger (E-12)

COMPONENT DESCRIPTION	REEVALUATION CRITERIA L	CALCULATED VALUE C	L/C	INTEGRITY CRITERIA I	I/C	MEETS REEVALUATION CRITERIA		MEETS INTEGRITY CRITERIA		REMARKS
						YES	NO	YES	NO	
Heat Exchanger Shell (KSI)	30.0	15.4	1.95	70.8	4.60	X		X		
Support Saddle (KSI)	28.1	32.8	0.86	70.8	2.16		X	X		Resulted from Large Nozzle Loads Coupling Between Heat Exchanger and Piping Should be Examined
Anchor Bolts (KSI)	40.0	97.5	0.41	130.00	1.33		X	X		

TABLE 5.1-

MECHANICAL EQUIPTMENT ANALYSIS SUMMARY

EQUIPMENT: Component Cooling Surge Tank (C-17)

COMPONENT DESCRIPTION	REEVALUATION CRITERIA L	CALCULATED VALUE C	$\frac{L}{C}$	INTEGRITY CRITERIA I	$\frac{I}{C}$	MEETS REEVALUATION CRITERIA		MEETS INTEGRITY CRITERIA		REMARKS
						YES	NO	YES	NO	
Surge Tank Shell (KSI)	30.0	23.5	1.28	70.8	3.01	X		X		
Support Saddle (KSI)	28.4	6.4	4.44	71.34	11.15	X		X		
Anchor Bolts	11.2	35.7	0.31	36.4	1.02		X	X		Require Additional Anchors At Saddle Plate

TABLE 5.1-8

MECHANICAL EQUIPMENT ANALYSIS SUMMARY

EQUIPMENT: Residual Heat Removal Pump-Active (G-14A, B)

COMPONENT DESCRIPTION	REEVALUATION CRITERIA L	CALCULATED VALUE C	$\frac{L}{C}$	INTEGRITY CRITERIA I	$\frac{I}{C}$	MEETS REEVALUATION CRITERIA		MEETS INTEGRITY CRITERIA		REMARKS
						YES	NO	YES	NO	
Base Plate	22.7	20.2	1.12	53.51	2.65	X		X		
Base Plate Hold Down Bolts - ½Ø (KSI)	40.0	164.3	0.24	106.2	0.65		X		X	Bolt Bending Due to Large Nozzle Loads
Base Plate Hold Down Bolts - 3/4Ø (KSI)	40.0	10.7	3.74	106.2	9.93	X		X		
Motor Plate Support (KSI)	22.7	11.7	1.94	53.51	4.57	X		X		
Motor Mounting Bolts (KSI)	40.0	256.0	0.16	106.2	0.41		X		X	Bolt Bending Due to Seismic
Pump Bolting (KSI)	40.0	105.6	0.38	106.2	1.00		X	X		Due to Large Nozzle Loads

TABLE 5.2-1. SMALL PIPING RESULTS FOR CHEMICAL FEED SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
1110-1/2-EG1	334772-0						X		-	-	(1) O.K.
1111-1/2-EG1	334773-0						X		-	-	(1) O.K.
1112-1/2-EG1	334774-0							X	-	-	(1) Add N-S and vert. restraint about mid-way on 7' 5" E-W
1150-3/4-GM	334871-0	173.4	37.7	0.22	196.	1.13		X	-	-	(2) Integrity margin conclusion on lines 1151 thru 1154 is judgement. Addition of an E-W and vert. restraint on N-S run of line 1150, near 5' 1-1/2" riser, should ensure that all lines (1150 thru 1154) meet the criteria allowable.
1151-3/4-GM	334825-0	58.6	37.7	0.64	196.	-		X	-	-	
1152-3/4-GM	334825-0	58.6	37.7	0.64	196.	-		X	-	-	
1153-3/4-GM	334825-0	110.5	37.7	0.34	196.	-		X	-	-	
1154-3/4-GM	334825-0	72.2	37.7	0.52	196.	-		X	-	-	

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

**Integrity Allowable = 5.2 (Criteria Allowable)

TABLE 5.3-1. LARGE PIPING RESULTS FOR CIRCULATING WATER SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
416-12-KP1	334797-0 (SW-01-1)	1.915	36.	18.8	187.2	97.75	X		X		Accepted as it is.
415-12-KP1	334796-1 (SW-01-2)	1.805	36.	19.94	187.2	103.71	X		X		Accepted as it is.
415-12-KP1 416-12-KP1	334796-1 334797-0 (SW-01-3)	5.573	36.	6.46	187.2	33.59	X		X		Accepted as it is.
413-20-KP1 412-12-KP1 413-12-KP1 454-10-KP1	33417-0 (SW-02)	6.304	36.	5.71	187.2	29.70	X		X		Accepted as it is.
811-8-KN 813-8-KN 866-8-KN 811-4-KN 812-4-KN 815-3-KN 817-3-KN	(SW-03)	109.66	36.	0.328	187.2	1.71		X	X		(1) Add restraint in E-W direction at following existing supports: 14-PS-14 (D.P. 20) 14-PS-11 (D.P. 40) (D.P. 550) (2) Add holddown and E-W restraint at existing support: 14-PS-10 (D.P. 60) (3) Add holddown at data point 30, & 624 (4) Add holddown and N-S restraint at existing support: 14-PS-9 (D.P. 540) & (D.P. 200) (5) Add restraint in N-S direction at existing support: 14-PS-9 (D.P. 535) (6) Install new support in E-W & N-S direction at node point 560. (7) Add holddown, N-S & E-W restraint at node point 300.

TABLE 5.3-2. SUPPORT RESULTS FOR CIRCULATING WATER SYSTEM

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
416-12"-KP1	334797-0	15	C	Conc. fastener	10.6 KIP	2.2 KIP	0.21	26.4 KIP	2.5		X	X		Add brace.
416-12"-KP1	334797-0	257	J	5/8x11" x17"P	F2=2.5	18	7.2			X		X		
415-12"-KP1	334796-1	115	C	Conc. fastener	8.7 KIP	2.2 KIP	0.25	26.4 KIP	3.03		X	X		Add brace.
415-12"-KP1	334796-1 (SW-01)	186	J	5/8		F_b=1.44 x11" x17"P	32.4	22.5		X		X		
413-20"-KP1	334717	60	J							X		X		As per catalog (4)
454-10"-KP	SW-02	100	J							X		X		As per catalog (4)
454-10"-KP	SW-02	110	J							X		X		As per catalog (4)
454-10"-KP	SW-02	120	J							X		X		As per catalog (4)
454-10"-KP	SW-02	130	J							X		X		As per catalog (4)
454-10"-KP	SW-02	140	J	Conc. fastener	T=30.27	2.2	.10	26.4	.87		X		X	Provide brace 1 to pipe.
454-10"-KP	SW-02	150	J	Conc. fastener	Pullout 2.625	2.2	.83	26.4	10.0		X	X		Provide brace in X-direction
454-10"-KP	SW-02	160	J	Conc. fastener	Pullout 2.625	2.2	.83	26.4	10.0		X	X		Provide brace in X-direction
454-10"-KP	SW-02	170	J	Conc. fastener	Pullout 2.625	2.2	.83	26.4	10.0		X	X		Provide brace in X-direction
811-8"-KN	SW-03	20	C	W8x31	F_b=12.38	32.4	2.61			X		X		
811-8"-KN	SW-03	30	C	6B 8.5	F_b=27.11	32.4	1.2			X		X		
811-8"-KN	SW-03	40	J							X		X		Refer to D.P. #30

(1) ADLPIPE Node No.

TABLE 5.3-2. SUPPORT RESULTS FOR CIRCULATING WATER SYSTEM

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
811-8"-KN	SW-03	50	J							X		X		Refer to D.P. #30
811-8"-KN	SW-03	60	J							X		X		Refer to D.P. #20
811-8"-KN	SW-03	200	C	Conc. fastener	T=2.9	2.2	0.75	26.4	9.1		X	X		Add brace.
813-8"-KN	SW-03	140	C	Conc. fastener	T=1.92	2.2	1.14			X		X		
817-3"-KN	SW-03	300	J							X		X		Small load.
812-4"-KN	SW-03	405	J	2"Ø pipe (stan-chion)	Fa=1.1	18	16.36			X		X		
815-3"-KN	SW-03	535	J							X		X		Refer to D.P. #200
815-3"-KN	SW-03	540	J							X		X		Refer to D.P. #140
815-3"-KN	SW-03	550	J							X		X		Refer to D.P. #405
815-3"-KN	SW-03	580	J							X		X		Refer to D.P. #405
815-3"-KN	SW-03	627	J							X		X		Small loads.

(1) ADLPIPE Node No.

TABLE 5.3-3. SMALL PIPING RESULTS FOR CIRCULATING WATER SYSTEMS

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
463-1-KN 464-1-KN	RLCA Doc. 310-18 SR. 4,5,6 & 8							X X	- -	- -	(1) Existing unistrut supports require additional stiffness in the horizontal direction.
815-3/4-KN 815-1-KN	Doc. 310-18 SR. 2						X X		- -	- -	(1) O.K.
815-2-KN	Doc. 310-18 SR. 4,7 & 8							X	-	-	(1) Following items need lateral stiffening: unistrut columns, I-beam & channel columns, 1-1/2x1/4 strap to 10" pipe. Additional E-W & vert. supports reqd. on line attached to E-wall. Repair U-bolts on riser at N-wall.
872-1-KN	Doc. 310-18 SR. 3							X	-	-	(1) Add N-S and E-W restraint near upper elbow of riser on E-wall.
873-2-KN	Doc. 310-18 SR. 3										
877-1-KN	Doc. 310-18 SR 4 & 8							X	-	-	(1) Add N-S and E-W restraint near upper elbow of riser on E-wall. Included in evaluation of line 815 (see above).
878-1/2-KN	Doc. 310-18 SR. 1	12.9	36.0	2.8	187.2	14.5	X		-	-	(1) (2) O.K.
878-3/4-KN 878-1-KN	Doc. 310-18 SR. 1	50.7	36.0	0.71	187.2	3.7		X	-	-	(1) (2) Add E-W and N-S restraint to 15' 4" riser at N end of pipe (see SR. 1)
880-1/2-KN 880-3/4-KN	Doc. 310-18 SR. 1						X X		- -	- -	These lines covered by evaluation of lines 878-1/2-KN and 878-3/4-KN.

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.5-4

MECHANICAL EQUIPMENT ANALYSIS SUMMARY

EQUIPMENT: Saltwater Cooling Pumps - Active (G-13, 13S)

COMPONENT DESCRIPTION	REEVALUATION CRITERIA L	CALCULATED VALUE C	$\frac{L}{C}$	INTEGRITY CRITERIA I	$\frac{I}{C}$	MEETS REEVALUATION CRITERIA		MEETS INTEGRITY CRITERIA		REMARKS
						YES	NO	YES	NO	
Pump Outer Shell (KSI)	28.3	11.1	2.55	66.60	6.0	X		X		
Pump Outer Shell Bolting (KSI)	40.0	12.3	3.25	106.2	8.63	X		X		
Pump Discharge Head (KSI)	31.5	1.5	21.0	74.34	49.56	X		X		
Pump Discharge Head Bolting (KSI)	40.0	63.4	0.63	106.2	1.68		X	X		Lack of Lateral Bracing
Motor Holddown Bolts (KSI)	40.0	16.1	2.48	106.2	6.60	X		X		

TABLE 5.4-1. PIPING RESULTS FOR COMPRESSED AIR SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
903-6-HH2	Area drawings 568630/1/2 Support dwg. M31731 Sh. 11 Doc. WC-350-037 and -038, WC-380-014	8.8	36.0	4.1	187.2	21.3	X		-	-	③ O.K.
904-6-HH2							X		-	-	Seismically qualified by similarity to line 903-6-HH2
905-6-HH2							X		-	-	Seismically qualified by similarity to line 903-6-HH2
906-4-HH2		11.6	36.0	3.1	187.2	16.1	X		-	-	③ O.K.
907-4-HH2							X		-	-	Seismically qualified by similarity to line 906-4-HH2
908-4-HH2							X		-	-	Seismically qualified by similarity to line 906-4-HH2
909-3-HH2	Doc. 310-9 Pg. 14						X		-	-	① O.K.
910-3-HH2	Doc. 310-9 Pg. 14						X		-	-	① O.K.
911-3-HH2	Doc. 310-9 Pg. 14										① O.K.
913-3-HH2	Doc. 310-9 Pg. 14&15							X	-	-	① Add two N-S and vert. restraints between S wall penetration and elbow where line turns S. Add E-W restraints at S wall penetration.
914-2-HH2	Doc. 310-9 Pg. 16							X	-	-	Included in assessment of line 913-3-HH2.

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.4-1. PIPING RESULTS FOR COMPRESSED AIR SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
915-2-HH2 916-2-HH2 917-2-HH2	Doc. 310-9 Pg. 16						X		-	-	① Note! Line modification (8/81) replaced three filters by two filters. New configuration of two lines meets the critical span criteria.
918-2-HN	Doc. 310-9 Pg. 1 and Pg. 16	57.8	26.9	0.47	139.8	2.4		X	-	-	② Add E-W restraint in general vicinity of the DW hanger on line 918-2-HH2.
919-2-HN 920-2-HN	Doc. 310-9 Pg. 1 and Pg. 16							X	-	-	① Note! Line modification (8/81) replaced three filters by two filters. New line configuration adequate if recommended support added to line 918-2-HH2.
921-2-HN	Doc. 310-9 Pages 1-8	345.	26.9	0.08	139.8	0.41		X	-	-	② This is the instrument air header; the loop has 35 seismic spans of which 20 do not meet the criteria. In general, where seismic supports exists they are located on building columns which have spans from 16' to 20'. Numerous additional seismic supports are required on this line and should be installed on spans of approx. 12' or less. (Note! Only the most southerly portion of the line fails to meet the Integrity Criteria)
928-1-1/2-HN (& smaller sizes)	714475-4 456406-0 (16 Sheets)	580.	26.9	0.05	139.8	0.24		X	-	-	① ② This line has 97 seismic spans of which 77 do not meet the critical span criteria. Numerous additional seismic supports are required throughout the line. It is recommended that these supports be spaced as follows: 1/2" & 3/4" lines -- approx. 8' or less 1" & 1-1/2" lines -- approx. 10' or less.
932-3-HH2	Doc. 310-9 Pg. 15							X	-	-	① Add N-S restraint near valve CV4-1.
933-2-HH2	Doc. 310-9 Pg. 15							X	-	-	Included in assessment of line 913-3-HH2. Add E-W and N-S restraint near top of vertical riser.

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.4-1. PIPING RESULTS FOR COMPRESSED AIR SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reeval-uation Criteria 2.4 S_h KSI (b)	Reeval-uation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reeval-uation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
986-3-HH2	Doc. 310-9 Pg. 14						X		-	-	① O.K.
987-3-HH2	Doc. 310-9 Pg. 14						X		-	-	① O.K.
988-3-HH2	Doc. 310-9 Pg. 14						X		-	-	① O.K.

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.[illegible] SUPPORT RESULTS FOR COMPRESSED AIR SYSTEM

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judgement	Critical Section	Section Stress (KSI) (a)	Reevaluation Criteria (KSI) (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevaluation Criteria		Meets Reevaluation Criteria		Remarks
										Yes	No	Yes	No	
903-6-HH2	M31731 Sh. 297 Doc. WC-350-038	903-PS-1	C	Shear of weld to base	50.1	34.6	0.69	58.0	1.2		X	-	-	Additional weld material required for junction with baseplate.
	M31731 Sh. 159	903-SWS-3	C	Strut	960lb	1500lb	1.6			X		-	-	O.K.
904-6-HH2			J							X		-	-	Both seismic supports qualified based on line 903-6-HH2
905-6-HH2			J							X		-	-	Three seismic supports qualified based on line 903-6-HH2
906-4-HH2	M31731 Sh. 285	6-PS-85	C	Baseplate bending	25.5	38.4	1.5	58.0	2.3	X		-	-	O.K.
	M31731 Sh. 284	6-PS-84	C	U-bolt	590lb	2260lb	3.8							
907-4-HH2			J							X		-	-	O.K. based on line 906-4-HH2
908-4-HH2			J							X		-	-	O.K. based on line 906-4-HH2
910-3-HH2			J							X		-	-	Meets crit. spans, supports O.K.
915-2-HH2 916-2-HH2 917-2-HH2			J							X		-	-	Meets crit. spans, supports O.K.
986-3-HH2			J							X		-	-	Meets crit. spans, supports O.K.

(1) ADLPIPE Node No.

TABLE 5.4

MECHANICAL EQUIPTMENT ANALYSIS SUMMARY

EQUIPMENT: Aftercoolers (E-26A, B & C)

COMPONENT DESCRIPTION	REEVALUATION CRITERIA L	CALCULATED VALUE C	$\frac{L}{C}$	INTEGRITY CRITERIA I	$\frac{I}{C}$	MEETS REEVALUATION CRITERIA		MEETS INTEGRITY CRITERIA		REMARKS
						YES	NO	YES	NO	
Aftercooler Shell (KSI)	36.0	7.2	5.0	84.96	11.8	X		X		
Moisture Separator (KSI)	36.0	4.6	7.8	84.96	18.47	X		X		

TABLE 5.4-4

MECHANICAL EQUIPMENT ANALYSIS SUMMARY

EQUIPMENT: Air Receivers (C-4A, B & C)

COMPONENT DESCRIPTION	REEVALUATION CRITERIA L	CALCULATED VALUE C	$\frac{L}{C}$	INTEGRITY CRITERIA I	$\frac{I}{C}$	MEETS REEVALUATION CRITERIA		MEETS INTEGRITY CRITERIA		REMARKS
						YES	NO	YES	NO	
Air Receiver Tank (KSI)	45.0	8.5	5.29	106.2	12.49	X		X		
Support Angles (KSI)	28.4	9.1	3.12	71.34	7.84	X		X		
Tank Support Interface Weldment (KSI)	14.2	1.8	7.89	35.73	19.84	X		X		Shear Stress
Base Plates 1 (KSI)	28.4	40.5	0.70	71.34	1.76	X		X		Plate Bending; Require Additional Anchors
Loc. Anchor Bolts Pull Out (KIPS)	4.27	11.3	0.38	17.06	1.51		X	X		
Shear (KIPS)	7.03	1.0	7.03	30.63	30.63	X		X		

TABLE 5.4-

MECHANICAL EQUIPTMENT ANALYSIS SUMMARY

EQUIPMENT: Air Compressors - Active (K-1A, B & C)

COMPONENT DESCRIPTION	REEVALUATION CRITERIA L	CALCULATED VALUE C	$\frac{L}{C}$	INTEGRITY CRITERIA I	$\frac{I}{C}$	MEETS REEVALUATION CRITERIA		MEETS INTEGRITY CRITERIA		REMARKS
						YES	NO	YES	NO	
Compressor Tandem Section (KSI)	27.0	0.3	90.0	63.72	212.4	X		X		
Tandem Bolting (KSI)	36.0	16.5	2.18	84.96	5.15	X		X		
Foundation Anchors (KSI)	40.0	47.9	0.84	106.2	2.22		X	X		Bolting Bending Based on Conservative Assumption of only Two Bolts are Effective

TABLE 5.5-1. PIPING RESULTS FOR CHEMICAL & VOLUME CONTROL SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria			Remarks
							Yes	No	Yes	No		
2000-3-151	334629-0	44.2	42.7	.97	222.	5.0	X		-	-	3	O.K. because within 3% of allowable. No seismic supports
2000-4-151	334629-0	31.2	42.7	1.3	222.	7.1	X		-	-	3	O.K.
2001-3-151	334629-0	28.2	42.7	1.5	222.	7.9	X		-	-	3	O.K. No existing seismic supports
2002-2-2502	334455-0	14.4	44.4	3.1	230.9	16.	X		-	-	3	O.K. (In charging pump room)
2002-3-2501	334456-0	8.7	45.1	5.2	234.6	27.0	X		-	-	3	O.K. (In charging pump room) No existing seismic supports
2003-2-2502	334455-0	17.0	44.4	2.6	230.9	13.6	X		-	-	3	O.K. (In charging pump room) No existing seismic supports
2003-3-2501	334456-0	12.9	45.1	3.5	234.6	18.2	X		-	-	3	O.K. (In charging pump room) No existing seismic supports
2004-3-2501	334456-0	9.1	45.1	5.0	234.6	25.8	X		-	-	3	O.K. (In charging pump room) No existing seismic supports
2005-2-2501 2005-2-2502	714493-2	73.8 334527-1 334528-1	44.4	.60	230.9	3.1		X	-	-	3	On Dwg. 334528-1: Add E-W & vert. suppt. on 12'-2" N-S run; and N-S & vert. suppts., 1 each on 2 long E-W runs. On Dwg. 334527-1: add E-W & N-S suppts., 1 each on 8'-4-1/4" riser and 3'-11-5/8" riser. (In containment)
2005-2-2502	334535-0	119.	44.4	.37	230.9	1.9		X	-	-	3	O.K. if 2005-4-2502 in penetration rm. supported as recommended below
2005-4-2502	334535-0	54.8	44.4	.81	230.9	4.2		X	-	-	3	Add E-W vert. suppt. near branch conn. with 2012-2-2502 (in penetration room)
2005-4-2502	334535-0	7.2	44.4	6.2	230.9	32.1	X		-	-	3	O.K. (In charging pump room) No existing seismic supports
2006-2-2502	334614-0	135.0	44.4	.33	230.9	1.7		X	-	-	3	O.K. if 2005-4-2502 in penetration rm. is supported as recommended

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.5-1. PIPING RESULTS FOR CHEMICAL & VOLUME CONTROL SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria			Remarks
							Yes	No	Yes	No		
2007-3/4-2501	334457-2 334458-1 334459-2	1,460.0	45.1	.03	234.6	.16		X	-	-	2	Add a 3-way support near the RO and its bypass shown on Dwg. 334457-2. On Dwg. 334458-1: add E-W suppt. for 7'7" E-W run; and N-S suppt. and 2 E-W and vert. suppts. for 16'-2" N-S run; add vert. suppt. for FIC1116A. On Dwg. 334459-2: convert the 4 deadweight suppts. on the 33'-1" E-W run to 2-way seismic and add one E-W suppt. for this run; add 3-way suppt. near CV276
2008-2-2501	334464-2	10.7	45.1	.42	234.6	2.2		X	-	-	3	RCP spectra not used; except higher stresses to result if RCP spectra used. On Dwg. 334460-2: convert 1-PS-38, 1-PS-50, and 1-PS-52 to 2-way seismic suppts; add an E-W suppt. on the 41'-1-1/2" E-W run. On Dwg. 334461-2: add a vertical suppt. on the 14' riser. On Dwg. 334464-2: convert the 4 rod hanger suppts. to 2-way seismic suppts.; support valve 360-3/4-T58 so as to reduce stress at branch conn.-consider relative motion of 2" line. (Inside containment)
2008-2-2502	334460-2 334461-2 334462-2 334463-1 334464-2	145.	44.4	.31	230.9	1.6		X	-	-		
2008-2-2502	714504-2	64.6	44.4	.69	230.9	3.6		X	-	-	3	O.K. if line 2005-4-2502 in penetration rm. is supported as recommended above
2008-2-2502	334460-2 714504-2	38.4	44.4	1.2	230.9	6.0	X		-	-	2	O.K. (secondary shield wall to sphere penetration)
2009-2-2502	334614-0	133.	44.4	.33	230.9	1.7		X	-	-	3	O.K. if 2005-4-2502 in penetration rm. is supported as recommended
2010-2-151	334793-0	3.7	42.7	11.5	222.	60.	X		-	-	3	O.K. No existing seismic supports
2011-2-2501	334468-2	28.6	45.1	1.6	234.6	8.2					3	RCP spectra not used; expect higher stresses if RCP spectra used. (No existing seismic suppts.)

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.5-1. PIPING RESULTS FOR CHEMICAL & VOLUME CONTROL SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria			Remarks
							Yes	No	Yes	No		
2011-2-2502	334465-2 334466-2 334467-2 334468-2	101.	44.4	.44	230.9	2.3		X	-	-		On Dwg. 334465-2: Convert detail 334475, 1-PS-38, 1-PS-50, 1-PS-52, 1-PS-54, 1-R-152-23, 1-R-152-9 to 2-way seismic suppts,; and 2 N-S & E-W suppts. on riser from (-)2'-6" to 11'-9", on Dwg. 334466-2: add vert. suppt. for 11'-9" riser. On Dwg. 334468-2: support valve 361-3/4-T58 so as to reduce stress at branch conn.-consider relative motion of 2" line
2011-2-2502	334465-2 714497-2	43.	44.4	1.03	230.9	5.4	X		-	-	2	O.K. (secondary shield wall to sphere penetration)
2011-2-2502	714497-2	71.4	44.4	.62	230.9	3.2		X	-	-	3	O.K. if 2005-4-2502 in penetration rm. is supported as recommended
2012-2-2502	334614-0	96.3	44.4	.46	230.9	2.4		X	-	-	3	O.K. if 2005-4-2502 in penetration rm. is supported as recommended
2013-2-151	334793-0	18.8	44.4	2.4	230.9	12.3	X		-	-	3	O.K. No existing seismic supports
2014-2-2501	334472-1	126.	45.1	.36	234.6	1.9			-	-	3	(Within secondary shield wall) On Dwg. 334472-1 add a 3-way suppt. at or near PCV1115A; add N-S suppt. for 8-5" N-S run
2014-2-151	334472-1	198	42.7	.22	222.	1.1			-	-		
2014-3-151	334469-2	151.	42.7	.28	222.	1.5		X	-	-		
2014-3-151	334469-2 714448-5	9.0	42.7	4.7	222.	24.6	X		-	-	3	O.K. (from secondary shield wall to sphere penetration)
2014-3-151	714448-5 334927-0	22.6	42.7	1.9	222.	9.8	X		-	-	3	O.K. (within penetration structure) No existing seismic supports
2014-3-151	334624-0	13.5	42.7	3.2	222.	16.4	X		-	-	3	O.K. (within charging pump room)
2015-1/2-151	334794-1	34.2	44.4	1.3	230.9	6.8	X		-	-	2	O.K.
2016-3-151	334627-1	23.5	44.4	1.9	230.9	9.8	X		-	-	3	O.K. No existing seismic supports
2017-3/4-2501	334473-1	2,310.	45.1	.02	234.7	.10		X	-	-	2	Add N-S & vert. suppt. on horiz. run (el. 18'-9") near cluster of 5 valves; add E-W suppt. for this run also. Add vertical suppt. for FIC1116B. Add N-S & E-W suppt. on riser from connection to 2007-3/4-2501 to FIC1116B.

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.5-1. PIPING RESULTS FOR CHEMICAL & VOLUME CONTROL SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks	
							Yes	No	Yes	No		
2018-2-2501	334471-1	191.	45.1	.24	234.6	1.2		X	-	-	3	Add 3-way support at or near PCV 1115B
2018-2-151	334471-1	309.1	42.7	.14	222.	.72		X	-	-		
2019-2-2502	334618-0	17.5	44.4	2.5	230.9	13.2	X		-	-	3	O.K. No existing seismic supports
2020-2-2501	334470-1	233.	45.1	.19	234.6	1.0		X	-	-	3	Add vertical support at Detail 1 334475; add E-West and Vertical suppt. at 1-R-152-23 and I-R-152-9; add E-W suppt. at rod hanger (4" north of vertical riser - El.(-) 2'-6"); add vertical suppt. suppt. midway up this riser; for riser (El(-) 2'-6" to 18'-6") and E-W & N-S and 3-way suppt. for PCV 1115C.
2020-2-151	334470-1	362.	42.7	.12	222.	.61		X	-	-		
2020-3-151	334469-2	152.	42.7	.28	222.	1.5		X	X		3	Add N-S & Vert. suppt. at 1-PS-42, 1-PS-38, 1-PS-50, 1-PS-51, add bilateral suppt. at 1-PS-53.
2028-2-151	334793-0	45.6	42.7	.94	222.	4.9	X		-	-	3	O.K. because within 6% of allowable
2029-3/4-2502	334792-0	87.8	45.1	.51	234.6	2.7		X	-	-	3	Convert "separator" on long E-W run to N-S & Vert. suppt.
2030-3/4-2502	334792-0	87.8	45.1	.51	234.6	2.7		X	-	-		
2031-2-151	334617-0	39.8	42.7	1.1	222.1	5.6	X		-	-	3	O.K.
2031-2-2502	334617-0	28.7	44.4	1.5	230.9	8.0	X		-	-		
2033-2-151	334618-0	39.8	42.7	1.1	222.1	5.6	X		-	-	3	O.K.
2033-2-2502	334618-0	43.5	44.4	1.02	230.9	5.3	X		-	-		(No existing seismic suppts. for spec 2502 portion of 2033-2")
2037-2-151	334817-0	21.5	42.7	1.99	222.	10.3	X		-	-	3	O.K. No existing seismic supports.
2037-3-151	334817-0	12.3	42.7	3.47	222.	18.0	X		-	-	3	O.K. No existing seismic supports.

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.5-1. PIPING RESULTS FOR CHEMICAL & VOLUME CONTROL SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks	
							Yes	No	Yes	No		
2039-2-151	334817-0	76.4	42.7	0.56	222.	2.9		X	-	-	3	O.K. if 2103-2-151 supported as recommended
2052-2-HN1	334632-0	37.3	37.0	.99	192.	5.1	X		-	-	3	O.K. because within 1% of allowable
2055-3/4 2501	334474-2 334475-1	952.	45.1	.05	234.6	.25		X	-	-	2	On Dwg 334474-2; Add E-W & Vert. suppt. near cluster of 5 valves: add N-S suppt. below RO. On DWG 334475-1: Add vertical suppt to F1C1116C; add N-S suppt. near bottom of 6'-3" riser (El(-) 2'-4-3/4" to F1C1116C); Convert Detail $\frac{1}{}$, 1-R-152-9, 1-R-152-23, 1-PS-54, & 1-PS-53 to 2-way seismic suppts.
2056-2"-HN1	334463-0	35.1	37.4	1.1	194.5	5.5	X		-	-	3	O.K.
2067-2"-2501	334476-3	960.	43.4	0.05	226.	0.23		X	-	-	2	See support recommendations for 2071-2"-2501 601 add N-S, Vert. support near valve CV202.
2068-2" 2501	334476-3	960.	43.4	0.05	226.	0.23		X	-	-	2	See support recommendations for 2071-2"-2501 601 add N-S, vert. support near valve CV204.
2071-2"-2501	334476-3	960.	43.4	.05	226.	.23		X	-	-	2	Add N-S & Vert. suppt. near (CV203; add E-W support at CV203.
2071'2"-601	334476-3	1360.	38.9	0.03	202.	0.15		X	-	-	2	Add N-S, Vert. support at 2 rod hanger locations on the 21'-8" E-W run at El. 10'-10".
	334477-2											Add N-S support for the 13'-2" N-S run at El. 10'-10".
	334477-2											Add N-S, Vert. support at 1-R-PS-50, 1-PS-51 and at 1-PS-52.
												Add vert. near north end of 40'-4" N-S run At El. 0'-7".
												Add E-W support for the 28'-5" E-W run at El. 0'-1".
												Add N-S, E-W support near middle of riser El. 0'-1" to El. 10'-10".

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.5-1. PIPING RESULTS FOR CHEMICAL & VOLUME CONTROL SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria			Remarks
							Yes	No	Yes	No		
												Add E-W, vert support near middle of riser 13'-10" portion of N-S run at El. 0'-7". Add E-W, vert support at each detail 1 location shown on DWG. 334478-2.
2080-2-2501	334480-3	581.	43.2	.07	224.6	.39		X	-	-	2	Add N-S Vert. suppt to E-W run at El. 62'-7"; add E-W & N-S suppt. to riser from El 48'-6" to El. 62'-7"; add E-W & N-S suppt. to riser from El. 27'-6" to El. 48'-6" & add vertical suppt. for this riser. Add N-S suppt. to western end of E-W run at El 20'-0" and add E-W suppt. to this run. Add E-W & N-S suppt. near top of 5'-3" riser at eastern end of line; add vert suppt. for the 5'-3" riser also.
2081-2-2501	334481-3 334482-3	500	43.2	0.086	224.6	0.45		X	-	-	2	On DWG 334482-3: Add E-W & N-S suppt. on riser between El-0'-6" and 5010-27-1/2-2501; also add a vert. suppt. for this riser; add E-W & vert. suppt. on N-S run at El. 0'-6"; convert 1-PS-38, 1-R-PS-50, 1-PS-51 to 2 way seismic suppts. On Dwg. 334481-3: Add E-W & N-S suppt. and vert. suppt. for 12'-0" riser. Add N-S suppt. near western end of 10'-8" E-W run; also ensure E-W suppt. for this run.
2093-1-1/2-151	334814-0	-	-	-	-	-	X		-	-	1	O.K.
2094-1-1/2-151	334814-0	-	-	-	-	-	X		-	-	1	O.K.
2103-2-151	334817-0	81.	42.7	.53	222.	2.7		X	-	-	3	Add N-S, E-W suppt. for CV410 & CV411
2104-3-151	334624-0	-	-	-	-	-						Reported as part of 2014-3-151 on Dwg. 334624-0
2105-4-2502	334535-0	11.	44.4	4.	231.	21.	X		-	-	3	O.K.
2105-3-2502	334607-0	16.2	44.4	2.7	231.	14.	X		-	-	3	O.K.

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.5-1. PIPING RESULTS FOR CHEMICAL & VOLUME CONTROL SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria Yes	Meets Reevaluation Criteria No	Meets Integrity Criteria Yes	Meets Integrity Criteria No	Remarks
2105-3-BH1	334607-0	8.3	37.7	4.5	196	24.	X		-	-	3 O.K.
2106-4-2502	334535-0	11.	44.4	4.	231.	21.	X		-	-	3 O.K.
2108-3-2502	334535-0	24.5	44.4	1.8	231.	9.	X		-	-	3 O.K.
2108-3-BH1	334535-0	10.1	37.7	3.7	196.	19.	X		-	-	3 O.K.
2109-4-2502	334536-0	8.6	44.4	5.2	231.	27.	X		-	-	3 O.K.
2109-3-2502	334536-0	28.3	44.4	1.6	231.	8.	X		-	-	3 O.K.
2109-3-BH1	334536-0	13.1	37.7	2.8	196.	15.	X		-	-	3 O.K.
2110-3-2502	334608-0	17.	44.4	2.6	231.	14.	X		-	-	3 O.K.
2110-3-BH1	334608-0	8.7	37.7	4.3	196.	22.	X		-	-	3 O.K.
2111-3/4-151	334642-0	300.	42.7	.14	222.	.74		X	-	-	2 Add E-W & vert suppt. near spring hanger El. 14'-11"; add vert suppt. at FIT 1117A.
2111-3/8-153	334642-0	270.	42.7	.16	222.	.82		X	-	-	2 See suppt. recommendations for 2111-3/4-151; add N-S suppt for HCV 427A.
2112-3/4-151 2112-3/8-153	334643-0	1700.	42.7	.03	222.	.13		X	-	-	2 Add N-S suppt. for HCV 427B; add vert suppt at FIT 1117B.
2113-3/4-151 2113-3/8-151	334644-0	960.	42.7	.04	222.	.23		X	-	-	2 Add E-W suppt near middle of 5'-7-1/2" N-S run at El. 15'-5-14/"; add vert suppt at FIT 1117C; add N-S suppt for HCV 427C.
2154-2-2502	334617-0	9.9	44.4	4.5	230.9	23.3	X		-	-	3 O.K. No existing seismic supports
3122-2-S1	3347949-A	8.1	37.7	4.7	196.	24.2	X		-	-	2 O.K.
3203-3-HM3	714448-5	33.1	37.7	1.1	196.	5.9	X		-	-	3 O.K.

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.5-1

MECHANICAL EQUIPTMENT ANALYSIS SUMMARY

EQUIPMENT: Seal Water Heat Exchanger (E-34)

COMPONENT DESCRIPTION	REEVALUATION CRITERIA L	CALCULATED VALUE C	$\frac{L}{C}$	INTEGRITY CRITERIA I	$\frac{I}{C}$	MEETS REEVALUATION CRITERIA		MEETS INTEGRITY CRITERIA		REMARKS
						YES	NO	YES	NO	
Heat Exchanger Shell (KSI)	30.0	2.4	12.5	70.8	29.5	X		X		
Support Saddle (KSI)	28.1	4.9	5.73	70.8	14.5	X		X		
Support Frame (KSI)	28.4	98.4	0.29	71.34	0.73		X		X	
Saddle Bolts (KSI)	40.0	27.5	1.45	141.6	5.15	X		X		
Floor Conc. Anchor Bolts Pullout 1 (KIPS)	2.6	30.0	0.09	10.3	0.34		X		X	Large Bolt Pullout Due Anchor Plate Bending
Wall Concrete Anchor Bolts Pullout (KIPS)	2.6	26.5	0.10	10.3	0.39		X		X	

TABLE 5.5-3

MECHANICAL EQUIPMENT ANALYSIS SUMMARY

EQUIPMENT: Regenerative Heat Exchanger (E-13)

COMPONENT DESCRIPTION	REEVALUATION CRITERIA L	CALCULATED VALUE C	$\frac{L}{C}$	INTEGRITY CRITERIA I	$\frac{I}{C}$	MEETS REEVALUATION CRITERIA		MEETS INTEGRITY CRITERIA		REMARKS
						YES	NO	YES	NO	
Heat Exchanger (Shell (KSI)	33.6	13.5	2.49	79.30	5.87	X		X		
Heat Exchanger Connecting Pipes (KSI)	33.6	60.3	0.56	79.30	1.32		X	X		Require Bracing Lateral to Minimize Moments at Connections
Support Saddles (KSI)	28.4	23.3	1.22	71.34	3.06	X		X		
Anchor Bolts	40.0	139.2	0.29	130.0	0.93		X		X	Same

TABLE 5.5

MECHANICAL EQUIPTMENT ANALYSIS SUMMARY

EQUIPMENT: Seal Water Return Filter (C-40)

COMPONENT DESCRIPTION	REEVALUATION CRITERIA L	CALCULATED VALUE C	$\frac{L}{C}$	INTEGRITY CRITERIA I	$\frac{I}{C}$	MEETS REEVALUATION CRITERIA		MEETS INTEGRITY CRITERIA		REMARKS
						YES	NO	YES	NO	
Seal Water Filter Shell (KSI)	37.2	24.1	1.54	87.79	3.64	X		X		
Filter Support Pipes (KSI)	34.9	98.4	0.35	87.79	.89		X		X	Need to Provide Lateral Support at Filter to Minimize Overturning Moment
Shield Support Stand (KSI)	33.8	1.5	22.53	84.96	56.64	X		X		
Anchor Bolts (KSI)	40.0	130.2	0.31	141.6	1.09	X		X		
Base Plate Weldment (KSI)	28.4	79.4	0.36	71.34	.90		X		X	
Shield Support Plate (KSI)	32.6	9.2	3.54	82.13	8.92	X		X		

TABLE 5.6-1. LARGE PIPING RESULTS FOR FEEDWATER SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
721-14"-HP 721-10"-HP 726-10"-HP 727-10"-HP 722-12"-HP 722-8"-HP 723-8"-HP 724-8"-HP 725-8"-HP 380-4"-HP 396-4"-HP 380-4"-EG 396-4"-EG 721-12"-HP	334762-0 334763-0 334751-0 334752-0 (AF-01)	349.853	45.12	0.129	234.62	0.67		X		X	(i) Add holddown to following existing support: (a) (D.P. #14) (b) 6-380-PS-5 (D.P. #630) (ii) Change following existing rod hangers to strut (a) 6-R-PS-30 (D.P. #510) (b) 6-380-RH-1 (D.P. #604) (c) 6-380-RH-3 (D.P. #616) (d) (D.P. #656) (iii) Install new anchor at data point 99 (iv) Install new restraint in E-W direction at data point 27 & 507 (v) Add holddown & E-W restraint at existing support (a) (D.P.#16) (b) 6-R-PS-40 (D.P. #40) (vi) Add holddown & N-S restraint at existing support (a) 6-R-PS-29 (D.P. #416) (b) 6-R-PS-29 (D.). #516) (vii) Change from existing stub-in into reinforced fabricated tee at following node points: (a) 28 (c) 38 (e) 64 (g) 72 (b) 34 (d) 41 (f) 68 (h) 98 (viii) Change pipe schedule from IOS to standard (a) Line No. 721-12"-HP from node point 63 to 73 (b) Line No. 722-12"-HP from node point 99 to 110

TABLE 5.6-1. LARGE PIPING RESULTS FOR FEEDWATER SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
391-10-EG	334537-2 (FW-01)	17.807	36	2.02	187.2	10.51	X		X		(i) Change following existing rod hanger into strut: 1-R-RH-391-1 (D.P. #31) 1-R-RH-391-2 (D.P. #38) (ii) Add holddown to the existing support 1-KB4-391-1 (iii) Replace existing snubber 1-S-SW-391-1 (D.P. #230 as per revised loads.
392-10-EG	334538-2 (FW-02)	15.451	36	2.33	187.2	12.12	X		X		(i) Add holddown to following existing supports: 1-K-KB-392-1 (D.P. #322) 1-K-KB-392-2 (D.P. #330) 1-KBG-392-1 (D.P. #332) 1-KBG-392-2 (D.P. #334) 1-K-KB-392-4 (D.P. #345)
393-10-EG	334539-1 (FW-03)	9.967	36	3.61	187.2	18.78	X		X		Accepted as it is.
391-10-EG 392-10-EG 393-10-EG (Outside contmt.)	334537-2 334538-2 334539-1 (FW-04)	16.256	36	2.21	187.2	11.52	X		X		(i) Add holddown to the following existing supports: 2-PS-326-1 2-PS-326-2 2-PS-325-1 2-PS-325-2 2-PS-329-1 2-PS-329-2

TABLE 5.8-2. SUPPORT RESULTS FOR FEEDWATER SYSTEM

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
721-14"-HP	334762	14	C	Weld	23.24	19.2	0.83	66	2.84		X	X		
721-14"-HP	334762	16	C	Weld	38.39	19.2	0.5	66	1.72		X	X		
721-14"-HP	334762	6-R-PS-41	C	Pipe stan-chion	P_y = 5.46K	14.7K	2.69			X		X		
721-14"-HP	334762	6-R-PS-41	C	Pipe stan-chion	P_y = 12.3K	14.7K	1.20			X		X		
721-14"-HP	334762	6-R-PS-40	C	Pipe stan-chion	P_y = 6.96K	14.7K	2.11			X		X		
724-8"-HP	334763	6-R-PS-55	C	Rod 7/8"ϕ	5.8K	7.1K	1.22			X		X		
724-8"-HP	334763	6-R-PS-14	C	Rod 1/2"ϕ	1.78K	2.1K	1.18			X		X		
724-8"-HP	334763	6-R-PS-43	C	Rod 1/2"ϕ	1.15K	2.1K	1.83			X		X		
724-8"-HP	334763	6-R-PS-46	C	Rod 1/2"ϕ	2.6K	2.1K	.81	8.4K	3.23		X	X		Replace rod hgrs.
725-8"-HP	334763	6-R-PS-32	C	Rod 3/4"ϕ	7.125K	5.1K	7.2K	20.4K	2.86		X	X		Replace rod hgrs.
725-8"-HP	334763	6-R-PS-30	C	Rod 7/8"ϕ	12.18K	7.1K	0.58	28.4	2.33		X	X		Replace rod hgrs.
725-8"-HP	334763	6-R-PS-29	C	2-1/2 x2-1/2 x3/8L	F_b=35.62	32.4	0.91	186.5	4.7		X	X		Install brace in Y-direction
722-8"-HP	334763	6-R-PS-32	C	Rod 3/4"ϕ	17.9K	5.1K	0.28	20.4K	1.14		X	X		Replace rod hgrs.
722-8"-HP	334763 (AF-01)	6-R-PS-30	C	Rod 7/8"ϕ	19.4K	7.1K	.366	28.4K	1.46		X	X		Replace rod hgrs.

(1) ADLPIPE Node No.

TABLE 5.6-2. SUPPORT RESULTS FOR FEEDWATER SYSTEM

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
722-8"-HP	334763	6-R-PS-29	C	2-1/2 x2-1/2 x3/8L	F_b=35.62	F_b=32.4	0.91	F_b=168.5	4.7		X	X		Install brace in Y-direction
727-8"-HP	334763	6-R-PS-30	C	Rod 7/8"ϕ	10.33K	7.1K	.69	28.4K	2.75		X	X		Replace rod hgr.
727-8"-HP	334763	6-R-PS-29	C	2-1/2 x2-1/2 x3/8L	F_b=35.62	F_b=32.4	0.91	F_b=168.5	4.7		X	X		Install brace in Y-direction
726-8"-HP	334763	6-R-PS-30	C	Rod 7/8"ϕ	8K	7.1K	.89	28.4K	3.55		X	X		Replace rod hgr.
726-8"-HP	334763	6-R-PS-29	C	2-1/2 x2-1/2 x3/8L	F_b=35.62	F_b=32.4	0.91	F_b=168.5	4.7		X	X		Install brace in Y-direction
726-8"-HP	334763	519	C	Rod 7/8"ϕ	5.58K	7.1K	1.27			X		X		
723-8"-HP	334763	6-R-PS-32	C	Rod 3/4"ϕ	12.92K	5.1K	0.39	20.4K	1.6		X	X		Replace rod hgr.
723-8"-HP	334763	6-R-PS-60	C	Rod 1/2"ϕ	1.78K	2.1K	1.18			X		X		
723-8"-HP	334763	6-R-PS-61	C	Rod 1/2"ϕ	1.2K	2.1K	1.75			X		X		
723-8"-HP	334763	6-R-PS-62	C	Rod 1/2"ϕ	1.27K	2.1K	1.65			X		X		
723-8"-HP	334763	6-R-PS-67	C	Rod 1/2"ϕ	1.02K	2.1K	2.06			X		X		
723-8"-HP	334763	6-R-PS-63	J							X		X		Small load P_y =.41K
380-4"-HP	334751	6-380-RH-1	J							X		X		Small load P_y=.57K
380-4"-HP	334751 (AF-01 Cont)	6-380-RH-1	J							X		X		Small load P_y=.48k

(1) ADLPIPE Node No.

TABLE 5.6-2. SUPPORT RESULTS FOR FEEDWATER SYSTEM

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
380-4"-HP	334751	624	J							X		X		Small load P_y=260LBS
380-4"-HP	334751	630	J							X		X		Small load P_y=230LBS
380-4"-HP	334751	656	J							X		X		Small load P_y=320LBS
721-8"-HP	334762	6-R-PS-33	C	Anchor bolt	Tension 5.42K/ bolt	1.5K/Bolt	0.28	18K/Bolt	5.0		X	X		Provide brace in Y-direction
721-8"-HP	334762	6-R-PS-34	C	Weld	174	19.2KSI	.11	86.4KSI	0.5		X		X	As compared to 6-R-PS-36 Provide brace in X & Z-direction
722-8"-HF	334763	6-R-PS-36	C	Weld	174KSI	19.2KSI	.11	86.4KSI	0.5		X		X	Provide brace in X & Z-direction
380-4"-HP	334751	6-380-PS-7	C	Weld	22KSI	19.2KSI	.87	86.4KSI	3.93		X	X		Provide brace for dummy pipe
380-4"-HP	334751	6-380-PS-8	C	Weld	14.2KSI	19.2KSI	1.35			X		X		
380-4"-HP	334751	6-380-PS-9	J							X		X		By comparison to 6-380-PS-8
380-4"-HP	334751 (AF-01)	6-380-PS-10	J							X		X		Small loads
391-10"-EG	334537-2	1-S-SW-391-2	J							X		X		As per catalog (SN)
391-10"-EG	334537-2	1-S-SW-391-1	J							X		X		As per catalog (SN)
391-10"-EG	334537-2	1-S-SW-391-3	J							X		X		As per catalog (SN)
391-10"-EG	334537-2	1-R-RH-391-1	C	Weld	10.88	19.2	1.76			X		X		
391-10"-EG	334537-2	1-KBG-391-1	C	Weld	9.86	19.2	1.95			X		X		
391-10"-EG	334537-2	1-R-RH-391-2	C	Weld	10.88	19.2	1.76			X		X		
391-10"-EG	334537-2 (FW-01)	1-S-SW-391-4	J							X		X		As per catalog (SN)

(1) ADLPIPE Node No.

TABLE 5.0-2. SUPPORT RESULTS FOR FEEDWATER SYSTEM

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
391-10"-EG	334537-2	1-S-SH-391-2	J							X		X		As per catalog (SP)
391-10"-EG	334537-2 (FW-01)	1-S-SH-391-1	C	Weld	4.0	19.2	4.8			X		X		
392-10"-EG	334538-2	1-S-SW-392-1	J							X		X		As per catalog (SN)
392-10"-EG	334538-2	1-S-SW-392-2	J							X		X		As per catalog (SN)
392-10"-EG	334538-2	1-K-KB-392-1	C	Weld	8.96	19.2	2.19			X		X		
392-10"-EG	334538-2	1-S-SW-392-3	J							X		X		As per catalog (SN)
392-10"-EG	334538-2	1-S-SW-392-4	J							X		X		As per catalog (SN)
392-10"-EG	334538-2	1-K-KB-392-2	C	Weld	8.96	19.2	2.14			X		X		
392-10"-EG	334538-2	1-KBG-392-1	C	Weld	8.96	19.2	2.19			X		X		
392-10"-EG	334538-2	1-KBG-392-2	C	Weld	8.96	19.2	2.19			X		X		
392-10"-EG	334538-2	1-KBA-392-1	C	Weld	16.69	19.2	1.15			X		X		
392-10"-EG	334538-2	1-K-KB-392-3	C	Weld	16.69	19.2	1.15			X		X		
392-10"-EG	334538-2	1-KBG-392-3	C	Weld	10.22	19.2	1.88			X		X		
392-10"-EG	334538-2	1-K-KB-392-4	C	Weld	2.49	19.2	7.71			X		X		
392-10"-EG	334538-2	1-SW-392-5	J							X		X		As per catalog (SN)
392-10"-EG	334538-2	1-S-SH-392-2	J							X		X		As per catalog (SP)
392-10"-EG	334538-2 (FW-02)	1-S-SH-392-1	J							X		X		As per catalog (SP)

(1) ADLPIPE Node No.

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
393-10"-EG	334539-1	1-S-SW-393-1	J							X		X		As per catalog (SN)
393-10"-EG	334539-1	1-S-SW-393-2	J							X		X		As per catalog (SN)
393-10"-EG	334539-1	1-S-SH-393-1	J							X		X		As per catalog (SP)
393-10"-EG	334539-1	1-S-SW-393-3	J							X		X		As per catalog (SN)
393-10"-EG	334539-1	1-RH-393-1	J							X		X		As per catalog (R)
393-10"-EG	334539-1	1-KBG-393-1	C	Weld	9.86	19.2	1.95			X		X		
393-10"-EG	334539-1	1-R-RH-393-2	J							X		X		As per catalog (R)
393-10"-EG	334539-1	1-S-SW-393-4	J							X		X		As per catalog (SN)
393-10"-EG	334539-1 (FW-03)	1-S-SH-393-2	J							X		X		As per catalog (SP)
391-10"-EG	334537-2	2-PS-326-1	C	W8x15	F_b=11.95	32.4	2.71			X		X		
391-10"-EG	334537-2	2-PS-326-2	C	W8x15	F_b=11.95	32.4	2.71			X		X		
392-10"-EG	334538-2	2-PS-325-1	C	W8x15	F_b=11.95	32.4	2.71			X		X		
392-10"-EG	334538-2	2-PS-325-2	C	W8x15	F_b=11.95	32.4	2.71			X		X		
393-10"-EG	334539-1	2-PS-329-1	C	W8x15	F_b=11.95	32.4	2.71			X		X		
393-10"-EG	334539-1 (FW-04)	2-PS-329-2	C	W8x15	F_b=11.95	32.4	2.71			X		X		

(1) ADLPIPE Node No.

TABLE 5.6-3. SMALL PIPING RESULTS FOR FEEDWATER SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
341-2-EG	334428-1	197.7	36.0	0.18	187.2	0.95		X	-	-	(2) Modify support Detail (1) to restrain N-S & vert. motion; add U-bolt on riser at S end of line near S/G; add U-bolt on skewed pipe joint N of rod support; add a U-bolt on loop emerging from S side S/G (Inside Containment)
341-2-EG	714076-2							X	-	-	Evaluation based on results for line 342-2EG (see below) Add E-W restraint at support Detail D (Outside Containment)
342-2-EG	334429-1	2064.	36.0	0.02	187.2	0.09		X	-	-	(2) Recommend all DW supports be modified to bilateral supports (Inside Containment)
342-2-EG	714076-2	37.2	36.0	0.97	187.2	5.0		X	-	-	(2) Add N-S restraint at support Detail F; add E-W restraint at support detail D (Outside Containment)
343-2-EG	334430-2 450334-0	49.0	36.0	0.73	187.2	3.8		X	-	-	(2) Requires additional seismic supports between sec. shield wall and S/G. Recommend supports at approx. 10 ft. spans (Inside Containment)
343-2-EG	714076-2							X			Evaluation based on results for line 342-2-EG (see above) Add E-W restraint at support detail D; add N-S restraint at support detail F (Outside Containment)

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.6-4

MECHANICAL EQUIPMENT ANALYSIS SUMMARY

EQUIPMENT: Condensate Storage Tank

COMPONENT DESCRIPTION	REEVALUATION CRITERIA L	CALCULATED VALUE C	$\frac{L}{C}$	INTEGRITY CRITERIA I	$\frac{I}{C}$	MEETS REEVALUATION CRITERIA		MEETS INTEGRITY CRITERIA		REMARKS
						YES	NO	YES	NO	
Uplift:	1.54 KSI	6.02 KSI	0.26	3.08 KSI	0.51		X		X	Foundation With Anchor Bolts Required
Overturning Moment	27500 K-FT	20073 K-FT	1.37	55000 K-FT	2.74	X		X		
Sliding:	520 KIPS	1654 KIPS	0.31	1040 KIPS	0.63		X		X	Foundation With Anchor Bolts Required
Tank Stress:										
Dome	18.75 KSI	2.33 KSI	8.05	58 KSI	24.89	X		X		
Axial	18.75 KSI	7.06 KSI	2.66	58 KSI	8.22	X		X		
Bending	18.75 KSI	6.91 KSI	2.71	58 KSI	8.39	X		X		

TABLE 5.7-1. LARGE PIPING RESULTS FOR MISC. WATER

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
728-8"-HP 729-8"-HP 6015-6"-151R	334741-0 334834-0 (MW-01)	86.0	37.68	0.438	195.94	2.28		X	X		(i) Install welding tee @ lines 728-8"-HM2 6015-6"-151R } Data Point 31 (ii) Add restraint in E-W direction and holddown @ Node Pt. 75 (14-PS-56) (iii) Remove vertical support @ Node Point 30 (8-PS-11)
734-6"-HM2 734-6"-GM 6016-4"-301R 736-4"-GM 736-4"-HP	334735-1 334748-0 334908-0 334909-0 334576-1 (MW-02)	16.057	37.68	2.35	195.94	12.20	X		X		(i) Add holddown to following existing supports a) T-1-PS-19 (D.P.83) b) T-1-PS-20 (D.P.87) c) 14-PS-15 (D.P.190) d) 14-R-PS-35 (D.P.250) e) T-8-PS-3 (D.P.120) (ii) Reduce clearance between pipe to support from 1/8" to 1/16" in E-W direction at following supports a) T-8-PS-4A (D.P.125) b) T-8-PS-4D (D.P.140) c) T-8-PS-4E (D.P.145) (iii) Install new support (3-way) at node point 435 (iv) Remove the vertical support from existing support 14-PS-50 (D.P.265)

TABLE 5.7-1. LARGE PIPING RESULTS FOR MISC. WATER

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
734-6"-HM2 734-6"-HH 8050-4"-HM2 735-4"-HM2 735-4"-HP 734-6"-HH7 765-4"-HM2 765-4"-HH (Inside cont.)	334735-1 334739-0 334736-0 334737-0 (MW-03)	20.031	36.0	1.797	187.2	9.35	X		X		(i) Add holddown to following existing supports a) 1-734-U-010 (D.P.15) b) 1-PS-57 (D.P.45) c) 1-734-U-004 (D.P.105) d) 1-PS-56 (D.P.200) e) 1-PS-33 (D.P.230) (ii) Replace snubber at existing support 1-734-SS-003 (D.P.95) as per revised loads (iii) Install in line anchor at data point 335 (new)
737-8"-HP	334559 (MW-04)	112.0	37.68	0.336	195.94	1.75		X	X		(i) Add restraint in N-S direction at existing support a) T1-PS-19 (D.P.40) b) T1-PS-20 (D.P.50) (ii) Install new support in N-S direction at node point 148 (iii) Add restraint in E-W direction at existing support T-1-PS-17 (D.P.20) (iv) Add holddown to following existing support a) T1-PS-17 (D.P.20) b) T1-PS-19 (D.P.40) c) (D.P.70) d) T8-PS-3 (D.P.100)

TABLE 5.7-1. LARGE PIPING RESULTS FOR MISC. WATER

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
737-8"-HP 737-8"-HM1 8050-4"-HM2 6018-6"-HM2 6019-6"-HM2 6018-6"-152R 6019-6"-152R (Inside Cont.)	714474-3 334564-3 334577-1 (MW-05)	129.556	42.72	0.33	222.14	1.71		X	X		(i) Add holddown to following existing support a) 1-6018-UG-002 (D.P.555) b) 1-6019-UG-002 (D.P.745) and data points 365, 370, 565, 755 & 765 (ii) Add restraint in N-S direction at existing support a) 1-6018-UG-005 (D.P.425) b) 1-6019-UG-005 (D.P.625) c) 1-SC-152-5 (D.P.820) (iii) Install restraint in E-W & N-S direction at data pt 395, 530, & 728 (new) (iv) Install restraint in N-S and vertical direction @ data point 806 (new) (v) Install restraint in E-W direction at data point 812 (new) (vi) Install restraint in N-S direction at data point 546 & 736 (new)

TABLE 5.7-2. SUPPORT RESULTS FOR MISC. WATER

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
728-8"-HP	334571	8-PS-11	C	Concrete fastener	7.7KIP	2.7 KIP	0.35	32.4 KIP	4.2		X	X		Install brace in Z-dir.
728-8"-HP	334571	14-PS-19A	C	Concrete fastener	4.5K	2.2K	0.49	26.4K	5.9		X	X		Install brace in X-dir.
728-8"-HP	334571	14-PS-22	C	Concrete fastener	4.5KIP	2.2KIP	0.49	26.4KIP	5.9		X	X		Refer to AC-07, D.P.#33
728-8"-HP	334571	14-PS-56	C	C6x8.2	F_b=2.58	32.4	12.55			X		X		
728-8"-HP	334571	PS-57	C	Angle	210.6KSI	32.4KSI	0.15	172.8	0.82		X		X	Replace angle for T.S.
6013-6"-152R	334575	395 (1)	J							X		X		
6013-6"-152R	334575 (MW-01)	415 (1)	J							X		X		
734-6"-GM	334735	65	C	W6x15.5	80.5KSI	24KSI	0.30	172.8	215		X	X		Install brace in Y-direction
	334735	83	C	W4x13	F_b=0.58	18	31			X		X		
	334735	87	C							X		X		Refer to D.P.#83
	334735	91	C	W4x13	F_b=1.7	32.4	19.1			X		X		
	334735	95	C							X		X		Refer to D.P.#83
	334908	115	C	3x3x3/8L	F_b=12.15	32.4	2.66			X		X		
	334908	120	C	4x4x1/2L	F_b=9.35	32.4	3.47			X		X		
	334908	125	C	W4x13	F_b=3.35	32.4	9.72			X		X		
	334908	130	J							X		X		Refer to D.P.#125
	334908	135	J							X		X		Refer to D.P.#125
	334908	140	J							X		X		Refer to D.P.#125
	334908	145	C	W4x13	F_b=2.5	32.4	12.96			X		X		
	334908	150	J							X		X		Refer to D.P.#125
	334908	155	C	W4x13	F_b=2.5	32.4	12.96			X		X		
	334908	170	C	W4x13	F_b=2.5	32.4	12.96			X		X		
	334908	175	C	W4x13	F_b=11.51	32.4	2.81			X		X		
	334908	190	C	L2-1/2x 2-1/2x 3/8	F_b=14.6	32.4	2.22			X		X		
	334908	195	C	Concrete fastener	8.1KIP	2.2KIP	0.27	26.4KIP	3.3		X	X		Install brace in X-direction
	334908	200	C	W6x15.5	F_b=28.1	32.4	1.15			X		X		
736-4"-GM	334909	250	J								X		X	Replace existing support to Y-rigid Restraint
736-4"-GM	334909	260	C	WT4x6.5	F_b=19.98	32.4	1.62			X		X		
736-4"-GM	334909	265	J							X		X		Refer to D.P.# 260

(1) ADLPIPE Node No.

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
734-6"-GM	334909	280	C	Concrete Fastener	13.8KIP	3.6KIP	0.26	43KIP	3.1		X	X		Install brace in Z-direction
734-6"-GM	334909	298	C	W6x15.5	F_b=50.21	32.4	0.65	172.8	3.44		X	X		Install brace in X-direction
734-6"-GM	334909	308	C	W6x15.5	F_b=.22	32.4	147.27			X		X		
734-6"-GM	334909	340	C	L2-1/2x 2-1/2x 3/8	F_b=9.4	32.4	3.4			X		X		
734-6"-GM	334748	35	C	2-1/2"x 1"x6"P	F_v=.33	24.4	74			X		X		
734-6"-GM	334909 (MW-02)	395	C	Weld	43.7KSI	19KSI	0.44	86.4	1.98		X	X		Provide brace in X & Z direction
734-6"-HM2	334735-1 (MW-03)	15	C	W4x13	Fb=4.4	32.4	7.36			X		X		
		45	C	10B 11.5	F_b=6.29	32.4	5.15			X		X		
		95	C	Weld	20.7KSI	19.2KSI	0.93	86.4	4.17		X	X		Install brace in Z-direction
		105	C	Concrete fastener	T=7.6	T=2.2	0.29	26.4	3.47		X	X		Install brace in Y-direction
		145	J							X		X		As per catalog (SP.)
		150	C	1/2x6x 17 P	F_b=10.V3	32.4	3.1			X		X		
		155	C	L2x2x1/4	F_b=15.65	F_b=32.4	2.0			X		X		
		160	J							X		X		Refer to D.P.# 155
		165	J							X		X		Refer to D.P.# 155
		200	C	W6x15.5	F_b=5.76	32.4	5.63			X		X		
		225	C	2x2x1/4L	F_b=8.2	32.4	3.95			X		X		As per catalog (SN)
		230	J							X		X		Refer to D.P.# 225
		235	C	L3x3	F_b=13.1	32.4	2.47			X		X		
		270	C	W4x13	F_b=2.2	32.4	14.72			X		X		
		145	J							X		X		As per catalog (SN)

(1) ADLPIPE Node No.

TABLE 5.7-2. SUPPORT RESULTS FOR MISC. WATER

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
737-8"-HP	334559	20	J							X		X		Small load for exist support
737-8"-HP	334559	40	C	5/16x 9/16x 12" PL	F_b=4.5	32.4	7.2			X		X		
727-8"-HP	334559	50	C							X		X		Refer to D.P.# 40
737-8"-HP	334559	60	J							X		X		Small load
737-8"-HP	334559	77	J							X		X		As per catalog (SN)
737-8"-HP	334559	90	J							X		X		Refer to MW-02 D.P.# 115
737-8"-HP	334559	100	J							X		X		Refer to MW-02 D.P.# 120
737-8"-HP	334559	110	J							X		X		Refer to MW-02 D.P.# 125
737-8"-HP	334559	120	J							X		X		Refer to MW-02 D.P.# 125
737-8"-HP	334559	130	J							X		X		Refer to MW-02 D.P.# 125
737-8"-HP	334559	140	J							X		X		Refer to MW-02 D.P.# 125
737-8"-HP	334559	160	C	Concrete fastener	3.4KIP	1KIP	0.30	12KIP	3.57		X	X		Refer to AC-05 8-PS-1
737-8"-HP	334559	175	C	Concrete fastener	8.1KIP	2.7KIP	0.34	32.4KIP	4.02		X	X		Refer to AC-05,8-PS-2
737-8"-HP	334559	190	C	Concrete fastener	28.5KIP	3.6KIP	0.13	43KIP	1.5		X	X		Add brace in X-direction
737-8"-HP	334559 (MW-04)	202	C	Concrete fastener	28.5KIP	3.6KIP	0.13	43KIP	1.5		X	X		Refer to D.P.# 190
737-8"-HP	714474-3	365	C							X		X		Refer to AC-14, D.P.# 67
737-8"-HP	714474-3	370	C							X		X		Refer to AC-14, D.P.# 67
737-8"-HP	714474-3	1-737-UG-001	C	C5x9	F_b= 13.99KSI	32.4KSI	2.3-1			X		X		
737-8"-HP	714474-3	1-SC-152-5	J							X		X		Refer to AC-14, D.P.# 22
737-8"-HP	714474-3	1-R-DS-47	J							X		X		As per catalog (R)
737-8"-HP	714474-3	1-737-UG-002	C	W6x15.5	F_b= 289.74KSI	32.4KSI	0.11	172.6KSI	0.60		X		X	Provide brace in Z-direction

(1) ADLPIPE Node No.

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
737-8"-HP	714474-3	1-737-UG-002	C	Inter-action Anchor Bolts	11.17	1.0	0.089	12.0	1.07		X	X		Refer to D.P.# 840
737-8"-HM1	714474-3	1-737-U-001	C	Concrete Fastener	S=1.02	6.5	6.37			X		X		
737-8"-HM1	714474-3	905	J							X		X		
6018-6"-HM2	334564-3	1-6018-SS-006	J							X		X		As per catalog (SN)
6018-6"-HM2	334564-3	1-6018-UG-005	C	W6x15.5	F_b=1.7	32.4	19.1			X		X		
6018-6"-HM2	334564-3	(1-SC-152-6) 1-6018-RS-003	J							X		X		Refer to AC-14 D.P.# 57
6018-6"-152R	334564-3	(1-PS-46) 1-6018-UG-002	J J							X		X		Refer to AC-14 D.P.# 22
6018-6"-152R	334564-3	565	J							X		X		Refer to D.P.# 575
6018-6"-152R	334564-3	575	C	L3x3x3/8	F_b= 64.99KSI	32.4KSI	0.5	172.6KSI	2.66		X	X		Install add'l Y-rest.
6018-6"-152R	334564-3	1-6018-G-001	C	3x3x3/8L	F_b=21.87	32.4	1.48			X		X		
6019-6"-HM2	334577-1	1-6019-SS-006	J							X		X		As per catalog (SN)
6019-6"-HM2	334577-1	1-6019-UG-005	C	W6x15.5	F_b=1.7	32.4	19.1			X		X		
6019-6"-HM2	334577-1	1-6019-RS-004	C	W10x33	F_b=.38	32.4	85.3			X		X		
6019-6"-152R	334577-1	(1-SC-152-6) 1-6019-UG-003	J							X		X		Refer to AC-14 D.P.# 57
6019-6"-152R	334577-1	(1-SC-152-5) 1-6019-UG-002	J							X		X		Refer to AC-14 D.P.# 22
6019-6"-152R	334577-1	755	J							X		X		Refer to D.P.# 575
6019-6"-152R	334577-1	765	C	L3x3x3/8	F_b= 64.79KSI	32.4KSI	0.5	172.6KSI	2.66		X	X		Refer to D.P.# 575
6019-6"-152R	334577-1	1-6019-G-001	J							X		X		Refer to D.P.# 585
6018-6"-HM2	334564-3 (MW-05)	1-6018-RS-004								X		X		Refer to D.P.# 680

(1) ADLPIPE Node No.

TABLE 5.7-3. SMALL PIPING RESULTS FOR MISCELLANEOUS WATER SYSTEMS

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
810-1-KN	Doc. 310-17 Sk. 3	37.1	36.0	0.97	187.2	5.0	X		-	-	(2) Judged o.k. since margin within 3%
817-3-KN	Doc. 310-17 Sk.3, 9 & 10							X	-	-	(1) Replace DW supports (Sk. 10) with bilateral restraints. Provide E-W restraint on 4" long riser (Sk. 3)
826-1-KN	Doc. 310-17 Sk. 1, 2 & 3							X	-	-	(1) Add E-W restraint about halfway along 54" N-S run of line 826-1-KN
827-1-KN											
827-1-1/2-KN											
828-3-KN	Doc. 310-17 Sk. 3							X	-	-	(1) Line will meet margin criteria if recommended supports are added to line 817-3-KN
8005-1-GM	334730-0	44.1	37.7	0.85	196.0	4.4		X	-	-	
8005-1-HP	334869-0										(2) Add DW support at valve 1-600-152
8021-2-HP	334799-0	36.6	42.7	1.2	222.1	6.1	X		-	-	
8030-2-SI	334749-A 5152702-0	42.1	37.7	0.90	196.0	4.6		X	-	-	(2) O.K. max. stress based on assumed rigid support; recommend that 3" pipe column support be braced literally
8063-1-HP	334869-0						X		-	-	
8063-1-GM											(2) Add E-W restraint at support locations S-1 S-3 on dig. 5152702-0
											(1) Add E-W restraint at support detail 5

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.7-4

MECHANICAL EQUIPMENT ANALYSIS SUMMARY

EQUIPMENT: Refueling Water Storage Tank

COMPONENT DESCRIPTION	REEVALUATION CRITERIA L	CALCULATED VALUE C	L/C	INTEGRITY CRITERIA I	I/C	MEETS REEVALUATION CRITERIA		MEETS INTEGRITY CRITERIA		REMARKS
						YES	NO	YES	NO	
Bolt Stress:										
Shear	13.33 KSI	18.93 KSI	0.70	29 KSI	1.53		X	X		
Tension	26.66 KSI	32.85 KSI	0.81	58 KSI	1.77		X	X		
Overturning Moment:	36027 K-FT	23492 K-FT	1.53	72079 K-FT	3.07	X		X		
Sliding: (Force In Foundation Slab)	2035 KIPS	1614 KIPS	1.26	4070 KIPS	2.52	X		X		
Tank Stress:										
Dome	18.75 KSI	2.33 KSI	8.05	58 KSI	24.89	X		X		
Axial	18.75 KSI	7.06 KSI	2.66	58 KSI	8.22	X		X		
Bending	18.75 KSI	6.91 KSI	2.71	58 KSI	8.39	X		X		
Hoop Stress:										
Ring 1 (Fr.Bottom)	18.75 KSI	18.46 KSI	1.02	58 KSI	3.14	X		X		
Ring 2 (Fr.Bottom)	18.75 KSI	21.37 KSI	0.88	58 KSI	2.70		X	X		
Ring 3 (Fr.Bottom)	18.75 KSI	16.60 KSI	1.13	58 KSI	3.49	X		X		

TABLE 5.8-1. LARGE PIPING RESULTS FOR SAFETY INJECTION

Line No.	Isometric	Max. Stress (KSI) (a)	Reeval-uation Criteria 2.4 S_h KSI (b)	Reeval-uation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reeval-uation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
6000-16-151R 6002-16-151R 318-14-GG	334584-2 (SI-04)	43.126	36	0.834	187.2	4.34		X	X		(i) Add holddown at following existing supports: 14-R-151R-8 (D.P. 37) 14-PS-3A (D.P. 60) 5-R-151R-Z (D.P. 224) (ii) Change existing rod hangers to strut: 6-R-151-6 (D.P. 153) 5-R-151R-4 (D.P. 175) 5-R-151R-3 (D.P. 210) 5-318-RH-3 (D.P. 325) (iii) Install new support in E-W & N-S direction at data point 407 (iv) Add restraint in N-S direction at following existing support: 5-318-SW-11 (D.P. 330) 6-R-151R-5 (D.P. 165) (v) Reduce the clearance between pipe and support to 1/16" of existing support: 6-SC-151R-12 (D.P. 110) (vi) Replace existing snubber 5-318-SW-10 with revised design loads
6001-16-151R 6003-16-151R 317-14-GG 317-16-GG	334585-1 (SI-05)	36.127	36.	0.996	187.2	5.18		X	X		(i) Add holddown at existing support 14-PS-4 (D.P. 50) (ii) Change existing Rod hanger: 6-317-RH-3 (D.P. 225) 6-R-317-1 (D.P. 275) 6-317-RH-2 (D.P. 295) to strut

TABLE 5.8-1. LARGE PIPING RESULTS FOR SAFETY INJECTION

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
											(iii) Install new support in E-W and N-S direction at node point 322 (iv) Reduce clearance between pipe and support to 1/16" in X and Y direction at existing support: 6-SC-151R-12 (D.P. 110) (v) Replace existing snubber: 6-SW-151R-13 (D.P. 140) 6-SW-151R-14 (D.P. 146) 6-317-SW-5 (D.P. 227) 6-317-SW-10 (D.P. 245) As per revised design loads
6006-6-1501R 6006-6-1501R	334582-3 (SI-06)	51.01	45.12	0.884	234.62	4.60		X	X		(i) Change existing rod hangers: 1-R-1501W-8 (D.P. 15) into strut (ii) Install new support in E-W and N-S direction at node point 150 (iii) Reduce the clearance between pipe and support to 1/16" at following existing supports: 1-SC-1501R-2 (D.P. 90) 1-R-1501W-13 (D.P. 102) 1-SC-1501R-3 (D.P. 120)
6007-6-1501R 6007-6-2501R	334581-3 (SI-07)	61.687	45.12	0.73	234.62	3.8		X	X		(i) Change existing rod hangers: 1-R-1501W-17 (D.P. 15) 1-R-1501W-18 (D.P. 25) to strut

TABLE 5.8-1. LARGE PIPING RESULTS FOR SAFETY INJECTION

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
											(ii) Install restraint in E-W and N-S direction at existing support: 1-S-1501W-21 (D.P. 130) (iii) Reduce the clearance between pipe and support to 1/16" at following existing supports: 1-SC-1501R-2 (D.P. 80) 1-R-1501W-13 (D.P. 90)
6008-6-1501R 6008-6-2501R	334583-2 (SI-08)	33.145	45.12	1.39	234.62	7.08	X		X		(i) Change existing rod hangers: 1-R-1501W-1 (D.P. 15) 1-R-1501W-2 (D.P. 25) 1-R-1501W-4 (D.P. 56) 1-R-1501W-5 (D.P. 70) to strut (ii) Reduce the clearance between pipe and support to 1/16" of existing supports: 1-R-1501W-3 (D.P. 45) 1-SC-1501R-1 (D.P. 80)

TABLE 5.8-2. SUPPORT RESULTS FOR SAFETY INJECTION

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
6002-16"-151R	334584-2	37	C	5'ϕ Pipe	F_a = 1.4	18	12.8			X		X		
6002-16"-151R	334584-2	50	C							X		X		Refer to S1-05, D.P. #60
6002-16"-151R	334584-2	60	C							X		X		Refer to S1-05, D.P. #70
6002-16"-151R	334584-2	70	C							X		X		Refer to S1-05, D.P. #70
6002-16"-151R	334584-2	80	C							X		X		Refer to S1-05, D.P. #80
6002-16"-151R	334584-2	90	J							X		X		As per catalog (SN)
6002-16"-151R	334584-2	100	C							X		X		Refer to S1-05, D.P. #100
6002-16"-151R	334584-2	110	C							X		X		Refer to S1-05, D.P. #110
6002-16"-151R	334584-2	120	J							X		X		As per catalog (R)
6002-16"-151R	334584-2	130	J							X		X		As per catalog (R)
6002-16"-151R	334584-2	140	J							X		X		As per catalog (R)
6002-16"-151R	334584-2	150	J							X		X		As per catalog (ST)
6002-16"-151R	334584-2	153	J							X		X		As per catalog (R)
6002-16"-151R	334584-2 (SI-04)	165	J							X		X		As per catalog (R)

(1) ADLPIPE Node No.

TABLE 5.8-2. SUPPORT RESULTS FOR SAFETY INJECTION

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
6002-16"-151R	334584-2	175	J							X		X		As per catalog (R)
6002-16"-151R	334584-2	190	C	Weld	5.6	19.2	3.43	86.4	15.43	X		X		
6002-16"-151R	334584-2	200	C	Weld	2.72	19.2	7.1	86.4	31.76	X		X		
6002-16"-151R	334584-2	210	J							X		X		As per catalog (R)
6002-16"-151R	334584-2	224	C	W8X20	F_b = 7.2	32.4	4.5			X		X		
6002-16"-151R	334584-2	228	J							X		X		As per catalog (ST)
6002-16"-151R	334584-2	233	J							X		X		As per catalog (SN)
6002-16"-151R	334584-2	236	J							X		X		As per catalog (SN)
6002-16"-151R	334584-2	244	J							X		X		As per catalog (SP) non-seismic
318-14"-GG		286	J							X		X		As per catalog (SP) non-seismic
318-14"-GG		306	J							X		X		As per catalog (SN)
318-14"-GG		308	J							X		X		As per catalog (SN)
318-14"-GG		310	J							X		X		As per catalog (ST)
318-14"-GG		325	J							X		X		As per catalog (R)
318-14"-GG		330	C	Weld	26.8	19.2	0.72	86.4	3.22		X	X		Install brace in X-direction

(1) ADLPIPE Node No.

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
		335	J							X		X		As per catalog (R)
		375	J							X		X		As per catalog (R)
		390	J							X		X		As per catalog (SP) non-seismic
	(SI-04)													
6003-16"-151R	334585-1	14-R-151R-9	J							X		X		Refer to SI-04, D.P. #37
6003-16"-151R	334585-1	14-PS-5	C	Weld	79.12	19.2	0.26	86.4	1.09		X	X		Install brace in X-direction
6003-16"-151R	334585-1	14-PS-4	C	Conc. Fastener	32.49	2.2	0.07	26.4	0.82		X		X	Add brace N-S direction
6003-16"-151R	334585-1	14-PS-4	C	Conc. Fastener	32.49	2.2	0.07	26.4	0.82		X		X	Add brace in N-S direction
6003-16"-151R	334585-1	14-PS-3	C	W6X15.5	F_b=6.85	32.4	4.73			X		X		
6003-16"-151R	334585-1	14-PS-2	C	Weld	23.35	19.2	0.8	86.4	3.7		X	X		Install brace in Y-direction
6003-16"-151R	334585-1	14-PS-2B	C	1/4" thk PL	54.5	32.4	0.6	172.8	3.17		X	X		Install add'l stiffener PL
6003-16"-151R	334585-1	14-PS-1	C	W8X17	F_b=14.22	32.4	2.3			X		X		
6003-16"-151R	334585-1	6-SC-152-12	C	Weld	58.2	19.2	0.16	86.4	1.48		X	X		Install brace in Y-direction
6003-16"-151R	334585-1	6-SW-151R-15	J							X		X		As per catalog (SN)
6003-16"-151R	334585-1 (SI-05)	6-R-151R-7	J							X		X		As per catalog (SP) non-seismic

(1) ADLPIPE Node No.

TABLE 5.8-2. SUPPORT RESULTS FOR SAFETY INJECTION

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
6003-16"-151R	334585-1	6-SW-151R-13	C	Conc. Fastener	T=2.65 S=1.86	2.2 3.7	0.82 1.99	26.4 3.7	9.96 1.99		X	X		Replace conc. fastener
6003-16"-151R	334585-1	6-SW-151R-14	C	Conc. Fastener	T=2 S=2.73	2.2 3.7	1.1 1.36	26.4 3.7	13.2 13.6		X	X		------ do ------
317-14"-GG	334585-1	6-317-SH-7	J							X		X		As per catalog (SP) non-seismic
317-14"-GG	334585-1	6-317-SWS-6	C	Conc. Fastener	T=1.53 S=1.24	2.2 3.7	1.44 2.98	26.4 3.7	17.25 2.98		X	X		Replace conc. fastener
317-14"-GG	334585-1	6-317-SWS-5	C	Conc. Fastener	T=1.96 S=1.7	T=2.2 S=3.7	1.12 2.17	26.4 3.7	13.47 2.17		X	X		------ do ------
317-14"-GG	334585-1	6-317-SW-4	C	Conc. Fastener	T=3.05	2.2	0.7	26.4	8.66		X	X		------ do ------
317-14"-GG	334585-1	6-317-SW-10	J							X		X		As per catalog (SN)
317-14"-GG	334585-1	6-317-RH-3	J							X		X		As per catalog (R)
317-14"-GG	334585-1	6-317-SWS-8	J							X		X		As per catalog (ST)
317-14"-GG	334585-1	6-R-317-1	J							X		X		As per catalog (R)
317-14"-GG	334585-1	6-317-RH-2	J							X		X		As per catalog (R)
317-14"-GG	334585-1	6-317-SH-1	J							X		X		As per catalog (SP) non-seismic
317-14"-GG	334585-1 (SI-05)	6-317-820-9	J							X		X		As per catalog (SN)
6006-6-1501R	334582-3	1-R-1501W-8	J							X		X		P_Y = 1210 Small load for exist. W
6006-6-1501R	334582-3 (SI-06)	1-R-1501W-9	J							X		X		P_Y = 1.366 lbs small load

(1) ADLPIPE Node No.

TABLE 5.8-2. SUPPORT RESULTS FOR SAFETY INJECTION

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
6006-6-1501R	334582-3	1-R-1501W-10	C	Conc. Fastener	T=3.2 S=0.5	T=2.2 S=3.7	0.69 7.4	26.4 11.1	8.25 22.2		X	X		Install brace in Y-direction
6006-6-1501R	334582-3	1-R-1501W-11	C	Conc. Fastener	T=2.67 S=0.5	2.2 3.7	0.82 7.4	26.4 11.1	9.89 22.2		X	X		------ do ------
6006-6-1501R	334582-3	1-SS-1501R-4	C	Conc. Fastener	T=0.6 S=0.6	T=2.2 S=3.7	3.67 6.17			X		X		
6006-6-1501R	334582-3	1-R-1501W-12	J	Interac-tion Conc. Fastener	1.16	1.0	.86	12.0	10.29		X	X		Install add'l Y-direction brace
6006-6-1501R	334582-3	1-R-1501W-20	J	Interac-tion Conc. Fastener	1.16	1.0	.86	12.0	10.29		X	X		------ do ------
6006-6-1501R	334582-3	1-SC-1501R-2	J	Interac-tion on Anch. Bolts	2.6	1.0	.38	12.0	4.6		X	X		------ do ------
6006-6-1501R	334582-3	1-R-1501W-13	J	Interac-tion on Anch. Bolts	1.16	1.0	.86	12.0	10.29		X	X		By comparison to 1-R-1501W-12
6006-6-1501R	334582-3	1-R-1501W-14	C	Base Plate	F_b=254	32.4	0.13	172.8	0.68		X		X	Add brace
6006-6-1501R	334582-3	1-SC-1501R-3	C	Conc. Fastener	T=5.73 S=0.91	T=2.2 S=3.7	0.38 4.07	26.4 S=3.7	4.61 4.07		X	X		Install add'l Y-direction brace
6006-6-1501R	334582-3	1-SH-1501-15	J							X		X		Small load for 4-1/2"ϕ anch. bolts
6006-6-1501R	334582-3 (SI-06)	1-SS-1501-11	C	Conc. Fast. Inter-action	.64	1.0	1.57			X		X		

(1) ADLPIPE Node No.

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
6006-6-1501R	334582-3	1-SS-1501R-5	J							X		X		Small load for 4-3/4"ϕ anch. bolts
6006-6-1501R	334582-3	1-SS-1501R-14	J							X		X		Small load for 6-3/4"ϕ anch. bolts
6006-6-2501R	334582-3 (SI-06)	1-S-1501W-16	J							X		X		OK by comparison to 1-SS-1501-11
6007-6-1501R	334581-3	1-R-1501W-17	J							X		X		P_Y = 900 Small load for exist WF24x84
6007-6-1501R	334581-3	1-R-1501W-18	J							X		X		Small load for 2-3/4"ϕ anch. bolts
6007-6-1501R	334581-3	1-SS-1501R-6	J							X		X		P_Y = 345 lbs, P_Z = 670 lbs Small load for braced support
6007-6-1501R	334581-3	52	J							X		X		Supported at sleeve
6007-6-1501R	334581-3	1-R-1501W-12	C	Anchor Bolt Inter-action	1.16	1.0	.86	12.0	10.29		X	X		See SI-06 for calcs
6007-6-1501R	334581-3	1-R-1501W-20	C	Anchor Bolt Inter-action	1.16	1.0	.86	12.0	10.29		X	X		See SI-06 By comparison to 1-R-1501W-12
6007-6-1501R	334581-3 (SI-07)	1-SC-1501R-2	C	Anchor Bolt Inter-action	2.6	1	.38	12.0	4.6		X	X		See SI-06 for calcs

(1) ADLPIPE Node No.

TABLE 5.8-2. SUPPORT RESULTS FOR SAFETY INJECTION

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
6007-6-1501R	334581-3	1-R-1501W-13		Anch. Bolts Inter-action	1.16	1.0	.86	12.0	10.29		X	X		See SI-06 By comparison to 1-R-1501W-12
6007-6-1501R	334581-3	1-SS-1501R-15	J							X		X		Small load for 6-3/4"ϕ anch. bolts
6007-6-1501R	334581-3	1-SS-1501R-7	C	Anchor Bolts Inter-action	0.6	1.0	1.66			X		X		
6007-6-1501R	334581-3	1-SS-1501-12	J							X		X		See SI-06 By comparison to 1-SS-1501-11
6007-6-1501R	334581-3	1-S-1501W-21	J							X		X		Small loads for conc. fast.
6007-6-2501R	334581-3 (SI-07)	1-S-1501W-22	J							X		X		See SI-06 By comparison to 1-SS-1501-11
6008-6-1501R	334583-2	1-R-1501W-1	J							X		X		P_Y = 1000 lbs Load small for exist WF18x50
6008-6-1501R	334583-2	1-R-1501W-2	C	C4x3.1	F_b=20.16	32.4	1.6			X		X		
6008-6-1501R	334583-2	1-SS-1501R-1	J							X		X		P_Y = 966 lbs, P_Z = 1897 lbs Small load for braced support
6008-6-1501R	334583-2	1-R-1501W-3	C	Anch. Bolt Inter-action	.73	1.0	1.4			X		X		

(1) ADLPIPE Node No.

TABLE 5.8-2. SUPPORT RESULTS FOR SAFETY INJECTION

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
6008-6-1501R	334583-2	1-R-1501W-4	J							X		X		As per catalog (R)
6008-6-1501R	334583-2	1-R-1501W-5	J							X		X		As per catalog (R)
6008-6-1501R	334583-2	1-SC-1501R-1	C	L2x2x1/4	F_b=26.8	32.4	1.2			X		X		
6008-6-1501R	334583-2	1-SS-1501R-2	J							X		X		As per catalog (SN)
6008-6-1501R	334583-2	1-SS-1501R-10	J							X		X		As per catalog (SN)
6008-6-1501R	334583-2	1-SS-1501R-13	C	Interac-tion on Anch. Bolts	.12	1.0	8.33			X		X		
6008-6-1501R	334583-2	1-S-1501W-6	C	Conc. Fastener	T=4.5 S=0.45	T=2.2 S=3.7	0.49 8.2	26.4 3.7	5.87 8.2		X	X		Add brace in Y-direction
6008-6-2501R	334583-2 (SI-08)	1-S-1501W-7	J							X		X		As per catalog (SP) non-seismic

(1) ADLPIPE Node No.

TABLE 5.8-3. SMALL PIPING RESULTS FOR SAFETY INJECTION SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
2090-2-2501	334483-3	140.9	45.1	0.32	234.6	1.7		X	-	-	③ Add three-way seismic restraint near MOV356
2090-2-2502	334483-3	70.2	44.4	0.63	230.9	3.3		X	-	-	
2091-2-2501	334484-3	126.0	45.1	0.36	234.6	1.9		X	-	-	③ Add three-way seismic restraint near MOV357
2091-2-2502	334484-3	75.0	44.4	0.59	230.9	3.1		X	-	-	
2092-2-2501	334485-2	202.0	45.1	0.22	234.6	1.2		X	-	-	③ Add three-way seismic restraint near MOV358
2092-2-2502	334485-2	95.6	44.4	0.46	230.9	2.4		X	-	-	
6011-2-151	334519-1	104.5	44.6	0.43	232.	2.2		X	-	-	② Add E-W and N-S restraint on riser below valve 856B-2-T57
6012-2-151	334520-2	103.9	44.6	0.43	232.	2.2		X	-	-	② Add E-W and N-S restraint near top of rsier from line 6004-4-1501
6013-2-151	334521-1	64.9	44.6	0.69	232.	3.6		X	-	-	② Add N-S restraint on 13" long riser
6014-2-151	334521-1	63.0	44.6	0.71	232.	3.7		X	-	-	② Add N-S restraint near 4th elbow from the tee connection to line 6002-16
6014-3-151								X	-	-	
6015-4-151	334575-1	33.5	42.7	1.27	222.	6.6	X		-	-	③ ④ Three-way restraint required at MOVLCV1100B and 1100D to limit stress to valve shown
6015-6-151	334575-1	16.0	42.7	2.67	222.	13.9	X		-	-	③ ④ Stress based on addition of recommended restraint for line 6015-4
6016-4-2502	334576-1	20.2	44.4	2.20	230.9	11.4	X		-	-	③ ④ Stress value based on addition of 3-way restraint at MOV880 as recommended by Bechtel analysis

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.8-4

MECHANICAL EQUIPMENT ANALYSIS SUMMARY

EQUIPMENT: Safety Injection Pumps (G-50A, B)

COMPONENT DESCRIPTION	REEVALUATION CRITERIA L	CALCULATED VALUE C	$\frac{L}{C}$	INTEGRITY CRITERIA I	$\frac{I}{C}$	MEETS REEVALUATION CRITERIA		MEETS INTEGRITY CRITERIA		REMARKS
						YES	NO	YES	NO	
Support Frame	22.7	9.44	2.40	71.34	7.56	X		X		
Pump Hold Down Bolts	40.0	158.0	0.25	141.6	0.90		X		X	Bolts Bending Due to Seismic loads
Motor Hold Down Bolts	40.0	4.8	8.33	141.6	29.5	X		X		
Foundation Anchor Bolts	20.0	16.1	1.24	65.0	4.04	X		X		Loaded in Shear

TABLE 5.9-1. SMALL PIPING RESULTS FOR REACTOR CYCLE SAMPLING SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
3008-3/8-2505 3008-3/4-601	456428-0 Sh.1 of 3	183.	37.7	0.21	196.	1.1		X	-	-	② Add N-S restraint at W end of 4-1/2" E-W run. Ensure 3-way restraint at CV962.
5004-3/8-2501 5004-3/4-2501	334508-2							X	-	-	① Add N-S and E-W restraint approx. midway between CV956 and line 5006. Ensure 3-way restraint at CV956.
5026-3/8-2501 5026-3/4-2501	334508-2 714477-4							X	-	-	① Add N-S restraint near W end of 5-1/4" E-W run (located between CV955 and line 5017). Ensure 3-way restraint at CV955.
5029-3/8-2501 5029-3/4-2501	714463-4							X	-	-	① Ensure 3-way restraint at CV951.
5032-3/8-2501 5032-3/4-2501		49.2	40.5	0.82	210.6	4.3		X	-	-	② Add E-W restraint on 1'0" N-S run at El.54'7". Ensure 3-way restraint at CV953.

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.10-1. LARGE PIPING RESULTS FOR REACTOR COOLANT

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
5013-10-2501R	334534-2 (RC-01)	13.456	41.52	3.08	215.90	16.05	X		X		Accepted as it is
5011-4-2501R 5011-3-2501R 5025-3-2501R	334597-2 334595-2 (RC-02)	69.609	41.52	0.596	215.90	3.10		X	X		(i) Change the following existing spring hanger into strut 1-S-2501R-5 (D.P. 62) 1-S-2501R-27 (D.P. 114) 1-S-2501R-25 (D.P. 130) (ii) Change following existing rod hangers into strut 1-R-2501R-6 (change from D.P. 52 to 56) 1-R-2501R-2 (D.P. 85) (iii) Reduce the clearance between the pipe and support to 1/16 inch at following support 1-SC-2501R-7 (D.P. 145) 1-SC-2501R-6 (D.P. 148) (iv) Install (new) vertical snubber at node pt. 35 (v) Install (new) restraint in E-W direction at D.P. 71 (vi) Install (new) restraint in E-W and N-S direction at node point 46 and 108 (vii) Install (new) restraint 1^{ar} to pipe at data point 140 (viii) Install (new) restraint in N-S direction at data point 126
5035-4"-602R	334919-1 (RC-03)	175.124	40.224	0.229	209.165	1.194		X	X		(i) Change existing rod hanger to strut at data point 76

TABLE 5.10-1. LARGE PIPING RESULTS FOR REACTOR COOLANT

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
5035-10"-602R 3004-4"-601R 5035-2"-2501R 5034-3"-2501R 5028-6"-602R 5031-6"-602R 5027-3"-2501R 5030-3"-2501R	334514-3 334596-3 334598-3 (RC-03)										(ii) Change existing spring hanger (1-S-602R-13) into X, Y guide at data point 69 (iii) Reduce the clearance between pipe and support to 1/16" for following existing supports a) 1-SC-602R-5 (D.P. 19) b) 1-SC-602R-4 (D.P. 34) c) 1-SC-602R-3 (D.P. 46) d) 1-SC-602R-7 (D.P. 90) e) 1-SC-602R-7 (D.P. 143) f) 1-SC-602R-1 (D.P. 186) g) 1-SC-602R-1 (D.P. 247) h) 1-SC-602R-2 (D.P. 214) i) 1-SC-602R-2 (D.P. 175) (iv) Install the new supports at following data points

Data Point	Restraint Direction	Snubber
80	X	Y
94	Z	
69	X & Z	
73	Y & Z	
112	Y & Z	
120		X
148	Z	Y
228		Y
178	Z	
217	Z	

TABLE 5.10-2. SUPPORT RESULTS FOR REACTOR COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
5013-10"-2501R	334534-2	1-S-2501R-4	J							X		X		Small loads
5013-10"-2501R	334534-2 (RC-01)	1-SC-2501R-9	C	3x4.2 Channel	189	32.4	0.17	172.8	0.91		X		X	Provide brace
5011-4"-2501R	334595-2	1-S-2501R-22	J							X		X		Small load
5011-4"-2501R	334595-2	1-SC-2501R-5	C	C4x3.1	F_b=226 KSI	F_b=32.4 KSI	.14	172.8 KSI	0.76		X		X	Provide brace in Z-direction
5011-3"-2501R	334595-2	1-S-2501R-21	J							X		X		Small load P_y=323LBS
5011-3"-2501R	334595-2	1-SC-2501R-3	C								X	X		Install brace in Z-direction
5011-3"-2501R	334595-2	1-R-2501R-6	C	L3x3x3/8	F_b=35.54 KSI	32.4 KSI	0.91	172.8 KSI	4.87		X	X		Install brace in Y-direction
5011-3"-2501R	334595-2	1-S-2501R-5	J							X		X		Small load P_y=242LBS
5011-3"-2501R	334595-2	1-SC-2501R-2	C	Pull out on anchor bolts	6.2K/ Bolt	1.5K/ Bolt	.24	18K/ Bolt	2.9		X	X		Install brace in Y-direction
5011-3"-2501R	334595-2	71 ①	C	L3x3x3/8	F_b=159.8 KSI	32.4 KSI	.20	172.8 KSI	1.08		X	X		Install brace in Y-direction
5011-3"-2501R	334595-2	1-S-2501R-3	J							X		X		Small loads P_y=81LBS
5011-3"-2501R	334595-2	1-SC-2501R-1	C	Inter-action anchor bolt	1.23	1	.81	12.	9.75	X		X		

(1) ADLPIPE Node No.

TABLE 5.10-2. SUPPORT RESULTS FOR REACTOR COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
5011-3"-2501R	334595-2	1-R-2501R-2	J							X		X		Small loads P_y=504LB
5025-3"-2501R	334597-2	1-S-2501R-27	J							X		X		Small loads P_y=261LB
5025-3"-2501R	334597-2	1-S-2501R-26	J							X		X		Small loads P_y=178LB
5025-3"-2501R	334597-2	1-SC-2501R-8	J							X		X		Small loads for exist support
5025-3"-2501R	334597-2	1-S-2501R-25	J							X		X		Small loads P_y=201
5025-3"-2501R	334597-2	1-S-2501R-24	J							X		X		Small loads P_y=231
5025-3"-2501R	334597-2	1-SC-2501R-7	C	Inter-action anchor bolts	1.35	1.0	0.74	12	8.89		X	X		Install brace
5025-3"-2501R	334597-2	1-SC-2501R-6	C	Inter-action anchor bolts	1.05	1.0	.95	12	11.42		X	X		Install brace
5025-3"-2501R	334597-2 (RC-02)	1-SC-2501R-23	J							X		X		Small loads P_y=464LBS
5035-10"-602R	334919	1-S-602R-10	J							X		X		Small load P_y=621LBS
5035-10"-602R	334919	1-SC-602R-5	C	C5x6.7	116KSI	32.4KSI	0.28	172.8	1.49		X	X		Install brace in x & Z-direction

(1) ADLPIPE Node No.

TABLE 5.10-2. SUPPORT RESULTS FOR REACTOR COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
5035-10"-602R	334919	1-S-602R-9	J							X		X		Small load P_y=1602LBS
5035-10"-602R	334919	1-SC-602R-4	C	C5x6.7	90KSI	32.4KSI	0.36	172.8	1.92		X	X		Install brace in Z-direction
5035-10"-602R	334919	1-SC-602R-6	J							X		X		P_y=4170LBS Small load for exist WE10x21
5035-10"-602R	334919	1-S-602R-8	J							X		X		P_y=1.791 Small load for exist WE10x21
5035-10"-602R	334919	1-SC-602R-3	C	P_L(3/8" x10" x26")	104KSI	32.4KSI	0.31	172.8	1.65		X	X		Install brace in Z-direction
5035-10"-602R	334919	1-S-602R-7	J							X		X		Small load P_y=855LBS
3004-4"-601R	334919	76 ①	J							X		X		P_y=2000LBS Small load for exist WE10x21
5035-4"-602R	334919	1-S-602R-14	J							X		X		Small load P_y=193LBS
5035-4"-602R	334919	1-S-602R-13	J							X		X		Small load P_y=178LBS
5035-4"-602R	334919	1-S-602R-7	C	Conc. fastener	2.4KIP	2.2KIP	0.92	26.4	11		X	X		Install +Z-rest & brace in Z-direction
5035-4"-602R	334919	1-SC-602R-11	J							X		X		Small load P_y=627LBS
5034-4"-602R	334919	1-SC-602R-7	C	Conc. fastener	2.4KIP	2.2KIP	0.92	26.4	11		X	X		Refer to D.P. #99

(1) ADLPIPE Node No.

TABLE 5.[redacted]2. SUPPORT RESULTS FOR REACTOR COOLANT SYSTEM

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
5034-4"-602R	334919	1-S-602R-12	J							X		X		Small load P_y=293LBS
5035-2"-2501R	334514	1-S-2501R-1	J							X		X		Small load P_y=408LBS
5037-6"-602R	334596	1-S-602R-6	J							X		X		Small load P_y=407LBS
5037-6"-602R	334596	1-S-602R-4	J							X		X		Small load P_y=252LBS
5037-6"-602R	334596	1-SC-602R-1	C	C5x6.7	63KSI	32.4KSI	0.52	172.8KSI	2.76		X	X		Install additional Z-direction brace
5037-6"-602R	334596	1-S-602R-1	J							X		X		Small load P_y=437LBS
5028-6"-602R	334598	1-S-602R-5	J							X		X		Small load P_y=382LBS
5028-6"-602R	334598	1-S-602R-3	J							X		X		Small load P_y=348LBS
5028-6"-602R	334598	1-SC-602R-1	C	C5x6.7	63KSI	3.24KSI	0.52	177.8KSI	2.76		X	X		Refer to D.P. #186
5028-6"-602R	334598	1-S-602R-2	J							X		X		Small load P_y=333LBS
5031-6"-602R	334596	1-SC-602R-2	C	Conc. fastener	5.32KIP	2.2KIP	0.41	26.4	4.96		X	X		Install brace in Y-direction
5028-6"-602R	334598 (RC-03)	1-SC-602R-2	C	Conc. fastener	5.32KIP	2.2KIP	0.41	26.4	4.96		X	X		Refer to D.P. #175

(1) ADLPIPE Node No.

TABLE 5.10-3. SMALL PIPING RESULTS FOR REACTOR COOLANT SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
5003-2-2501	334507-2	307	41.5	0.14	216	0.70		X	-	-	② Add E-W and vertical restraint near valves 513-2"-T58 and 2"-1500-126. Add N-S restraint on 2'8-3/4" E-W run.
5008-2-2501	334481-3	482	41.5	0.09	216	0.45		X	-	-	② Add N-S and vertical restraint at angle 19"E of LCV1112. Add E-W and vertical restraint near the 2"-T58 valve. Existing U-bolt supports on N-S run may require strengthening. Add N-S and E-W restraints at top and bottom of 12' riser.
5008-2-2501	334482-3										Modify 1-PS-52 to vertical seismic restraint N-S and vertical restraint at 1-PS-51, 1-R-PS-50 and 1-PS-38. Modify three DW supports on N-S run to be E-W and vertical restraints. Add vertical restraint near 2nd elbow from branch to line 5009-29-2501. (Line temperature = 570F)
5014-3/4-2501 5016-2-2501	334509-1	300	41.5	0.14	216	0.72		X	-	-	② Add restraint to prevent E-W motion of CV287. Analysis shows Integrity Margin exceeded; judgement indicates this would not be the case.
5022-3/4-2501	334807-1	195.3	41.5	0.21	216	1.1		X	-	-	② Add E-W and N-S restraint close below valve 517-3/4-T58.
5033-3/4-2501	334514-3	1242	40.5	0.03	211	0.17		X	-	-	② Add E-W and N-S restraint near top of loop.
5037-2-2501	334515-3	281	41.5	0.15	216	0.77		X	-	-	① Add N-S and vertical restraint at valves 508-2"-T58 and 2"-1500-126.

(1) Line assessed by critical span criteria only
(2) Line assessed by screening test No. 2
(3) Line assessed by ADLPIPE analysis

TABLE 5.11-1. LARGE PIPING RESULTS FOR MAIN STEAM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
1-24"-EG 2-24"-EG 3-20"-EG 4-20"-EG 5-20"-EG 6-24"-EG 7-24"-EG 14-20"-EG 50-24"-EG 51-24"-EG	334530-3 334531-2 334532-2 334533-2 568589-3 (MS-01)	17.623	36.00	2.04	187.2	10.62	X		X		(i) Add Hold Down to Existing Supports a) 1-K-KB-7-4 (D.P.130) b) 1-K-KB-7-3 (D.P.135) c) 1-K-KB-7-2 (D.P.140) d) 1-K-KB-7-1 (D.P.150) e) 1-KBG-6,7-1 (D.P.160) f) 1-K-KB-6-1 (D.P.165) g) 1-K-KB-6-2 (D.P.175) h) 1-K-KB-6-3 (D.P.180) i) 1-K-KB-6-4 (D.P.185) Add also holddown on detail 3 of ISO 568589 at data points 350, 355, 360, 395, 400 & 405 (ii) Reduce the clearance between the pipe & support to 1/16" in E-W direction at existing support 1-KBG-6,7-1 (D.P.160) (iii) Replace the following existing snubber as per revised design loads a) 2-SW-1-10 b) 2-SW-1-8 c) 2-SW-1-9 d) 2-SW-1-5 e) 1-S-SW-1-2 f) 1-S-SW-7-6 g) 1-S-SW-7-5 h) 1-S-SW-7-3 i) 1-S-SW-7-2 j) 1-S-SW-7-1 k) 1-S-SW-6,7-1 l) 1-S-SW-6-1 m) 1-S-SW-6-2 n) 1-S-SW-6-3 o) 1-S-SW-6-5 p) 1-S-SW-6-6 q) 1-S-SW-2-1 r) 1-S-SW-2-2 s) 1-S-SW-2-3

TABLE 5.11-1. LARGE PIPING RESULTS FOR MAIN STEAM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria Yes	Meets Reevaluation Criteria No	Meets Integrity Criteria Yes	Meets Integrity Criteria No	Remarks
	(MS-01)										t) 2-SW-2-5 u) 2-SW-2-9 v) 2-SW-2-8 w) 2-SW-2-10 x) 2-51-SW-1 y) 2-51-SW-2 z) 2-50-SW-2 aa) 2-50-SW-1
17-8"-EG 17-6"-EG 19-6"-EG 78-4"-EG 75-1"-EG 74-1"-EG	334890-0 (MS-02)	82.385	36.0	0.437	187.2	2.27		X	X		i) Change existing rod hangers to strut at following support locations a) 2-R-RH-17-5 (D.P.65) b) 5-17-RH-7 (D.P.90) c) 5-17-RH-8 (D.P.130) d) (D.P.290) (ii) Install welding tee @ intersection of lines 17-8"-EG and 17-6"-EG (D.P.120) (iii) Install reinforced fabricated tee at intersection of lines a) 19-6"-EG and 78-4"-EG (D.P.193) b) 17-6"-EG and 78-4"-EG (D.P.250)
20-10"-EG 18-10"-EG 18-6"-EG 20-6"-EG 79-4"-EG 15-4"-EG 15-8"-EG 15-6"-EGX 13-12"-EGX	334881-0 (MS-03 Cont'd)	124.30	36.0	0.29	187.2	2.27		X	X		(i) Change the following existing rod hangers to strut a) 2-R-RH-18-5 (D.P.45) b) 6-18-RH-7 (D.P.60) c) 6-18-RH-9 (D.P.80) d) (D.P.225) e) (D.P.260) f) 6-15-RW-2 (D.P.297) g) 6-15-RH-1 (D.P.416) (ii) Install vertical restraint @ node point 445 - new support

TABLE 5.11-1. LARGE PIPING RESULTS FOR MAIN STEAM

Line No.	Isometric	Max. Stress (KSI) (a)	Reevaluation Criteria 2.4 S_h KSI (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
	(MS-03)										(iii) Change existing support 6-15-PS-3 (D.P.391) to XY, XZ rigid and add snubber in N-S direction (iv) Change existing support 6-15-PS-4 (D.P.321) into XY and add anubber in N-S direction (v) Replace stub-in into welding tee (10"x6") at node point 90 line no. 20-10"-EG and 20-6"-EG (vi) Replace stub-in into reinforced fabricated tee at node points 140 & 190 Line No. 20-6"-EG, 79-4"-EG } Data Point 190 Line No. 18-6"-EG, 79-4"-EG } Data Point 140

TABLE 5.[illegible]2. SUPPORT RESULTS FOR MAIN STEAM

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
1-24"-EG	334531-2	2-SH-1-5	C	Connec-tion	13.45K/ Bolt	17.7K/ Bolt	1.32			X		X		
1-24"-EG	334531-2	2-SW-1-11	J							X		X		By comparison to 2-SW-1-10
1-24"-EG	334531-2	2-SW-1-10	C	W10x21	F_b = 101.99KSI	32.4KSI	.31	172.6KSI	1.69		X	X		Provide brace
1-24"-EG	334531-2	2-SH-1-4	J							X		X		By comparison to 2-SH-1-5
1-24"-EG	334531-2	2-SW-1-8	J							X		X		By comparison to 2-SW-1-10
1-24"-EG	334531-2	2-SW-1-9	J							X		X		By comparison to 2-SW-1-10
1-24"-EG	334531-2	2-SH-1-3	J							X		X		Small loads
1-24"-EG	334531-2	2-SW-1-5	C	Snubber	99.54	30.8KIPS	.31	154KIPS	1.55		X	X		As per catalog
1-24"-EG	334530-3	2-S-SH-1-2	J							X		X		By comparison to 2-SH-1-5
1-24"-EG	334530-3	2-S-SW-1-3	J							X		X		By comparison to 2-SW-1-10
1-24"-EG	334530-3	2-S-SW-1-4	C	Anchor Bolt Inter-action	.89	1.0	1.12			X		X		
1-24"-EG	334530-3	1-S-SW-1-2	C	Anchor Bolt Inter-action	3.37	1.0	.30	12.0	3.56		X	X		Provide add'l PL & conc. fastr.
1-24"-EG	334530-3	1-SH-1-1	C	Weld	10.35KSI	19.2KSI	1.86			X		X		

(1) ADLPIPE Node No.

TABLE 5.11-2. SUPPORT RESULTS FOR MAIN STEAM

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
7-24"-EG	334530-3	1-K-KB-7-4	C	Pullout on Anch. Bolts	4.15K/ Bolt	2.2K/ Bolt	.53	26.4K/ Bolt	6.36		X	X		Install brace in Y-dir
7-24"-EG	334530-3	1-S-SW-7-6	C	Anchor Bolt Inter-action	2.6	1.0	.38	12.0	4.6		X	X		Provide add'l PL & conc. fast.
7-24"-EG	334530-3	1-S-SW-7-5	C	Anchor Bolt Inter-action	3.6	1.0	.28	12.0	3.33		X	X		Provide add'l PL & conc. fast.
7-24"-EG	334530-3	1-S-SW-7-4	C	Anchor Bolt Inter-action	.89	1.0	1.12			X		X		
7-24"-EG	334530-3	1-K-KB-7-3	C	Pullout on Anch. Bolts	3.53K/ Bolt	2.2K/Bolt	.62	26.4K/ Bolt	7.48		X	X		Install brace in Y-dir.
7-24"-EG	334530-3	1-K-KB-7-2	C	Pullout on Anch. Bolts	2.96K/ Bolt	2.2K/Bolt	.74	26.4K/ Bolt	8.9		X	X		Install brace in Y-dir.
7-24"-EG	334530-3	1-S-SW-7-3	C	Anchor Bolt Inter-action	2.0	1.0	.5	12.0	6.0		X	X		Provide add'l PL & conc. fast.
7-24"-EG	334530-3	1-S-SW-7-2	C	Anchor Bolt Inter-action	1.47	1.0	.68	12.0	8.16		X	X		Provide add'l PL & conc. fast.
7-24"-EG	334530-3	1-K-KB-7-1	C	Pullout on Anch. Bolts	6.1K/ Bolt	2.2K/Bolt	.36	26.4K/ Bolt	4.33		X	X		Install brace in Y-dir.

(1) ADLPIPE Node No.

TABLE 5.1-2. SUPPORT RESULTS FOR MAIN STEAM

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
7-24"-EG	334530-3	1-S-SW-7-1	C	Anch. Bolt Inter-action	1.75	1.0	.57	12.0	6.9		X	X		Provide add'l PL & conc. fast.
6-24"-EG	334530-3	1-KBG-6,7-1	C	Pullout on Anch. Bolts	28.66K/ Bolt	2.2K/Bolt	.08	26.4K/ Bolt	0.92		X		X	Additional brace in Y-dir. req'd.
6-24"-EG	334530-3	1-S-SW-6,7-1	C	Anch. Bolts Inter-action	1.9	1.0	.53	12.0	6.31		X	X		Provide add'l PL & conc. fast.
6-24"-EG	334530-3	1-K-KB-6-1	C	Pullout on Anch. Bolts	5.02K/ Bolt	2.2K/Bolt	.44	26.4	11.66		X	X		Install brace in Y-dir.
6-24"-EG	334530-3	1-S-SW-6-1	C	Anch. Bolts Inter-action	1.5	1.0	.66	12.0	8.0		X	X		Provide add'l PL & conc. fast.
6-24"-EG	334530-3	1-K-KB-6-2	C	Pullout on Anch. Bolts	3.03K/ Bolt	2.2K/Bolt	.73	26.4K/ Bolt	8.7		X	X		Install brace in Y-dir.
6-24"-EG	334530-3	1-S-SW-6-2	C	Anchor Bolts Inter-action	1.4	1.0	.71	12.0	8.6		X	X		Provide add'l PL & conc. fast.
6-24"-EG	334530-3	1-S-SW-6-3	C	Anchor Bolts Inter-action	2.0	1.0	.5	12.0	6.0		X	X		Provide add'l PL & conc. fast.
6-24"-EG	334530-3	1-K-KB-6-3	C	Pullout on Anch. Bolts	3.47K/ Bolt	2.2K/Bolt	.63	26.4K/ Bolt	7.6		X	X		Install brace in Y-dir.

(1) ADLPIPE Node No.

TABLE 5.11-2. SUPPORT RESULTS FOR MAIN STEAM

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
6-24"-EG	334530-3	1-S-SW-6-4	C	Anch. Bolts Inter-action	.89	1.0	1.12			X		X		
6-24"-EG	334530-3	1-K-KB-6-4	C	Pullout on Anch. Bolts	4.12K/ Bolt	2.2K/Bolt	.53	26.4K/ Bolt	6.4		X	X		Install brace in Y-direction
6-24"-EG	334530-3	1-S-SW-6-5	C	Anch. Bolts Inter-action	3.7	1.0	.27	12.0	3.24		X	X		Provide add'l PL & conc. fast.
6-24"-EG	334530-3	1-S-SW-6-6	C	Anch. Bolts Inter-action	2.6	1.0	.38	12.0	4.56		X	X		Provide add'l PL & conc. fast.
2-24"-EG	334530-3	1-S-SH-2-1	C	Weld	10.35KSI	19.2KSI	1.86			X		X		
2-24"-EG	334530-3	1-S-SW-2-1	C	Anchor Bolts Inter-action	1.7	1.0	0.59	12.0	7.06		X	X		Provide add'l PL & conc. fast.
2-24"-EG	334530-3	1-S-SW-2-2	C	Anchor Bolts Inter-action	.86	1.0	1.16			X		X		
2-24"-EG	334530-3	1-S-SW-2-4	J							X		X		By comparison to 2-SW-1-10
2-24"-EG	334530-3	1-S-SW-2-3	C		2.6	1.0	.38	12.0	4.6		X	X		Provide add'l PL & conc. fast.
2-24"-EG	334530-3	1-SH-2-2	J							X		X		By comparison to 2-SH-1-5
2-24"-EG	334530-3	2-SW-2-5	C	Snubber	99.41K	30.8K	.31	154K	1.55		X	X		As per catalog

(1) ADLPIPE Node No.

TABLE 5.11-2. SUPPORT RESULTS FOR MAIN STEAM

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
2-24"-EG	334530-3	2-SH-2-3	J							X		X		Small loads
2-24"-EG	334530-3	2-SH-2-4	J							X		X		By comparison to 2-SH-1-5
2-24"-EG	334530-3	2-SW-2-9	J							X		X		By comparison to 2-SW-1-10
2-24"-EG	334530-3	2-SW-2-8	J							X		X		By comparison to 2-SW-1-10
2-24"-EG	334530-3	2-SH-2-5	C	Connec-tion capacity	13.15K/ Bolt	17.7K/ Bolt	1.35			X		X		
2-24"-EG	334530-3	2-SW-2-11	J							X		X		By comparison to 2-SW-1-10
2-24"-EG	334530-3	2-SW-2-10	C	W10x21	F_b = 101.99KSI	32.4KSI	.31	172.6KSI	1.69		X	X		Install brace
4-20"-EG	334532-2	1-S-SW-4-1	C	Anchor Bolt Inter-action	.56	1.0	1.78			X		X		
5-20"-EG	334533-2	1-S-SW-5-1	C	Anchor Bolt Inter-action	.29	1.0	3.45			X		X		
3-20"-EG	334532-2	1-S-SW-3-1	C	Anchor Bolt Inter-action	.56	1.0	1.78			X		X		
51-24"-EG		350	C	Weld	16.8KSI	19.2KSI	1.14			X		X		

(1) ADLPIPE Node No.

TABLE 5.1-2. SUPPORT RESULTS FOR MAIN STEAM

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
51-24"-EG		2-S-51-SW-1	C	Anch. Bolt Inter-action	2.2	1.0	.45	12.0	5.45		X	X		Provide add'l PL & conc. fast.
51-24"-EG		360	C	Weld	16.8KSI	19.2KSI	1.14			X		X		
51-24"-EG		2-S-51-SW-2	C	Anchor Bolt Inter-action	2.0	1.0	.5	12	6.0		X	X		Provide add'l PL & conc. fast.
50-24"-EG		2-S-50-SW-2	C	Anch. Bolts Inter-action	1.95	1.0	0.51	12.0	6.15		X	X		Provide add'l PL & conc. fast.
50-24"-EG		395	C	Weld	16.8KSI	19.2KSI	1.14			X		X		
50-24"-EG		400	C	Weld	16.8KSI	19.2KSI	1.14			X		X		
50-24"-EG		405	C	Weld	16.8KSI	19.2KSI	1.14			X		X		
51-24"-EG		355	C	Weld	16.8KSI	19.2KSI	1.14			X		X		
1-24"-EG	33530-3	115	C	Anch. Bolts Inter-action	1.61	1.0	0.60	12.0	7.2		X	X		Provide add'l PL & conc. fast.
50-24"-EG	(MS-01)	400	C	Anch. Bolts Inter-action	2.2	1.0	0.45	12.0	5.45		X	X		Provide add'l PL & conc. fast.

(1) ADLPIPE Node No.

TABLE 5.11-2. SUPPORT RESULTS FOR MAIN STEAM

Line No.	Isometric	Support No. or Data Point(1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
17-8"-EG	334890	2-S-SW-17-1	J							X		X		Small loads
17-8"-EG	334890	2-S-SW-17-2	J							X		X		Small loads
17-8"-EG	334890	2-S-SH-17-3	J							X		X		Small loads
17-8"-EG	334890	2-S-SW-17-4	J							X		X		Small loads
17-8"-EG	334890	2-R-RH-17-5	J							X		X		Small loads
17-8"-EG	334890	5-17-SW-6	J							X		X		Small loads
17-8"-EG	334890	5-17-RH-7	J							X		X		Small loads
17-8"-EG	334890	5-17-SW-9	J							X		X		Small loads
17-8"-EG	334890	5-17-RH-8	J							X		X		Small loads
19-6"-EG	334890	5-17-SH-11	J							X		X		Small loads
19-6"-EG	334890	5-17-SH-10	J							X		X		Small loads
78-4"-EG	334890 (MS-02)	290 ①	J							X		X		Small loads
20-10"-EG	334881	20	J							X		X		As per catalog (SN)
20-10"-EG	334881	25	J							X		X		As per catalog (SN)
20-10"-EG	334881	35	J							X		X		As per catalog (SP)
20-10"-EG	334881	40	J							X		X		As per catalog (SN)
20-10"-EG	334881	45	C	Rod3/4"0	11.91KIPS	5.1K	.43	20.4KIPS	1.71		X	X		Replace rod hgr
20-10"-EG	334881	50	J							X		X		As per catalog (SN)
20-10"-EG	334881	60	C	Rod7/8"0	6.53KIPS	7.1KIPS	1.09	-	-	X		X		As per catalog (R)
20-10"-EG	334881	65	J							X		X		As per catalog (SN)
20-10"-EG	334881	80	C	Rod7/8"0	8.47K	7.1KIPS	.84	28.4KIPS	3.35		X	X		Replace rod hgr

(1) ADLPIPE Node No.

TABLE 5.11-2. SUPPORT RESULTS FOR MAIN STEAM

Line No.	Isometric	Support No. or Data Point (1)	Calc. or Judge-ment	Critical Section	Section Stress (KSI) (a)	Reevalu-ation Criteria (KSI) (b)	Reevalu-ation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (c/a)	Meets Reevalu-ation Criteria		Meets Reevalu-ation Criteria		Remarks
										Yes	No	Yes	No	
18-16"-EG	334881	115	J							X		X		Small load (R)
18-6"-EG	334881	167	J							X		X		Small load (R)
79-4"-EG	334881	225	J							X		X		Small load (R)
15-18"-EG	334881	260	J	Rod7/8"0	18.04KIPS	7.1KIPS	.39	28.4KIPS	1.57	X		X		As per catalog
15-4"-EG	334881	285	C	W24x68	F_b = 19.79KSI	32.4KSI	1.64			X		X		
15-4"-EG	334881	291	J							X		X		As per catalog
15-4"-EG	334881	297	C	Rod3/4"0	5.81K	5.1K	.88	20.4K	3.51		X	X		As per catalog
15-4"-EG	334881	321	C	PL3/4x 4x0'- 11-1/2"	F_b = 19.55KSI	32.4KSI	1.66			X		X		
15-6"-EG	334881	391	C	PL3/4x 4x0'- 11-1/2"	F_b = 181KSI	32.4KSI	0.2	172.8KSI	1.07		X	X		Reinforce PL
15-6"-EGX	334881	416	J	Rod3/4"0	13.3K	5.1K	.38	20.4K	1.53		X	X		As per catalog
13-12"-EGX	334881 (MS-03)	440	J							X		X		Small load

(1) ADLPIPE Node No.

TABLE 5.11-3. SMALL PIPING RESULTS FOR STEAM SYSTEM

Line No.	Isometric	Max. Stress (KSI) (a)	Reeval-uation Criteria 2.4 S_h KSI (b)	Reeval-uation Criteria Margin (b/a)	Integrity Criteria (KSI) (c)	Integrity Criteria Margin (C/a)	Meets Reeval-uation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
10-1-EG 10-1-1/2-EG 11-1-EG	Doc. #310-20 Sketch 13	443	36.	0.08	187.2	0.42		X	-	-	② N-S, E-W, and vert. restraints should be provided throughout the scope of these lines on an average seismic span of approximately 8 ft.

TABLE 5.12-1. VALVE EVALUATION SUMMARY

Line No.	Isometric	Max. Acce. G (a)	Reeval-uation Criteria G (b)	Reeval-uation Criteria Margin (b/a)	Integrity Criteria G (c)	Integrity Criteria Margin (C/a)	Meets Reeval-uation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
											Valve Identification
15-4"-EG	MS-03	7.65	4.56	.60	23.71	3.10		X	X		CV3
15-4"-EG	MS-03	6.50	4.56	.70	23.71	3.65		X	X		CV4
721-10"-HP	334763-0	2.98	1.87	.63	9.72	3.26		X	X		CV20
65-10"-HH	568589.3	2.85	1.87	.66	9.72	3.41		X	X		CV76
64-10"-HH	568589.3	2.85	1.87	.66	9.72	3.41		X	X		CV77
63-10"-HH	568589-3	2.85	1.87	.66	9.72	3.41		X	X		CV78
62-10"-HH	568589-3	2.85	1.87	.66	9.72	3.41		X	X		CV79
18-6"-EG	334881-0	1.52	2.34	1.54	12.17	8.01	X		X		CV124
20-6"-EG	334881-0	1.48	2.34	1.58	12.17	8.22	X		X		CV125
17-6"-EG	334890-0	2.21	2.34	1.06	12.17	5.51	X		X		CV126
19-6"-EG	334890-0	2.52	2.34	.93	12.17	4.83		X	X		CV127
10-1-1/2"-EG	334890-0	7.10	4.80	.68	24.96	3.52		X	X		CV145
2067-2"-2501	334476-3	10.3	3.28	.32	17.06	1.66		X	X		CV202
2071-2"-2501	334476-3	10.3	3.28	.32	17.06	1.66		X	X		CV203
2068-2"-2501	334476-3	10.3	3.28	.32	17.06	1.66		X	X		CV204
2007-3/4"-2501	334459-2	7.4	6.90	.93	35.88	4.85		X	X		CV276
5014-3/4"-2501	334509-1	2.2	3.86	1.75	20.07	9.12	X		X		CV287
2104-2"-151	334624-0		3.39		17.63						CV291

TABLE 5.12-1. VALVE EVALUATION SUMMARY

Line No.	Isometric	Max. Acce. G (a)	Reevaluation Criteria G (b)	Reevaluation Criteria Margin (b/a)	Integrity Criteria G (c)	Integrity Criteria Margin (C/a)	Meets Reevaluation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
											Valve Identification
2081-2"-2501	334481-3	2.2	3.28	1.49	17.06	7.75	X		X		CV304
2080-2"-2501	334480-3	6.1	3.28	.54	17.06	2.80		X	X		CV305
2102-1"-601	334486-2	2.9	5.38	1.86	27.98	9.65	X		X		CV412
2073-1"-601	456419	3.4	5.38	1.56	27.98	8.23	X		X		CV413
5025-3"-2501	334597-2	4.87	3.28	.67	17.06	3.50		X	X		PCV430C
5011-3"-2501	334597-2	4.84	3.28	.68	17.06	3.52		X	X		PCV430H
5034-2"-2501	334514-3	10.17	2.34	.23	12.17	1.20		X	X		CV530
5035-2"-2501	334514-3	3.08	2.34	.76	12.17	3.95		X	X		CV531
5034-2"-2501	334514-3	5.57	3.28	.59	17.06	3.06		X	X		CV545
5035-2"-2501	334514-3	6.93	3.28	.47	17.06	2.46		X	X		CV546
3033-8"-152	714452-1	3.15	1.87	.59	9.72	3.09		X	X		TCV601A
3029-8"-152	714450-1	3.69	1.87	.51	9.72	2.63		X	X		TCV602B
3097-1"-152	334502-1	1.40	6.90	4.93	35.88	25.63	X		X		RCV605
3079-1-1-1/2"-152	334496-2	2.14	2.46	1.15	12.79	5.98	X		X		CV722A
3076-1-1/2"-152	334494-2	1.76	2.46	1.40	12.79	7.27	X		X		CV722B

TABLE 5.12-1. VALVE EVALUATION SUMMARY

Line No.	Isometric	Max. Acce. G (a)	Reeval-uation Criteria G (b)	Reeval-uation Criteria Margin (b/a)	Integrity Criteria G (c)	Integrity Criteria Margin (C/a)	Meets Reeval-uation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
											Valve Identification
3082-1-1/2"-152	334499-1	1.37	2.46	1.80	12.79	9.34	X		X		CV722 C
2002-2"-2502	334455	1.4	2.46	1.75	12.79	9.14	X		X		FCV1112
5008-2"-2501	334481-3	5.0	1.99	.40	10.35	2.07		X	X		LCV1112
2005-2"-2502	711493-2	4.0	1.40	.35	7.28	1.82		X	X		FCV1115A
2008-2"-2502	714504-2	4.3	1.40	.33	7.28	1.69		X	X		FCV1115B
2011-2"-2502	714497-2	5.0	1.40	.28	7.28	1.46		X	X		FCV1115C
2006-2"-2502	334614-0	6.1	2.34	.38	12.17	2.0		X	X		FCV1115D
2009-2"-2502 2502	334614-0	7.3	2.34	.32	12.17	1.67		X	X		FCV1115E
2012-2"-2502	334614-0	7.3	2.34	.32	12.17	1.67		X	X		FCV1115F
2014-2"-151	334472-1	11.0	1.99	.18	10.35	0.94		X		X	PCV115A
2018-2"-151	334471-1	8.8	1.99	.23	10.35	1.18		X	X		FCV1115B
2020-2"-151	334470-1	6.5	1.99	.31	10.35	1.59		X	X		PCV1115C
17-6"-EG	334890-0	3.149	3.8	1.21	13.3	13.15	X		X		MOV 14
19-6"-EG	334890-0	3.638	3.8	1.04	13.3	3.65	X		X		MOV 15
18-6"-EG	334881-0	2.223	3.8	1.71	13.3	5.99	X		X		MOV 16
20-6"-EG	334881-0	2.422	3.8	1.57	13.3	5.5	X		X		MOV 17
2005-4"-2052	334535-0	2.0	1.2	.60				X	X		MOV 18

TABLE 5.12-1. VALVE EVALUATION SUMMARY

Line No.	Isometric	Max. Acce. G (a)	Reeval-uation Criteria G (b)	Reeval-uation Criteria Margin (b/a)	Integrity Criteria G (c)	Integrity Criteria Margin (C/a)	Meets Reeval-uation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
											Valve Identification
2106-4"-2502	334535-0	1.9	1.2	.63	3.5	1.84		X	X		MOV 19
2090-2"-2502	334483-2	9.4	2.4	.26	8.3	.88		X		X	MOV 356
2091-2"-2502	334484-3	6.7	2.4	.36	8.3	1.24		X	X		MOV 357
2092-2"-2502	334485-2	7.3	2.4	.33	8.3	1.14		X	X		MOV 358
3057-10"-152	334599-1	0.125	8.6	68.8	29.9	23.9	X		X		MOV 720B
5002-8"-2501	334579-3	2.50	2.9	1.16	10.1	4.04	X		X		MOV 813
5002-8"-2501	334579-3	2.60	2.9	1.12	10.1	3.88	X		X		MOV 814
3015-6"-601	334578-1	1.283	4.5	3.52	15.5	12.11	X		X		MOV 822A
3019-6"-601	334578-1	1.009	4.5	4.46	15.5	15.35	X		X		MOV 822B
3001-6"-2501 2501	334579-3	1.24	3.8	3.06	13.3	10.73	X		X		MOV 833
3001-6"-2501	334579-3	1.33	3.8	2.86	13.3	10.00	X		X		MOV 834
6015-4"-151	334734-0	1.00	5.0	5.00	17.5	17.5	X		X		MOV 1100B
2000-4"-151	334629-0		5.0		17.5						MOV 1100C
6015-4"-151	334734-0	1.00	5.0	5.00	17.5	17.5	X		X		MOV 1100D

TABLE 5.12-1. VALVE EVALUATION SUMMARY

Line No.	Isometric	Max. Acce. G (a)	Reeval-uation Criteria G (b)	Reeval-uation Criteria Margin (b/a)	Integrity Criteria G (c)	Integrity Criteria Margin (C/a)	Meets Reeval-uation Criteria		Meets Integrity Criteria		Remarks
							Yes	No	Yes	No	
											Valve Identification
721-10"-HP	334762-0	3.26	1.29	.40	6.71	2.06		X	X		CV-19
734-6"-HM2	334735-1	1.04	1.17	1.13	6.08	5.85	X		X		CV-82
765-4"-HM2	334737-0	3.79	1.8	0.475	9.36	2.47		X	X		CV-92
8020-6"-HM2	334735-1	.50	1.17	2.34	6.08	12.17	X		X		CV-114
3001-6"-2501	334579-3	3.10	1.87	.60	9.72	3.14		X	X		HCV-602