COMANCHE PEAK DESIGN ADEQUACY PROGRAM
ENGINEERING EVALUATION COVER SHEET

TITLE Review of Calc. GENX-042 EVALUATION ID.NO.DAP-E P - 057

NO. OF SHTS. 5

DAP DISCIPLINE: Piping and Supports DAP ACTION PLAN NO. IX

SUPPORTING ENGINEERING EVALUATIONS:

CONT.ID.NO. DAP-E- ___ - ___ TITLE: _____
DAP-E- ___ - ___ TITLE: _____
DAP-E- ___ - ___ TITLE: _____
DAP-E- ___ - ___ TITLE: _____

SUPERSEDES ENGINEERING EVALUATION NO. DAP-E- ___ - ___

PURPOSE: Evaluate and document the DAP review Stone and Webster's calculation No. 15454-NZ(c)-GENX-042, titled Justification of the Design Load for Strut/Snubbers and Lugs Used in Conjunction with Riser Clamp.

SCOPE: Review of calculation No. 15454-NZ(c)-GENX-042

CONTENTS (SEE SECTION 4.0, DAP-8)

REV.NO.	REVISION ORIGINATOR	DATE	REVIEWED BY	DATE	APPROVED BY	DATE
0	VH Ramamurthy	2/10/87	[signature]	7/13/87	[signature]	7/15/87

1.0 ABSTRACT

The purpose of SWEC calculation 15454-NZ(c)-GENX-042 is to provide a technical basis for design load distribution between two parallel struts/snubbers used in conjunction with riser clamps. It also determines the design load for shear lugs used in the above configurations. It provides a basis for the modeling of eccentric supports. This engineering evaluation has determined that the SWEC calculation meets the third party acceptance criteria, and the conclusions of the calculation are correctly incorporated into SWEC procedure CPPP-7.

2.0 REVIEW PROCESS

2.1 Scope: The entire calculation was reviewed.

2.2 The calculation was reviewed for methodology and an independent numerical check was performed to verify the results.

2.3 Acceptance Criteria are defined in Section 4.0. The calculation was evaluated against these criteria.

2.4 SWEC procedure CPPP-7, Rev. 2 (Reference 3.2) was reviewed to verify accurate implementation of the results of this calculation.

2.5 The conclusions are presented in Section 6.0

3.0 REFERENCE DOCUMENTATION

3.1 SWEC Calculation 15454-NZ(C)-GENX-042 titled, "Justification of the Design Load for Strut/Snubbers and Lugs Used in Conjunction with Riser Clamp," Rev. 1.

3.2 SWEC Project Procedure; Design Criteria for Pipe Stress and Pipe Supports, CPPP-7, Rev. 2

3.3 Additional references specific to the calculation are identified on page five of Reference Calculation 15454-NZ(c)-GENX-042.

4.0 ACCEPTANCE CRITERIA

4.1 Dual strut/snubbers are designed with sufficient capacity to compensate for uneven loading conditions.

4.2 Local stresses are calculated based on the assumption that the total load is restrained by no more than half the total number of lugs in conformance with standard industry practice.

5.0 EVALUATION

5.1 The calculation was reviewed for methodology and an independent numerical check was performed to verify the results.

5.1.1 The calculation provides technical justification for load distribution between dual strut/snubber supports using riser clamps. The design load for each strut/snubber is to be based on 75 percent of total design load. The design basis of 75 percent is developed from a geometric model, which assumes only one pair of lugs makes contact with the clamp. A load distribution is calculated using simple statics. The resulting distribution (75:25) is conservative in that no credit is taken for the other lugs or for the "moment connection" between the clamp and pipe. The calculation does not consider the effects of differential snubber lock-up; however, given the conservatism noted above, the design basis of 75% of total load is considered reasonable.

5.1.2 The design load for lugs used in conjunction with a riser clamp and dual strut/snubber assembly is to be based on each of the four lugs carrying half the total load. This approach is considered acceptable as it is in conformance with standard industry practice.

5.1.3 It should be noted that the static equilibrium formulas are based on a specific "standard" configuration. If the as-built configurations differ from this "standard" configuration, the assumptions for load distribution should be changed accordingly.

5.2 The calculation develops a criterion for evaluation of dual strut/snubber supports based on stiffness. For configurations where both sides are less than minimum stiffness (Km) and are not similar, one strut/snubber is physically removed and the support is modeled as an eccentric translational restraint. This is considered acceptable as the support has only one effective strut/snubber and the normal represents the analytical model.

5.3 The calculation develops criteria for modeling of eccentric supports in piping analyses where the support eccentricity is due to removal of one strut/snubber following a stiffness evaluation - as noted in 5.2 above. For eccentric supports, the design load for each component support is to be the total design load. The design load for each lug is given by a formula developed in the calculation based on static equilibrium and rotational stability. This formula is considered acceptable as it is based on fundamental principles of statics. (Note that on page 20, numerical errors appear in the formulation of the problem. These errors arise from transcription and do not affect calculation results.)

5.4 SWEC procedure CPPP-7, Rev. 2 (Reference 3.2) was reviewed to verify accurate implementation of the results of this calculation. Sections 3.10.6.2, 3.10.6.7 and Attachment 3-11 give guidelines for modeling support eccentricities in piping analysis. Section 3.10.8 and Attachment 4-18 give guidelines for assessing pipe support stiffness.

Attachment 4-8 implements calculation results. Table 4A and 4B of Attachment 4-8 list maximum allowable stiffness ratios between support structures. Section 2.1 of Attachment 4-8 gives criteria to determine design loads for lugs used in conjunction with riser clamps.

6.0 CONCLUSIONS

6.1 SWEC calculation 15454-NZ(c)-GENX-042 meets the acceptance criteria, SWEC procedure CPPP-7, Rev. 2 provides proper implementation of this calculation.

7.0 ATTACHMENTS

None.